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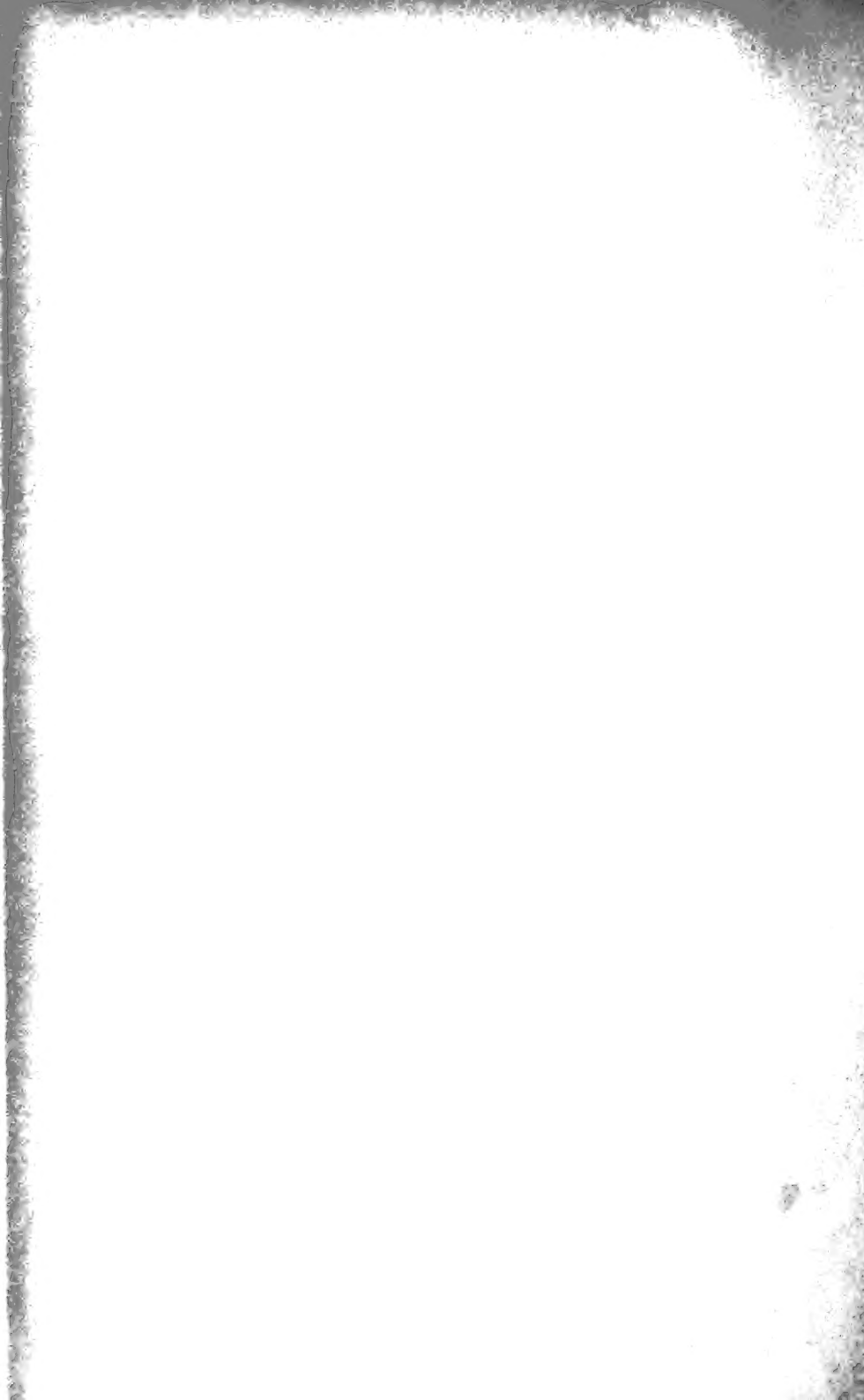


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JOURNAL
OF THE
**American Veterinary Medical
Association**

FORMERLY
AMERICAN VETERINARY REVIEW

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Edited and Published for

THE AMERICAN VETERINARY MEDICAL ASSOCIATION

By

J. R. MOHLER, WASHINGTON, D. C.

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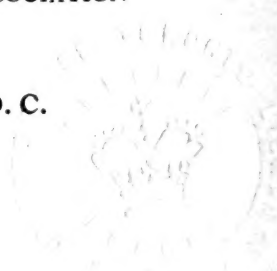
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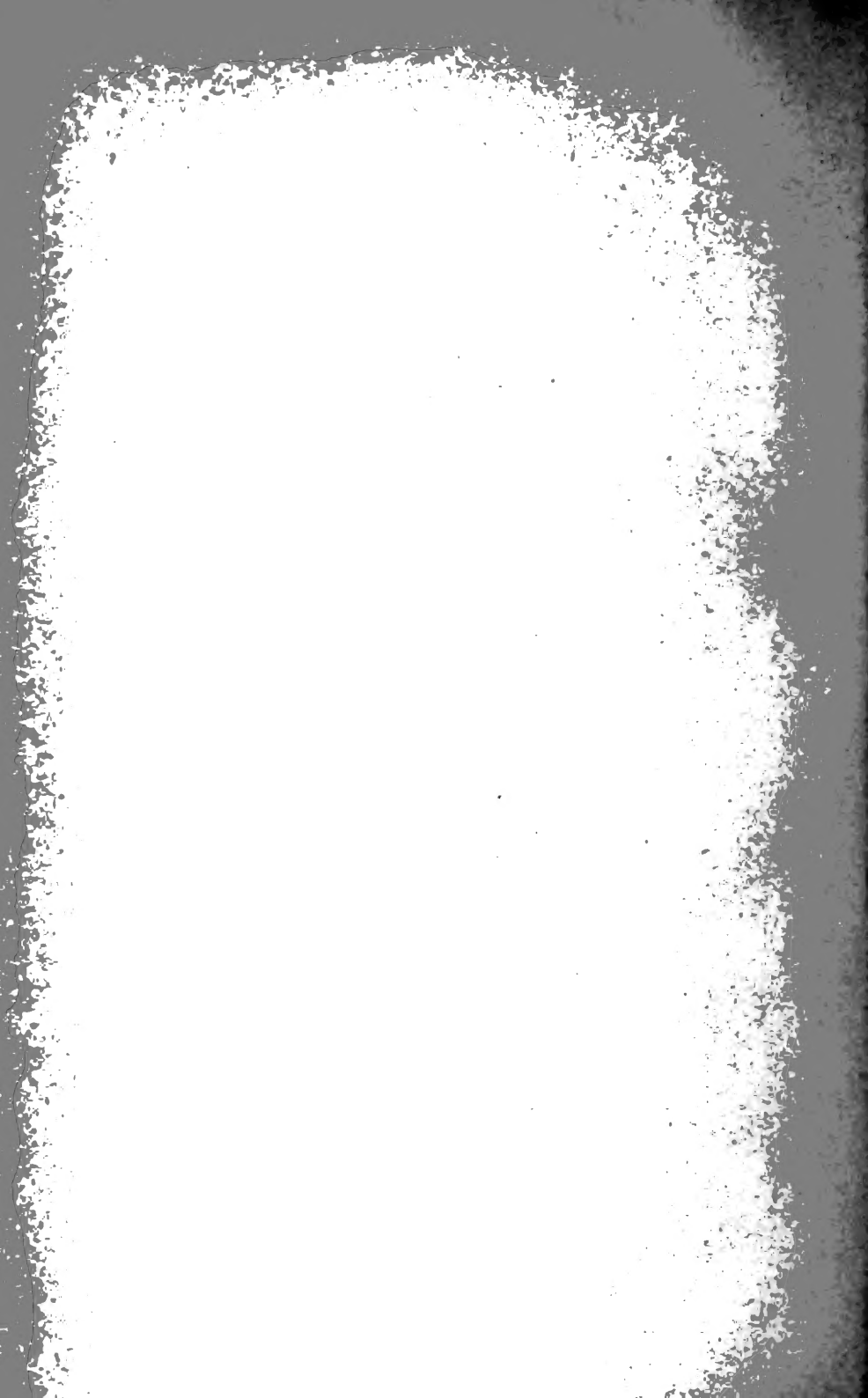
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OCTOBER, 1920

No. 1

OUR NEWLY ELECTED PRESIDENT

DR. DAVID S. WHITE, the newly elected President of the American Veterinary Medical Association, is known personally to many readers of the JOURNAL. His father was from Louisiana and his mother was a Northern woman. "Dave," as he is best known to his friends, is the product of a happy blending of admirable qualities that characterize the people of these two sections of the country. He was born on September 28, 1869, at West New Brighton, Staten Island, New York. He received his early education in private schools on Staten Island and in the public schools of New York City. In 1886 he took up a general course of study at the Ohio State University but transferred to the Veterinary Department of that institution in 1888 and was graduated in June, 1890.

Throughout his course of study at the Ohio State University, Dr. White showed marked ability as a student and it was fortunate for veterinary education in this country that he was able to satisfy his ambition to become an educator. With this object in view, he sailed for Europe in September, 1890, to continue his studies in veterinary medicine under the most eminent teachers in the profes-



PRESIDENT DAVID S. WHITE

son. His first year abroad was spent at Hanover, Germany, attending lectures under Babe in pathology and under Lustig in the clinics for large animals. In September, 1891, he went to Berlin and took up scientific work under Schutz, Dieckerhoff, Möller and Fröhner. While at the University of Berlin he also studied in Virchow's laboratory under Israel and in Koch's laboratory under

Günther. From Berlin he went to Vienna, where he studied surgery and ophthalmology under Bayer and attended clinics for large animals under Schindelka. In the latter part of 1892 he entered the veterinary school in Dresden to study pathogenic bacteriology and pathology under Johnie and at the same time he took Lungwitz's course in horseshoeing and attended Siedamgrotski's clinics.

On his return to the United States in 1893, Dr. White was appointed Assistant in Veterinary Medicine in the Ohio State University. When the university was reorganized in 1895, he was appointed Dean of the Veterinary College and has held the position continuously since that time. In June, 1896, Dr. White was married to Nellie E. Smith of Marietta, Ohio. One daughter, now married, was born to them.

In July, 1917, Dr. White was appointed a member of the Veterinary Advisory Board to the Surgeon General of the Army. On October 4, 1917, he was commissioned major in the Veterinary Corps of the National Army and placed in charge of veterinary supplies and equipment with headquarters at Washington, D. C. On July 10, 1918, he was promoted to the rank of lieutenant colonel and ordered overseas. On August 29, 1918, he was made Chief Veterinarian of the American Expeditionary Force in France. While serving in this capacity, Lieutenant Colonel White succeeded in having the Veterinary Corps transferred from the Quartermaster Corps, under which it was operating in France, to the Medical Department. The reorganization of the service in France was in conformity with the veterinary organization in effect in the United States. On October 23, 1918, Lieutenant Colonel White was promoted to the rank of Colonel and soon after was ordered to England on business in connection with the veterinary service. During his stay in England he was the guest of the Royal Army Veterinary Corps. On February 11, 1919, Colonel White received at Camp Dix, New Jersey, an honorable discharge from the service and returned to the Ohio State Veterinary College to resume his duties as Dean, and again became known to his students and friends as Dr. White.

Colonel White was among those who acquired distinction for meritorious service in the war with Germany. From France he received the decoration "Officier de la Legion d'Honneur," from England the "Commander of St. Michael and St. George," and he was made an Honorary Associate of the Royal College of Veterinary Surgeons (London). Colonel White values highly these marks of

distinction, but he prizes most highly of all the honor of being the first veterinarian in the United States Army to be raised to the rank of Colonel.

Dr. White has not confined his activities to the class room. In addition to raising the Ohio Veterinary College to one of the highest in rank among the veterinary colleges of this country, he has acquired an enviable reputation as a fluent speaker and an able writer. He is the author of a text-book entitled "The Principles and Practice of Veterinary Medicine" and in conjunction with Dr. Paul Fischer translated Malkmus's "Veterinary Diagnostics."

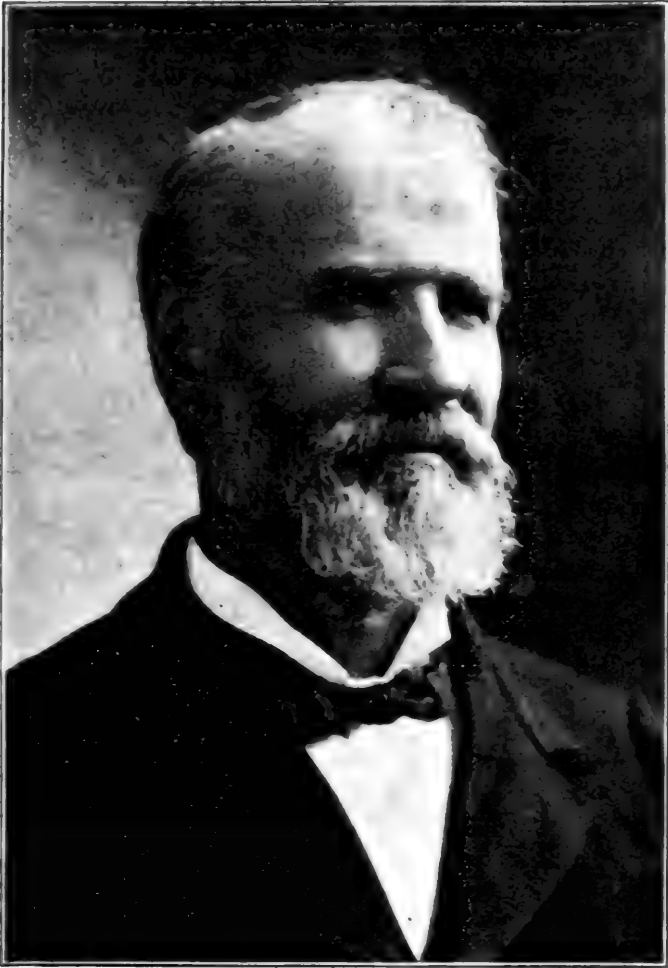
Dr. White has always been an ardent exponent of higher veterinary education in this country. As an educator, the value of his wise teaching is reflected in benefits to the livestock industry in practically every State in the Union through the graduates of his college who are following successfully the practice of their profession. It is gratifying that the American Veterinary Medical Association has chosen such an able man as its President, and the JOURNAL wishes him a successful administration.

THE PASSING OF A GRAND OLD MAN

JAMES WILSON, former Secretary of Agriculture, who passed away August 26 at his home in Iowa at the ripe age of eighty-five years, leaves behind him the record of a long life of useful service to agriculture, to the nation and to his fellow man.

Born in Scotland in 1835, he came to America with his parents when he was sixteen years old, and a few years later settled in Iowa and engaged in farming. From the beginning he was a farmer of the progressive type, recognizing the importance of purebred stock and good methods of feeding. He soon became a leader in his community and was elected to the State legislature. Later he served three terms in Congress, beginning in 1873. During part of that period he was a regent of Iowa University. From 1890 to 1897 he served as Professor of Agriculture in the Iowa State College and as Director of the Experiment Station.

Mr. Wilson's most notable service was as Secretary of Agriculture from 1897 to 1913 under Presidents McKinley, Roosevelt and Taft. His occupancy of that position for sixteen years established a record for the greatest length of service of a cabinet officer. His administration of the Federal Department of Agriculture was marked by great development and progress. On entering the Department he found a force of 2,144 employees, and he left it with nearly 14,000.



JAMES WILSON

Former Secretary of Agriculture, who died August 26, 1920

Combining a practical knowledge of agriculture with an appreciation of science, he encouraged scientific research and knew how to make the results available in practice. Among the important developments which featured his administration were the importation of useful plants such as alfalfa and durum wheat, the development of the beet-sugar industry, undertaking the control and eradication of animal diseases, enlarging and improving the meat inspection, the passage and enforcement of the pure food and drugs law, forest

conservation, and the discovery of anti-hog-cholera serum. He was a real friend of the farmer. So unassuming and friendly was his nature that the humblest farmer visiting Washington could have ready access to his office.

Secretary Wilson took a special interest in stock raising and veterinary service. He was willing to accept and act upon the professional judgment of the veterinary officials of the Bureau of Animal Industry, and he gave them his firm and unwavering support in carrying out measures decided upon as necessary or wise. In launching and prosecuting the gigantic task of eradicating the southern cattle ticks, and in stamping out two extensive outbreaks of foot-and-mouth disease, all of which aroused strong opposition, he courageously resisted popular clamor and political pressure, feeling confident that the results would justify his course. An instance of his deep concern for the welfare of the American live-stock industry was revealed in a statement that he made after retiring from office. He said that in his whole official career nothing had ever caused him so much anxiety as the discovery of the infection of surra in an importation of Brahman cattle from India while held in quarantine after landing in this country. He said that he walked his bedroom floor, unable to sleep.

One who was privileged to serve under Secretary Wilson throughout his entire administration may be permitted to quote here the following letter which was written to him on the occasion of his eighty-fifth birthday, a short time before his death:

"DEAR MR. SECRETARY:

"There are many of us yet in the Bureau of Animal Industry who served under you a part or all of the time you were Secretary of Agriculture. We recall with tender feelings of personal regard your able administration of the affairs of the Department, your keen foresight in envisaging the needs of agriculture, your staunch support in enabling us to carry out the policies formulated, your sympathetic attitude and wise counsel, the confidence you reposed in your subordinates and your appreciation of their efforts to help you make the Department of Agriculture the greatest institution of its kind in the world.

"It is with pride that we recall the achievements of the Bureau of Animal Industry during the sixteen years you were with us. Accept our congratulations on your eighty-fifth birthday, and be assured of the continuance of our gratitude, respect and admiration. May you be spared many more years to enjoy with us the benefits of your successful endeavors.

Yours sincerely,

"J. R. MOHLER,
"Chief of Bureau."

While we were attending the Columbus convention of the A. V. M. A. a message came from the present head of the Department of Agriculture, Secretary Meredith, asking us to attend Secretary Wilson's funeral as a representative of the Department of Agriculture. It is a matter of regret that the time was too short for executing this commission and paying this last tribute of respect.

FOOT-AND-MOUTH DISEASE RESEARCH

A special cable from London to the *Washington Post* contains the following interesting information:

Novel features characterize a series of experiments which are about to be made by the British Ministry of Agriculture in connection with the movement to exterminate foot-and-mouth disease among cattle in England, where numerous sporadic outbreaks have occurred during the last few years.

One of the novel features is that the work will be done at sea, in view of the fact that foot-and-mouth disease is so highly contagious and no chances will be taken that would make possible its spread. It is the purpose of the Admiralty and the Ministry of Agriculture that obsolete vessels be used for the experiments, and that these vessels be equipped with laboratories and all facilities for the carrying out of the work. Officials believe valuable data will be obtained which will be of great benefit to stock breeders. For example, it may be found that certain breeds of cattle are immune from foot-and-mouth disease, just as certain varieties of potatoes are immune from wart disease. In this connection it was recalled that the work of the foot-and-mouth commission in India in 1912 was rendered abortive by the discovery that Indian cattle were not subject to the disease.

In this issue we begin the publication of the proceedings of the recent Fifty-seventh Annual Meeting of the American Veterinary Medical Association and the papers which were read at that gathering. These will be continued from month to month as rapidly as space will permit. It is expected that the entire proceedings will be completed within a shorter time than was possible in the case of the preceding convention.

The announcement that the law does not permit the prescribing of alcoholic liquors for animals will be sad news to many stable attendants.

FURTHER STUDIES ON THE PATHOLOGY OF THE REPRODUCTIVE ORGANS IN STERILITY¹

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THE material for this paper was obtained from four herds of cattle in which abortion disease has been a more or less serious problem for the last six or eight years.

The bacteriological investigations in connection with these cases were conducted by the Department of Bacteriology. To Dr. Bannenden is due the credit for the work on the first seven cases and to Dr. Stafseth for the work on the remaining four. An effort was made in each case to demonstrate the abortion bacillus. Cultural examinations and guinea-pig inoculations were made from the surface of the uterine mucosa in the first seven cases, and in the latter four cases, in addition to the above, from material obtained from the deeper layers of the mucosa. After searing the surface with a hot iron, areas were selected which appeared pathologic and small pieces of tissue from the deeper layers were removed and ground in a mortar with sterile sand and physiological salt solution. Cultures and guinea-pig inoculations were made from this material.

Not only were the guinea pigs subsequently killed and carefully autopsied, but appropriate tissues were taken from the guinea pigs and tested culturally for *Bacterium abortus* and their blood was tested with the complement fixation and agglutination test for *Bacterium abortus* antibodies. All results were negative in so far as *Bacterium abortus* was concerned.

CASE 808

Case 808 was purchased as a yearling September 7, 1917, at which time her blood was negative to abortion tests. September 23, 1917, 25 c. c. of live culture of *Bacterium abortus* were injected subcutaneously. A positive reaction to the complement-fixation and agglutination tests developed October 5, 1917, and her blood remained positive until the animal was killed.

This animal was bred first November 1, 1917, and on several occasions afterwards, but failed to conceive. Subsequent to February 22, 1918, the animal was more or less constantly in heat. An

¹ Published with the permission of the Director of the Michigan Agricultural Experiment Station.

examination on March 12, 1918, demonstrated a muco-purulent discharge in vagina and a cystic left ovary. The cyst was crushed and the uterus douched, but there is no record of what was used in uterus. There are no records of any subsequent treatment. Animal was slaughtered August 9, 1918.

Macroscopic examination: Vagina contains a considerable quantity of clear mucus not unlike the mucus of estrum. External os closed. There is a small amount of adhesive mucus in cervical canal. Uterine body $3\frac{1}{2}$ cm. in length; mucosa contains no cotyledons; lumen small; wall apparently thickened and fibrous. Mucosa of horns yellowish gray and moist, cotyledons 3 to 5 mm. in length and 3 mm. in width. Oviducts apparently normal. Right ovary $2\frac{1}{2}$ cm. in length and contains a cyst about the size of a hazelnut; left ovary, about 2 cm. in length and shows a cicatrix extending around its dorsal border, transverse to the long axis of the ovary.

Bacillus coli communior was obtained from the cystic ovary. Cultures from the uterus were negative.

Histological examination: The mucosa of the posterior cervix in places is covered by a stratified epithelium varying in thickness from 65 to 130 microns. The superficial cells show marked mucoïd changes. Cyst-like structures averaging about 25 microns in diameter, containing a mucoïd material, are observed in the epithelium. A part of the mucosa of the posterior cervix is covered by a simple epithelium 20 to 25 microns high. Here there are numerous tubular depressions simulating wide, shallow glands. Practically all of the cells lining these tubules show mucoïd changes.

The mucosa of the middle cervix shows the same extensive mucoïd changes in the epithelium.

The structure of the wall of the uterine body is unlike that of the normal body, but is similar to that of the anterior end of the cervix. At only one point is there seen a group of uterine glands (about 40 in number) in the deeper portion of the stroma. All other portions show an absence of distinct uterine glands. The epithelium is arranged similarly to that of the anterior cervix and shows considerable mucoïd changes, though not as extensive as that of the cervix. The uterine wall is not differentiated into a distinct mucous membrane and a muscular coat, but the muscularis blends with the stroma of the mucosa as is the case in the cervix.

The mucosa of the horns averages about $3\frac{1}{2}$ mm. thick and is covered by an epithelium 16 microns high. There are no epithelial

defects. The tissue of the cotyledons extends from 1 to 1.3 mm. into the stroma.

In the gland mucosa the subepithelial tissue is only very slightly more cellular and apparently more reticular than the more deeply lying stroma. There are about 75 cross-cut gland tubuli per square millimeter, varying in diameter from 40 to 80 microns. In a great many of the glands the epithelium is surrounded by a clear zone as if the glandular epithelium had contracted away from the periglandular tissue. For example, glands 50 microns in diameter are in a clear zone 75 microns in diameter. A few goblet cells are present and numerous small round cells are seen in the lumen of some of the gland tubules.

CASE 996

Case 996 was born May 28, 1916. On November 9, 1917, blood was positive to abortion test. On March 31, 1918, she gave birth to an apparently normal calf after a prolonged labor. A few days after this a vaginal discharge was observed and examination demonstrated considerable pus in the uterus. The uterus was douched daily for three weeks with a weak solution of a coal-tar disinfectant. During the last week of treatment an ulcerated cervix was treated by swabbing at intervals of two days with 50 per cent tincture of iodine in glycerine, four treatments being given. The animal apparently recovered. At the beginning of this treatment *Streptococcus pyogenes* and *Bacillus pyogenes* were isolated from the uterus. During the latter part of July endometritis again developed. At this time *Streptococcus pyogenes* and *Bacillus coli communior* were isolated from the uterus. The uterine discharge was of a reddish brown color and fetid odor. She was given the same treatment indicated above, and the uterine discharges ceased, but there soon developed a peri-uterine abscess. She was slaughtered October 7, 1918.

Macroscopic examination: There is an abscess containing about 100 c. c. of thick, creamy pus, slightly to the right of the median line and between the uterine body and the rectum. The capsule wall has involved the dorsal wall of the vagina and the uterus and the ventral wall of the rectum so that the rectum is dissected from the vagina and the uterine body with difficulty. Externally the left oviduct is apparently normal. The ovarian end of the right oviduct is involved in the abscess capsule. The left ovary is covered by the peritoneum and shows a few immature follicles on the surface. The

right ovary is completely ensheathed in fibrous tissue that is a continuation of the abscess capsule. In the broad ligament there are several abscesses containing a thick, creamy pus and varying in size up to as large as a hazelnut.

The cervical canal is $5\frac{1}{2}$ cm. in length; mucosa apparently normal. The uterine body is 2 cm. in length. The uterine cavity contains no excessive exudate and the mucosa is moist and glistening. It is of a grayish chocolate color, but not entirely uniform; around some of the cotyledons it is apparently more vascular. The cotyledons vary in size from 3 to 6 mm. in diameter, and those of the left horn are apparently more vascular.

Histological examination: The mucosa of the external cervix is covered in places by an epithelium 25 microns thick and 4 cells deep. In other places it is covered by simple epithelium and only 6 microns in depth. Whether this is the result of incomplete development of the epithelium subsequent to cervicitis is a question. There are no other epithelial defects. There is no sub-epithelial cellular zone. The mucosa of the middle and anterior cervix is covered in places by an epithelium 35 microns deep and consisting of 4 layers of cells. In other places the epithelium is simple and 15 microns deep. There are no epithelial defects. In a few places there is a sub-epithelial zone about 50 microns deep that is slightly more cellular than the deeper part of the stroma. Otherwise there is no differentiation between a cellular sub-epithelial zone and a deeper fibrous layer. At one point about 150 microns below the surface is an area of cells about 125 microns in diameter. These are apparently connective tissue cells in the transitional stage between fibroblasts and fixed connective tissue cells.

The mucosa of the uterine body varies in thickness from 0.6 to 1.5 mm. It is covered by a simple epithelium averaging about 15 microns high. Only a few mucoid cells are seen. A differentiation into an outer cellular and an inner more loosely fibrous layer of the stroma is not distinct. The deeper portion of the stroma is more densely fibrous than is the corresponding part of the normal wall. There is a conspicuous diminution in the number of uterine glands. In some portions of the gland mucosa no glands are observed. The uterine glands vary in diameter from 25 to 40 microns.

The mucosa of left horn varies in thickness from 1 to 3 mm., averaging a little thicker toward the middle and anterior end of the horn. The epithelium is simple and averages about 20 microns high. There are no epithelial defects. The outer cellular layer

of the stroma is not uniform, but in places the more fibrous deeper portion extends to the epithelium. A few small foci of small round cells are seen in the deeper portions of the stroma. These foci vary in size from 125 to 175 microns in diameter. They consist of cells which apparently represent an intermediate stage between fibroblasts and fixed connective tissue cells. The diminution in number of glands is not as marked as in the uterine body. The mucosa of the right horn shows the same changes seen in the left horn. In addition some of the gland luminae contain a few lymphocytes and there are a few local areas of edema in the stroma.

CASE 17

Case 17, a Red Poll heifer, 3 years old, was bred for the first time in April, 1918, and was soon turned on pasture for the summer. During the first week in December, 1918, she aborted a 4-months-old fetus. This was apparently from service in pasture during the summer. The animal was killed for beef January 21, 1919.

Macroscopic examination: Uterus not enlarged, oviducts apparently normal. Left ovary contains a corpus luteum about $1\frac{1}{2}$ cm. in diameter, also one cyst-like structure 1 cm. in diameter and several immature follicles slightly protruding above the surface. Right ovary normal. The external cervix is $2\frac{1}{2}$ cm. in diameter; the external os is closed. There is a small quantity of a turbid, slightly adhesive exudate in the external os. There is some hypertrophy of the second and third transverse folds of the cervical mucosa. The uterine body is 4 cm. in length; the mucosa has a fairly uniform light drab color. The mucosa of the right horn is not uniform in color. Portions of the gland mucosa are of a light drab color, others dark drab, giving the gland mucosa a mottled appearance. The mucosa is moist and glistening, but there is no excessive exudate. The cotyledons are 3 to 6 mm. in length and of uniform color. The mucosa of the left horn is of a lighter and more uniform color. Cultures from the uterus were negative.

Histological examination: The mucosa of the external cervix is covered by a simple epithelium 15 to 25 microns high. The sub-epithelial tissue is very slightly, if any, more cellular than the deeper-lying stroma. There is considerable mucus between the folds of the mucous membrane and in the tube-like depressions, in which are seen numerous lymphocytes. The epithelial cells show considerable mucoid changes, but not to the same extent as is seen in Case 808.

It is apparent that in this case (17) the nuclear changes are not the same as in Case 808. Here the nucleus is larger, more vesicular and more deeply stained than in Case 808. The questions arise: Is there a distinction between physiological mucus production and that seen in the catarrhal conditions? Are the latter characterized more particularly by degenerative nuclear changes?

The mucosa of the middle cervix differs from that of the external cervix only in that here the rugæ and tubular depressions are more numerous and the stroma in places is slightly more cellular. In a few of the spaces between the folds are numerous exfoliated epithelial cells. In the mucosa of the anterior cervix the mucoid changes are less conspicuous and the sub-epithelial tissue is more cellular. Near the apex of some of the rugæ the fibroblasts are so numerous that the structure simulates that of the cotyledon of the non-pregnant uterus.

The mucosa of the uterine body averages about 1.8 mm. in thickness and is covered by an epithelium 16 to 25 microns high. There are no epithelial defects other than a few lymphocytes seen passing through the membrane. There is a fairly uniform cellular sub-epithelial stratum averaging about 0.3 mm. in depth, in which moderately numerous eosinophiles are seen. A few groups of glands are seen where the periglandular tissue consists almost entirely of fibroblasts. The glandular epithelium in these groups shows no defects.

The mucosa of the right horn averages about 2 mm. thick and is covered by an epithelium 20 to 25 microns high. There are no epithelial defects except that in places numerous lymphocytes are seen passing through. There is a distinct sub-epithelial cellular zone which in places shows considerable blood pigment and numerous small round cells and eosinophiles. The latter are more numerous. There are a few foci averaging about 100 microns in diameter in which eosinophiles are the predominating cells. One focus of polymorphonuclears and fibroblasts is seen. There are a few groups of glands in the deeper layers of the mucous membrane which show a slight peri-glandular fibrosis. There are no defects of the glandular epithelium, though in the lumen of a few glands are seen numerous lymphocytes.

The mucosa of the left horn averages about 2 mm. thick and is covered by an epithelium 16 to 25 microns high. There is a fairly uniform sub-epithelial cellular zone averaging about 0.2 mm. deep.

There are no defects of the glands, although there is a slight periglandular fibrosis in a few places. At one point involving an artery with a lumen of 140 microns and a wall 80 microns thick there is a crescent-shaped area of what appears to be transitional fibroblasts that extends about one-third the distance around the artery. At one point this area involves about one-half the thickness of the arterial wall. At its thickest portion it is 90 microns and gradually diminishes to a point at each end.

CASE 18

Case 18 was a Holstein cow 5½ years old. She was bred for the first time August 20, 1914, and calved May 21, 1915. After this she was bred unsuccessfully a number of times and was treated for sterility, but records do not show the nature of the treatment. She was then bred January 27, 1916, and calved October 28, 1916. The records show the following service dates: September 17, 1917; January 3, 1918; February 14, 1918; March 10, 1918; August 8, 1918. There were no known abortions during this time. The animal was slaughtered January 27, 1919.

Macroscopic examination: There is a cyst 4 cm. in length and 1¼ cm. in diameter projecting above the surface of the floor of the vagina 19 cm. posterior to the external os. The cervical canal contains a small quantity of clear, slightly adhesive exudate. The posterior transverse fold of the cervical mucosa is considerably enlarged in its lower portion. The left lateral portion of the third fold is also enlarged, but not to the same extent as is the posterior fold. The body of the uterus is 2 cm. in length, the mucosa fairly uniform in color. The mucosa of the left horn is of a light chocolate color, though some portions show a little more blood pigment than others. The cotyledons are normal in appearance. The gland mucosa around the cotyledons in the right horn is a little more vascular than usual. Both oviducts are apparently normal. The right ovary contains a corpus luteum 1½ cm. in diameter, in the center of which is a cyst 6 mm. in diameter. The left ovary contains a cyst-like structure 1 cm. in diameter. Cultures from the uterus and ovaries were negative.

Histological examination: Other than slight mucoid changes in the cervical epithelium and a fibrous thickening of the transverse cervical folds, no histological changes could be detected in the uterine mucosa.

CASE 20

Case 20 was a grade Shorthorn cow about 6 years old. Her last calf was born in January, 1917. She was bred during the late spring or early summer of 1917 and was thought to be with calf. There was no known abortion, but during the spring of 1918 she began to come in heat, first irregularly, but later, during the summer and fall, quite regularly. She has been bred persistently, with failure to conceive. She was slaughtered February 11, 1919.

Macroscopic examination: External cervix is 3 cm. in diameter. External os closed. There is a considerable quantity of clear, only slightly adhesive exudate in the external os and covering the posterior end of the cervix. The cervical canal is $6\frac{1}{2}$ cm. in length. The transverse folds of the mucous membrane are normal, but there is an appreciable quantity of rather adhesive exudate in the canal. The body of the uterus is $4\frac{1}{2}$ cm. in length. The mucosa is of a light gray uniform color. The cotyledons are 3 mm. in diameter. The mucosa of the horns is similar to that of the uterine body, with an occasional more slightly vascular area. The color of the mucosa is more like that of a heifer's uterus than that of a cow's that has calved. Both oviducts are apparently normal. The left ovary is 4 cm. in diameter, spherical in shape, and has a protruding corpus luteum 2 cm. in diameter. The right ovary is 4 cm. in diameter, and has one cyst 2 cm. in diameter and several smaller ones. Cultures from the uterus were negative. *Bacillus coli communior* was isolated from the cystic ovary.

Histological examination: Only slight mucoid changes are observed in the cervical epithelium. Otherwise the cervical mucosa is normal. In the mucosa of the uterine body the sub-epithelial cellular layer is not uniform but in places is indistinct. There is apparently but little fibrosis but some local edema. A few foci of small round cells are seen in the mucosa. There are no glandular changes. The mucosa of the horns does not differ from that of the uterine body.

CASE 21

Case 21 was a Guernsey cow, born May 16, 1911. Records show the following service dates: February 27, 1913; March 30, 1913; December 20, 1913; January 12, 1914; February 3, 1914; March 10, 1914; March 30, 1914; April 10, 1914; April 27, 1914; May 5, 1914; May 27, 1914; June 30, 1914; August 9, 1914. Calved May 15, 1915. There is no record of abortion, nor do the records show

the appearance of heat between March 30, 1913, and December 20, 1913. Artificial impregnation was attempted by the manager at heat periods from December 20, 1913, to May 5, 1914, inclusive (included in service dates above), and the yeast treatment was given by him June 30 and August 9, 1914.

After calving the following service records are recorded: July 20, 1915; September 9, 1915; September 18, 1915; October 4, 1915; October 21, 1915; December 21, 1915; December 31, 1915; January 20, 1916; February 24, 1916; March 31, 1916; May 19, 1916; June 7, 1916; June 23, 1916; July 11, 1916; September 9, 1916; October 12, 1916; November 8, 1916; January 20, 1917; September 22, 1917; December 6, 1917; March 25, 1918. The yeast treatment was given at heat periods from March 31 to June 23, 1916, inclusive. On November 8, 1916, the vagina was douched with warm salt solution before service, and on September 22, 1917, soda solution was used in the vagina before service.

Some time during the spring of 1918 (date not recorded) the writer made an examination and diagnosed pregnancy, apparently of about 70 or 80 days' duration. A few weeks later another examination was made by the writer, at which time there was no evidence of pregnancy. No record was made of the clinical condition at this time. She was shortly turned out to pasture without further service to bull, and remained in the pasture until October 12, 1918. On this date the following notes were made by the writer:

"There is a small quantity of clear mucus in vagina in which are seen a few flakes of pus. On manipulation of cervix 15 or 20 c. c. of a more adhesive drab-colored exudate is forced out of cervical canal. The external os and posterior end of cervix is sufficiently dilated to allow the insertion of three fingers, although the canal is closed at its anterior end. On rectal examination it is found that the uterus is distended. The walls are tense and simulate pregnancy of the fourth or fifth month, although a fetus can not be felt. The writer is informed that the cow was not bred subsequent to his last examination the previous spring, and no bull had been with cow in pasture during the summer. The writer then proceeds to draw some 14 to 16 liters of amniotic fluid from the uterus, after which a 25 to 30 cm. fetus can be distinctly felt through the rectum. No effort was made to remove the fetus at this time, believing that it would be delivered in a few days."

On November 8, 1918, this animal was again examined and the following notes made:

"The fetus has been delivered. Uterus is still somewhat enlarged, but there is no apparent discharge."

On December 14 an examination revealed an adhesive mucopurulent discharge in the anterior part of the vagina and cervical canal. No enlargement of uterus, tone fair, small cyst in right ovary. Cyst was crushed and cervix cleansed and swabbed with Lugol's solution of iodine, and 30 c. c. of a 50 per cent Lugol's solution was injected into the uterus.

The writer did not see the case again until February 1, 1919, at which time there was a mucopurulent discharge in the vagina. The external cervix was congested and the canal open. Uterus not enlarged, and tone fair.

The owner did not care to attempt further treatment, and animal was slaughtered February 11, 1919.

Macroscopic examination: External os is dilated, cervical canal is 9 cm. long and contains a small quantity of a clear, slightly adhesive exudate. There is a slightly hypertrophy of the first transverse fold of the mucous membrane in its lower and right lateral portion. The mucosa is of a light drab color. The body of the uterus is 2 cm. in length, the mucosa of a slightly mottled, light pinkish color. Small areas of a lighter grayish color are seen. The mucosa of the posterior end of the left horn is similar in appearance to that of the body. Cotyledons are 3 mm. in diameter and are of a grayish white color, contrasting with the gland mucosa. In proximity to one cotyledon near the posterior end of the horn is a small nodule 1 cm. in diameter and projecting about 6 mm. above the surface of the mucosa, which appears to be a small tumor. The mucosa of the middle and anterior portions of the left horn is of a light drab but not uniform color. There is present a small quantity of a turbid creamy exudate. The mucosa of the right horn is more uniform and a lighter drab color than that of left horn. The same exudate as seen in the left horn is present. A small piece of flat bone, $4\frac{1}{2}$ cm. long by $1\frac{1}{4}$ cm. wide is found lying free in the anterior end of the horn. There is a cyst 1 cm. in diameter at the fenestrum of the right oviduct. The left oviduct is apparently normal. The right ovary is 4 by $4\frac{1}{2}$ cm. and has a cyst 2 cm. in diameter. The left ovary is 4 by $5\frac{1}{2}$ cm. and has a cystic corpus luteum 4 cm. in diameter. *Bacillus coli communior* was isolated from the uterus. Cultures from cystic ovaries were negative.

Histological examination: The mucosa of the posterior cervix is covered in places by a simple epithelium 20 to 25 microns high and in others by a stratified epithelium 6 to 8 cells deep and 65 microns high. The mucoid changes of the epithelium are well

marked. A faintly pinkish granular exudate containing many small round cells is adherent to the surface in places. The sub-epithelial tissue is but slightly cellular. In the middle and anterior portions of the cervix the mucoid changes of the epithelium are more extensive than in the posterior end. Here the nuclei show distinct degenerative changes. The sub-epithelial zone is distinctly cellular and shows many small round cells and polymorphonuclears. The mucosa of the uterine body averages about 2 mm. thick. The sub-epithelial cellular zone is not uniform but is absent in places. The deeper portions of the gland mucosa are not uniform. In places there is an absence of glands and the stroma is edematous. The glandless areas are not densely fibrous but are more reticular with here and there small areas of a more fibrous nature. In the glandular portion of the stroma the periglandular tissue is more cellular than is normally seen. There are no defects of the glandular epithelium but in a few of the gland tubules numerous small round cells are seen.

The mucosa of the left horn varies in thickness from 3 to 6 mm. and is covered by an epithelium 16 to 25 microns in height. There are no epithelial defects. There is not a uniform sub-epithelial zone with a deeper, more reticular stroma, but the deeper stroma is distinctly denser because of an increase of the cellular and fibrous constituents. There is considerable infiltration of the sub-epithelial tissue with small round cells and an increase in the number of connective tissue cells. However, the small round cell infiltration is not uniform and in places it has the appearance of irregularly shaped follicles. The small tumor in the posterior end of the horn described in the macroscopic examination consists of a cheesy pinkish-staining material with a few nuclei scattered throughout the cheesy material. The wall surrounding this mass is lined with low cuboidal epithelium, indicating that the nodule is due to the plugging of a gland duct with retention and inspissation of the secretions. A few of the gland tubules show some disintegrations of the epithelium with numerous small round cells in the lumen, but the majority of glands show no epithelial defects. Many of the gland tubules show a periglandular fibrosis, though this has not reached the stage of scar tissue. A few localized areas of edema are observed in the stroma. In the region of a cotyledon there is a distinct depression in the mucosa, but this does not appear to be due to cicatrization but to a vitreous degeneration and obliteration of the underlying arteries.

The mucosa of the right horn varies in thickness from 3 to 7 microns and is covered by an epithelium 16 to 25 microns high. In places there is a small amount of exudate consisting of red blood cells and leucocytes adherent to the surface of the epithelium. There is also seen in places a layer of a granular, pinkish material containing a few leucocytes between the epithelium and the sub-epithelial cellular zone. This layer is 15 to 30 microns thick. There are no marked epithelial defects except that in places there is a separation of the epithelial cells through which the granular layer above described is continuous with the surface coagulum. The sub-epithelial cellular zone is not uniform in depth, but in places extends down into the stroma and reaches the muscularis in places. There is seen here the same small round cell infiltration and periglandular fibrosis as described in the left horn. Adjacent to an arteriole 40 microns in diameter is a focus of fibroblasts about 100 microns in diameter. There is some disintegration of the glandular epithelium and small round cell infiltration observed in a few of the gland tubules.

CASE 22

Case 22 was a Guernsey cow born August 30, 1910. First served December 21, 1912, and calved normally October 2, 1913. Was again bred April 18, 1914, and calved normally February 1, 1915. Was then bred March 16, 1915, and aborted May 30, 1915. She was successively bred August 22, 1915; October 26, 1915; December 10, 1915; April 2, 1916; and aborted November 4, 1916. She was then bred January 12, 1917; February 2, 1917; February 26, 1917; March 18, 1917; April 9, 1917; May 6, 1917, and November 6, 1917. Abortion was not observed between May and November. There is no record of the case between November 6, 1917, and December 14, 1918, other than that there has been no known abortion nor has the cow calved during that time. On December 14, 1918, the following notes were recorded: "There is some cloudy mucus around external os. External cervix much congested, canal slightly dilated. Uterus not enlarged, but walls are flaccid."

The cow was slaughtered February 11, 1919.

Macroscopic examination: The external cervix is $4\frac{1}{2}$ cm. in diameter. The external os is slightly dilated and there is present a considerable amount of slightly cloudy adhesive exudate. The cervical canal is 8 cm. in length, the mucosa of a grayish drab color with a few ecchymotic areas. The body of the uterus is 5 cm. in

length, the mucosa of a darker drab and more uniform color than that of the cervix. The mucosa of the horns is similar to that of the body, with a few small areas apparently more vascular. Cotyledons are 6 mm. in diameter and of a yellowish gray color. There is a protruding corpus luteum about 6 mm. in diameter in each ovary, also a cyst-like structure in the left ovary about $1\frac{1}{2}$ cm. in diameter. The right ovary is spherical and $2\frac{1}{2}$ cm. in diameter. The left ovary is 3 by 2 cm. in size. Cultures from the uterus were negative.

Histological examination: The mucosa of the external cervix is covered in some places by a stratified epithelium 60 microns deep and in others the epithelium is simple and 25 microns high. The exudate has been washed off except between the folds of the mucous membrane; here it appears as a partly granular, partly stringy, pinkish mass in which many lymphocytes are seen. The epithelial defects are not marked, though in places there is some mucoid degeneration. The sub-epithelial tissue is quite generally fibrous with here and there slight accumulations of leucocytes. It is observed, however, that in the region of the fundus of the pits between the folds of mucous membrane the sub-epithelial tissue is more cellular. Whether this is due to greater irritation due to retarded drainage of the exudate is a question. The mucosa of the middle and anterior cervix is covered by a simple epithelium 12 to 25 microns high. Mucoid degeneration of the epithelium is marked. There are observed in the stroma a few foci of fibroblasts averaging about 200 microns in diameter. These are at an average depth of 0.5 mm. from the surface.

The mucosa of the uterine body is 5 to 6 mm. in thickness and is covered by an epithelium 25 to 45 microns high, apparently consisting of four or five layers of cells in places. There are no marked epithelial defects, though in places numerous lymphocytes are seen in the process of passing through the epithelium. The sub-epithelial cellular zone is not distinct but considerably more fibrous than in the normal uterus. Many fibroblasts and distinct foci of fibroblasts are seen in the stroma. The deeper portions of the stroma are more densely fibrous than normal, though the increased thickness of the mucosa is partly due to edema. There is a marked diminution in the number of glands. The glands are not uniformly distributed but are completely absent in places. Only a few of the glands show mucoid changes in the epithelium.

The mucosa of the left horn varies in thickness from 1.6 to 9 mm.

In the thicker portions considerable edema with leucocytic infiltration is observed. A differentiation into an outer and an inner layer of the stroma is not uniform. The sub-epithelial zone is more fibrous than normal, with distinct cicatrization in places. The uterine glands are more uniformly distributed than in the body, but more mucoid changes with some disintegration of the glandular epithelium are observed.

The mucosa of the right horn varies in thickness from 4 to 10 mm. and is covered by simple epithelium 20 to 25 microns high. There are no marked epithelial defects, though a few leucocytes are seen passing through the membrane. The stroma is not uniformly differentiated into two layers, but there is a fibrosis of both layers. Much edema of the stroma is observed, although the amount varies considerably in different portions of the mucosa. Numerous eosinophiles and lymphocytes are seen in the edematous areas. Scattered through the edematous areas are seen groups of from one to four gland tubules with occasionally an arteriole surrounded by a fibrous periglandular tissue. These groups, which are irregularly shaped and vary in size from 120 to 750 microns in their greatest diameter, stand out as islands surrounded by edematous fluid. The glandular defects are not marked, though there are slight mucoid changes in the glandular epithelium and the periglandular tissue is distinctly, though not densely, thickened. Only occasionally are there observed a few glands with atrophic epithelium and surrounded by scar tissue. Here desquamated epithelium and leucocytes are observed in the gland luminae.

CASE 23

Case 23 was a Guernsey cow; past breeding record not available, but it is known that the animal has had two or three calves and has been bred a number of times since calving with failure to conceive. On January 20, 1919, it was recorded that the external cervix was very much congested, but no abnormalities of the uterus or ovaries could be detected by rectal examination. On the above-mentioned date the cervix was swabbed with Lugol's solution of iodine. This animal was slaughtered March 3, 1919.

Macroscopic examination: There is a small quantity of a rather adhesive muco-purulent exudate in the anterior part of the vagina and external os. There is some hypertrophy of the external fold of the mucous membrane of the cervix in its lower right portion. The mucosa is not of a uniform color, but the lack of uniformity is

apparently due to some portions being more vascular than others. At the lower border of the middle transverse fold there is a fibrous tag adherent at each end to the fold, having a small opening beneath the tag. The mucosa of the anterior cervix is adherent, completely closing the cervical canal. The adhesions are not dense but apparently of recent origin. This condition is probably a sequel of the treatment administered on January 20. The body of uterus is 5 cm. in length and the wall of the body and left horn is much thinner than normal and suggests a condition of pregnancy. The left horn contains about 125 c. c. of serous exudate, but no coagulum is present. The mucosa is of a light drab but not uniform color. In some portions the vascular network is distinctly seen, indicating considerable thinning of the overlying mucosa. The cotyledons average about 3 mm. in diameter and are gray in color. The wall of the right horn is thicker than that of the body and left horn, but there is some thinning of this wall. The mucosa is similar to that of the left horn. Both oviducts are apparently normal. The right ovary is spherical, $2\frac{1}{2}$ cm. in diameter, and contains a cyst-like structure 1 cm. in diameter and several regressed corpora lutea. The left ovary is oval and is $4\frac{1}{2}$ cm. in its longest diameter and contains a cyst $2\frac{1}{2}$ cm. in diameter. *Staphylococcus pyogenes aureus* and *Staphylococcus pyogenes albus* were obtained from the surface of the mucous membrane and were also obtained from the deeper layers.

Histological examination: No tissue is saved from the cervix and uterine body. The mucosa of the left horn varies in thickness from 0.36 to 0.8 mm. (the uterine wall is only 2 to 4 mm. thick), and is covered by a simple epithelium 25 microns high. The stroma of the mucosa is not differentiated into two layers but is more densely fibrous than normal. The proportion of glands to interglandular tissue is apparently normal. A few of the glands show cellular degeneration with numerous lymphocytes in the gland luminae. Atrophy of the muscle fibers of the internal muscular coat is apparent. The mucosa of the right horn varies in thickness from $1\frac{1}{2}$ to 4 mm. and is covered by an epithelium 18 to 30 microns high. In places a few vacuoles and disintegrating cells are observed in the epithelium. The sub-epithelial cellular zone is more noticeable than in the left horn. The center of one cotyledon is depressed and appears to have undergone some induration to a depth of 150 microns. In another cotyledon there is a more deeply seated indurated area about 1 mm. in diameter. Beneath this cotyledon are numerous glands with atrophic epithelium. The condition of stroma

varies in different parts of the horn. While there is a more or less uniform diffuse fibrosis of the stroma, the stage of fibrosis varies in different portions. In places the interglandular tissue is largely fibrous; in others it consists very largely of fibroblasts indicating an active condition. Numerous small round cell foci, averaging about 250 microns in diameter, are seen both in the gland mucosa and in the region of the cotyledons. The condition of the glands varies considerably in different portions of the horn. In places the glandular epithelium is apparently normal; in others there is shrinking of the nucleus and caryorrhexis with disintegration of the cytoplasm. Here numerous small round cells are seen in the gland luminae.

In this case and the remaining three of this series an attempt was made to stain sections from different portions of the uterus for bacteria, but we were not able to demonstrate successfully their presence. In some of the sections a few scattered small spherical bodies were seen, but these were not sufficiently numerous to determine whether they were cocci or chronidia. In view of the fact that cultures were obtained from the deeper layers of the mucosa it is believed that our technique was imperfect or else there were such small numbers of bacteria that they were not recognized.

CASE 24

Case 24 was a Guernsey cow about 5 years old. This cow aborted a 7-months-old fetus in September, 1917. A few days afterwards three fetal hoofs were washed out of the uterus. She soon made an apparent recovery and was bred persistently with failure to conceive.

February 1, 1919, the author made an examination of the cow and recorded that "the vagina contains no excessive exudate. There is a little enlargement of the right horn, and right ovary contains a corpus luteum. The animal is probably pregnant, but not sufficiently advanced to make a positive diagnosis."

February 22 an examination by the author found the animal not pregnant, but the clinical condition was not recorded. She was slaughtered March 2, 1919.

Macroscopic examination: The external os is slightly dilated. The cervical canal is $7\frac{1}{2}$ cm. in length. There is an excess of clear mucus in the canal. The first transverse fold of the mucosa and the mucosa of the anterior cervix shows quite a few petechial hemorrhages. The uterine body is $2\frac{1}{2}$ cm. in length, the mucosa of a fairly uniform light drab color. The mucosa of the left horn

is of a light drab color. The cotyledons are not numerous, and those that are present appear as a very small, slightly elevated, grayish area with a depressed center. The mucosa of the right horn is of a fairly uniform light chocolate color. Only few cotyledons are visible. Near the posterior end of the horn is a scar-like area, grayish white in color, irregularly triangular in shape, $2\frac{1}{2}$ cm. in length and 6 mm. at the base. In the anterior end of the horn there are a few hemorrhagic or acutely congested areas at the crest of the folds of mucous membrane; these areas average about 6 by 12 mm. in size. Both oviducts are apparently normal. The left ovary is 3 cm. in diameter and contains a protruding corpus luteum 1 cm. in diameter. The right ovary is oval, is 4 cm. in its longest diameter, and contains a cyst-like structure 1 cm. in diameter. A micrococcus and *Bacillus subtilis* were obtained from the surface and also from deeper layers of the uterine mucosa.

Histological examination: Sections are saved only from the posterior cervix and the right uterine horn. No abnormalities are observed in the external cervix. The mucosa of the right horn varies in thickness from 3 to 5 mm. and is covered by an epithelium averaging about 25 microns in height. The sub-epithelial cellular zone is fairly well marked, though in places it apparently extends to a greater depth into the stroma than is normally seen. Numerous lymphocytes are diffusely scattered through the stroma and in places foci of small round cells are seen. There is marked edema of the stroma and here and there evidence of proliferation of the interglandular tissue. The glandular changes are conspicuous and extensive. They vary from vacuolization of only a few cells in a gland tubule to very marked caryorrhesis with disintegration of the cytoplasm and marked round-cell infiltration of the gland lumen. Many of the cotyledons show cicatrization.

CASE 25

Case 25 was a Guernsey cow about 7 years old. As a heifer this animal was bred persistently before she conceived, and calved apparently normally during the summer of 1915. She was again bred the following December and calved in September, 1916. For the next year and a half she was bred irregularly, but never conceived; at least abortion was not observed during that time. She was treated once during the summer of 1918 and again once during the fall for a cystic right ovary. There is no record of the nature of the treatment.

February 1, 1919, the author examined this cow and made the

following notes: "There is considerable muco-purulent discharge in the anterior vagina. The external os is slightly dilated, the mucosa is moist and congested, but there is no apparent hypertrophy of the external cervix. The uterus is not enlarged; the walls are somewhat flaccid. The right ovary contains a cyst. The cyst was dislodged, uterus massaged, and cervix swabbed with Lugol's solution of iodine."

February 22 the animal was examined by the author and the following notes recorded: "There is about 100 c. c. of cloudy mucus in the anterior vagina and external os. The external os is open and the mucosa slightly congested. The uterus is not enlarged; walls flaccid. No cyst can be felt in either ovary. The uterus and ovaries were massaged and the cervix swabbed with Lugol's solution of iodine."

March 22 the following notes were made by the author: "There is about 30 c. c. of a slightly adhesive cloudy exudate in the anterior part of the vagina. The mucosa of the cervix is slightly congested, and there are a few friable adhesions in the posterior cervical canal. The left uterine horn is somewhat smaller than the right; the wall is flaccid and noticeably thinner than that of the right horn. There is a cyst the size of a hazelnut in the left ovary. No cyst can be felt in the right ovary." No treatment was given at this time, as an unfavorable prognosis was made, and the animal was slaughtered March 23, 1919.

Macroscopic examination: There is an excess of clear mucus in the anterior part of the vagina and external os. The cervical canal is $7\frac{1}{2}$ cm. in length and contains a small quantity of a clear mucus in which a few flakes of pus are seen. The mucosa is not uniform in color but shows a few injected areas. There is some hypertrophy of the right lateral portion of the second transverse fold, with a small fibrous tag attaching the apex of this fold to the opposite wall of the cervix. The body of uterus is 4 cm. in length, and the wall is abnormally thin. The mucosa is mottled, of a grayer color than normal, and in places the underlying vascular network can be easily seen. No cotyledons can be seen. The mucosa of the left horn is similar in appearance to that of the body, only here a few cotyledons are present varying in size from 3 to 6 mm. in diameter. The thinning of the wall of this horn is very noticeable. Externally the size of the horn is apparently one-half that of the right. There is a small quantity of a flocculent serous fluid in the right horn. The mucosa is of a grayer color than normal, and the cotyledons are 6 to 9 mm. in size. Their color is a mottled grayish yellow and

simulates the appearance of a cotyledon in the latter stages of involution. Near the middle of the right horn is an area about 5 cm. in diameter, the wall of which is not more than 3 mm. thick. In the center of this area is a radiating scar. The left ovary contains four cysts, the largest of which is about 2½ cm. in diameter. The right ovary contains two cysts, the largest of which is about 2 cm. in diameter. Cultures from the surface of the uterine mucosa were sterile. *Bacillus coli communior* was obtained from the deeper layers.

Histological examination: The mucosa of the uterine body varies in thickness from 0.3 to 0.8 mm. and is covered by an epithelium averaging about 16 microns in height. The sub-epithelial cellular zone is not distinct and the entire stroma is more densely fibrous than normal. The ratio of glands to interglandular tissue is apparently normal. A few of the more deeply seated glands show atrophic epithelium and there are others that show some degenerative changes of the epithelium with small round cell infiltration of the gland lumenæ. The mucosa of the left horn varies in thickness from 0.5 to 1¼ mm. and is covered by an epithelium 12 to 16 microns high. The uterine wall varies from 2 to 10 mm. in thickness. Fibrosis of the stroma is more or less general but varies in extent in different portions. At places it is slight, in others it is marked and has resulted in atrophic thinning of the mucosa. The condition of the uterine glands also varies. In some places they are apparently normal, in others there are degenerative changes of the glandular epithelium with small round cell infiltration, and in still others there are glands with atrophic epithelium. The mucosa of the right horn varies in thickness from 0.8 to 2 mm. The glandular changes are similar to those of the left horn. There is a more or less general fibrosis of the stroma but not to the extent seen in the left horn.

CASE 26

Case 26 was a Guernsey cow about 8 years old. As a heifer she was bred several times before conceiving, and calved normally in the spring of 1914. Her second calf was aborted at about 4 months in the fall of 1914. She calved normally again in the fall of 1915 and has been bred irregularly since then with failure to conceive; at least abortion has not been observed. The cow was slaughtered March 23, 1919.

Macroscopic examination: There is a yellowish muco-purulent exudate in the vagina and external os. In the floor of the vagina there is a multilocular cyst 5 cm. long, 1½ cm. wide, by 6 mm.

high. Externally there is no enlargement of the uterus. The external os is closed; the cervical canal is 9 cm. in length. The transverse folds of the mucosa are congested and there is some hypertrophy of the left lateral portion of the second fold. The body of the uterus is 4 cm. in length. There is about 30 c. c. of a sero-purulent exudate in the uterine cavity. The mucosa of the body is not uniform in color. Upon closer examination areas are seen in which there are small, irregularly shaped, grayish colored foci varying in size from that of a pin point to 1 mm. in diameter. The mucosa of the left horn is more uniform in color, except at its posterior end, where the appearance is similar to that of the body. The color of the mucosa is a lighter gray than is normally seen in a cow that has calved. The cotyledons vary in size from 3 to 6 mm. and are of a grayish yellow color. Both oviducts are apparently normal. The left ovary is $4\frac{1}{2}$ cm. in diameter and contains a cyst-like structure $1\frac{1}{2}$ cm. in diameter. The right ovary is 4 cm. in diameter. *Bacillus coli communior* was obtained from the exudate in the uterine cavity. Cultures from the deeper layers were negative.

Histological examination: The epithelium of the cervical mucosa is not uniform in appearance. In places it is normal, in others the cells are swollen and many of them have lost their nuclei. Desquamation is observed in places. Many of the sub-epithelial capillaries are filled with blood and small sub-epithelial hemorrhages are seen in places. Local areas of edema are also observed. In places there are marked collections of cells under the epithelium. Here endothelial cells and lymphocytes predominate, although there are a few polymorphonuclears and erythrocytes observed.

The mucosa of the uterine body varies from 1 to 3 mm. in thickness and is covered by an epithelium 16 to 30 microns in height. Numerous leucocytes are seen in the process of passing through the epithelium. In places the epithelial cells are cloudy and the nuclei very faintly stained. The sub-epithelial cellular zone is not sharply differentiated, but blends gradually with the deeper portion of the stroma. There is a marked leucocytic infiltration of the sub-epithelial zone. There are numerous collections of the leucocytes into groups, explaining the appearance seen in the macroscopic examination. The interglandular tissue is thickened, but partakes more of the nature of adult connective tissue. Only in places is there evidence of active proliferation. The glandular changes are marked. Many of the glands are apparently normal, but many

others show marked degenerative and disintegrative changes of the epithelium with round cell infiltration of the gland luminæ.

SUMMARY

Of the eleven cases presented here, all except Nos. 996 and 17 were clinically sterile. No. 996 was slaughtered because of a peri-uterine abscess, and No. 17 was slaughtered because of aborting some seven weeks before. The anatomical alterations of the uterine mucosa vary in the different animals from slight fibrous thickening of the transverse cervical folds with no apparent alterations of the corporal and cornual mucosæ (Case 18) to an atrophic endometritis (Cases 23 and 25). The lesions observed in varying degrees in the different cases are mucoid degeneration of the superficial epithelium, local and diffuse fibrosis of the uterine mucosæ, leucocytic infiltration of the stroma and gland luminæ and degeneration and disintegration of the glandular epithelium with diminution in the number of glands. In the majority of cases the anatomical alterations are comparatively few and it is hardly conceivable that failure to breed was the result of loss of functional tissue of the uterine mucosæ. Of course it is not known to what extent the uterine mucosa may be anatomically altered and yet remain functional, but it may be logically assumed that considerable alterations are necessary to render the uterus permanently sterile. Surely some fibrosis of the mucosæ with some loss of uterine glands should not render the uterus functionally inactive. This is not nature's way. Theoretically, before arriving at a conclusion (and conclusions can not be drawn until more data are available), we must distinguish between the sequelæ of an active condition and the effects of a condition still active. Judging from alterations of other functional organs, considerable of the former are compatible with functional activity. This thought suggests two problems of research that are vital to the solution of the cause of sterility, viz.: The alterations of the secretions and their effect on the male and female sexual cells, because of an active morbid condition of the uterine mucosæ, and second, the effects of such a condition on the cyclic functional activity of the ovary. The difficulty of obtaining suitable material for this kind of investigation is a great obstacle in the way of valuable research, but the importance of this problem impels us to overcome this difficulty.

Dr. E. H. Riley has resigned his position as livestock extension specialist, at the Montana College of Agriculture to engage in general farming and stock raising near Hammond, Minn.

DISEASES OF THE BULL INTERFERING WITH REPRODUCTION

By W. W. WILLIAMS, *Springfield, Mass.*

THE role played by diseases of the bull upon the reproductive problem has generally been overlooked or at least much underestimated. Some investigations have been made along these lines, but they have been so restricted to certain phases of the subject that the value of the findings in relation to the question as a whole is problematical. Impotence, sterility, and the production of weak offspring from a given sire are very common.

For the maintenance of efficient reproduction the diseases of the bull demand thorough study. Their relation to disease and reproduction difficulties of the cow may sometimes be quite obscure, but nevertheless they have an important bearing on the subject. Since several bulls in the same herd may become simultaneously infertile, the fact that the cow has had services to more than one bull does not suffice to prove that she is sterile.

Disease interfering with reproduction may be classified as to cause under several different heads. Feeding and care of the mature bull, aside from the sexual hygiene, seem usually to have no immediate relation to true infertility, although it is to be expected that the general debility following continued improper care may definitely lower the vitality of the germinal cells or even alter their morphological characteristics.

Insemination may be seriously hampered by physically defective coitus or by psychic impediments to coitus. The difficulty may be caused by deformity of the limbs or feet, sore feet, overloading of the rumen with coarse, non-nutritious foods, obesity, fear of falling, paralysis, etc. Obesity in show animals is particularly detrimental, as they usually have insufficient exercise.

Penial tumors, usually of the epithelioma type, may grow to such dimensions as to interfere mechanically with coitus. Immobilization of the penis may result from tubercular adhesions in the region of the peri-penial lymph glands or adhesions caused by the imprudent use of irritating disinfectants in the sheath.

Granular balano-posthitis occurs very frequently, especially in older animals, and the coincident tenderness of the prepuce and glans penis may interfere seriously with coitus. In some cases it may cause the cessation of coitus, but not so frequently that it should

be classified as an important cause of sterility. In 40 bulls examined by me, distinct balanitis occurred in 9 cases. The severest cases were accompanied by other changes which were more significant.

The health of the accessory glands is of great importance because of the part they play in the manufacture of the seminal fluid, to certain elements of which the spermatozoon owes its virility. In the bull there are three sets of accessory glands—the prostate, Cowper's glands (bulbo-urethral), and the seminal vesicles. The prostate and Cowper's glands are not readily defined clinically, as they are covered by the musculature which surrounds the urethra. Their function is not so clear as that of the vesiculæ seminales, although it is very probable that their secretions are inimical to reproduction. Clinical data concerning them are absent. The seminal vesicles secrete most of the seminal fluid. These glands are usually very readily palpated per rectum. Seminal vesiculitis, or spermatocystitis, in varying degrees of intensity is common. Fifty-five per cent of the infertile and impotent bulls which I have so far examined show symptoms of spermatocystitis. On palpation it may be recognized by evident pain or by enlargement, induration, abscessation, or a cystic condition of the gland. The tenderness is usually more marked on the anterior side near its base. As the inflammatory process progresses the gland increases in size and becomes firmer and the lobules more accentuated. Not infrequently one gland becomes several times the size of its mate. If the excretory duct be occluded the gland becomes cystic or abscessed.

The normal variation in size and consistency of the seminal vesicles is so great that some experience is required to differentiate the normal from the abnormal. The glands of the young bull are often quite small, not more than 2 inches long by $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter, and they are quite soft and pliable. With increased age and function there is constant enlargement, so that the bull at 10 years may possess glands measuring as much as 4 inches in length with an average diameter of about $1\frac{1}{2}$ inches. In the seminal vesicles, which act as reservoirs for the seminal fluid, the spermatozoa collect, swimming free in their contents, and await ejaculation. The amount of seminal fluid stored in the older bull is normally somewhat greater than in the younger animal. The fluid may occasionally be palpated per rectum in apparently normal animals. This should not be confused with a cystic condition of the gland.

Chronic spermatocystitis is apparently quite common. There is

usually a proliferation of the connective tissue, probably accompanied by excoriation of the epithelial cells. Any inflammatory process of the gland tends markedly to lower the fertility of the animal. In one case, where there was considerable induration of the gland, the inflammation had apparently subsided and the breeding sufficiency of the bull remained unimpaired. Apparently a slight spermato cystitis may interfere seriously with fertility, but an enlargement of the vesiculæ seminales in the absence of active inflammation is not necessarily detrimental, providing the volume of the seminal fluid is not greatly lessened or its character altered.

Disease of the epididymis is not uncommon. An inflammatory process may readily cause a closure of the finely coiled tubule, immediately bringing about total sterility. The epididymes lie principally upon the medial side of the testicle, the head above and the tail below, the latter being continued by the vas deferens which turns upward anteriorly, parallel to the body of the epididymis. The head invests the superior extremity of the testicle. The body is small. Inferiorly, it terminates in the tail which is closely attached to the inferior extremity of the testicle, forming a hemispherical mass approximately $1\frac{3}{4}$ inches in diameter. Epididymitis is indicated by swelling, by the parts being poorly defined, or by abnormal consistency. Usually, I believe, other disease in the genital organs may be expected in conjunction with epididymitis.

The physical and chemical character of the seminal fluid varies greatly according to the condition of the glandular structures. From a very large seminal vesicle the quantity of the secretion may be much increased, but that this increase is in any way injurious to the spermatozoa in the absence of a definite seminal vesiculitis is improbable. The normal ejaculation of semen varies in amount between 6 and 15 mils. In some apparently healthy animals only 2 or 3 mils of very viscid semen may be excreted, but if a second ejaculation follows immediately a discharge of 10 mils or more of normal semen may result. The first coitus in these cases is apt to be without results. A diminution in the quantity of the ejaculation occurs when the seminal vesicle becomes indurated or its excretory duct occluded. In the young bull the glands may be underdeveloped and a hypo-function result. A lessened secretion in the older animal is usually accompanied by an increased viscosity of the seminal fluid.

The color and opacity of the seminal fluid vary widely. Even in normal samples the differences are very marked. It may be whitish

or straw-colored, of the consistency and appearance of thick pus, or quite translucent. The normal sample contains a whitish sediment, or flocculi, which occupies about one-half to two-thirds its volume. In some cases a coagulum occurs soon after ejaculation. This is usually associated with a definite diminution in the numbers and vitality of the germinal cells, but the reason for the coagulation is not clear.

Most sterility is due to diseases affecting the germinal cells. The condition is usually referable to pathological processes existing in the testicle, but the vitality of the spermatozöon is probably also readily influenced by the character of the secretion of the accessory glands or declining constitutional vitality of the bull. Even in the absence of perceptible orchitis, disturbances of the testicular germinal epithelium and of the spermatozoa occur with great frequency. In most cases they are largely trophic, all parts of the cell developing but the nucleus remaining atrophic. This lessening in size of the nuclear elements results in a great variety of differently shaped heads. In some the nucleus is represented by a bar not much greater in diameter than the connecting piece. In others there is a gradual tapering off to a point. In still others, cells may be seen in which the tapering, beginning at the nuclear membrane, is abrupt. In the latter, the longitudinal measurement of the cell is much lessened, resulting in an almost hemispherical mass. Few abnormal cells are motile, and a large number are ejaculated minus their tails.

The final result of the process of spermatogenesis is the production of mature spermatozoa which become loosened from the germinative cells and lie free in the seminiferous tubules. Under certain conditions, as in an inflammatory process of the testicles, spermatogenesis is interrupted. An exfoliation of the primitive germinal cells occurs, and spermatids, spermatocytes and spermatogonia may be present in the ejaculated semen. These germinative cells resemble epithelial plates, but their nuclei occupy a much larger proportion of the cell than do those of the squamous or transitional epithelia. Various stages of the mitosis may be distinguishable.

During the later stages of spermatogenesis the nucleus occupies the portion of the cell facing the periphery of the seminiferous tubule, and the cytoplasm the more centrally located portion of the cell. The tail, connecting piece and neck now form, protruding from the cytoplasmic portion of the cell. The cytoplasm undergoes a transition. Part of it probably acts as nutriment to the maturing

cell; the rest is gradually transposed to the anterior aspect of the nucleus.

An arrest in development may occur at any stage, but the type usually observed is that in which the cytoplasm in the body region has undergone incomplete absorption. This may be recognized as a slight enlargement in the connecting piece, or, if the absorption is less complete, as a tuberosity nearly as large as the head. Then the nucleus comprises the entire head part, the chromatin material remains somewhat organized, and the neck granule is usually very distinct. The spermatozoon which has been arrested in development is non-motile and otherwise unfitted for fecundation. The connecting piece and tail usually remain firmly attached.

The occurrence of tailless spermatozoa is quite common. The condition is usually accompanied by further morphological changes in the nuclear portion of the head. Where there is any great cellular disintegration, clumps of tails matted together may be distinguished scattered throughout the sample.

A diminution in the number of excreted spermatozoa is termed oligospermia. If no cells are eliminated, the condition is termed azoö spermia. This may result either from a disturbance of the germinal epithelium or from an occlusion of an excretory passage. If the inflammatory process occurs during fetal life or soon thereafter, the testicle may remain very small, flabby and imperfectly developed. No spermatozoa are produced. Later in life the testicle is subject to a variety of inflammatory processes. It may undergo abscessation, but perhaps the occurrence of a desquamative inflammation or trophic disturbances in the seminiferous tubules is commoner. The spermatogenic process is then materially decreased or stopped and many of the cells may be eliminated in an imperfect state of development. The testicle, instead of increasing in size as in abscessation, atrophies slightly and loses its typical testicular tone. This process is very chronic and occurs without any evidence of heat or pain.

Epithelial débris from various parts of the genital tract may be present in the seminal fluid when taken from the vagina of the cow. The differentiation of types and the determination of their source is often difficult. They may arise from any location in the urogenital tract, as the urethra, bladder, ureters, vasa deferentia, vagina, epididymes or seminiferous tubules.

Although the emission of blood in the seminal fluid undoubtedly occurs, I have not as yet observed it. Its presence is apparently

injurious to the spermatozoa. Occasionally a small amount of vaginal hemorrhage results when the semen sample is taken. Under the microscope the spermatozoa may be seen entangled in the fine fibrin meshwork. When a great deal of blood is present, little motility is observed. Especially with heifers at the time of coitus, slight hemorrhage is quite common, and probably this is occasionally responsible for the temporary sterility of such animals.

The causes of sterility, such as physical or psychic impediments to coitus, diseases of the testicles, epididymes or accessory organs, and miscellaneous influences lowering the vitality of the spermatozoa, are more or less interrelated and dependent to a certain degree upon such influences as improper diet and exercise. But diet and exercise, except in so far as they may lower the constitutional vigor or cause a predisposition to disease which results in a lessened vitality of the spermatozoa, can not be held accountable for any great part of the lowered production. The cause in most cases is the pathologic changes occurring in the essential genital organs, which are evidenced only by an alteration in the character of the seminal fluid and the spermatozoa contained therein. The efficiency of the bull usually varies in proportion, dependent upon the extent of these changes.

Of course all non-motile or dead cells are functionless, but cases of sterility in which all cells are dead when ejaculated are not common. Usually only partial sterility exists. In my series of 40 examinations, only one case excreted 100 per cent dead cells, although 20 of them have given more or less clinical evidence of sterility and impotence. It may be estimated that a normal ejaculation contains at least 50,000 spermatozoa. Theoretically only one cell is required for fecundation. Thousands die where one survives. Clinically it is interesting to note that, when even a small per cent of the spermatozoa are destroyed—say $\frac{1}{2}$ to 1 per cent—the chances for that one to survive are materially lessened. The breeding efficiency is lowered out of all proportion to the changes observed in the semen.

I believe that the process or agent which causes death and disintegration of only a few cells may so devitalize the remaining spermatozoa as to render them incapable of fusing with the ovum. It is not common for all cells to suffer to the same degree.

In general, infertility, as to cause, falls into two main groups: (1) That due to extrinsic factors, such as impediments to coitus, overfeeding, etc., and (2) those changes which lower the vitality or

impede the migration of the spermatozoa. In the first case the fundamental cause is usually readily ascertained and the difficulty may be corrected. If any serious impediment exists it is usually apparent enough that the animal may be sent to the butcher. Changes in the semen and spermatozoa, however, demand a closer study, as they have an intrinsic influence upon the reproductive problem. When the vitality of the germinal cells is appreciably lessened a viable offspring is not produced. This is evidenced clinically by an increased sterility and abortion rate. (See accompanying table.)

Breeding Statistics of B-4, January 5, 1920.

Items	1916		1917		1918		1919		Total
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
Copulations...	10	....	67	.....	69	....	106	....	251
Cows bred...	10	....	36	.....	40	....	38	....	63
Conceptions...	8	80	32	88.9	26	65	9	21	75
Abortions...	2	25	7	21.95	7	27	5	55.5	21
Not conceiving current year.....	2	25	4	11.1	14	35	30	79	

Clinical manifestations of disease, 24 cows, or 36.5% per cent of total cows served.

Out of 9 cows conceiving in 1919, 1 calved normally and organs remained normal; 3 calved normally but had diseased organs, have not bred since or have been delayed in breeding; 5 aborted and have given more or less difficulty in breeding since.

Thus out of a total of 40 examinations recently made, I have recorded changes in the semen of 23, or 57.5 per cent, of which 18, or 78.3 per cent, evidenced an increased sterility or abortion rate or both. Twenty bulls, where the herd history showed increased sterility and abortion in the cows served by these bulls, were examined; in 18, or 90 per cent, changes in the seminal fluid of spermatozoa were noted. Fifteen out of 23 abnormal samples taken from 40 individuals contained spermatozoa with morphological changes. The clinical significance of these changes depends to a great extent upon their character. The most important of this group are the 10, or 66.2-3 per cent, of the cases having an abnormal development of the nucleus. Of these 10 cases, 90 per cent show an increased sterility rate and 50 per cent an increased abortion rate.

Sterility of this character is probably due to trophic disturbances

in the later stages of spermatogenesis. It is very tenacious because an abnormal morphology of the spermatozoa, once established, is not readily influenced by extrinsic factors or drugs. Most of the abnormal cells are non-motile, but the lessened vitality is not confined to such cells. The infertility is much greater than the percentage of diseased cells observed would indicate. Several bulls exhibiting changes in the spermatozoa have been examined frequently for a period of about 9 months, and although their care and usage have been altered and improved, no perceptible improvement has occurred in the condition of the spermatozoa. It is interesting to note that, in 6 out of 8 cases where an evident increase in the abortion rate was seen in the cows served, an abnormal type of head was common.

If these observations are representative, it would appear that abortions in some cases are the result primarily of a lessened vitality of the germinal cells and not due directly to the infection present. That the changes may originally be the result of an infection is quite probable, but when we compare the abortion rate of this group with that of other groups which give greater clinical manifestations of active infection of the essential organs, we find in the latter a higher sterility rate. It is not clear to what extent infections are directly responsible for the arrest in development of spermatozoa.

Recently I have observed, in specimens from four bulls, cells which had appendages of cytoplasm to the anterior portion of the body. In one case cells of a more primitive type were present. In three out of four cases the fertility was perceptibly lessened. With the other case no accurate history was obtained, but from all that I could ascertain the breeding efficiency had not been impaired.

The occurrence of tailless spermatozoa indicates a loss in vitality of all cells present. The condition is apparently the result of trophic disturbances in the later stages of spermatogenesis, though it is possible that the elements from the accessory glands may to a limited degree bring about similar results. In the latter case, however, one would not expect marked morphological changes in the nuclear portion of the head. Tailless spermatozoa are usually coincident with a head of the constricted nucleus type. Where this occurs, the breeding efficiency is poor. Recently I have observed in one sample about 20 per cent of heads without tails, having no further morphological changes. The motility of the remaining cells was good, and no ill effects up to the present time have been observed from the use of the bull in the herd. However, free heads

should be regarded as an indication of decreased vitality of the spermatozoa, and, as in samples where there are abnormal forms, the rest of the cells of the particular sample may be expected to share the effects of the devitalizing agent, whatever it may be.

Total azoöspERMIA does not often occur. It is difficult in most cases to decide whether the proper number of cells are eliminated, but when the difference is very marked an estimation is possible. In one case where I estimated that the cells did not exceed about 50 per cent of their normal number the seminal fluid was straw colored and but very slightly turbid. In another case where there was a total azoöspERMIA the seminal fluid was of a watery consistency and entirely translucent. I do not know the origin of the seminal fluid in the latter instance, but it is doubtful if any of it originated in the seminal vesicles, as these were both badly diseased.

Although nature deems it necessary to produce such great numbers of spermatozoa that one may survive for fusion with the egg, it is hardly probable that such quantities are at all necessary, were it not for the possibility that the percentage of cells capable of fusing with the egg may be below normal. An apparent slight diminution in the number of cells excreted is of little significance, providing all are normal and of high vitality. If the reduction in the number of cells is apparent or other indications of a serious disturbance occur in the semen or genital organs, the condition should be viewed with concern.

In some cases the ejaculation is very scant and the mucus extremely viscid. Upon placing a small drop under the microscope it will be seen that there is no active locomotion. The cells may be seen clumped together in a very viscid mucus which serves to impede locomotion, although the cell is alive and apparently normal. The semen does not mix readily with the vaginal mucus and the spermatozoa remain more or less imprisoned. This, of course, interferes considerably with the fertility of the bull.

The question naturally arises as to what part infection plays in the production of infertility or impotence in the bull. Since an infection may or may not be clinically apparent, it is practically impossible to answer this question. Some of the changes, such as spermatocystitis, epididymitis and orchitis, are very definitely due to a bacterial infection. These different inflammations are closely related in many cases with changes in the spermatozoa or seminal fluid. The spermatozoa and semen may, however, be abnormal in the absence of any indication of a previous or present inflammation

of any of the organs. Especially is this true when there is a narrowing of the nuclear portion of the head, in which cases only 40 per cent of the animals which I have examined gave any clinical indication of an inflammation ever being present. We have attempted in many cases to ascertain the bacterial content, and to this end have had samples examined from about 30 bulls. A variety of organisms has been found, the most constant of which is a short chained streptococcus. We have no evidence in any of them of any etiological relation with the *Bacillus abortus* of Bang.

One bull was slaughtered on account of an extremely high abortion and sterility rate. The organs exhibited clinically no pathological evidence of disease. The spermatozoa were less motile than normal, although most of them were active to a limited degree and practically normal as to morphology. Inoculations from various parts, including the testicles, epididymes, vasa deferentia and seminal vesicles, proved sterile. I believe that in this case, as with several others that exhibited no marked clinical lesions but in which there were slight changes in the spermatozoa, the difficulty was entirely referable to the weakened vitality of the germinal cells and not to an infection. Of course at some remote period in the animal's life orchitis may have been present, but of this we have no evidence, and I feel justified in stating that this animal transmitted no infection to the cows he served, although out of 62 cows served by him 53.2 per cent did not conceive, and 31 per cent of those conceiving aborted.

It may be noted in some herds that the estrual cycle of almost all the cows becomes suddenly disturbed. Instead of coming at 21 days after service, estrum runs over two or three days or as many weeks. When this has continued for some time, the cattle breeder has very little or no idea what percentage of his herd is pregnant. The cessation of estrum ceases to be any indication of pregnancy. Examination of the cows will reveal few or no clinical lesions responsible for this phenomenon. This has been particularly the case in herds which I shall designate as A, B and C. In herd A, in which two bulls were used, I am informed that, up to about eight months ago, it was exceptional that estrual periods should be irregular. Since then almost all cows served by these two bulls have become irregular. In herd B, about one year ago, cows served by one bull began to abort in considerable numbers. Many animals would not conceive and their estrual periods were generally abnormal, especially just after they were bred and did not conceive. The

bull was removed from service, and the number of cows which now skip a heat after service and are not pregnant is well within the limit of error in the observation of the herdsman. In fact, an abnormal heat rarely occurs. The cows have generally conceived promptly from services by other bulls. Two or three have not, but estrum occurs at regular intervals in these animals. In herd C, in which three diseased bulls were used, improvement of the general breeding condition followed immediately upon cessation of their use.

In all these cases there was an abnormal type of spermatozoa which probably resulted in the formation of a weak embryo, unable to survive more than a week to three or four weeks. Abortion then followed unobserved and the cow again came in heat. As all cells of a given specimen are not of the same degree of vitality, the vitality of the embryo is dependent to a great extent upon the law of chance.

Very little is known of the extent of disease in the genital organs of the bull. Almost all practitioners have seen diseased bulls in which certain symptoms are very evident, but the detection of the less evident, those changes which are often of the greatest importance, has been neglected. Buck, Creed and Ladson report the results of the agglutination test for *Bacillus abortus* upon the blood samples of 325 mature bulls. Of this number they report an infection of the organs in 5 cases (1.54 per cent) and describe lesions in 2 cases which appear quite sufficient to render a bull infertile.

In contrast to this, out of my series of 40 cases, 20, or 50 per cent. showed lessened fertility, and other animals aside from these showed minor changes in the genital organs or semen. Several animals, in which the fertility was quite definitely lowered, showed very slight pathological changes; a few which showed very marked pathological conditions were functionally sound. My cases are all purebred bulls, most of them leading large herds. The percentage of diseased animals revealed is perhaps somewhat above the average, owing to especial attention being given to the clinically inefficient. However, the number of bulls in a given herd, unfit for service, may be very great. Thus, in one herd, 4 out of 6 were infertile; in another 2 out of 5, and in still another 2 out of 2, the latter being in a small herd where the bulls were used but little.

Infertility in the young bull is not uncommon. Over 50 per cent of the bulls with lessened fertility which I have examined have been under 6 years of age.

From the limited amount of work done upon the male, any definite conclusions now as to the extent of disease and its significance can not well be made, but I feel quite justified in stating that disease of the male reproductive organs is quite equal in importance to that of the female. Insemination with weak or dead spermatozoa may quickly be followed by a catastrophe to the herd. To the cow an abortion may be considered a serious handicap, no matter what its cause may be. If infection causes no permanent disability of the organs, the mere wasting of the breeding time by itself constitutes a serious economic loss. I believe that it is the duty of every practitioner who is working with diseases of the genital organs to consider carefully in each case the male as the source of the difficulty, and make certain that he is sound. Any veterinarian not possessing the knowledge on this point may expect to make serious errors in diagnosis. It has been the custom in the past to hold the cow accountable for all diseases of the genital organs, and I dare say this view has been responsible for many a good animal going quite uselessly to the shambles. The mere ability to copulate and the ejaculation of apparently normal semen by any bull is no proof of his reproductive ability.

CONCLUSIONS

1. The clinical examination of the sexual organs of the bull and of his semen is of vital importance and should be carried out by one who is equipped for the purpose.

2. Examination is best made with the aid of a high-power lens with the fresh specimen, and an oil-immersion lens with the stained preparation. The efficiency of the semen depends not only upon its physical properties but upon the number of spermatozoa which are motile, the degree of motility, degree of oligospermia, and the percentage of imperfect spermatozoa, either deformed or immature.

3. When fecundation is the result of the union of germinal cells of lessened vitality, abortion may result in the absence of any specific infection.

EXAMINATION OF SEMEN

The samples of semen for examination is best taken directly from the cow's vagina, which, just prior to service, should be freed as thoroughly as possible from vaginal mucus so that the semen is not too greatly diluted. Place the semen in the sterile vial and examine under the microscope within 30 to 45 minutes, in the mean time keeping the sample at about 102° F.

After noting the quantity and the physical characteristics of the

semen, a small drop is placed upon a warm microscope slide and covered with a thin cover-glass. It is immediately examined under a high-power lens and observations made to determine the relative abundance of cells, degree of motility, and number and character of dead cells.

The finer morphological details are best determined with a stained preparation. For this a smear from a fresh sample of semen is made upon a microscope slide and dried quickly by waving in the air. It is then fixed by heat. Staining for bacteria and spermatozoa require different methods. If for bacteria, the fixed film without any further treatment is stained with any of the common bacterial stains. When it is desired to stain the spermatozoa, the fixed film should be treated with a $\frac{1}{2}$ per cent chlorazene solution for about 7 minutes to remove the mucus, which otherwise clouds the field. Rinse with tap water and then either dry the film or wash with 95 per cent alcohol. It is now ready to stain.

For proper examination of stained preparations it is necessary that the cells should take the stain deeply and the constituent parts show in clear detail. Such is not readily accomplished with the common aniline stains excepting with the most painstaking technique. The most satisfactory stain which I have used is a triple stain made up as follows:

Stain No. 1

Alcohol	1 part
Carbol fuchsin	2 parts
Alcoholic eosin	1 part
Filter until no precipitate occurs.	

Stain No. 2

Loeffler's methylene blue.....	1 part
Distilled water.....	1 part

Stain the smear for 2 minutes with solution No. 1, changing the stain over the film continually, to prevent its precipitation. Solution No. 1 is very unstable; a precipitate occurs either if it is exposed to the air too long or if it comes into contact with the slightest moisture. Rinse the smear under a gentle stream of water and counterstain for 3 seconds with solution No. 2. Examine under the microscope and ascertain the quality of the stain. If the counterstain with methylene blue is insufficient, stain again for 2 or 3 seconds. If the eosin-carbol fuchsin stain is not properly applied and a precipitate occurs, remove the stain with 95 per cent alcohol and restrain. Dry smear in air and cover with thin cover-glass if to be retained as a permanent preparation. Examine under an oil-immersion lens. Spermatozoa stain a purplish color by this method, and bacteria are usually not stained so as to be seen.

Abnormal findings in either the fresh or stained preparations should be checked with subsequent samples, but normal findings may be considered as conclusive evidence of health.

SURGERY OF THE UDDER IN DAIRY COWS¹

By R. L. WEST, *Waseca, Minn.*

THE subject as assigned to me is "Surgery of the Udder in Dairy Cows," but I intend to confine my remarks to affections of the teats and their surgical treatment. I am not posing as an authority on this subject. Surgery of the teat in dairy cows has always been considerable of a bugbear to me. I have had more than my share of it to do. If I can start a discussion of the problem, which may not be so much of a problem to the older practitioners, my object will have been attained.

The difficulties of surgery in this region are no doubt recognized by all, but to sum them up: First, in the large majority of cases we are called upon to do this work on cows giving milk; in fact, most commonly on those which have just freshened. Hence we have the milk flow to contend with, making healing by first intention difficult, due to contamination of the wound by milk, mechanical interference with the wound during the process of milking, and making it impracticable in most cases to remove the patient to the hospital, making it necessary to leave the after care in the hands of the layman with all that that implies. Second, the ease with which the udder may become infected by the insertion of foreign matter through the teat duct, unless unusual care is exercised; and third, the practical impossibility of maintaining dairy cows in slings, making it difficult to guard against post-operative infection when the animal lies down.

To offset these disadvantages, we have a few factors that make for ease and success in operating in this field. First, the accessibility of the parts, under proper restraint; second, the parts being hairless, making preoperative disinfection and cleansing easy; and third, the fact that this is one of the few places on the animal body where dressings can be secured successfully by means of adhesive tape.

We have three general classes of surgical diseases of the teats to contend with; i. e., traumatism, fistulae of the teat duct, and obstructions of the teat duct.

TRAUMATIC WOUNDS

Traumatic wounds are not usually of much consequence unless the lactiferous duct is involved, but in the rare cases of this kind to

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which we are called every effort should be made to obtain healing by first intention. The client has doubtless wrestled for weeks in the past with cows with torn teats, and when he finds a serious-looking cut entirely healed in a few days his satisfaction is something wonderful to behold. And after all, satisfaction on the part of the client is the best fee that a veterinarian can obtain. Of course where the teat is badly lacerated or contused, or both, healing by first intention is impossible, and the client's mind should be prepared for a long period of gymnastic exhibitions at milking time.

In case the milk duct is involved—and we are not often called unless it is—even greater care should be used to obtain primary union. In the first place, always cast the animal. I hog-tie all four legs, even in pregnant animals, and tie the tail out of the way. I do not believe that there is any method of restraint by which proper work can be done in these cases with the animal standing. There is practically no danger of any bad effects from casting, even in cows in an advanced stage of pregnancy, although it is of course always well to prepare the owner's mind for such a contingency.

If the wound is of more than an hour's standing I remove the entire surface of the wound with a very sharp scalpel. Hemorrhage usually ceases spontaneously in a few minutes, but if not it should be thoroughly checked. I then cleanse the wound very thoroughly with mild antiseptics. If possible to obtain boiled water, I use physiologic saline solution only. The wound is then painted lightly with tincture of iodine and sutured. I consider it very important to insert a row of buried sutures of fine medium hard chromic gut. For this purpose I use a small No. 20 full-curved needle and needle holders. These sutures are interrupted, and are placed rather deeply through the muscle tissue, as close to the milk duct as possible, but not through the mucous membrane of the duct. The skin may then be united with either a continuous suture of fine silk or by adhesive tape. The latter I consider preferable.

A self-retaining milk tube is then inserted in the duct; and here let me say that in all cases where a milk tube must be left in a teat for any length of time I always use one with openings throughout the entire length of the tube, the lowest being just above the self-retaining enlargement. This tube should be left in place for six or seven days, only removing it for a few minutes once daily to cleanse and sterilize it by boiling. This, in my opinion, is very important, for if the tube is removed for any length of time the milk which accumulates in the teat will surely work into the wound

and prevent its healing properly, usually resulting in a milk fistula. In instructing the client as to the after care, too much emphasis can not be placed upon the proper cleansing of the milk tube when removing and replacing it. If this handling of the tube by the layman could be eliminated it is certain in my mind that a much higher percentage of complete recoveries would result; but I have not found it practicable in the ordinary case to visit the patient daily for this purpose. The client invariably thinks that you are trying to pad his account, just driving out to wash that little tube and replace it, which he thinks that he could just as well do himself; yet I will wager that there is not one layman in ten who, in spite of all cautioning, will resterilize the tube in case it should touch the cow's foot, or even be accidentally kicked from his hand onto the nice clean bedding, while he is trying to insert it in the teat.

FISTULA OF THE TEAT DUCT

Milk fistulæ of the teat may be congenital but are more often the result of improper healing of traumatic or operative wounds. Their treatment should, if possible, be delayed until the end of the lactation period. If the opening is small it may sometimes be closed by cauterizing the opening slightly by means of the actual cautery; but I believe that an operation consisting of removing a piece of tissue including the opening of the fistula, and suturing, is more certain in its results and hence more satisfactory. I first insert a milk tube or probe into the milk duct through the natural opening, making an elliptical incision, including the opening of the fistula, down through all the tissues to the milk duct, wait for the hemorrhage to cease, remove all clotted blood and close the wound as before described in the treatment of traumatic wounds. In these cases also, even if the cow is practically dry, I insert a milk tube, as there is nearly always enough milk secreted by the quarter to interfere seriously with healing if means are not made for its ready escape through the natural teat opening. In these cases it is usually unnecessary to remove the tube for cleansing so often, and when the udder is not secreting so profusely it seems to be more resistant to infection for some reason. At any rate we seldom see an infected quarter from operating when the cow is practically dry.

OBSTRUCTIONS OF THE TEAT DUCT

Obstructions of the teat duct, causing partial or complete interference with the milk flow, are perhaps the most serious and difficult conditions affecting these parts that we have to treat surgically.

These obstructions may be of several kinds, viz., congenital atresia, papillomatous tumors, usually with a constricted pedicle or neck, accumulation of a varying amount of fibrous or epithelial tissue in some part of the milk duct, and true stenosis or narrowing of the lumen of the milk duct.

Congenital atresia is not usually noticed until the heifer comes in milk with her first calf. It is usually easily corrected by making an X-shaped incision over the end of the teat. I have fortunately not met with those cases described in literature where a portion of the milk duct is lacking.

Probably the most common obstructions are the tumorous growths of some kind which may occur anywhere along the course of the milk duct. They may be felt through the teat wall as more or less hard, firm bodies of varying size, and when a milk tube is introduced into the teat their point of attachment can usually be ascertained. After many attempts with various instruments I have given up trying to remove these tumors through the natural opening of the teat. After treating traumatic wounds successfully in that region I was encouraged to attempt their removal through an operative opening on the side of the teat, and I have since followed that procedure with much better success. The technique in these cases is very similar to that used in correcting teat fistulæ. The teat tube or probe is first inserted and an attempt made to locate the point of attachment of the obstruction. A rather free incision is then made clear through into the teat tube, endeavoring to cut through just to one side of the base of the tumor. The tumor is then removed with scissors or scalpel, the base of the tumor just touched with the fine point of the actual cautery (this stops the hemorrhage, and since I have been using it I seem to have less trouble with recurrence of the affection), and the parts sutured as described before and similar after care given. The important points in this operation, in my opinion, aside from the usual precautions as to asepsis, etc., are, first, the use of the actual cautery, and second, the location of the incision, close to the base of the tumor, as I believe that in this way the most complete incision of the tumor can be accomplished with the least sacrifice of the epithelial lining of the milk duct.

Those conditions in which there is a proliferation of fibrous or connective tissues in the duct are more difficult to treat, especially if a large portion of the length of the duct is involved. Use of the teat splitter and dilators give temporary relief, but in my hands the relief is only temporary. Hence in cattle of ordinary value I usually

open the teat well, leave a milk tube, and advise drying of the quarter as soon as possible and disposing of the animal at the end of the lactation period. I believe that amputation of the teat in these cases is really the rational procedure, but I have not practiced it. I have tried operating in a manner similar to that used in the case of tumorous obstructions, but it seems difficult to dissect away the excessive tissue without destroying so much of the lining mucous membrane that stenosis of the duct results. However, in the case of a valuable animal, where the proliferation does not seem excessive, I believe that such an operation is indicated, as in my opinion it gives the only chance of permanent and complete recovery.

COMPLICATIONS

Complications in all these operations are similar. The one most commonly met with and the most to be feared is, of course, infection and possible loss of the quarter, which may even result in a fatal case of mastitis. This infection is practically always occasioned by the use of an infected milk tube. Milk fistulæ, if they occur following an operative opening of the duct, may be corrected at the end of the lactation period. Aside from these complications, care should be used in giving a prognosis, as recurrence of the trouble or stenosis of the duct may supervene. While polyvalent bacterins should not in any way replace every precaution in regard to asepsis, both during the operation and in the after care, still I believe that their use at the time of operation, or, in the case of traumatic wounds, when they are first treated, is of material benefit in preventing post-operative infection of the udder.

This in a general way has been my method of handling these cases. Teat troubles, especially in valuable dairy cows, are exceedingly trying to the dairyman and are often the cause of severe monetary losses; so if we can work out more satisfactory methods of handling them not only are we performing a real service, but I think that there are no fees more cheerfully paid than those for work of that kind where the actual benefit from the operation is so plainly apparent.

It is announced that the Second International Congress of Comparative Pathology will be held at Rome in the spring of 1921 under the presidency of Professor Perroncito. The first congress was held at Paris in 1912 and was attended by more than 500 physicians, veterinarians and botanists.

THE OCCURRENCE OF EPITHELIAL TUMORS IN THE DOMESTICATED ANIMALS¹

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INTRODUCTION.

THE economic importance of tumors in the domestic animals is entirely underestimated. Of the epithelial tumors the papilloma is the most common. Next comes the true epithelioma. The adenoma and the adeno-carcinoma are not so numerous.

The papillary epitheliomata occur sporadically and enzoötically. Often all the dogs in a kennel are affected, while calves in a single stall are also found affected simultaneously. This points to infection as being the possible causative agent. They occur in the mouth, esophagus, stomach, around the external genitalia, in the urinary bladder and on the skin generally. In general, papillomata are most common at the places where there is a transition of epithelium from the true skin to a modified epithelium.

Papillomata of the skin, according to Kitt, have been seen in newborn foals and calves. In addition to the congenital origin they are claimed to result from a mechanical irritation by the amniotic threads. Usually the development appears to be due to inflammatory irritation in which there seems to be a contagious material. Schindelka produced papilloma in calves by rubbing sections of warts on the lightly scarified skin. Zwick and Royere contend that warts are infectious and that they are identical in man and beast.

The places of predilection in horses and dogs are the external genitalia, the lips and the foot of the horse. The papillomata are particularly numerous on the udder of the cow. They may also occur on various parts of the body in the same animal. They also occur on the head, ears, side of the neck, shoulders, abdomen and the extremities. They were also seen by Youatt and Van Hieffelen in goats and sheep.

The mucosa of the mouth is predestined to papillomatosis. Here the papillomata seem to be due to mechanical irritation, in the horse by taking up hard fodder (König). On the other hand, an infectious

¹ Presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

agent may be the cause; for example, in dogs, where often an entire kennel is affected by papillomata of the mouth. According to Kitt, they proliferate quite often in cattle and dogs from the gums of the lower jaw in the region where the teeth cut through. They also occur on the mucosa of the lips, gums and cheeks, as well as on the tongue and the pharyngeal mucosa. They are often seen in dogs that suffer simultaneously from a chronic catarrh, so that they appear to be infectious (Gratia).

Filiform, coraliform and pedunculated papillomata occur in the esophagus of cows. They were also observed in the omasum and reticulum. In the stomach of the horse papillomata commonly occur at the line of transition between the cardia and the pylorus. They may result from an inflammation or they may be present independently of any inflammatory irritation (Kitt). In connection with the proliferation of the squamous epithelium, the glandular tissue may also proliferate.

Adenomata of the skin arise from the sebaceous or the sweat glands. They may be a simple hypertrophy of the sudoriferous glands, as occurs in chronic eczema of the back (Siedamgrotzky). They may also be due to retention of the secretion associated with a glandular proliferation leading to cyst formation (cystadenoma). In dogs the sebaceous adenomata are common. The circumanal glands seem to be particularly predisposed to tumor formation. The sebaceous glands in the skin around the concha of the ear and the sweat glands of the external auditory apparatus are also often hypertrophied.

Carcinoma of the skin originates in the squamous epithelium, the so-called horny cancer, or epithelioma. It may also take its origin from the sudoriferous or the sebaceous glands of the skin. The carcinomata develop preferably in the places where the skin goes over from the general skin to the mucous membranes. The shoulder and the croup have also been seen as the primary seat of carcinomata (Fröhner). On account of the extreme importance of epidermoid carcinomata in domesticated animals, it was deemed best to devote a separate paper to these neoplasms.

Carcinoma of the mammary glands occurs mostly in dogs. Pütz undertook transplantation of mammary carcinomata in normal dogs. They healed in, were resorbed, and no noticeable tumor growth resulted after a year of observation. One dog developed multiple carcinoma of the lactiferous glands with metastasis in the lungs and in the ligaments and epiphyses of the left elbow joint.

Carcinomata arising from the nasal mucosa are composed of cylindrical cells. They are of rare occurrence. Eberlein described two such cases in the horse. A similar tumor primary in the mucosa of the frontal sinus was noted by Kitt. On the other hand, tumors in the maxillary sinus of the horse have been observed quite often. They develop from the epithelium of the hard palate or from embryonally misplaced epithelial islands.

Primary adeno-carcinomata of the lungs are quite rare. They arise from the mucous glands of the bronchi. More rarely their origin is in the bronchial epithelium, or in the flattened epithelium of the alveoli. They have been seen in the horse (Nocard), sheep (Schütz, Besnoit and Eber), dog and cat (Kitt).

Thyroid carcinomata occur quite often in the dog. They were also described in the horse (Pfeifer).

Adeno-carcinomata of the kidney have been observed in horses, cattle, swine and dogs. We have observed an enormous sized adeno-carcinoma of the kidney of a horse used for anatomical dissection. Papillary carcinoma rarely develops in the pelvis and ureter of the dog. On account of its embryonal situation and development, the kidney is a favorable place for mixed tumors. Johne saw a growth in the kidney of a pig which, owing to its structure, he named adeno-sarcorhabdomyoma.

In the ovary adeno-carcinoma and cystadenoma are the common tumors. Sarco-carcinomata also occur. These are known as ovario-blastomata. Uterine carcinomata are quite rare in domesticated animals. They have been seen mostly in dogs. In woman this is one of the most frequent forms of carcinoma.

Liver adenomata were described in sheep, dog, swine and cattle. An adenoma arising from bile duct epithelium was described in a horse. Hepatic carcinoma or adeno-carcinoma may be of liver cell or of bile duct epithelium. It is not so common in domestic animals as in man. It has been seen in dogs and sheep (Johne, Martin, Besnoit).

Scirrhous carcinomata of the pancreas were seen in several cases in dogs (Kitt). They have broken through into the intestine, with metastasis in the liver. A case of multiple adenoma of the pancreas has been described.

Kitt observed primary sarco-carcinoma of the peritoneum in horses. Casper described a case of primary carcinoma of the sub-lumbar and mesenteric lymph glands of a horse.

CASES

Case 1. A portion of the esophagus of a cow that was received for diagnosis. The organ was greatly enlarged for an area of 24 cm. in length. The enlargement was due to numerous irregularly rounded growths projecting from the mucosa and practically occluding the lumen. These whitish nodules varied from 1 to 4 cm. in diameter. On section they were found to be composed of whitish connective tissue and covered by a more granular layer 1 mm. thick. This layer resembled the normal mucosa of the esophagus (fig. 1). Microscopic examination showed it to be a papilloma.

Case 2. A 7-year-old chestnut mare, driving type, that was destroyed on account of progressive paralysis due to degeneration of



Fig. 1. Papilloma in esophagus of cow. Case 1. (Half natural size.) A, papillomatous growths. B, mucosa of dilated esophagus

the lumbo-sacral roots, and to congestive spinal meningitis. On the line that marks the transition between the cardia and the pylorus there were numerous warty elevations varying in size from 1 mm. to 2 cm. in diameter. Microscopically these were seen to be composed of vascular connective tissue arranged in the form of papilla:

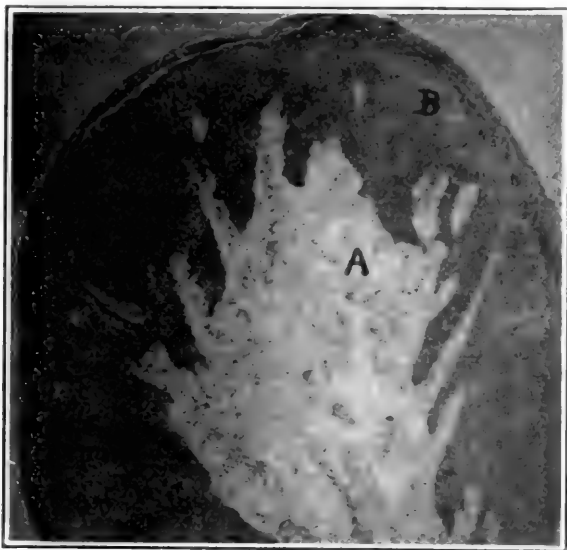


Fig. 2. Papilloma in teat of cow. Case 3. ($\times 40$.) A, vascular connective tissue. B, thickened epithelial layer

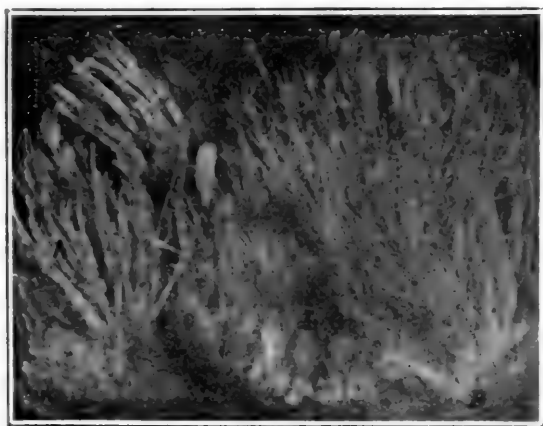


Fig. 3. Papilloma from eyelid of cow. Case 4. (Natural size.) A, filiform papillomatous outgrowths. B, place where skin has been removed

and covered by a thick layer of stratified squamous epithelium. The adjacent glandular tissue also showed irregular proliferation. This is a case of multiple gastric papilloma.

Case 3.—Tumor, 3 mm. long and 1.5 mm. in diameter, removed from a teat of a cow. The teat canal was occluded. Microscopically it was composed of vascular connective tissue covered by stratified squamous epithelium. This is a papilloma of the teat (fig. 2).

Case 4.—Growth on skin around the eye on the membrana nictitans of a cow. Received from Dr. Juliand, Greene, N. Y. It involved an area of 8 cm. long and 2 cm. in its widest part. It was composed of whitish threads 2 to 6 cm. long and 0.5 to 1 mm. in diameter (fig. 3). Microscopically this was found to be a papilloma.



Fig. 4. Section of papilloma from penis of horse. Case 5. (Natural size.) A, corpus cavernosum. B, deviated urethra. C, beginning of papillomatous growth. D, connective tissue. E, epithelial tissue

Case 5.—Tumor removed from glans penis of a horse, surgical clinic. The tumor, 1 cm. long and 6.5 cm. in diameter, was granular, of a grayish color, and covered by a sticky substance. It was composed of finger-like projections varying in size from 5 mm. long and 2 mm. in diameter to 4.5 cm. long and 3 cm. in diameter. The smallest ones were next to the penis and the largest were those farthest away. There was a sharp line of demarcation between the penis and the new growth. On section these finger-like growths were of a whitish glassy appearance in the center, and surrounded by a grayish granular zone. The urethral opening deviated so that it opened on the side. On microscopic examination this tumor was found to be composed of richly vascular connective tissue arranged in the form of papillæ and covered by a heavy layer of stratified epithelium. This is a case of papillary epithelioma (fig. 4).

Case 6.—A poorly nourished 12-year-old gray pointer with black spots, spayed when about 6 months old. She began to lose flesh 5 months previously. Destroyed by ether.

Autopsy showed little subcutaneous and subperitoneal fat. The mesentery, visceral and parietal peritoneum were markedly congested. The liver was larger than normal and contained numerous grayish white nodules varying in size from 1 to 5 cm. in diameter, projecting from the surface. On section a large quantity of reddish liquid escaped. There were a few scattered nodules in the interior of the liver tissue. The parenchyma appeared hazy. The hepatic lymph glands were greatly enlarged. They were united into a mass about 8 cm. in diameter. In color this mass resembled the nodules that were found in the liver. One omental lymph gland was 1.5 by 1 by 1 cm., of a reddish color, and contained grayish white spots at one end. The spleen was enlarged and contained three hematomas, each about 1 cm. in diameter. The left thyroid was about 5 cm. in diameter. On section a quantity of pus escaped, leaving in the center a cavity about 3 cm. in diameter. The rest of the gland had a hazy appearance. The right thyroid gland was normal. The heart was dilated, particularly the left ventricle. The valves were normal. All the other organs appeared normal.

Microscopically the follicles of the thyroid were larger than normal, irregular in shape, and filled with degenerated cuboidal cells. In places there was a little colloid. In the liver the nodules were composed of cells resembling the follicular cells of the thyroid with colloid material between them. Immediately around the nodules there was a considerable amount of colloid between

the cords of liver cells. The liver cells showed cloudy swelling.

This is a case of a colloid carcinoma arising in the thyroid follicles, with metastases in the liver, the hepatic and the omental lymph glands.

Case 7.—A well-nourished aged male hound weighing 22.5 kgs. that was destroyed on account of posterior paralysis. He had a cataract on each eye, small papilloma behind the elbow joint and one on the penis.

The right thyroid gland was 10 cm. long and 5.5 cm. in diameter. The distal end was lobulated. The left thyroid was apparently normal; it measured 4 by 2 by 1 cm. On section the right thyroid was nodular, the nodules being yellowish white in color. There was a hard nodule 1 cm. in diameter involving the subcutaneous tissue in the region of the right thyroid.

The esophageal lymph glands as far down as the entrance to the thoracic cavity were swollen and nodular, the largest one being 5 by 3 by 2 m. On section these nodules were yellowish white in color and firm in consistency. In the lungs there were solid nodules 1 to 3 mm. in diameter scattered uniformly, mostly under the pleura. The pancreas was enlarged by numerous nodules 2 to 5 mm. in diameter scattered throughout. The liver contained scattered nodules 1 cm. in diameter in all the lobes. The wall of the gall bladder also contained several nodules. On section the lobules were found sparsely distributed throughout the organ, some of them being lobulated. There was a nodule 1.5 cm. in diameter in the left adrenal. The heart showed chronic dilatation of both ventricles with almost complete synechia of the pericardium.

Histologically the nodules in the thyroid were made up of large rounded cells with round nuclei occupying about one-fourth of the cell. These cells were arranged in large nests with very little supporting tissue. The metastatic nodules in the pancreas and in the other organs were surrounded by thick vascular capsules. In places these capsules were being invaded by nests and cords of cells. These cells were similar to those found in the thyroid gland.

This is a thyroid carcinoma with metastasis in the lymph glands, lungs, liver, pancreas, adrenal, and subcutaneous tissue (fig. 5).

Case 8.—A 2-year-old Holstein heifer, destroyed on account of sterility. Case of Dr. W. L. Williams. The animal was in good condition. There was a considerable amount of subcutaneous and subperitoneal fat.

The mammary glands were surrounded by edema. They were

soft and fluctuating. On section they were edematous and cystic, and a large amount of watery liquid containing a little milk oozed out.

Microscopically, the normal glandular tissue was absent. The fat was infiltrated by nests of cells arranged in tubules filled with cuboidal cells.

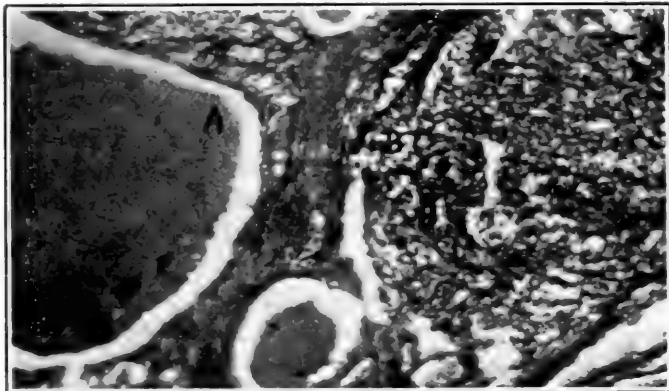


Fig. 5. Thyroid carcinoma in a dog. Case 7. ($\times 105$.) A, distended follicle filled with colloid. B, distended follicle filled with cells

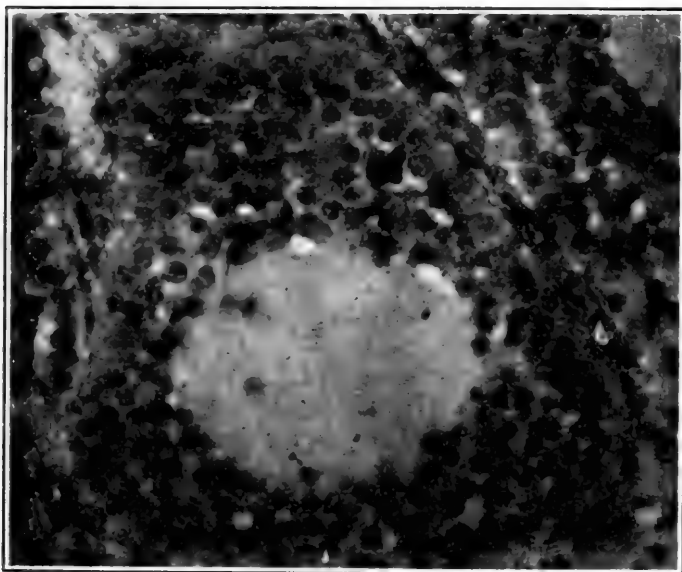


Fig. 6. Granulosa cell carcinoma in ovary of cow. Case 8. ($\times 350$.) Showing a Graafian follicle filled with granulosa cells and colloid material in the center. Adjacent to it are other similar follicles

The right ovary was enlarged to 15 by 12 by 12 cm. in the diameter. The surface was smooth excepting at one point where it seemed to have ruptured. It was adherent at this point to the omentum. This adhesion was of a brick-red color and resembled an organized clot of blood. The ovary was of a reddish color and the superficial vessels were tortuous and greatly distended with blood. The ovarian artery was also greatly distended with blood. On section there were spaces filled with a gelatinous substance and spaces filled with blood. There were also large vessels distended with blood.

Microscopically, the cortex of the right ovary was seen to be composed of follicles filled with granulosa cells and colloid material, sinuses filled with blood, engorged blood-vessels and a thick connective tissue stroma which was also infiltrated with granulosa cells (fig. 6). Toward the center there was a glandular structure with a tendency to formation of papillæ. The tubules were irregular in size and in shape. They were lined by cells ranging from cuboidal to cylindrical cells, the larger tubules being lined by the cylindrical cells.

The left ovary was 1.2 cm. long and 6 mm. in diameter, markedly hypoplastic.

The spleen was enlarged and lighter in color than normal. The capsule was covered by yellowish connective tissue growths. On section the pulp was of a yellowish brown color and the splenic corpuscles were distinctly visible. The organ bulged on section.

Microscopically, the growths on the surface were seen to be composed of connective tissue cells, a few fibroblasts and numerous blood vessels, covered by mesothelium. The splenic corpuscles were identical with lymph nodes, except that they contained the arterioles, either in the center or at the periphery, that are characteristic of splenic corpuscles. These corpuscles were lighter in the center where the number of cells was scant and darker at the periphery where the lymphocytes were compact. Around these corpuscles there were numerous polymorphonuclear leucocytes, eosinophiles and eosinophilic myelocytes packed together. The veins in this organ contained an excessive amount of polymorphonuclear leucocytes and lymphocytes.

The liver contained numerous abscesses varying in size from 2 to 5 cm. in diameter. These were composed of thick yellowish gray pus surrounded by thick capsules. The capsules were of a pinkish yellow color and varied in thickness from 3 to 5 mm.

The parietal as well as the visceral peritoneum was covered by tufts varying in length from 0.5 to 1.5 cm. and 2 to 5 mm. thick. These tufts were particularly numerous on the right side, the larger ones being near the ovary and gradually diminishing in size toward the anterior part of the body. In addition the peritoneum was thickened by tissue in the form of whitish nodules.

Microscopically, these growths were seen to be composed of fat infiltrated by tubules similar to those found in the mammary glands. The internal inguinal lymph glands were slightly swollen and congested. Microscopically, the sinuses contained in places tubules composed of cells resembling those found in the ovarian growth.

This is a case of a granulosa-cell carcinoma of the right ovary with metastasis in the peritoneum, mammary gland, and the inguinal lymph glands. No microscopic examination was made of the abscesses of the liver. While they appeared to be ordinary pyogenic lesions, it is possible that they also were metastatic foci of the neoplasm. We were presented with a set of slides from Ziegler's laboratory. Among these there are several showing a tumor in a woman similar to this one, with metastasis in the liver as well as in the peritoneum.

The spleen in this case showed evidence of formation of leucocytes, the polymorphonuclear and the eosinophilic varieties. This is indicated by the fact that the veins contained more leucocytes than the arteries, also by the Malpighian corpuscles resembling nodes of lymph glands. There was no evidence of red cell formation.

The metastatic foci in the lymph glands showed numerous granular leucocytes. According to Weill, such cells are formed in carcinoma.

Case 9.—A registered Guernsey cow about 10 years old, belonging to the Anna Dean farm, Barberton, Ohio. Case of Dr. W. L. Williams. The animal was in fair condition for her age. She was suffering from what was presumptively diagnosed as an abscess of the broad ligament, of about 6 months duration. This was removed surgically and was found to be an enlarged right ovary. The animal recovered and was apparently healthy at the time of writing, five months after the operation.

The right ovary was irregularly spherical, being 12 cm. in diameter and weighing 530 grams. The surface was smooth and shiny. At one end there was an elevation 2.5 by 2.5 by 1.5 cm.

This was apparently normal ovarian tissue containing several small cysts, each being 2 mm. in diameter, and a corpus luteum 1 cm. in diameter. On section the mass was found to be composed of yellowish gelatinous cysts interspersed by whitish granular tissue. The cysts varied in size from 2 mm. to 1 cm. in diameter. There was a capsule all around the tumor measuring from 0.5 to 4 mm. in thickness. The ovarian tissue was separated from the main mass by the connective tissue capsule excepting at one end where it was indistinguishable from it.

Microscopically the tumor was seen to be composed of follicles filled with granulosa cells and containing colloid material in the center.

This is a granulosa cell carcinoma of the ovary, similar to case 8. This one was removed apparently before metastasis had taken place. By the structure and location, such tumors do not metastasize very readily, and if removed early, recovery may be expected.

Case 10.—Tumor from neck of dog. Case of Dr. Hollingworth, Utica, N. Y. The growth was removed surgically and a piece received for diagnosis. It was a hard tumor and gritty on section. It was firmly attached to the trachea. Microscopically it was composed of cylindrical cells arranged in a glandular manner with spicules of bone scattered throughout.

This is a case of osteoid adeno-carcinoma that apparently arose from the mucous glands in the tracheal wall.

Case 11.—A guinea pig that was inoculated with suspected bovine sputum. In the usual course of time 1 c. c. of tuberculin was injected, which apparently killed the animal. Autopsy revealed nodules in the lungs, liver and spleen. Those nodules were apparently free from tubercle bacteria. Histologically the nodules in the lungs and in the liver were composed of tubules lined with bronchial epithelium. These tubules were of irregular shapes and sizes, with a small amount of connective tissue between them. The epithelium lining these tubules was of a cuboidal type resembling the lining cells of the bronchioles. The nodules in the spleen were apparently hyperplastic splenic corpuscles.

This is a case of adeno-carcinoma arising in the lining of the smaller bronchi or bronchioles with metastases in the liver (fig. 7).

Case 12.—A well-nourished adult ewe that was slaughtered on account of difficult respiration thought to be due to larvæ of *Æstrus ovis*. With the exception of the head, the animal was apparently normal.

External examination of the nostrils showed nothing abnormal. On opening the nasal cavities and the sinuses, the turbinated bones were found to be greatly enlarged, entirely occluding the right nostril and causing a slight deviation of the nasal septum (fig. 8). The mucosa of the right superior maxillary sinus was about 5 mm. thick and of a gelatinous appearance. The retropharyngeal lymph glands were slightly enlarged, otherwise they appeared normal.

Microscopically, the growth of the turbinated bones was seen to be composed of rounded cells somewhat resembling small, round-cell sarcoma. At the periphery, however, there seemed to be a

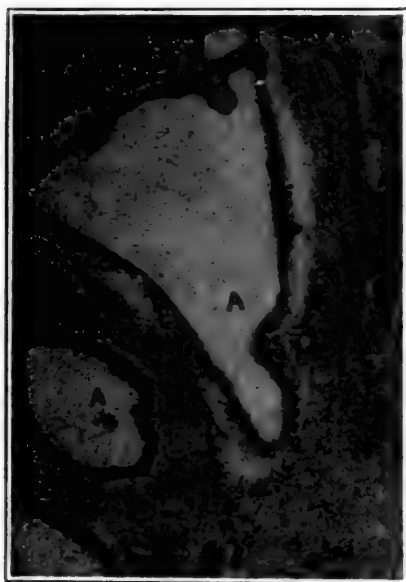


Fig. 7. Bronchial carcinoma in lung of guinea pig. Case 11. (x 65.) A, irregular sized and shaped bronchioles. B, connective tissue infiltrated by cords of tumor cells

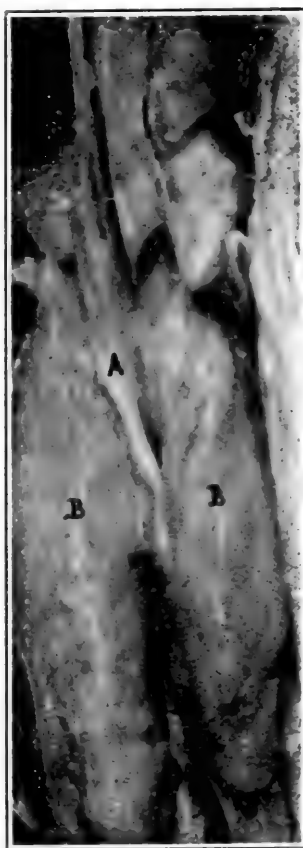


Fig. 8. Diffuse carcinoma in turbinated bones of sheep. Case 12. (Natural size.) A, nasal septum. B, thickened turbinated bones

transition from the columnar cells lining the mucous glands to those round cells. There was very little connective tissue in the growth.

Ewing has an illustration of a similar tumor in man which he calls diffuse carcinoma. He claims that such carcinomata are very often mistaken for sarcomata.

This appears to be a case of diffuse carcinoma of the turbinated bones.

Case 13. Tumor of kidney of a horse, accession 293. The animal died with an acute hemorrhagic colitis.

The right kidney was greatly enlarged by a circumscribed encapsulated growth 22 cm. in diameter. On section, the tumor was



Fig. 9. Adenoma in kidney of horse. *Case 13.* (A little less than half natural size.) A, atrophied kidney tissue. B, adenomatous tumor

composed of rounded areas surrounded by a little connective tissue. The tumor was rather soft and of a grayish color. There was a considerable amount of degeneration and necrosis in the center. The kidney tissue was pushed to one side and greatly atrophied. There was a sharp line of demarcation between the kidney tissue and the new growth (fig. 9).

Microscopically the tumor was seen to be composed of various sized tubules containing numerous papillæ. The tubules were lined by a single layer of cuboidal cells. There was a small amount of connective tissue between the tubules (fig. 10).

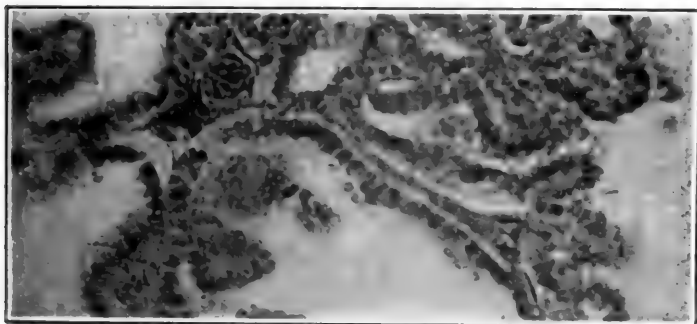


Fig. 10. Same as B in Fig. 9. (x 350.) Showing cuboidal cells forming papillary projections in a tubule

The left kidney was greatly hypertrophied.

This is a case of a papillary adenoma of the kidney.

Case 14.—A spayed, well-nourished, aged Maltese cat weighing 3 kg. She had a soft, somewhat fluctuating swelling 5 cm. in diameter in the right parotid region, from which a small amount of pus escaped on incision. Destroyed by chloroform. On section the mass was found to be lobulated and composed of soft whitish tissue with a considerable amount of degeneration and suppuration. Histologically it was composed of glandular epithelium infiltrating the tissue with a considerable amount of fibrin and polymorphonuclear leucocytes between the glandular epithelium. There was very little connective tissue stroma. The tumor was vascular, however. The cells were of the columnar type, resembling those found in the parotid gland. This is, therefore, an adeno-carcinoma originating in the parotid gland.

Summary of Cases

The first five cases are those of papilloma at the point of transition from the true skin to a modified epithelium or from one form of epithelium to another. They are in the esophagus of a cow, in the line of transition between the cardia and pylorus of the stomach of a horse, in the teat canal of a cow, on the membrana nictitans of a cow, and on the glans penis of a horse.

Cases 6 and 7 are those of thyroid carcinoma of dogs. In the former there were metastases in the lymph glands and in the liver. The latter metastasized in the lymph glands, lungs, liver, pancreas, adrenal and the subcutaneous tissue.

Cases 8 and 9 are those of granulosa-celled ovarian carcinoma of cows. The former showed early metastasis in the lymph sinuses of the internal inguinal lymph glands, in the peritoneum, in the mammary glands, and perhaps also in the liver. In the latter there was apparently no metastasis.

Case 10 is an osteoid adeno-carcinoma of the tracheal mucous glands of a dog. Case 11 is a bronchial adeno-carcinoma of a guinea pig with metastasis in the liver. Case 12 is a diffuse adeno-carcinoma of the turbinated bones of a sheep. Case 14 is that of a parotid-gland carcinoma of a cat. These four tumors are interesting as to both the origin and the structure.

Case 13 is that of a papillary adenoma of the kidney. It is a well-circumscribed tumor that by its growth produced pressure atrophy of the kidney tissue. It is composed of cuboidal cells arranged in an irregular glandular form.

The tissue reaction to tumor cells is, as a rule, encapsulation by connective tissue. In the case of malignant tumors the cells infiltrate the capsule, thus breaking down the resistance of the host. In diffuse carcinoma, as is shown in case 12, the tumor cells invade the tissues without any resistance on the part of the host.

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DR. HAVNER INJURED

Dr. H. H. Havner, specialist in animal husbandry of the Pennsylvania Extension Service, is in the hospital at Columbia, Pa., with a broken leg and other injuries sustained when the automobile in which he was riding was struck by a train at a grade crossing in York County, Pa. His companion, Mr. E. E. Owens, a junior in agriculture at Pennsylvania State College and acting as Assistant County Agent of York County, was instantly killed.

Dr. R. W. Tuck, who entertained the New Orleans convention with an address on "Federal Meat Inspection," is now on a vacation trip through France and England. He reports another outbreak of foot-and-mouth disease at Norfolk, where he is visiting his sisters. The disease is now apparently under control, the slaughtering method being used to eradicate it.

Dr. Wilbur J. Murphy of New York and Cornelius J. Hayes of Illinois, both of whom were formerly connected with the Bureau of Animal Industry, are candidates at the coming primary elections to represent their respective districts in the national Congress.

Dr. George J. Gruenewald was recently transferred from Hog Cholera Control work in Wisconsin to the B. A. I. Inspection and Quarantine service along the Canadian border, with official station at Calais, Me.

SOME NOTES ON THE COMPARATIVE STUDY OF VETERINARY MEDICINE IN FRANCE AND THE UNITED STATES¹

By L. A. MERILLAT, *Orrville, Ohio*

THE title of this paper as published in the program is "French and American Practice Compared." This title was selected by our distinguished chairman, Professor Bemis, who evidently thought my two years' sojourn in the A. E. F. qualified me for the assignment. At first the title seemed compliant enough a text to supply a wealth of material, but on second thought and in the attempt to elaborate on the subject it occurred to me that during my sojourn in France veterinary practice other than military did not actually exist, since during the war all French veterinarians were mobilized. The civil population were left with very few practitioners to administer to the ailments of the animal population. This is true of both rural and urban veterinarians. In Paris all the veterinary hospitals were closed. Even the great clinic at Alfort did not open until after the armistice. The schools of Lyons and Toulouse had been converted into hospitals for humans; that is, the dormitories were used as military hospitals. Alfort for a time was occupied by an artillery organization, and it did not function as a regular veterinary school until in the season of 1919. At the time of my departure Lyons and Toulouse had not yet opened for veterinary instruction. With these facts opposing, it is plain that I did not actually qualify as a judge of veterinary practice in France under normal conditions. There was no great opportunity to judge American and French veterinarians in their normal spheres of action.

My contact with French veterinarians was, however, a close one. There was a French veterinary officer assigned to my office to assist me while I occupied the position of Chief Veterinarian of the First Army, and for four months my connection with the Franco-American Veterinary Liaison Mission, which was composed of an equal number of French and American veterinary officers, widened my opportunity for making observations. Later I spent four months at Alfort and Paris, always in contact with men of our profession.

I have found without exception that the French veterinarian is a suave, dignified, courteous and scholarly man. His preliminary education is high, and his professional training, both scientific and

¹Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

practical, leaves little to be desired. In short, the French veterinarian is the product of a century and a half of progress among a people who possess an inborn penchant for scientific research. The snap judgment of some of our veterinary officers, generally from a limited observation, that they lack practicability, is incorrect. A closer observation would have shown them that the ability of the French veterinarian to apply his high scientific knowledge is little short of marvelous. At the risk of being called a panegyrist I would add that their lovable personalities and the high social status they occupy is enviable, viewed from the American point of view. They are original and at the same time have the good quality of being very poor imitators. They challenge everything new, almost ferociously, but are always the first to bow gracefully to the producer of proven facts. They scrutinize closely and carefully in making diagnoses, and studiously avoid making hasty conclusions, and they never make decisions before exhausting every available means of defending them. They have acquired a better general understanding of the problems of animal husbandry than we have thus far pretended to have obtained in our college training and field work, and while they are not all expert laboratory technicians, the percentage among them capable of carrying out their own pathological researches is a reflection of the high scientific status they occupy.

Veterinary education in France is national. There are three national veterinary colleges—Alfort, founded in 1765; Lyons, founded in 1761; and Toulouse, founded in 1825. The first one is located in a suburb of Paris and the others in the cities their names indicate. Aspirants for admission apply to the Minister of Agriculture and submit with the application their legal, moral and educational credentials. Admission is by competitive examinations held at different geographical centers of the country on the same day. The number of successful applicants the colleges are permitted to admit is determined by the Minister of Agriculture and is based on the civil and military needs of the nation. The applicant must be a citizen of France, between 17 and 20 years of age, and must hold the "baccalaureat" of the French educational system. (So far as it is possible to make parallel comparisons, this is equal to two years of college work in American universities.) Certificates of health, moral character and smallpox vaccination must accompany the application. Graduates of the National Agricultural College who have the baccalaureate degree are admitted without examination. Aliens are admitted by permission of the Minister of Agri-

culture under the same regulations as French citizens, but on completion of the course receive a certificate of qualification in lieu of the diploma. The competitive examination is both written and oral, and is a test of the applicant's knowledge of composition, physics, chemistry and biology, including zoölogy, botany and paleontology.

The college course is four years of ten months each, exclusive of examinations. In making comparisons of these schools with ours the most striking difference found is the qualification of the teaching staff. Each professor is a master of the subject he teaches, an authority of world-wide reputation. He is so well known to readers of books and current literature that one feels acquainted with him before the introduction. He obtains his position by gradual steps and through competitive tests. He is first a tutor, then a *chef de travaux* (assistant professor), before reaching the distinguished rank of professor. The organization of the teaching staff is unique. The school is divided into ten departments called chairs, each one directed by a professor who is supplied with an assistant professor and tutors as required. The branches of the curriculum are so divided among the ten chairs as to give each of them the same relative importance. The ten professors constitute the Council, one of them acting as Director. Each of the three schools have precisely the same organization and are supervised by the Inspector of Veterinary Schools, who is advisor of the Minister of Agriculture on matters of veterinary education.

The schedules are prepared each year by the Councils and must be approved by the Minister. When thus approved they are publicly posted in the college departments as the official work of the year. Deviation from the schedule is prohibited. Lectures not thus prescribed can not be given except on permission from the Council.

Schedule

First year.—Medical physics, medical chemistry, pharmacology, pharmacy, toxicology, medical and forage botany, anatomy (first part), histology, embryology, physiology (first part), hippo-mechanics and horse judging.

Second year.—Zoölogy, pathology of parasitic diseases, anatomy (second part), general therapeutics, *materia medica*, semeiology, elementary pathology and hygiene.

Third year.—Pathological anatomy, technique of autopsies, legal medicine, medical pathology (first part), surgical pathology (first part), clinics, surgical anatomy, operative surgery, shoeing, bovine, ovine, caprine, porcine and avian pathology, special operative surgery, clinics, obstetrics, general pathology and microbiology.

Fourth year.—Food inspection, inspection of establishments under veterinary control, medical pathology and clinics (second part), veterinary jurisprudence, surgical pathology (second part), bovine, ovine, porcine, caprine and avian pathology (second part), microbial diseases and sanitary police, and zootechnics.

Schedule by Chairs

First chair.—Medical physics, 15 hours; medical and pharmaceutical chemistry, pharmacy and toxicology, 60 hours.

Second chair.—Medical and forage botany, 22 hours; medical zoölogy, pathology of parasitic diseases, 50 hours; clinical lectures, 15 hours.

Third chair.—Anatomy, first part, 30 hours; anatomy, second part, 30 hours; histology and embryology, 25 hours; teratology, 5 hours.

Fourth chair.—Physiology, first part, 15 hours; physiology, second part, 40 hours; general therapeutics and materia medica, 30 hours.

Fifth chair.—Pathological anatomy, 40 hours; legal medicine, 5 hours; food inspection and inspection of establishments under veterinary control, 30 hours.

Sixth chair.—Medical pathology, first part, 20 hours; medical pathology, second part, 20 hours; clinical lectures, 30 hours; semeiology and elementary pathology, 15 hours; veterinary jurisprudence, 15 hours.

Seventh chair.—Surgical pathology, first part, 25 hours; surgical anatomy, second part, 25 hours; clinical lectures, 30 hours.

Eighth chair.—Bovine pathology and bovine operative surgery, first part, 20 hours; bovine pathology and operative surgery, second part, 20 hours; obstetrics, 27 hours; avian pathology, 5 hours; clinical lectures, 20 hours.

Ninth chair.—General pathology and microbiology, 25 hours; microbial diseases and sanitary police, 50 hours; clinical lectures, 20 hours.

Tenth chair.—Hippo-mechanics and exterior of the horse, 15 hours; hygiene, 25 hours; zootechnics, 55 hours.

Total hours (not including clinical lectures), 780.

The work of each professor is so arranged as to cover a definite proportion of the whole at each lecture, or lesson, as they are called. The feature of the teaching at Alfort that impressed me most is the great pains taken in preparing each lesson for presentation to the students. A lecture is not a perfunctory affair. It is a definite amount of the curriculum presented with great attention to detail and in a way to leave a profound and lasting impression on the mind. Its outlines are carefully written out on great blackboards which cover the entire front of the room, and the professor's

table is arrayed with all manner of illustrative specimens, some from the large museum and others freshly prepared and showing that a great deal of time and pains were taken in making them. These blackboard outlines and specimens are left in view of the students sometimes for several days to enable them better to complete their study and to tabulate properly their notes.

Each chair has its own buildings and equipment, including laboratories and such laboratory paraphernalia as the group of branches it covers requires. In fact, Alfort is constituted of ten separate colleges, one for each chair. They are so distinctly separated from one another that a visitor of one might remain entirely unconscious that there were nine others in the immediate surroundings, each working diligently with its own specialty.

Alfort is located adjacent to the banks of the Marne in a suburb of Paris of the same name. It is reached from Paris by tramway or by the river transports of the Seine. Its wall incloses a beautiful park embellished with flowers, magnificent trees, shrubs, walks, drives and monuments of such distinguished veterinarians as Bourgelat, Bouley, Trasbot and Nocard. It has ample stabling and profuse equipment for the general clinic, which is under the management of our distinguished colleague Professor Cadiot, whose work as a diagnostician and therapist impressed me as being almost magical. The small-animal department is not as complete as the Director desires, and a reconstruction is one of the approaching projects. The botanical garden of several acres, under the management of Professor Railliet, displays the French artistic temperament, and while excuses were made for its condition during the war, it appeared to me to be a splendid exhibition of plants of interest to the veterinarian that grow in that climate. I regretted very much afterwards that the day assigned for my official visit to the garden was not pleasant enough to enable me to gather valuable notes on its management and mode of utilization. The resources of France were so exhausted that such things which were not actually essential to the temporal welfare of the people were given scant attention. However, it reflects great credit on our colleague, Professor Vallée, an honorary member of this Association, that this feature of the college deteriorated so little.

Intra-semester examinations are given at intervals by the assistant professors after four days' notice to those who must take them. In these the student draws two questions from a prepared group and is given ten minutes for reflection and ten to answer. All

grades obtained are publicly posted. To pass to an upper class or to obtain the diploma the student must pass a final examination before the professor of each chair. The grades are submitted to the Minister of Agriculture for his personal consideration. Successful candidates are eligible to practice veterinary medicine and to compete for a commission in the veterinary service of the Army.

There are no veterinary laws in France as we know them in our several States. Anyone may practice, but the nongraduate is under such restrictions as to the particular disease he may treat and the drugs he may prescribe that the activities of the empirical practitioner are somewhat curbed. I say "somewhat" advisedly, because quackery is not unknown in France. In my travels in the rural districts I made a special effort to gather some information in this respect, and found that almost every community supported its handy horse and cattle doctor. The fact that all of the regular veterinarians were at the front may have intensified the situation and may have made it appear more grave than under normal peace-time conditions. I fear, however, from information thus obtained and that gathered by living almost a year in the home of a leading veterinarian of Paris, that the situation as regards empiricism is far from satisfactory to the practicing veterinarian, and I am also assured that the condition in Holland, Belgium, Germany and Italy is no better. In these countries empiricism and the patent-medicine industry thrive uncurbed. Judging from advertisements in the lay press and periodicals, it is legal to sell nostrums regardless of contents or of the effects claimed for them. Thus the veterinary practitioner, after having made this splendid preparation to practice, is little protected against cheap opposition. Then it appears that medical enormities and superstitions are practiced more among the European laymen than among the more intelligent American.

The one feature in which the French veterinarian differs most from us in this respect is the way he has been able to dignify his calling and separate himself from the empiric. Here we are still classed with the lowest type of charlatan, while in France everyone knows that the veterinarian and the quack belong to two entirely different categories of individuals. Here we fight the quack to rid ourselves of an undesirable companion, while in France no complaint is entered so long as the quack does not overstep his legal domain. The French practitioner looks on cheerfully as if rather satisfied to be rid of the uncanny and gruesome jobs he might be called upon to do if the quack were not in existence. This I think

explains the status of the quack situation in Continental Europe. The prices for veterinary services compare favorably with ours, and computed in the purchasing value of the money they are much higher than ours. The large veterinary hospitals maintain a horse-shoeing establishment as an adjunct. Asked the reason for this departure, a leading practitioner of Paris who had just reopened his establishment after it had been closed for four years said: "There is some profit in the enterprise, and it brings a beaten horse-path to the door." I have since wondered if this would not be a profitable departure for our city practitioners.

Then the large Army of France affords openings for many veterinarians. The rank is from second lieutenant (*aide major de deuxième classe*) to brigadier general (*vétérinaire inspecteur*). They receive the commission through the Mounted Service School of Saumur (*l'Ecole d'Application de Cavalerie*), entrance to which is by competitive examination to fill vacancies. The examination is a rigid one, including a search into the applicants' military aptitude. The course is two years, one with a mounted organization and one at the school. There is a rigid final examination leading to the commission, and those who fail must complete their military service in the usual way with the regiment to which they were originally assigned. It must be remembered that all physically fit citizens of France spend 28 years in the compulsory military service—three in the Active Army, eleven in the Reserves, seven in the Territorial Army, and seven in the Reserves of the Territorial Army. All able-bodied men are called at the age of 20. Veterinary students after answering the call may return to their studies and complete their service after graduation with grades above a private. This gives the veterinarian the opportunity of completing his service under better conditions than a layman. They receive non-commission grades from corporal to sergeant-major (*adjudant*), and after two years' service may apply for a commission in the Reserve Army, with rank as second lieutenant. Graduates and three-year students by meeting prescribed requirements obtain the grade of sergeant-major and retain that grade while passing through active, reserve and territorial periods of their military service. These are called auxiliary veterinarians.

The French have therefore three classes of veterinary officer in times of peace—auxiliary veterinarians, reserve officers, and the active officers. The latter are analogous to our veterinary officers of the Regular Army; the others are subject to call only when

needed. If a veterinarian arbitrarily chose to take his military service as a layman and not profit by the path of promotion open to him he would rank as a private if called into service of the Reserves or Territorials. At the beginning of the late war this very thing happened to some distinguished men, who, feeling assured with the long peace that reigned in France, failed to take advantage of this provision.

The French veterinary service, like that of England and the United States, underwent great changes in regulations during the late war. This war brought out in all countries (Germany possibly excepted) that the prevailing veterinary services of armies in general are not adequate to meet the needs of a devastating war. Their services as reorganized functioned well and proved a great economy to the nation. From the veterinarians' own standpoint it was not as satisfactory as the English service, but it functioned to the particular conditions existing. The French veterinary officer does not command men. The enlisted personnel belongs to the cavalry and is commanded by a cavalry officer. But he works under a wealth of detailed regulations that give him almost unlimited power in all questions of horse management. He communicates through veterinary channels to the Chief Veterinarian. Our service at this time, as I understand the reorganization, lacks this essential feature. We are no better off today than in 1917 except in the matter of rank, and if we were called to the field a few years hence our shortcomings would be just as great as they were at the opening of the late war.

The veterinary service of the French Army, like that of ours, is not satisfactory to the veterinarians of France, and the whole profession continues to struggle for better conditions. The veterinary military history of France as taught in the curriculum of the Mounted Service Schools at Saumur relates the campaigns for improvement of the service from 1772 to the present day. This history shows that there has been a constant struggle for improvement since the French Revolution. The efforts of the A. V. M. A. are therefore not unique. Troubles of the veterinarian to obtain a satisfactory status are world-wide.

Although I made no special effort to investigate the whole general plan of meat inspection in vogue in France, the inspection that I witnessed in both military and civil centers did not impress me favorably. It seemed to lack refinement, although the inspectors I met at work were well qualified to do better work. The work was

indifferently performed, much as if it were of no great importance. In small establishments I visited it was the custom to slaughter the animals and hang the carcasses some hours before the inspector arrived. The organs were heaped in a corner unmarked, and in two separate instances I heard sharp disputes between the inspector and the butcher as to what particular carcass a given set of internal organs belonged. This of course is no criterion, and is related as much in jest as to contrast it with our splendid Federal system that operates under such rigid regulations. Meat in France is eaten fresh and therefore calls for little refrigeration. The French people detest refrigerated meat, and when none other is obtainable many prefer meatless meals. On this account it hangs about entirely too long for unrefrigerated meat. In short, there seems much room for improvement in the actual handling of meat in the big markets. The small or retail markets are inviting enough, but the large ones do not seem to accord with the culinary system of France.

There is no gradation of milk nor any existing system of milk and dairy inspection designed to protect the consumer. Milk is handled in open vessels, and no regulations as to temperature, bacterial content or systematic tuberculization are enforced if they exist at all. The civil population are entirely indifferent to this situation, and those who comprehend the need of reforms seem to be handicapped by some naïve and hidden influence that prevents the initiation of remedial measures. In milk inspection in our large cities we lead the European, and I believe that the American public, indifferent enough, is as a whole wider awake and more discriminating in this connection. In fact, some of the leading veterinarians take but little stock in the transmissibility of tuberculosis from animals to man through the medium of milk consumed. Among these is our good friend Professor Cadiot of Alfort, who in a recent contribution gave it as his opinion that the danger is approximately nil, despite the admission that the disease is prevalent enough among the bovine population.

Another unique feature of French veterinary practice is mushroom inspection. It is the district veterinarian who selects the edible from the poisonous varieties found on the market, and to prepare for this work the inspection of mushrooms is included in the college curriculum. The work is of considerable importance, since both edible and nonedible varieties grow in great profusion in certain parts of France and constitute an important article of

diet. I had occasion to attend a lecture on the subject by the eminent parasitologist and botanist, Professor Railliet, and learned in this brief hour that the selection of edible varieties is no fool-proof undertaking. It requires lots of instruction and experience to become proficient.

In conclusion I should apologize for attempting to make contrasts between individuals, between professions, between nations, involving their merits and demerits. Where it pleases in one place such a task ruffles in another and is bound in the end to leave the author without much credit. I can not, however, in justice to all concerned, close this brief paper without paying tribute to my French and American colleagues in the military service. They rendered a noble and efficient service to their respective countries. In almost all instances they accepted a grade far below their civil status and served through the whole war, and until the governments relieved them, without complaint, faithfully and persistently performing their duties against obstacles that only military veterinarians will ever comprehend, and then returned to their civil duties with a zest that shows the fiber of the members of our profession.

“An unusually successful method of combating contagious animal diseases is suggested by the plan which has been worked out in Haakon County, South Dakota, during the past year. Blackleg, hemorrhagic septicemia, and anthrax were the important diseases combated by organization, proper disposal of carcasses, and vaccination. Fourteen animal-disease committeemen, appointed as deputy health officers, were instructed to make the campaign largely educational and to use authority only as a last resort. Considering the whole experiment, the results were satisfactory.”—*The Farmer*.

William W. Cutler, who recently sold his interest in Noyes Bros. & Cutler, Inc., will accept a similar position with the Beebe Laboratories, Inc., in which he has just acquired an interest. The Beebe Laboratories, Inc., under the direction of Dr. Ward L. Beebe, maintain an analytical laboratory and manufacture a line of vaccines and serums. By his entrance into the Beebe Laboratories, Mr. Cutler continues the connection with the medical supply business which his family has successfully maintained for three generations.

ANESTHETICS IN VETERINARY OPERATIONS¹

By R. R. DYKSTRA, *Manhattan, Kans.*

IN 1846 Jackson and Morton demonstrated publicly the practical use of ether, though it had been used in 1842 for this purpose, but without any publicity being given to it. As early as 1798 Davy advised the use of nitrous oxide as an anesthetic. Previous to the dates mentioned, human surgical operations were performed without the aid of anesthetics, and medical literature records that patients were carried struggling and screaming to the operating room, where fortunately nature soon stepped in, the patient becoming unconscious from the frightful ordeal to which he was subjected. During this day and age even the very minor human operations are performed with the aid of anesthetics.

In veterinary surgical operations we have not yet advanced to the same stage of humaneness in the treatment of our patients. The writer is loath to believe that this is due to a greater inherent cruelty in the veterinarian than in his human confrere, but rather to the greater difficulty in the application of anesthetics under the conditions under which the veterinarian is many times forced to operate, and also that institutions of veterinary education have not in times past attached sufficient importance to this very essential part of the curriculum. In the writer's mind there is no question but that many veterinarians do not realize the unfavorable, or in some instances almost repulsive, impression made on the owner of a pet or valuable animal by the barbaric cruelty of surgery without anesthesia. Most owners of animals are inclined to be rather practical minded, but many of them have informed the writer that they would rather destroy their animals outright than to have them "butchered alive." Nor must we forget the impression, probably only a fleeting one, made on our tortured patient.

Outside of the difficulties in application, no matter from what other angle viewed, there is no excuse for performing veterinary operations without adequate anesthesia. With this thought in mind an attempt has been made during the last few years in the veterinary clinic of the Kansas State Agricultural College to develop a form of anesthesia reasonably safe, easy of application, practical in character so as to meet the requirements of the average country practitioner, and fulfilling the dictates of a humane profession. The

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attempt was not entered upon as a fixed project, nor was it completed, but sufficient progress has been made to warrant a tentative report.

LOCAL ANESTHESIA

It was found that practically all minor and many major operations may be successfully performed under local anesthesia. The important point was to distribute the anesthetic used in such a manner as to have the operative area thoroughly infiltrated with the anesthetizing material, and at the same time use a minimum amount of anesthetic so as to avoid the general toxic effects of the agent used.

Cocaine hydrochloride in solution was the preparation employed. Perfect anesthesia could be obtained in nerve blocking for dental operations and in diagnosing lameness, in performing otherwise painful foot operations, and in dividing comparatively large sensory nerve trunks, by the injection of 1 to 2 drams of a 1 per cent water solution of the drug. In those surgical conditions in which nerve blocking could not be resorted to, and which demanded the removal of a comparatively large amount of pathological tissue, a $\frac{1}{4}$ per cent water solution of cocaine hydrochloride was in most cases found very satisfactory. Many fistulous withers may be operated upon with but little discomfort to the patient if the field is anesthetized by infiltrating it with 4 ounces of a $\frac{1}{4}$ per cent water solution of cocaine hydrochloride. This practically means 5 grains of the drug. This amount was not exceeded, and produced no ill effects in the average sized animal other than slight excitation. The same amount and strength solution was also successfully used in removing actinomycotic tumors in cattle.

Occasionally a horse or a cow is met with that either does not respond to very weak solutions or is hypersensitive, as the pain was not controlled as perfectly as desired. In such an instance from 6 to 8 drams of chloral hydrate dissolved in 16 ounces of normal salt solution may be given intravenously to an average-sized horse.

At a later date it was found that dissolving the cocaine in a normal salt solution enhances its anesthetic action.

The excitation produced by cocaine in horses was found to be a hindrance in the diagnosis of lameness, as it was believed that the disappearance of the lameness was due to the excitement rather than the anesthetization of the painful area. This may be successfully overcome by localizing the action of the drug by the addition of a small amount of adrenalin chloride.

As a local anesthetic no other drug than cocaine was used. Stovaine and novocaine could not be obtained during this period. It is believed that they would be of still greater service in some instances because greater amounts may be used, stovaine being only one-half as toxic and novocaine five time less toxic than cocaine.

GENERAL ANESTHESIA IN HORSES

Of the volatile anesthetics, chloroform gave the best results in our hands, especially when administered by a skilled anesthetist. For the average veterinary practitioner without skilled assistance, in our opinion it falls far short of being an ideal agent, and not suitable for use under usual farm conditions.

Fluid extract of *Cannabis indica* was not found to fulfil the requirements. It was administered intravenously. It does not produce complete anesthesia, though as much as 1 ounce was administered. In most animals, if given in large enough dosage, it causes incoördination of movement and appears to make some vicious horses easier to handle. In a few instances it caused delirium so that the animal became dangerous for the attendants. At no time did we observe prolonged bad after-effects such as thrombosis in distant vessels. We have used this agent intravenously in doses of 2 to 4 drams with good results in colicky affections where the pain was so intense that there was danger of the animal injuring itself. We believe it of special value in these cases, as in our experience it did not perceptibly reduce peristaltic action.

Chloral hydrate was used in various ways. Two ounces of the crystals dissolved in $\frac{1}{2}$ gallon of water administered per rectum has a quieting effect and produces incoördination of movement, but does not produce the degree of anesthesia essential for extensive operations. The same may be said for the oral administration of the drug.

The intraperitoneal use of a solution of chloral hydrate was tried in a very limited way only. It was felt that there was too much difficulty in a country practice in obtaining that degree of sterility in the solution demanded for an intraperitoneal injection. In instances the point of the needle used for injecting purposes becomes accidentally contaminated by penetrating the intestines, and upon its withdrawal deposits the contaminating material along its course, so that there is grave danger of an abscess developing in the abdominal wall.

Intravenously, in proper dilution, chloral hydrate has in our hands come closer to meeting our demands of a reasonably safe, easily applied, practical, general anesthetic for horses than any other agent. It has been our custom to prepare the patient by a subcutaneous injection of $\frac{1}{2}$ grain of atropine sulphate, which partially paralyzes the inhibitory nerve of the heart, thus in a measure discounting the depressing action of chloral on that organ. It is contended that some horses are very susceptible to chloral, and that others have a heart weakness which might be deleteriously affected by the chloral. We therefore have made it a practice to follow the suggestion of Savage to have ready for immediate use a 20 per cent solution of camphor in olive oil and to administer this subcutaneously in a dose of 1 ounce. According to Savage, Marfori has shown that the mammalian heart poisoned by chloral hydrate to such an extent that it has almost ceased to beat will revive under the action of camphor.

It has been our custom to dissolve 2 ounces of chloral in 1 quart of a normal salt solution; occasionally tap water was used with apparently good results. No dietary or other preparation of the patient is necessary. All or part of this is injected with proper precaution into the jugular, with the animal in lateral recumbency or in a standing position if preferred. Its passage into either the peri-venous tissues or the wall of the vein should be avoided, and also the entrance of air into the circulation. The danger of sloughing of tissues or abscess formation following such an accident as that first mentioned should not be underestimated, though in our experience it has never occurred. Savage claims that he has permitted a few drams of a 2 to 3 per cent solution of chloral hydrate to escape into the peri-venous tissue without bad after effects.

We have always been very careful to administer the chloral solution slowly, and, if undesirable effects are observed, to discontinue its administration immediately. If complete narcosis is desired, the 2 ounces of chloral dissolved in a quart of water may be safely given to a 1,200-pound horse. If the anesthesia is not deep enough, a few inhalations of chloroform will bring about the desired degree of unconsciousness. Unfavorable symptoms such as cyanotic mucous membranes, sweating, muscular trembling, very slow respiration and circulatory disturbances are treated by the use of camphorated oil, or strychnine sulphate, or both subcutaneously. These latter agents also hasten recovery. We have found it desirable, in order to avoid a tedious waiting for recovery when the animal is

on the operating table and has returned to consciousness, to place slings on the subject in the recumbent position, then turn up the table so that the patient is suspended in the slings, where more perfect recovery takes place in from 1 to 2 hours.

DOGS

The use of chloral hydrate also is followed by satisfactory anesthesia in dogs. Two drams dissolved in 2 ounces of cold water administered per rectum will anesthetize the average-sized dog in less than 10 minutes. If it does not, an additional dose is recommended. In a few cases, in order to obtain quicker results, we have used double the above-mentioned dose, and as soon as the animal is unconscious the excess or unabsorbed solution is withdrawn from the rectum with a 2-ounce bulb syringe having an 8-inch hard rubber nozzle. It is our experience that the drug causes less rectal irritation when dissolved in cold rather than warmed water.

SWINE

These animals are apparently not so readily affected by the rectal administration of a solution of chloral hydrate. We have administered per rectum as much as 3 drams of chloral in solution for every 50 pounds in weight, and then been compelled to complete the narcosis with inhalations of ether. We nevertheless prefer to anesthetize swine in this manner.

SUMMARY

1. Cocaine hydrochloride dissolved to the extent of $\frac{1}{4}$ per cent in a normal salt solution will anesthetize all tissues infiltrated with it.
2. Chloral hydrate in proper dosage dissolved in a normal salt solution and administered intravenously is a safe, satisfactory, practical, general anesthetic for horses.
3. Chloral hydrate in proper dosage dissolved in cold water and administered per rectum is a safe, satisfactory and practical anesthetic for dogs.
4. Chloral hydrate in proper dosage in solution in cold water is a fairly satisfactory general anesthetic for swine.

DISCUSSION

DR. GRUBER: How much per pound weight of chloral would you give in anesthetizing dogs?

DR. DYKSTRA: Two grains to about 5 pounds, per rectum.

DR. T. E. FOSTER: May I ask the Doctor what was the dose of chloral, per rectum, for hogs?

DR. DYKSTRA: We have used as much as 3 drams per 50 pounds of weight. I believe that could be exceeded, but I have never used more.

DR. GANNETT: Do you use anything other than ether on cats, with success?

DR. PATTERSON: I would like to ask the Doctor if he uses chloral in preference to the A. C. E. mixture in dogs.

DR. DYKSTRA: I have never used the A. C. E. mixture. Personally, I would prefer chloral. However, I think it is a little more practical. The A. C. E. mixture must be given by insufflation. The chief advantage of chloral is that it gives the man a chance to work with the dog alone for five or ten minutes. I was trying to make the paper practical for the average practitioner where he was all alone and had no assistants.

I have never used chloral for cats. I have always used ether. I have been afraid of anesthetizing cats.

DR. G. A. KAY: I would like to ask if you have had any difficulty in poisoning of cats, cats dying from giving ether alone. What are the results of the operation?

DR. DYKSTRA: We have had them die from ether, but we have always been very careful to give it slowly, and when we think anything is going wrong we stop immediately.

DR. KAY: I mean after-effects, not on the operating table. We have had some die with that.

DR. CARPENTER: I would like to ask Dr. Dykstra if he has ever had any trouble in getting the chloral into the rectum of the dog. Can you keep the chloral in the rectum?

DR. DYKSTRA: We have had some trouble. We had better results when we used cold water, rather than warm. We all know that chloral hydrate is very irritating, and it was my idea that the warm water increased irritation and the cold water rather reduced it, but the trouble has not been extensive.

DR. GANNETT: I have used various anesthetics on quite a number of dogs, and have found morphine to be very efficient.

NECROLOGY

On August 30, 1920, Frederick W. Ainsworth, inspector-in-charge, Lancaster, Pa., died of a complication of diseases. He was born at Pecatonica, Ill., March 16, 1862, and graduated from the veterinary department of Iowa Agricultural College. He entered the B. A. I. on February 7, 1898, and was in continuous service of the Government until his death.

“Hog cholera is as prevalent in China as it was in the United States before vaccination became available. In the delta region of Canton about 40 per cent of the spring crop of pigs die each year or are marketed because of this disease.”—*Wallaces' Farmer*.

THE TREATMENT OF CRYPTORCHIDISM¹

By E. E. WEGNER

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Washington, Pullman, Wash.*

EXPERIENCE teaches us that many otherwise useful and valuable animals are quite unsuitable for working purposes because of the retention of one or both testicles. Their dispositions are so very unreliable that many are a liability instead of an asset. They are never trusty, and most of them are ready to take advantage of the first opportunity to start trouble in the team or in the field. Many of them can not be permitted to run at large with the other animals, and I have seen some that would attack a man in the open field. They are generally much more excitable than the average entire male, and are not nearly so reliable.

In the very young animals this condition is seldom noticed, and it only comes to the attention of the owner when the animals are assembled for castration at the age of yearlings or two-year-olds. At this time it is the operator who makes the discovery that one or both testicles are retained. If castrated at one year of age it often happens that the organs are located with difficulty and may not be encountered by a casual examination. Therefore exhaustive examination in both the standing and recumbent positions should be made before the animal is classed as a monorchid.

Failing to locate the organ, one may take the normal one and allow the animal to be released, or he may allow the animal to go entire. It seems to make no difference in the future conduct of the retained one. If the normal testis is removed, one should make a careful record of the side from which the organ is removed, for future reference, as otherwise only a scar remains to tell the history of the former operation; and though this is quite reliable, a written record is better. The animal should be examined at intervals of six months to ascertain whether the normal descent has been made.

If the testicle has not descended at the age of two years the chances of its descending at all are very remote and operation for its removal may be recommended at once.

Animals over two years of age are frequently presented for operation, and some as old as ten years. This is really no handicap,

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as the older animals appear to suffer from the operation no more than the younger ones. In fact, they are frequently easier than the young ones, as the tissues are firmer and have a slighter tendency to tear. The animal's resistance at the greater age is noticeable, and unless an extreme age has been reached the patients are very desirable.

Animals are frequently presented for treatment that have never been observed by the operator. In this case, if they have attained the age of two years, operation is advised. It is surprising how often the testicles are palpated in the inguinal region of animals that are regarded by the owners as ridglings, and I consider the thorough examination of the canals very desirable, unless you wish to class all such cases as monorchids for financial reasons.

I have found that when the testicles are retained in the inguinal canals a very large percentage of them can be palpated, and the small percentage remaining are held exceedingly high. This applies to the average two-year-old that is not in high flesh, or any other animal that is in average working condition, and provided that the canals are normal. The spermatic cord that may be doubled and occupy the canal may also be palpated at times, though it is not always possible to tell for certain what it is. I would recommend, however, if one is not sure that he feels the testicle, that he make all preparation for a complete operation. In the absence of testicle or spermatic cord the canal has a distinct emptiness that is quite characteristic and differs considerably from the canal containing a doubled cord or a stump left after a previously successful operation.

My personal experience with about 150 such abdominal operations prompts me to say that the preparation of the animal is of very great importance. Simply withholding the coarse feeds, hay and roughage for a period of 30 hours is all that is required. The animal may have his water and grain, so that he suffers very little from hunger. This simple dieting is very essential, however, and should be insisted upon. One is frequently urged to operate as soon as the animal is brought in, so that the owner can witness the operation, as he usually expects to do. A reply that it is difficult for the operator and dangerous to the patient is usually sufficient to handle the situation. At times when these cases are met in the country, miles from a hospital and no previous notice of the cases, the temptation is very great to attempt operation in spite of one's better judgment, and I suppose under some circumstances one is justified in operating; but if the abdomen is full and the case difficult, one

may easily be sorry that he made the attempt. If he has no trouble he should charge it to good luck. With the full abdomen the bowels have a very decided tendency to pass out into the canal and remain there to annoy the operator, and especially when the animal strains, if it has not been completely anesthetized. In extreme cases it may be impossible to replace the bowels and keep them there; so I say, do not let this happen. It can be easily prevented.

After the animal has been properly prepared, the instruments, consisting of scalpel, scissors, emasculator and chain *écraseur*, are sterilized by boiling. Other instruments are occasionally necessary, but in the vast majority of cases those mentioned above are sufficient. If the operation is to be performed in the country the instruments may be boiled and wrapped in a sterile towel to be used when needed.

The animal is cast in the dorsal lateral position on the ground or mats, and tied with the straight pelvic tie, which flexes the hocks and holds the hind legs wide apart, exposing the inguinal regions in perfect manner for operation. The side to be operated is to be uppermost, and after the operation is started an assistant may hold the upper hock to advantage, pulling it outward to open the inguinal region still more.

The hocks and feet are covered with damp towels to prevent the contamination of the operative area. The entire region inside the thigh, the posterior part of the abdomen and the sheath are thoroughly cleansed as required. If clean and hairless, tincture of iodine alone is used in liberal quantities. If dirty and long-haired, thorough washing with a lysol solution and clipping followed by drying and tincture of iodine is the best method. The hands are washed well in antiseptic solution, and if necessary to aid with the casting, canvass gloves are worn to prevent contamination. When these are slipped off only a small amount of time is required to complete the sterilization. Lysol is my preference of a hand antiseptic, as it aids in lubricating the hands and this greatly facilitates progress of the operation.

I carefully examine both sides for scars of previous operations, as this gives very valuable evidence concerning a previous operation and frequently disputes a positive owner. If both sides have been opened previously, and two scars are found, then the scar evidence is of no value, and the selection of the side to be operated is made from the information received by palpation.

In the absence of any suggestion of preference, the left side is operated first, as about 65 per cent of monorchids have retained testicles on the left side. If the wrong canal is opened, the stump of the spermatic cord is encountered in the canal and the error is discovered before the operation has proceeded to a serious state, and the other canal is then made the object of operation. The object of the operation is to follow up the canal through which the testicles should normally descend.

The normal inguinal canal is easily followed after making an incision through the skin about 2 inches from the median line and parallel to it. The tissues of the canal can be thrust aside by using the fingers only. The error is sometimes made of missing the external ring and going outward under the skin of the flank. This may easily be prevented by a little care in making the advance, and is usually the result of nervousness. Occasionally one encounters an abnormal canal where the external ring is not well defined and is filled with a considerable amount of fibrous tissue. In such cases one may easily go wrong if extreme care is not taken in making the advance, and one must be guided by general anatomical knowledge to arrive at the inner ring.

When operation is attempted after a previous unsuccessful attempt, the difficulty is sometimes very great, as the canal is frequently filled with dense fibrous tissue which resists all attempts to separate it by blunt dissection. At times it is necessary practically to cut your way the entire distance through the canal, which is very difficult and annoying.

Once in the inguinal canal of the proper side, careful search should be made for any protrusion of the tunica vaginalis, and if such is found it is to be ruptured and the contents, usually the spermatic cord doubled, brought farther down and traction on the distal end applied, to bring the testicle up to the inner ring, which may then be enlarged by gently tearing it with the fingers so that the testicle may be drawn out. The opening thus made is only large enough to permit the testicle to pass, and the danger of prolapse is very remote.

If nothing is encountered in the canal, advance is made to the location of the inner inguinal ring, marked by a decided thinning of the abdominal wall at that point. The peritoneum here may be slightly loose and folded, and one may, by grasping the loose fold, palpate the spermatic cord just within. In these cases it is only necessary to break through and draw out the testicle. If the cord

can not be felt, a break is made in the thinnest part of the wall as high up in the canal as practicable and the fingers withdrawn and the tips placed in a circle around the opening. Then gentle movement inward and outward may cause the cord to pass out into the hand. If this fails, the forefinger is introduced and search is made about the region just inside. If this is not successful, two fingers are introduced and a wider search made, especially backward toward the pelvis. This two-finger search is practically the limit necessary to find the organ, or rather to find the epididymis or vas deferens, which can be drawn out and the testis will follow. Regardless of the fact that a great deal is made of the fact that the testicles are sometimes found against the diaphragm and in other remote places in the abdominal cavities, it still remains true that practically 100 per cent are at or very near the region of the inner ring only waiting for an opportunity to escape when someone kindly opens the gate.

Nor is it usually necessary to institute a prolonged search. A little patient, careful exploration is usually sufficient to locate the epididymis or the vas deferens. These may be recognized by the touch, especially the epididymis, which has a very characteristic feel. Structures of the cord also show a very natural willingness to pass out through the artificial opening, after that has been made, and frequently flow out without traction as soon as the fingers are pushed through the peritoneum, if this opening has been made at the natural point of exit.

One may ask, "How about the cases where the testis is not near the inguinal ring?" In most such cases it is the operator and not the testis that is abnormally located, though I admit that such cases do exist. If this occurs, the entire hand is introduced into the abdominal cavity and slowly thrust backward toward the pelvis, searching all the while for the desired organ. If it is not encountered, the vas deferens can easily be located near the bladder and brought down to the opening and the testis drawn out in that manner. Even in these cases the danger of prolapse is not as great as might be supposed, and the same precautions against prolapse may well be taken. The fact remains that even this opening made as high as possible in the inguinal canal is not likely to induce a prolapse.

After the testicle has been withdrawn and removed with emasculator or the chain écraseur, if the cord is short, the animal is allowed to regain his feet, and in 95 per cent of cases no packing or suturing is necessary. On this point there may be some difference of opinion,

but experience has taught me that the patients do vastly better when no pack is used and that the danger of prolapse of the bowels is much overestimated. In fact in the average case I am convinced that the pack is more dangerous than the open canal, since they soon become contaminated with pus if left any length of time. Where the opening at the inner ring is quite large I sometimes securely suture the skin of the scrotum to prevent complete prolapse if the bowel should descend. Only once, however, has this happened, and that was following operation on a case that had not been dieted and which developed a severe case of bloat after the operation. If sutures are used they should be removed after 12 to 18 hours, as there is little danger of prolapse after swelling starts, and future continuance of the sutures causes fever by preventing the escape of wound secretions. Perfect drainage is very essential to the prompt success of this operation. Many animals are removed from our hospital the day following the operation, as we recommend that they remain standing and quiet for the first 18 hours, after which they should be required to take one and one-half hours' exercise at a walk twice a day. Many of the patients that are operated in neighboring territory are never visited again, and those that are operated in the country likewise receive no post-operative treatment, and they make splendid recoveries, many of them having no greater trouble than the average normal castration.

Abnormal testicles come in for a considerable amount of discussion, but few are of any consequence as affecting the technique of the operation. Most of them are soft and small and are quite easily drawn through a small opening. In my experience I have encountered cystic testicles. The largest one when filled after operation held 16 ounces. This one was drawn up to the inner inguinal ring and the cyst punctured with a fine trocar and the fluid withdrawn, after which it was easily brought out. Another had on it an angioma oblong in shape and about 6 inches long and $2\frac{1}{2}$ inches thick. I admit that I felt some hesitation about withdrawing it, as it felt as if I were pulling the horse's liver out instead of the testicle. Examination of the cord to make sure that it was real was reassuring, and the entire mass was then drawn out. No serious consequences followed. Dermoid cysts have been encountered, but none have in any way affected the withdrawal of the testicle, nor were they discovered until after the organ had been removed.

To my knowledge only once was the testicle so large that removal through the inguinal canal was impossible. This case was operated

many years ago at the State College of Washington by Dr. Charles Frazier, now at Chicago, who removed through the side wall of the abdomen a testicle weighing 14 pounds.

In cases where both testicles are retained and the animal is to be operated, the question arises whether it is advisable to take both at once or allow the first wound to heal before removing the other. In such cases I operate the right side first, trusting that it will be easier than the left; and if that operation is attended with no unusual difficulties I feel at liberty to remove the other at the same time, operating both sides at once. While it is true that one operation is less serious than two, I do not feel that the danger is so great as to justify operating at two different times, unless the animal is very valuable.

The one difficult factor in cryptorchid operations is the fact that the operator is required to work without the aid of his sense of sight, and this is no simple handicap for many men to overcome, but it is not impossible.

I believe that the dangers and difficulties of this operation have been greatly exaggerated, and while such abdominal interference in the horse occasionally proves fatal, it does not hold the grave possibilities that some men attribute to it.

In conclusion may I say that I believe that the essentials of this operation are, first, properly dieting the patient; second, properly securing them so that the canals are accessible; thorough cleanliness; removal of the organ through as small an opening as possible; then, above all, perfect drainage and regular exercise. By such a method you will find that few will swell to any great extent; fever seldom causes any anxiety, and many have no rise of temperature at all.

I consider the simpler after-treatment the very best, and results appear to justify that opinion.

DISCUSSION

DR. BELL. The Doctor certainly read a very interesting paper. There are one or two questions I would like to ask. In the first place, opening the testicles on both sides when operating, the Doctor mentioned that he had nothing but a scar to guide him. I have found in a great many of those cases, almost all of them, by picking up the scar in one hand, you can feel the stub of the cord that has been operated on successfully, without making an incision, going down after it and discovering it later. By that means you save that incision on the horse.

He speaks about following the inguinal canal. I think that might be quite confusing to a young operator when he attempts this operation and

goes through the external inguinal ring and goes to find the inguinal canal, which, I hold, does not exist. There is a place there for a canal, but it is filled with tissue. There is no canal until the testicle descends. Consequently you must follow from the external ring to the internal ring, directly through the connective tissue, under the internal ring. You make an examination and see if part of the testicle is through the ring, as the gentleman said.

Another thing that I question somewhat—it is just a difference in opinion, perhaps—is the dieting of the patient. It has been my practice to operate when they come to my office, without any preparation; and I would almost hate to tell you the number I have operated on and the number I have lost in the past twenty years. I think there is an advantage in operating when the patient hasn't been dieted at all. In puncturing the peritoneum you puncture it with less difficulty and push it loose from its casings. You reach it naturally from the back of the inguinal ring, and I wait for the animal to make a struggle. If he does it on an expiration, I push my finger through the peritoneum. That means if he is full of food, it prevents you from tearing the peritoneum loose from that abdominal cavity.

I manipulate, as the doctor says, for leaving the intestines through. I feel that it is a good procedure to bring the finger back and rather milk over the opening. Very often it will come open.

I have had no bad results at all. I feel that I can operate in more cases where the patient has not been dieted at all. The testicle is nearer normal. Those are some of the things that I wished to bring out in the discussion.

DR. LACROIX: I, too, prefer, in handling three-year-old or mature animals, to take them immediately. This is from habit, because it has been necessary so often that I prefer to handle them that way. I would like to ask the last speaker if he handles the three-year-olds the same way.

DR. BELL: If I throw him down and find the testicle hasn't come down yet, I advise the owner to let him go and allow it to develop. I handle some Shetland ponies, and with good results. I have only had one case where I didn't have good results. In that case we had a case of tetanus.

DR. WEGNER: I would like to say in reply to the gentleman who spoke a while ago that while I realize that there is no inguinal canal, I simply outlined the method of operating with or without dieting. I have my own opinion, and every man is entitled to his own. As to going through the muscles or going through the inner ring, I prefer to go directly through it. I have not had the experience of going outside, possibly, that he has had, and he may not have the other experience that I have had. I would advise him to try it some time.

DR. ADAMS: I would like to ask some questions. First, I would like to know if there is any good reason for making sure whether there is a scar or not. I have always felt that the direct method, making the incision directly over the ring, gave better drainage and more direct access and was preferable. I know a good many operators will pull out the skin in the region and work up until they find the location of the external ring, and they have quite a bit of skin on their wrists. I think there are a number of reasons why the direct method is better.

Of course there is no canal. I always feel with the tips of my fingers, and I like to make the incision along the long axis of that, between the inner line of the thigh and the abdomen, through the skin, the subcutaneous fascia, pushing the veins away, so as not to cut them; and then when you pass in, always pass in the direction of the external ileum, keeping the hand forward around the internal inguinal canal; crowd your hand forward until your knuckles are in the ring, and sweep the fingers back. I prefer to make my incision by the Danish method, puncturing the thin abdominal muscles and the shaft of the ileum. Sweep the fingers back until the belly wall feels very thin, puncture through with the index finger, follow with the other, and then, as Dr. Bell has said, when the full inspiration is heard, a quick puncture and you go through the peritoneum. I very much prefer to have the intestines full, and very much prefer to give a general anesthetic.

I have tried both ways, and I have given up the anesthetizing of the patient and given up the dieting of the patient, for two reasons. If the wall is lax, you will often have to thrust in a great distance before you can get enough tension on that peritoneum, and you have driven that away from that abdominal wall; and sometimes if you haven't been clean you have an abscess in the sub-peritoneal fascia.

You ought not to have a prolapse in these animals that have long, full intestines, but as a rule in those that have been dieted. Then separate the two fingers. That makes the vacuum, and something fills that vacuum, and very often it is the tail or epididymis; you can always tell by feeling something like nodules in a silk purse. There is nothing in the abdomen that feels like that epididymis. I don't care to catch hold of the epididymis in the canal if I meet it. No matter how much you pull on it, you had better always disregard it, and leave it there and go on and do your abdominal work, then get your epididymis and draw it out again.

Suppose, after separating your fingers, nothing but the soft bowel comes in. What is the next thing to do? Sometimes shifting the patient on the back will release it, but very often it is advisable to have an assistant roll up his sleeve and carry his hand up the rectum; and when he carries his hand away, very often the intestines drop into the hand, while you can't reach it with the fingers. I wouldn't go on up with the hand, although I have taken it with the right hand, but it is better to have some assistance. Say to your assistant, "Go in with your hand until you feel my hand. Now, stir things up a bit." It is very simple.

These patients do a great deal better if they go right out on pasture. I would rather have them on pasture and leave them there. Our infections come from the stable, and when I am required to operate on a case and keep it in the stable, I put a veil of sterile gauze in the canal and put a loose suture into the skin for a few hours, possibly 36, because when he rises, or when the leg is in abduction, he sometimes sucks air through. I would rather that air be sucked through a veil. In other words, I would rather have him out in a pasture where the infections are very mild and don't require anything in the lower canal, and don't give any trouble.

As far as the scar is concerned, suppose we meet an animal with a scar on each side. Very often you can tell whether the castration has been performed at the time the scar was made by simply passing one hand into

the rectum, one hand across the ileum and holding there. Then you can take the scar and pull it down and see whether it tightens on your fingers. If the testicle has been removed and the stump of the cord is down in the canal, the old line of scar tissue will tighten the cord clear up. You take that cryptorchid, however, where the cord is in the abdomen; you can pull the skin of the scrotum down as much as you want to, and you will never feel any tightening of the cord under the fingers. The appearance of the scar doesn't tell you anything. Some will tell you the scar that is not followed by castration is not dimpled in; it is smooth. You have to look for it on the surface. It depends upon how much digging and boring was done at the time of operation.

DR. FERGUSON: This gentleman has covered what I wanted to say. I wanted to speak to the Doctor on preparing the horse by diet. I used to do that when I first started to practice. I find that the abdominal pressure assists materially in the operation.

Relative to the age, I take them when I can get them. We do the operation on Shetland ponies the same. The only difference is in the length of the canal. In the Shetland pony it is probably only 4 inches; probably in the six-year-old it is 6 inches. The larger the horse the deeper the canal.

It is an unsatisfactory proposition to do a quick operation with the technique that you can produce out in the field. What you want is good, safe technique. You can't engineer a complicated technique. You have to make it safe, and the proposition from start to finish, I think, that we all use, that is of most use in this country, is to operate by scrotal incision, not to go over the external ring. If we just pick up the skin of the scrotum and run a scalpel through it, you have a good, big incision and are in the lymphatics or veins. With your two fingers you can separate, and a strain will break the tissues down.

A gentle rotation separates the normal canal tissues, and there is no canal there, but it is all ready to be a canal. Rotate your hand up there with a quarter of a pound to three-quarters of a pound pressure. The tissues break down, and very soon you are at the internal ring. There is not a ring there or what we term the ring. There is a thin spot on the peritoneum. If your fingers are hard on the ends, sandpaper them down so that they are sensitive. If I can manipulate a bit and find the ring there, I slip through there and give it a quick puncture and rotate that, and if it is a young animal, a yearling or two-year, then bring the testicle down through that. Then hold your hand cone-shaped up against the peritoneum and give a punch or two, and if the animal's abdomen is full you can go through the ring and a very slight pull will descend the testicle.

In an older horse, where the organs have been removed—and in those cases there is always a development of the hidden organ—if one is retained and the animal is allowed to go a few years, there is always an enlargement of that. Whether there is a ring present or not, it is dangerous to pull the organ down through that. If you tear that ring, it heals slowly. I prefer to go in front of the ring, make a rupture as close to the ring as possible, and secure the vas deferens. I never look for the testicle. It is absolutely foreign to the operation, and unless it is a complicated affair I don't bother with it. If I find it is too big to pull down through, I try

to diagnose the condition to see if it is a cyst. If I think it is cystic, I cut it.

I agree that the pasture is the nicest place in the world for the horses after the operation. Turn them loose. If the case is in the stable, pack by all means, but the packing creates swelling. If you leave the packing 24 or 36 hours, you have created a swelling that dispels that suction of air, that vacuum of air, and there is no danger of infection.

DR. J. R. FOWLER (TORONTO, Canada): Mr. Chairman and gentlemen, I just wanted to say a word about that inguinal canal. I hear some of the gentlemen say there isn't any inguinal canal, and still they use the term. I want to say a few words in connection with that. I believe there is a small number of students here that have heard me describe that inguinal canal. If you don't think there is a canal, just try passing your fingers through any other portion of the tissue. No doubt, gentlemen, we have to imagine to a great extent a canal, as we have to imagine in all work in connection with that. We have to imagine a lot. When we say a canal, we don't mean there is an opening there that we could throw a baseball down; but there is a space filled by a certain amount of tissue in a natural state. It is in a natural position when the testicle has descended and the cord is in place. You will find when you want to go down that you have to break down a certain amount of tissue. We call it a canal for the want of a better name.

There is one other point I want to mention, and that is in the location of the vas deferens. Dr. Ferguson put it very nicely when he said that all he wanted was the vas deferens held in position by the fold of peritoneum, which is not more than $2\frac{1}{2}$ inches. Consequently the vas deferens can not get out of your way any more than 5 inches. If you run your finger down to the side of the pelvic cavity, if you don't come in contact with that, you will find that there is something wrong. The vas deferens must be there, no matter where the testicle is.

DR. BELL: The point about the inguinal canal is important. The inguinal canal is surrounded entirely by the peritoneum. Now, I believe that dropping down back of the abdominal muscle, going through where it is thin, where the testicle pops out of my hand easily, is another point in that operation.

There is still another point. Perhaps you have operated and you didn't make diagnosis of hernia, and the patient had it, and it places you in an embarrassing position. When you attempt to reduce it, you have a good deal of trouble. If you will drop down back of the abdominal muscle, and make your break, as the gentleman said, as if you were going to operate, get hold of the intestines, manipulate them, you will reduce it, as you couldn't otherwise.

THE CHAIRMAN: I am sure there are others who want to speak on this. I believe there are some other points that should be cleared up.

DR. MERILLAT: I think the preference as to the full abdomen is simply a matter of not understanding. I believe everybody will agree that an animal full is not a subject for inguinal castration, neither is the one that is gaunt. It has to be some condition that helps the abdominal retention to bring the testicle to the point of approaching.

PROLAPSUS RECTI AND PROLAPSUS UTERI AND VAGINÆ IN DOGS¹

By J. C. FLYNN, *Kansas City, Mo.*

PROLAPSUS RECTI IN PUPS

PROLAPSUS recti appears most frequently in young, debilitated pups 3 to 6 months old. It may, however, appear without warning at any age.

Cause

Irritation is always the cause. This irritation may be the result of diarrhea, constipation, parasites, trauma, tumors, labor pains, enlarged prostates, and medical agents. Some of the above-named causes do not apply to pups, however.

Symptoms

Difficult, painful locomotion, blood-stained hind quarters and kennel floor. The patient shrinks from and resents examination. A long, cylindrical, bloody mass is seen hanging from and protruding through the anal ring, and presents a semi-solid, deeply plethoric mass, with lacerations from contact with foreign bodies. At the distal end and in the center is an orifice, through which passes, when the animal strains, a few drops of liquid or semi-fluid bloody excrement.

This mass is at first bright red, but after several hours' exposure it becomes darker and more swollen. If not treated it will become ulcerated, and necrotic areas may appear.

This prolapse may vary in length according to breed, age, and intensity of attack, and should not be confused with prolapse of the anus, which never protrudes more than a short distance; nor should it be confused with intussusception of the colon, with the rectum and anus in normal position. The last-named condition can be determined by inserting the finger between the anal wall and the procidence and finding the procidence circumvallated.

Treatment

The unceasing efforts of the patient to inhibit retention makes prolapsus recti one of the most difficult problems of the small-animal practitioner. Palliative treatment corrects such a small per cent of cases that, so far as the writer is concerned, the only success-

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ful treatment is amputation. This is done in the following manner:

Give hypodermic of H. M. C. As soon as the patient becomes quiet, wrap the protruded mass in cotton saturated in a solution of chlorazene. Hold in place with rubber bands. Sterilize the following instruments: Sixteen small curved needles with silk or catgut sutures, one straight and one curved forceps, one small pair of shears, two or three small artery forceps, one scalpel, one needle holder, one seton needle, one pair rubber gloves. Insert in the seton needle a strong cotton or linen thread about 18 inches long, so one end will be 6 inches and the other 12 inches long. Wrap a piece of cotton on the seton needle about the size of the lumen of the intestine and about 2 inches long. With the 12-inch string wrap the cotton lightly by looping several times, and draw the cotton to a point slightly past the end of the needle. Place this in a solution of chlorazene. Its use will be explained later.

The patient is then placed under a general anesthetic, the protruded mass slipped through a slit in a sterile sheet of rubber or gauze held firmly against the body, and the tail wrapped in sterile gauze. Remove the chlorazene pack, which should have been in place about 45 minutes. Place a rubber band around the mass close to the anus. Insert one jaw of the straight forceps in the lumen of the mass and clamp firmly. Have assistant grasp forceps in one hand and the tail in the other and keep a slight tension on the gut. With the scalpel make a transverse incision on the upper surface, about one-half to one inch from the anus, completely through the tunics of the external tube. Expose just enough of the serous surface of the inner tube to allow a stitch to be taken through the serosa and deeper layers of the anal portion of the outer tube and like layers of the inner tube; tie the stitch and cut off ends closely. Repeat this operation until a complete row of stitches (about eight in number) are taken and the external tube is severed. The median hemorrhoidal blood vessels should be included in the two lateral stitches. Severing only enough tissue for one stitch at a time prevents a twist or flexure in the bowel by preventing the inner tube from moving. Slip the outer tube back out of the way and make a small transverse incision through the tunics of the inner tube, about one-fourth inch from the first line of stitches. The anal portion of the external tube has a tendency to turn back to normal position, which fact aids the operator by bringing the two mucous surfaces closer together. A stitch is then taken to bring the two mucous surfaces together. Do not allow the needle to penetrate the

serous surface of either tube. Repeat this operation until the inner tube is three-fourths severed. Now grasp the anal portion with the curved forceps opposite the remaining strip, sever the strip with shears, and complete stitching. Remove the rubber band from anal portion; insert cotton-wrapped seton needle about one inch. Release curved forceps and replace remaining portion of prolapse. This places cotton pack with equal portion on either side of row of stitches. Slight traction on seton needle and 6-inch string causes the pack to be held in place and the needle withdrawn. The 6-inch string is left protruding. In about 15 minutes the pack should be removed by gently pulling the protruded string, which tightens on the pack and reduces its size.

After-Care

The patient should be kept quiet for two or three days. It is sometimes necessary to administer hypnotics if there is persistent straining. Continue fasting the patient for 12 to 24 hours, according to the strength of the patient, and put on light diet for two or three days following the fasting. A hot sitz bath night and morning tends to soothe the parts.

Objections to Other Methods

All other methods practiced by the writer to correct the condition have either prolonged suffering or caused fatal delay.

Amputation by ligation has the following bad features: Gangrene is produced and held in apposition with the clean, healing tissue, which is not good surgery when it can be avoided. The patient's suffering is prolonged, and there is danger of amputating a fold of intestine and causing death.

Laporatomy and ventro-fixation has the objectionable feature of producing a sharp V-shaped curve in the intestine, and the normal action of the bowel is interfered with and difficult and painful defecation follow as the result of the adhesion.

The tobacco-pouch stitch and use of astringents add to the irritation and cause continued straining and have never produced results for the writer.

PROLAPSUS VAGINÆ AND UTERI

The fact that only about 25 per cent of the small-animal practitioner's patients are females, and only a small per cent of those afflicted with prolapse of the vagina or uterus, makes this ailment rare rather than common. Especially is this true of prolapse of the

uterus, which is not nearly so common as prolapse of the vagina. This condition is extremely difficult to handle in a satisfactory manner both to yourself and your client. Especially is this true in the brood bitch that the owner wishes to keep in service, as the ordinary amputation by ligation or by dissection or any method that tends to lessen the lumen or interfere with the normal function of the reproductive organs can not be used.

Cause

This condition is caused most frequently by difficult whelping. It may also be caused by constipation, diarrhea, cystitis, tumor growths or any irritation that causes straining.

Symptoms

A pear-shaped, red mass is seen protruding from the vulva. This mass is covered with mucus and bloody serum. If of long standing, ulcerated or gangrenous areas appear. The patient strains, licks the hind parts, and makes frequent efforts at micturition. If there is a prolapse of the uterus in connection with the vaginal prolapse, one or both of the horns will be prolapsed, as the uterus in the bitch is so short that when it is everted a portion of one or both cornua will be exposed. I have never witnessed a case where both horns prolapsed. The mass ordinarily is readily replaced within the lips of the vulva, only to be again forced out as soon as the external pressure is removed.

Therapeutics

In brood bitches, replacement by digital manipulations and the use of a blunt instrument or tallow candle, and retention without surgical interference, should be practiced.

After coating with sugar and replacing, a large pressure pad, held in place by a liberal amount of adhesive tape, should be used, and the patient kept quiet for 24 hours. H. M. C. is a good agent to use at this time. Vaginal douche should not be given unless the mass has suffered trauma, as the presence of a foreign matter produces a desire to void which is undesirable at this time.

When the above method fails I resort to the following: Administer H. M. C.; pack the proci-dence in a solution of chlorazene held in place with rubber bands. Sterilize the following instruments: One scalpel, two rat-tooth, one pair curved shears, rubber gloves, two or three small hemostatic forceps, one pair curved forceps.

Give a general anesthetic. (The operation may be done with local anesthetic, but I prefer a general.) If hard feces are present they should be removed. Remove the chlorazene pack and empty the bladder. With large curved forceps grasp the everted horn by placing one jaw of the forceps within the lumen of the horn and grasp firmly. Withdraw the mass as far as possible and inject a solution of adrehalin. With the scalpel make a small transverse incision one-fourth to one-half inch long (according to the size of the organ prolapsed), through the mucous membrane at the vulvo-vaginal margin. Starting from the perineal surface dissect a strip of mucous membrane the size of the incision in a right oblique line, to the inferior surface of the os uteri. Leave a like strip of normal tissue, and repeat this operation until 50 per cent of the mucous membrane has been removed. For descriptive purposes the surface of the vagina might now be compared to the old-fashioned striped stick candy, the red oblique stripes representing the strips of removed mucous membrane and the white strips the remaining normal mucous membrane. With the curved shears clip several longitudinal pieces equal distance apart from the ring of the everted os uteri and treat the everted horn in the same manner as the everted vagina. After the hemorrhage is controlled apply a liberal application of sugar and replace the organ by digital manipulation and the use of a tallow candle. Apply a pressure pad and leave it in place 24 hours, and keep the animal quiet for two or three days.

The scars formed by the above operation act as a torsion obturator to hold the organ in place. This aided by the longitudinal strips removed from the os uteri and the application of sugar will control a large per cent of cases.

If this operation fails, and there is no gangrene present, I advise celiotomy and ventro-fixation. Where gangrene is present amputation or destruction is advisable.

DISCUSSION

THE CHAIRMAN: We have a short time for discussion or questions on this paper. There ought to be some questions. Dr. Flynn has described a very nice technique, it seems to me, on these operations.

DR. MILLER: Mr. Chairman, I have enjoyed Dr. Flynn's paper much, and I would like to ask the Doctor to state how strong he makes his adrenalin solution for injection into the tissues.

DR. FLYNN: About one to three-thousandths.

DR. MILLER: I have asked that for a purpose. I have found in general dog practice, in using adrenalin as carefully as in human, for absorption of cocaine, that in the dog it has a detrimental feature. I find in all solu-

tions we get a great percentage of unnecessary sloughing from the use of that, where we are not supposed to get the checking of blood. We get starvation of parts, sloughing of parts, until we can't tell what is coming. The practice in human medicine, especially, is to use those so as to keep down absorption. That has a drawback, especially around parts where there is a lot of cellular tissue, as it will produce sloughing.

THE CHAIRMAN: The point made by Dr. Miller was that in using adrenalin, a dilute solution should be used to avoid sloughing which will follow the use of concentrated solution.

Are there any other questions?

DR. GRUBER: I would like to ask Dr. Flynn if it is not common after the second year—the uterus prolapse after the ninth or tenth day?

DR. FLYNN: As I stated in the paper, it is a rare, uncommon thing in small-animal practice, and I don't doubt at all but what you find more cases in the older bitches; but the cornu has a tendency, after delivery, to prolapse, because it does not have the same strength. I think that is found more commonly in bitches 4 or 5 years old.

DR. FERGUSON: I would like to ask if these cases show very easy or very difficult parturition?

DR. FLYNN: Very difficult.

DR. FERGUSON: That has been my experience in cattle. In cows, it is the lunar uterus that is more apt to prolapse. It is the tardy uterus in the majority of cases, and I would like to ask Dr. Flynn if he figures infection plays any part in the prolapse.

DR. FLYNN: I don't recall ever having a case where I can trace the cause to purely an infection.

TO SPEED UP TUBERCULOSIS WORK

Recognition of the intradermic method of applying the first test preparatory to accrediting a herd as free from tuberculosis, has just been announced by the Bureau of Animal Industry. The more general use of the intradermic test is expected to "speed up" the Federal and State coöperative campaign against tuberculosis.

The Federal recognition of the intradermic method provides, however, that herds undergoing it successfully must pass a subcutaneous test within a year before they can be accredited as free from tuberculosis. The intradermic test has been recognized also by about three-fourths of the forty-five States now coöperating with the Federal Government in the tuberculosis work.

London *Punch* is authority for the following: "It is reported that the muzzling order may come into force again in South Wales. We understand that a dog which thoughtlessly attempted to bark in Welsh in the main street of Cardiff was responsible for the belief that rabies had broken out again."

CLINICAL AND CASE REPORTS

NECROBACILLOSIS IN FISH

By HADLEIGH MARSH, *Helena, Mont.*

THE observation recorded here is of interest in connection with the widespread occurrence of the *Bacillus necrophorus* in nature and its relation to various forms of tissue necrosis in different species of animals. In this case an organism corresponding morphologically and in staining reactions to *Bacillus necrophorus*, and causing a tissue necrosis similar to the known forms of necrobacillosis, was found to be the predominating organism in necrosis of the gills of certain species of fish.

During July and August of this year large numbers of fish died in the Missouri River and some of its tributaries near Great Falls and Helena, Montana. The State Game Warden requested the assistance of Dr. Starz, chemist for the Live Stock Sanitary Board, in determining the cause of this loss, and Dr. Starz invited me to help in the investigation. We found that the species of fish principally involved were suckers and carp, with few, if any, trout affected. We examined a number of fish of both species and found no evidence of any pathological change except in the gills, which in every case were diseased. They showed more or less extensive patches of necrosis, appearing as a dirty gray area against the bright red of the normal gill. In these areas the mucous membrane of the gill was undergoing necrosis, leaving the skeleton of the organ exposed at the outer edge of the gill.

Microscopic examination of smears from the affected areas showed several different organisms present, but by far the most abundant was a long, slender, Gram-negative bacillus, showing irregular staining, and appearing in places as a network of threads. The appearance was exactly that of the *Bacillus necrophorus*, although there were no very long filaments.

Repeated attempts were made to obtain cultures of this organism, using various media, both anaerobic and aerobic incubation, and different temperatures. A rabbit and a guinea pig were inoculated with some of the original material, and although the guinea pig died, the only organisms isolated from it or from the local lesions on the rabbit were members of the colon group. Neither in cultures nor by animal inoculation were we able to isolate the organism

described above. Probably this could be done in laboratories equipped for pathological work on fish. Other organisms, particularly members of the colon group, were easily cultured from the same material.

Although we failed to isolate the organism in cultures or produce the disease in rabbits and guinea pigs, the very fact that this bacillus, while very abundant in the original material, was difficult to isolate, when considered together with its morphology and staining reactions and the nature of the lesion produced, leads us to believe that the *Bacillus necrophorus* was the primary factor in this gill disease which destroyed great numbers of fish.

ABSTRACTS

INTOXICATION OF RUMINANTS BY THE SECRETIONS OF LOCUSTS. M. Samsonoff. *Recueil de Médecine Vétérinaire*, vol. 95 (1919), pp. 556-563.

In the spring of 1915 great clouds of locusts descended upon Palestine, gravely injuring crops, etc. Immediately thereafter, an intoxication raged in animals of bovine, ovine and caprine species.

Symptoms.—About half an hour after drinking the animal is seized with dizziness, falls, walks in circles as in cerebral encephalitis. This is followed by coma and death unless treatment is soon begun.

The attacks are brought on by cattle drinking water that has been polluted by the secretions of the locusts; the trouble disappeared when uncontaminated water was furnished.

Treatment.—Hypodermic injection of 0.10–0.15 gr. pilocarpine; dry friction on ventral walls; 400–500 grams sodium sulphate; 100–150 grams alcohol; puncture of rumen if tympany is threatening, etc. All patients recovered when treated soon.

The ingestion of live locusts is without effect in animals. The brown green secretion of the locust, as secreted, or diluted with water, is a violent poison, acting particularly on the nervous system. When dried, the secretion loses toxicity completely. This was shown by herds grazing in fields where foliage had dried after locust invasion, with no ill effects. Sorghum was not the cause of the intoxication.

The intoxication is to be attributed to the brown green secretion deposited by the locust on foliage of sorghum or in water; the moisture in the vegetation conserves the toxicity.

W. N. BERG.

A SIMPLE METHOD FOR THE HISTOLOGICAL DETECTION OF IRON.

W. Stoelzner. *Centralblatt für Allgemeine Pathologie*, vol. 30 (1919), p. 225.

1. Into a small beaker containing 1 per cent solution of potassium ferrocyanide, $K_4Fe(CN)_6$, add a small crystal of potassium ferricyanide, $K_3Fe(CN)_6$ and a drop of hydrochloric acid. Stir until the originally pale yellow solution has become deep yellow. Remove the undissolved remainder of the ferricyanide crystal. Immerse the section to be examined for 5 minutes.

2. Rinse in distilled water.

3. Stain with alum carmine.

4. Rinse in distilled water. Imbed in balsam.

This method has the advantage over usual potassium ferrocyanide methods in so far as both ferrous and ferric compounds are detected by it. Its advantage over the ammonium sulfide method lies in the fact that the iron stain is more durable and is less apt to be confused with other pigments.

As to which method is the more delicate, on fresh objects the ammonium sulfide method is more delicate. Apparently the potassium ferro- and ferricyanide penetrate fresh tissues with difficulty, but on fixed histological preparations the proposed method is better.

For the histological detection of iron, tissues should be fixed in alcohol.

W. N. BERG.

INFECTIOUS ABORTION OF SWINE. L. P. Doyle and R. S. Spray.

Journal of Infectious Diseases, vol. 27 (1920), pp. 165-168.

The history of eight herds studied by the authors indicates that infectious abortion of swine is a serious and increasingly important source of loss to the swine industry.

Inoculation of two guinea pigs with triturated afterbirth from an aborting sow resulted in an infection, as demonstrated by the development of agglutinins and typical lesions. At the time of inoculation the blood of the two guinea pigs did not agglutinate a *Bacillus abortus* (Bang) antigen. Four weeks after inoculation the blood agglutinated this antigen completely in all dilutions up to and including 1:500.

An organism was isolated from the liver and spleen of both guinea pigs which, except for slight cultural peculiarities, is indistinguishable morphologically, culturally, or agglutinatively from typical *Bacillus abortus* (Bang).

Rabbit antiserum for four cattle strains and for this swine strain

gave cross-agglutination to the same titer as with the homologous antigens.

Antigen of the swine strain completely absorbed agglutinins from antiserum for each of the four cattle strains.

Antigen of the four cattle strains each completely absorbed agglutinins from antiserum for the swine strain.

NOMA IN THE DOG. J. McL. Phillips and Fred. Berry. *Journal of Infectious Diseases*, vol. 27 (1920), no. 2, pp. 136-138.

The authors record a condition in a dog apparently identical in symptomatology and bacteriologic findings with the disease known as noma in man.

The occurrence of noma in a dog so similar to that in man makes it appear possible that the dog may be a source of infection to man, especially to persons recovering from acute diseases, who are therefore more susceptible to such infection.

The condition was found in a cocker spaniel 9 months of age that previously had developed a mild attack of canine distemper. About the time that he had apparently recovered a peculiar and most offensive odor was noticed about the animal. Examination revealed tumefaction of the right lower lip. Four days later an oval, black eschar appeared on its most prominent point and salivation became profuse. In a few days a conical ulcer formed with a very offensive exudate. This ulcer gradually extended until on the thirteenth day it had eroded into the tissues of the neck and the ramus of the jaw exposing the loosened molar teeth. The dog ate well but seemed very thirsty. Then he became prostrated and pneumonia developed, when he was killed.

Smears made from the surface of the eschar revealed the presence of about equal numbers of fusiform bacilli and spirilla with only a few micrococci and short bacilli. Subsequent smears continued to show a great predominance of *Bacillus fusiformis* and spirilla.

Cultures made from the lesions failed to reveal the presence of *B. fusiformis*, while the few spirilla that were found were interpreted as being the result of a direct transfer of the original heavy inoculum and not a multiplication of these organisms.

"Anthrax, which was discovered recently among livestock in a number of southwestern Texas counties, has killed scores of army animals. Five border towns have been quarantined."—*Evening Star*. (August 28).

ARMY VETERINARY SERVICE

WAR DEPARTMENT CIRCULAR 47

W. D. CIRCULAR 47, issued under date of April 1, 1920, and signed by Col. C. R. Darnell, Medical Corps, U. S. A., as Executive Officer, deserves the attention and consideration of American veterinarians out of the army as well as in it, since the experience of the civilian veterinarian in the late war showed most impressively that army matters have more than an academic interest for us. If we ignore army matters in peace times, it will add nothing to our enjoyment of military red tape when we become ensnared in it in war times. By the same token, a general interest in army matters on our part may have a modifying effect on policies affecting the Veterinary Corps in peace times and aid in preserving conditions under which the veterinarian from civil life may find liveable arrangements and opportunity for effective service in war times, two things which were none too common in the lot of the veterinarian in the American army during the late unpleasantness.

Moreover, the potential results of army policies on civilian veterinarians in war times are not the only results which concern us. Army policies may exert an immediate influence on the civilian veterinarian in peace times.

Finally, we must be interested in army policies which affect the army veterinarian as a veterinarian engaged in the same line of work that we are engaged in. It is a phase of veterinary medicine and one which has immediate interest for veterinary students contemplating entering the Veterinary Corps.

On all of the foregoing grounds, Circular No. 47 interests and concerns us. It is entitled "Definition of the Veterinary Service and Its Conduct at Stations Having No Veterinary Officers Assigned." Briefly summarized, this circular has the following topics and provisions:

1. The veterinary service deals with two things: (1) The health and efficiency of animals; and (2) the protection of the human health of the command.

2. The requirements for a veterinary service exist at every station, regardless of its size. The Veterinary Corps is part of the Medical Department. Therefore the veterinary service of any station is part of the Medical Department and *the senior Medical Department officer should be responsible for its proper functioning.*

3. Existing regulations "do not contemplate any supervision of the veterinary service by the surgeon at stations to which veterinary officers are assigned. Until S. R. No. 70 shall have been officially revised, no change in this relationship is authorized." Cooperation between the veterinarian and the surgeon is expected. "The station veterinarian should remember that . . . in performing duties pertaining to human sanitation he is acting practically as technical adviser to the surgeon."

4. "The situation at stations of such limited animal or human strength as not to warrant the assignment of a veterinary officer is quite different. At such places the surgeon . . . is considered by this office to be responsible for the maintenance of the veterinary service."

5. The above situation at stations too small for the detail of a veterinary officer "can be met by the detail of an enlisted man of the Veterinary Corps." Veterinary officers are to train enlisted men in the duties of farrier (i. e., along the lines of animal health) and in meat and dairy inspection (i. e., along the lines of human health from its veterinary aspect). These enlisted men will report to the surgeon, who will assign them to their duties.

6. Surgeons at stations having no veterinary officer will examine their needs with a view to utilizing such enlisted men of the Veterinary Corps.

7. The enlisted men referred to above will be trained in animal management and control, sanitation, prevention of inefficiency and disease, inspection of forage, observation and interpretation of common symptoms, particularly of communicable disease, dosage and administration of medicines, first aid, dressings, bandages, etc. They are not to be stable attendants to sound animals. Under this arrangement, it will be less often necessary to call in civilian veterinarians, but the surgeon may employ such when necessary.

8. The surgeon will place the services of these enlisted men at the disposal of the local supply officer for meat inspection work.

9. At such stations, the surgeon will prepare the necessary veterinary reports.

10. Application for the services of the enlisted men described above are to be made by the various surgeons to the Surgeon General.

If we boil down the foregoing order, it amounts to this: At stations where there is a veterinary officer, he will continue to carry on veterinary duties with the aid of enlisted men who will function under his direction and supervision, and for the present he will continue to take his orders from Veterinary Corps headquarters, but it is strongly intimated there is a change contemplated in this respect, which change will consist in revising S. R. No. 70 to provide that the veterinarian shall report direct to the senior medical officer.

To drive home this point and lay the foundation for the change, it is urged that the veterinarian and surgeon coöperate, and noted that as regards meat and milk inspection the veterinarian is technical adviser to the surgeon. In other words, the subordination and dependence of the Veterinary Corps to the Medical Corps is to be emphasized.

Having thus provided for a pending change in the relations of the veterinarian at large stations, a long step towards establishing the subordination of the Veterinary Corps to the Medical Corps is taken as regards their relations at small stations. Here the veterinary officer finds his equivalent in the combination of a medical officer and an enlisted man of the Veterinary Corps. Inasmuch as the medical officer has not the necessary knowledge and training in veterinary medicine to function along this line, and the enlisted men of the Veterinary Corps also lack this professional training, it is provided that the veterinary officers are to give this veterinary training and education to enlisted men of the corps to enable them to function. But since these men lack the authority of officers, the authority is vested in medical officers. In this way the Veterinary Corps will function—so far as the untrained man who enlists in the Veterinary Corps can function after a sketchy course in veterinary medicine superimposed upon what is usually a very rudimentary education—without authority. Thus at small stations we will have a return to those happy days of a few years ago when the men who did the veterinary work of the army were without authority, but this time, due to the later formation of an enlisted Veterinary Corps, we will have added the fact that these men are also non-professional men of sketchy training and minus preliminary educational requirements.

There are several self-evident objections to the above arrangement which may be briefly stated. First, from the standpoint of the Veterinary Corps, the implied change whereby a veterinarian would report to the surgeon instead of to a veterinary headquarters officer is a step backward. The surgeon is not apt to be informed on veterinary topics or in sympathy with the veterinarian. Medical men are more apt to underestimate the value and importance of veterinary activities and to begrudge recognition to veterinarians than are line officers. If medical men are to direct and supervise veterinary activities, concerning which they are uninformed, it is apt to prove a fruitful source of friction. Two of a trade seldom agree, and two of closely related activities usually agree even less. Medi-

cal men, veterinarians and dentists in the service probably criticize one another more than they do line officers, naturally.

As regards the substitution of a physician and an enlisted man of the Veterinary Corps for a veterinarian, the objections are even more evident. Under normal conditions, the enlisted man of the Veterinary Corps works under the direction of a veterinarian. The niceties of diagnosis, selection of drugs and determination of dosages are matters calling for a veterinarian, not a non-professional enlisted man or a physician or a combination of the two. If the combination is adequate, the next logical step would be to substitute it for veterinary officers at all camps and save money, cutting the number of veterinary officers to a force sufficient to instruct enlisted men for veterinary aids to surgeons.

If the combination is not regarded as adequate, but merely as a makeshift, we may ask whether it is the best makeshift that could be devised. A sick horse is a sick horse, be it one of hundreds or the only one in camp. As such it deserves the attention of a competent veterinarian. If an army veterinarian is available, it is evidently within his province. If such is not the case, it would still appear that the animal requires the services of a veterinarian, and such services are usually available by the employ of a civilian veterinarian. If the services of a veterinarian are not available, the animal is evidently in a bad way. The same would be true of a sick man as concerns his need for the services of a physician, and the combination of a veterinary officer and an enlisted man of the Medical Corps would appeal to physicians and veterinarians alike as a poor substitute for a physician.

Another objection is that the enlisted man will combine the functions of an enlisted man with those of a veterinary officer. He will attend to sick animals, dress wounds and sores, as an enlisted man, and then in his vicarious role of veterinarian, but with a limited appreciation of asepsis, will inspect meat and milk under the supervision of a medical officer uneducated along the lines of such inspection. It would probably be safer and better to have the quartermaster buy only United States inspected meat and certified milk and let the cook pass on the presence of subsequent taint or souring.

The most serious objection to the proposed arrangement is its evident trend away from the ideal of a Veterinary Corps. The slogan "Accept No Substitute" has a certain sound basis, and the proposed arrangement is a substitution of the makeshift for the adequate and the competent. To function properly, the Veterinary

Corps must attain the status of a corps with a general officer at its head, and the long struggle for recognition in the army must continue in that direction. Without a head in the form of a veterinarian of such authority and standing in the army, the corps can never function properly, as the experience of the corps in the late war amply indicates. The English Veterinary Corps and those of the colonials and the French Veterinary Corps functioned efficiently by virtue of such standing and recognition. The German veterinarians since the war have complained that they could not function effectively because they had a general officer only on paper, but not in fact. It would be poor preparation for another war to weaken the authority of our Veterinary Corps, already too weak, and the order under discussion points only too clearly to a policy of permanent and increasing subordination to the Medical Corps. So far as the army veterinarian is concerned, it seems distinctly a step in the wrong direction. In passing, it should be said that there is no feud between the medical and the veterinary officers, any more than there is between physicians and veterinarians in general. The Veterinary Corps is undoubtedly in the hands of friends, but friends may at times err in judgment, especially in the well-meant disposal of a friend's career, and the paternal guidance of the Medical Corps is another instance of a father's maladroit kindness in selecting a career for the son. The Veterinary Corps can not unprotestingly adopt a program that threatens to permanently limit its effectiveness, steer it away from the goal of independence, and tie it forever to the apron strings of a corps which regards it as a distinctly subordinate and minor organization.

From the standpoint of the civilian veterinarian, the proposal that veterinary officers instruct enlisted men in diagnosis, therapeutics, theory and practice of veterinary medicine, meat and milk inspection, etc., can not meet with approval. It points too strongly to the likelihood that a number of these men, after functioning as substitute veterinarians under medical officers less familiar than themselves with veterinary matters, will branch out as quack practitioners in private life after leaving the army. Do medical officers prepare enlisted men of the Medical Corps for competition with medical men in civil life as unqualified practitioners? Would it not be a sounder arrangement to provide that a certain proportion of line officers connected with mounted units and transport work be given courses in animal management, shoeing and animal hygiene, as is done in the British army? This would insure a better handling

of animals by the officers actually in charge of them and a better realization of the importance of the Veterinary Corps among line officers, and would simultaneously protect the civilian veterinarian from the likelihood of army-trained quack practitioners, since the line officer is entirely unlikely to branch out in such a field.

Finally, the contemplated action will not render the life and career of a veterinary officer any more attractive to the best veterinary students or tend to elevate the standing of the veterinary profession in general in the United States.

M. C. H.

CORPS VETERINARIANS

The Army Reorganization Act approved June 4, 1920, provides that the Army shall at all times be organized as far as practicable into brigades, divisions and army corps and, when the President may deem it expedient, into armies. The corps areas were announced in War Department orders on August 31, 1920. The appointment of veterinary officers to act as corps veterinarians was recently made in accordance with the order designating the corps areas. The designation of the corps areas with the veterinary officers assigned to them, the corps headquarters and the States included in each corps area are noted below:

First Corps.—Lt. Col. W. V. Lusk; Boston, Mass.; Maine, New Hampshire, Massachusetts, Vermont, Rhode Island, Connecticut.

Second Corps.—Col. G. E. Griffin; Governors Island, N. Y.; New York, New Jersey, Delaware.

Third Corps.—Major W. P. Hill; Fort McHenry, Md. (temporarily Baltimore, Md.); Pennsylvania, Maryland, Virginia, District of Columbia.

Fourth Corps.—Lt. Col. C. Nockolds; Fort McPherson, Ga. (temporarily Charleston, S. C.); North Carolina, South Carolina, Georgia, Florida, Alabama, Tennessee, Louisiana, Mississippi, Arkansas.

Fifth Corps.—Major W. A. Sproule; Fort Benjamin Harrison, Ind.; Ohio, West Virginia, Indiana, Kentucky.

Sixth Corps.—Col. C. D. McMurdo; Fort Sheridan, Ill. (temporarily Chicago, Ill.); Illinois, Michigan, Wisconsin.

Seventh Corps.—Major J. H. Gould; Fort Crook, Nebr.; Missouri, Kansas, Iowa, Nebraska, Minnesota, North Dakota, South Dakota.

Eighth Corps.—Lt. Col. H. F. Steele; Fort Sam Houston, Texas; Texas, Oklahoma, Colorado, New Mexico, Arizona.

Ninth Corps.—Major R. Vans Agnew; Presidio of San Francisco (temporarily San Francisco, Calif.); Washington, Oregon, Idaho, Montana, Wyoming, Utah, Nevada, California.

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of Fifty-seventh Annual Meeting, Columbus,
Ohio, August 23 to 27, 1920

MONDAY MORNING, AUGUST 23, 1920

The Fifty-seventh Annual Meeting of the American Veterinary Medical Association convened in the Auditorium of the Memorial Hall, Columbus, Ohio, at 10:15 a. m., President C. A. Cary presiding.

THE PRESIDENT: I hereby call to order the Fifty-seventh Annual Meeting of the American Veterinary Medical Association. We will now stand and receive the invocation by Dr. Hargraves.

(Rev. Dr. Hargraves delivered the invocation.)

THE PRESIDENT: Ladies and gentlemen, it gives me great pleasure to introduce to you Mr. Hugo Schlessinger, of Columbus, Prosecuting Attorney for Franklin County, who will now deliver to you the address of welcome. (Applause.)

ADDRESS OF WELCOME

MR. HUGO SCHLESSINGER: Mr. President, Officials of the Association, Ladies and Delegates to the Fifty-seventh Meeting of the American Veterinary Medical Association: I know that it is considered to be very poor form and bad taste to begin with an apology, but being an honest politician (laughter and applause) I must be frank with you when I say that I am appearing today merely as a substitute for the real thing. You doctors have been trained, I know, when you send to the drug store to get a certain article, like Glover's Mange Cure, or something of that kind, to accept no substitutes (laughter), but I have it on you today because you have to accept this substitute. Mayor Thomas is out of the city, and that grand old young citizen of Columbus, Colonel Johnny Y. Bassell, whom I have been told by your honorable President you heard in New Orleans, unfortunately was taken sick this morning, and therefore he called upon the Prosecuting Attorney to come here and welcome you.

Now there is no peculiar significance in having the Prosecuting Attorney here, because I don't see a familiar face. (Laughter.) But it is indeed a pleasure and a most distinguished honor to welcome you, ladies and gentlemen, representing one of the greatest, if not the greatest, professions in the world, from all parts of this great Western Hemisphere, into not only the greatest State of these United States, the Buckeye Commonwealth of Ohio, but into the

garden spot of Eden of that State, the city of Columbus. (Applause.)

I am told—and after sitting here and viewing these handsome ladies (applause) and these intelligent-looking gentlemen (applause and laughter) I can scarcely believe it, still your President tells me it is true—that this is the first time this Association ever met, not only in Columbus, but, impossible of the impossibles, in the State of Ohio. (Applause.) Where in the world have you been? Everybody comes to Ohio. The two great parties of this country, after scouring the nation from the Atlantic to the Pacific and from the Great Lakes to the Gulf, have both had to come to Ohio. Just as soon as we get time we are going to move the Capitol of the United States from Washington here to Columbus. (Applause and laughter.) As you all will have to admit, we have been quite busy this summer, at Chicago and San Francisco, but we will get to that in the next few weeks. (Laughter.)

As a layman not versed in your science in any manner whatsoever, aside from having to call upon some of your talent here in the city upon certain occasions to look after a little Boston Bull that I have out at my house, the thought comes to me that you are deserving of more credit, if you please, than men engaged in other branches of the medical profession. Where would we be—we who live and must depend upon the marts of a city for our food—where would we be if it were not for you gentlemen? You are engaged in the daily struggle of work and experience and study and increasing the food supply; yes, that most fundamental food supply, milk, for instance. It seems that by all of your skill and knowledge the farming industry is utilizing everything in their power in order that the great cities throughout the land may have their daily supply of milk for the young. To a very great extent you do your service without any blare of trumpets and shouts of public acclaim, but in many instances the general public not only does not know of the service that you render, no matter how valuable it may be, but with a smile of derision say, "Oh, he is a horse doctor." Yet you continue to do that faithful service to the millions of citizenship of this country, and there is never an instance where a grateful patient of yours dies and remembers you in his will. (Laughter and applause.)

We have in this city one of the greatest universities in the United States, the Ohio State University, and it was with the greatest pleasure that I heard the distinguished President say this morning that the Veterinary College of Ohio University ranked right up with any in the United States of America. We are very proud of that fact. It was my pleasure to attend that university some twenty years ago, and the strides of progress and advancement it has made since that time are a credit not only to the State of Ohio but to the entire United States. I am informed that the Veterinary College has kept right up in the front ranks of progress, and I am sure a great many of the gentlemen present here today have assisted in keeping these

colleges of veterinary medicine up to the high standard which they should and will occupy.

You are welcomed here today, not only by the city of Columbus, but also by the Ohio Veterinary Medical Association, who have banded themselves together to entertain you during your stay in this city this week, and whose guests you will be throughout the various entertainment features. I want to assure you that the city of Columbus is open to you. I am not saying that figuratively; I mean it literally. You don't need view anything with suspicion in the city of Columbus, like a soldier of color who returned from across the sea a few months ago and for the first time in his life had a hundred dollars in his pocket. (This didn't occur in Columbus. It occurred in another city. I am afraid to mention the name because there might be somebody here from there.) He went to the bank on Monday morning and deposited his hundred dollars. That afternoon, as the bank was about to close, he was there and drew out his hundred dollars. The next morning, when they went to open up the bank, they found him out in front, waiting to get in. He came in and again deposited his hundred dollars. That afternoon, just before they closed, he drew it out. On the third morning, when he stepped up with the hundred, ready to deposit it, the cashier said, "Sam, what do you mean by this kind of carrying on, depositing your money and drawing it out?" He said, "Ah'll tell yo', boss. Ah don't know whar yo' folks go when yo' leave de bank." (Laughter.)

So, ladies and gentlemen, you need have no suspicion of that kind while you are the guests of the city of Columbus. Speaking for the quarter of a million citizenship of the city of Columbus, I will say to you that if you see anything you want here, and they don't hand it to you, why, take it, and I will guarantee the protection of the Prosecuting Attorney's office. (Laughter and applause.)

I want to thank you for being here, and I assure you that your presence is appreciated by all of our citizens. I trust that your meeting may be a most successful and happy one. (Applause.)

RESPONSE TO ADDRESS OF WELCOME

THE PRESIDENT: Ladies and gentlemen, it gives me pleasure to introduce to you one of our own men, who really needs no introduction. He is an ex-President of this Association, a man whom you all know. I therefore call on Dr. George H. Glover, of Colorado, to give the response to the address of welcome.

DR. GLOVER: Mr. President, Mr. Schlessinger, Ladies and Gentlemen: On behalf of the American Veterinary Medical Association I wish to express appreciation for these kindly and cordial words of welcome.

In the first place, I wish it to be distinctly understood that I am not the individual who originated Glover's Mange Cure. (Laughter.) If I were, I certainly would not be expected to pose as a

living exemplification of the benefits of this treatment. (Laughter.)

The officers of this Association have always been very considerate respecting the geographical distribution of our meeting places. We have met in New York City, San Francisco, Toronto, New Orleans, and several inland cities.

It has been said that the truth is most often found at a point about midway between the extremes, and that if a relatively small circle be drawn from this point it will represent the area of greatest truth, the area of safety, the area of conservatism. I am reminded that Columbus occupies a position very near the center of population of these United States, and that the great State of Ohio is carved out of a narrow strip of land in the North Temperate Zone where alone it is possible for mankind to attain to the highest possible degree of civilization.

It was said that out of the lair of the wolf came the founder of ancient Rome, and out of the forests of Ohio came the statesmen of young America. Ohio is indeed a great State, and her people are conspicuous for their many virtues, but there is one which I think we may reasonably question, and that is the virtue of modesty. I notice that Ohioans are good boosters, second only to Californians, I presume. When it comes to presidential candidates, Ohio takes the whole bakery—the cookies, doughnuts, pies, candies, the whole cheese. I understand that the pie is to be cut into appropriate sized pieces soon after the first week in November.

Ohio is great, not only for the politicians she has made, but for her achievements in the arts and sciences as well. If I were not already advised in this matter, I would still be bound to believe it, because of a statement in the *Atlantic Monthly*, which is as follows: "By combining coal and iron ore in a furnace, and roasting them together, they have transmuted iron, through steel, into gold." The dreams of the alchemists are at last realized, and this happened in Ohio.

We are indeed glad that we are privileged to meet at this time in the great State of Ohio, in this splendid city of Columbus, at the seat of one of the great universities of America and one of the foremost veterinary colleges. Ohio has been prodigal in the contribution to animal industry, which is the major part of agriculture. I understand that there are more colleges and universities in Ohio than in any State in the Union, and that her public school system is second to none.

Ours is the youngest of the learned professions, and being in position to profit by those who have gone before, we have made wonderful progress. We have made some mistakes, but our efforts may be likened to Kipling's pup that ate shoe blacking, gnawed the chair rungs and tore up the feather pillows, but was all the time getting ready to be a regular dog some day. We are indeed making commendable progress. We have consistently raised our educational standards, and I believe the majority of educators in the veterinary profession are hopefully looking forward to the time

when two years of collegiate work will be required for matriculation in all of our veterinary colleges. Education is the index of civilization, the one ladder by which we can climb, round by round, to higher and better things.

We are mindful, Mr. Schlessinger, of the responsibility which we must assume in accepting your generous hospitality, and we promise to conduct ourselves with dignity befitting the occasion. I wish to extend to you, to the visitors present, and to the citizens of Columbus a most cordial invitation to attend our deliberations, and once more I wish to assure you of our appreciation of your generous hospitality and to thank you for all the good things that have been provided to add to our pleasure and profit on this the fifty-seventh meeting of the American Veterinary Medical Association. (Applause.)

PRESIDENT'S ADDRESS

THE PRESIDENT: Ladies and gentlemen, before I enter into a discussion of my paper I want to make this statement; I expect to deal largely with the internal workings of this organization rather than to tell you something of what we have done in the way of science or any other line of work in our profession. What I say is not to be considered a criticism on past officers or the past of this organization. If I have not a message that will help or be for improvement, I shall have missed what I started out to do. I ask you to be patient with me in a short, suggestive paper, rather than an extended, long discussion. I feel that what I shall say is for the good of the organization and the good of the individual members of this organization, and that is why I mention the conditions that I do.

(Dr. Cary read his address. It was published in the JOURNAL for September, 1920.)

Adjournment.

MONDAY AFTERNOON

The meeting convened at 1:45 p. m., President C. A. Cary presiding.

REPORT OF EXECUTIVE BOARD

THE PRESIDENT: The first thing this afternoon will be the report of the Executive Board. The Secretary will present that.

(Secretary Mayo read the report of the Executive Board, including list of applications for membership.)

(It was voted, on motion of Dr. Kinsley, duly seconded, that the name of Charles W. Bandy be deferred and referred back to the Executive Board.)

(It was voted, on motion of Dr. W. H. Hoskins, duly seconded, that the rules be suspended and that the names read by Dr. Mayo, with the exception of Dr. Buck and Dr. Dunlap, be accepted.)

(It was voted, on motion of Dr. Kinsley, duly seconded, that the rules be suspended and Albert Buck and Dr. Dunlap be elected to membership.)

THE PRESIDENT: We will hear a further report from the Executive Board.

SECRETARY MAYO: The amendments to the Constitution as recommended by a sub-committee of the Executive Board are as follows:

ARTICLE V

Officers

SECTION 1. The officers of the Association shall consist of a President, five Vice-Presidents, a Secretary, a Treasurer, and an Executive Board. With the exception of the Secretary and district members of the Executive Board, they shall be elected at the regular annual meeting and hold office for one year from the date of their election, or until their successors are elected and have assumed office. No person shall be eligible to the offices of President, Vice-President, Secretary or Treasurer unless he has been a member in good standing for the five years preceding his election.

Secretary

SECTION 4. The Secretary shall perform all the clerical duties of the Association, and be custodian of all its property except money, and the properties of the official JOURNAL office. The Secretary may also act as Editor or Business Manager, or both, of the official JOURNAL when so recommended by the Executive Board, and approved by the Association. All moneys received by him shall be paid monthly to the Treasurer. He shall receive such salary and allowance as may be recommended by the Executive Board and approved by the Association.

He shall give bond to the Association in the sum of five thousand dollars (\$5,000), acceptable to the Executive Board. He shall present a written report at the regular annual meeting.

Executive Board

SECTION 7-L. It shall be the duty of the Executive Board to consider and recommend yearly to the Association concerning the selection of a Secretary and an Editor and a Business Manager of the JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION. The Editor and Business Manager of said JOURNAL shall receive such salary and allowances as may be recommended by the Executive Board and approved by the Association.

ARTICLE XIII

Editor and Business Manager

SECTION 1. The positions of Editor and Business Manager may be held by the same individual or either or both positions may be filled by the Secretary.

THE JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION shall publish the proceedings, transactions, papers, etc., and such other matter as the Editor may select.

This is a report of the sub-committee of the Executive Board to which was referred the proposed change in the Constitution and By-Laws made at the Philadelphia meeting with reference to combining certain offices.

THE PRESIDENT: You have heard the reading of the amendments as proposed at the Philadelphia meeting and considered and adopted by the Executive Board. What shall we do with that?

(It was voted, on motion of Dr. Kinsley, seconded by Dr. H. Preston Hoskins, that the proposed amendments be adopted.)

THE PRESIDENT: Is there anything further from the Executive Board?

(Secretary Mayo read the list of resignations, including that part of the Executive Board's report having to do with the resignation of Dr. T. E. White.)

SECRETARY MAYO: In explanation, I would say that Dr. White, who has been a member of this Association for about thirty years, is an old man, a sick and helpless man, and he tenders his resignation.

(It was voted, on motion of Dr. Kinsley, seconded by Dr. Kieran, that the rules be suspended and a remittance of Dr. White's dues be made, and that a statement be sent to him by the Secretary telling him that he is still on the roll as an active member, and that his dues be continued from year to year.)

(It was voted, on motion of Dr. W. H. Hoskins, seconded by Dr. Kinsley, that the report of the Executive Board be adopted, and that the action in regard to Dr. White be approved.)

(The other resignations read by Secretary Mayo were accepted.)

THE PRESIDENT: Lest you may not understand and enter into a little difficulty between now and tomorrow morning, let me remind you that your adoption of this amendment puts the election of the Secretary and Editor into the hands of the Executive Board. I was requested to make this statement. This is duly and regularly adopted now, and is a part of our Constitution and By-Laws.

TREASURER'S REPORT

THE PRESIDENT: The next thing in the regular order of business is the report of the Treasurer, Dr. Jacob.

DR. M. JACOB: Mr. President and gentlemen, the printed report of the Treasurer, which gives all of the information, has been distributed among you.

(This report will be printed in a later issue of the JOURNAL.)

(It was voted, on motion of Dr. W. H. Hoskins, seconded by Dr. Kinsley, that the report of the Treasurer be referred to the Auditing Committee.)

SECRETARY'S REPORT

THE PRESIDENT: We will now have the Secretary's report.

SECRETARY MAYO: Mr. President and members of the Association, I hereby submit the stenographic report of the proceedings of the last meeting of the Association held in New Orleans as the official report of that meeting.

THE PRESIDENT: You had that report printed and given to you some time ago. We ought to adopt it, though.

(It was voted, on motion of Dr. W. H. Hoskins, and seconded by Dr. Kinsley, that the report of the proceedings be adopted.)

(Secretary Mayo read his report, as follows:)

This report covers the period of about nine months since the last meeting of this Association in New Orleans.

The Association has about 4,100 members. During the past year 227 have been dropped for non-payment of dues. About 53 have been reinstated. We have lost 15 members by death and 10 have resigned. There are 37 honorary members.

You will note that in spite of special efforts of the Secretary and the active efforts and assistance of the Resident Secretaries, the applications for membership are far below the number for the past two years. This may be accounted for by the fact that the last meeting was only nine months ago, and not a full year. The subsidence of war activities has also been an important factor. A number of veterinary colleges have been dropped from the accredited list and very few veterinarians have been graduated this year. The discouraging effect of congressional reclassification of the Bureau of Animal Industry veterinarians is largely responsible for the small number of B. A. I. applications. They can not afford the small expense. If we assume that there are 8,000 veterinarians eligible to membership in the United States and Canada, something over 50 per cent are members of this Association. The American Medical Association has a membership of about 80,000 out of a total of 140,000 physicians, a little less than 60 per cent. We should make a special effort during the coming year to increase our membership. This is a duty that each individual member owes to the Association. If the members would see personally the veterinarians in their localities and secure their applications, our Association would greatly increase in members and efficiency. It is personal contact that counts. I would recommend that some additional methods of increasing the membership and JOURNAL circulation be devised.

Soon after the last meeting Dr. J. R. Mohler resigned as a member of the Executive Board from the fourth district. Postal cards were sent to all members in this district, and the following were the nominees: Drs. Kiernan, Houck, Turner, Musselman, Benjamin McInnes and G. W. Kinsey. On the postal-card vote Dr. Kiernan received 63, Dr. Houck 44, Dr. Turner 30, Dr. Musselman 30, Dr. McInnes 15, and Dr. Kinsey 14.

The Secretary's office handles more than \$20,000 annually, mostly in \$5 remittances. The funds received are turned over to the Treasurer on the 15th of each month. The financial condition of the Association is excellent, as will be shown by the Treasurer's report. Every member should study the Treasurer's report to know how the Association's funds are expended and invested.

The expenses of the Secretary's office, aside from the Secretary's salary, may be classified approximately as follows:

Printing for Secretary, Executive Board and Resident Secretaries..	\$491.38
Clerical help	380.52
Postage	177.42
Office equipment	30.14
Incidentals	10.24
Expenses attending New Orleans meeting.....	260.36

My assistant, Miss Apland, has handled all the funds of the Secretary's office and looked after the details efficiently and economically.

Possibly the most satisfactory progress made by our profession during the past year has been the securing of a satisfactory and efficient organization of the Army veterinary service. For a quarter of a century the A. V. M. A. has taken the lead in the work to secure such a measure, and it is gratifying that the object has been accomplished. Now that the Army service is well provided for, this Association should make an earnest and active effort to secure just and proper recognition and remuneration for other veterinarians in the United States Government service, the veterinarians in the Bureau of Animal Industry.

The Bureau of Animal Industry is recognized as the most efficient organization of its kind in the world. That this fine organization has made it possible for the American stockman and farmer to supply healthy animals and wholesome animal foods to all the world has been largely due

to the high standard of veterinarians in the Government service. At present the pay of graduate veterinarians, who pass the civil-service examinations and enter the Bureau of Animal Industry, is less than that of an untrained and illiterate day laborer who works under the veterinarians' direction. This condition is unjust to the Bureau veterinarians and to our profession and is seriously impairing the Bureau service. The Bureau of Animal Industry is the largest employer of veterinarians in America, and we should take up this cause not only for the benefit of those already in the service but for veterinarians who may desire to enter the Bureau service in the future. The cause of the Bureau veterinarians is a just one. They need our active assistance and should have it.

Frequent requests come to the Secretary's office for lists of members of the A. V. M. A. and their addresses. The applicants are referred to the JOURNAL Editor. Requests for copies of the Constitution and By-Laws are similarly referred. I would recommend that the Constitution and By-Laws with a list of members be published in pamphlet form and not in the JOURNAL. Since a "proceedings number" is impossible, it may be advisable to combine the business proceedings of the annual meeting with the Constitution and By-Laws in pamphlet form.

A number of complaints against members for violation of the code of ethics have been received. Some of these do not appear to be well founded. Some are due to personal grievances and some of the actions complained are on the border line. In many cases the complainant does not care to prefer formal charges but wants the actions stopped. In several instances the Secretary has assumed the rather unpleasant task of arranging the difficulty to the satisfaction of both parties. The American Medical Association has a Judicial Committee to consider questions involving the ethics of that Association, and I would recommend that our Association consider a similar plan.

This Association has a relief fund amounting to about \$2,100, with no efficient means of utilizing it in case of need or any means of locating cases of need among our members or their dependents. I would recommend that some means be taken by this Association to provide for the proper utilization of this fund.

Several years ago, as Secretary, I called attention to the requests from members for an official A. V. M. A. emblem that could be used as a pin or on an automobile or on stationery. Such an emblem should be useful and add to the advantages of this Association. The San Joaquin Valley Veterinary Medical Association has recently adopted such an emblem. I would recommend that a committee be appointed by the President to consider this matter.

I wish to express my thanks to President Cary, Editor Mohler and other officers of this Association for the cordial support and assistance given the Secretary during the past year. The chairmen and secretaries of the various sections have done splendid work in preparing the program for this meeting, not only for their respective sections but also for the general program. The local committee on arrangements has worked earnestly and efficiently and has cooperated in every way. They merit our thanks.

THE PRESIDENT: Gentlemen, you have heard the report of the Secretary. What shall we do with it?

(It was voted, on motion of Dr. W. H. Hoskins, seconded by Dr. Kinsley, that the report be received and referred to the Executive Board.)

REPORTS OF COMMITTEES

THE PRESIDENT: The next thing is reports of committees. We will call on these committees, and if they are not ready we will

defer their reports until they are ready. Committee on Intelligence. Dr. Way, have you anything to report?

DR. CASSIUS WAY: Mr. President, the committee is not ready to report, and we would like to defer until Wednesday morning.

REPORT OF COMMITTEE ON LEGISLATION

THE PRESIDENT: We will hear from the Committee on Legislation, Dr. Hoskins.

(Dr. W. H. Hoskins, chairman of the Committee on Legislation, read the report of that committee, as follows:)

Thirty years ago at our first meeting in the "Windy City" there came to that meeting in Chicago Drs. Le May, Griffin and Schwartzkopf, members of the United States Army veterinary service. While they expressed the appreciation of Army veterinarians for the interest the members of the United States Veterinary Medical Association had taken in the Army veterinarians, they had come to plead for a larger and more effective interest in behalf of the Army veterinary service.

Renewed pledges by the officers and members were given. A more active committee sought to secure a better recognition for our men in the service; yet the efforts at Washington, appeals and visits to the halls of Congress, were unavailing in bringing relief to those in the veterinary service. Resignations of many men in the service followed year after year when no reward of rank and commission was afforded through the efforts at Washington.

The Spanish-American War followed, and a better conception of how utterly inadequate was our veterinary force in the Army. The embalmed beef scandal will never pass out of history, nor the men responsible for the same ever be forgotten.

Following the Spanish-American War the late Rush Shippen Huidekoper, one of our number, under many assurances of support from those high in political and military power, led the most remarkable campaign in American veterinary history. Over an adverse report of the Senate and House military committees, he passed the measure, creating an Army Veterinary Corps, in both bodies of Congress. The treachery of men in our own profession, in and out of the Army, and others high in military power, including the Secretary of War, defeated in the end his efforts and blasted for nearly a score of years the hopes of any advancement for those in the service.

The granting of pensions and retirement, after the most tragic experiences of several of our number who died or were injured in the service, was achieved through members of this Association coöperating with the men in the service.

In 1916, just one year before our entrance into the great World War, after a nation-wide campaign in the Sixty-second, Sixty-third and Sixty-fourth Congresses, the establishment of a Veterinary Corps with the rank and commission of major as a part of the Medical Corps was attained.

In 1920 the consummation of a thirty years' campaign has brought us the goal of our ambition, and with it three of our number have attained the rank of colonel, all of whom have had more than thirty years of service in the Army as veterinarians in the cavalry, artillery and quartermaster's service. The number (175) accorded in the Army Reorganization Bill, over three times as many as were in the regular service in 1916, with shorter terms for promotion to the various ranks from second lieutenant to colonel, gives to the profession a higher status than it has ever enjoyed; and while the world is war weary and nations broken and demoralized with war debts, we are now assured that it is up to our own members to fulfill every duty devolving upon Army veterinarians, who are now clothed with power and assured of a just reward for a nation's service. That it

shall function with a veterinarian as colonel is the devout wish of every true veterinarian, and any confession of the profession that it has not in its number in the Army veterinary service those capable to fill this high place should be dismissed from our minds.

If this score and a half of years' struggle has not taught the lesson that in union there is strength, then it has not been worth while.

While we have been engaged in this battle, we have not been unmindful that a greater problem confronts us in the status of the veterinarians in the several other Federal services, and especially those in the Department of Agriculture's Bureau of Animal Industry. They are eight times as many in number as the Army veterinarians, and this number needs to be doubled for the larger economic veterinary service of the future of our country in a better control of the great animal scourges by joint action of the Federal and State veterinary services. Let it be remembered that these public servants do not receive as large initial pay as Army veterinarians; that promotions are slow and very limited in number in the higher salaried places; that no pensions or retirement are assured under any like favorable plan; that these members of our profession are wholly engaged in constructive work and the greater and richer triumphs of peace. That this Association, its membership and the profession as a single unit should be behind the necessary legislation that shall give to Federal and State bodies sufficient funds to afford adequate and proper salaries to those of our number engaged in these most needful public services goes without question.

It is a sad comment indeed that neither in the Senate nor House of Representatives of our country is there any record of a member of our profession ever filling a place in these bodies. In but one State has a member of our profession reached the place of Governor, and one could count on his fingers the number of the profession who have sat as members in our State legislative bodies. Yet the problems with which we are concerned and are asked to solve go to the daily well-being of every man, woman and child in our land from infancy to old age.

In closing this report and finishing the five years' period of my appointment on the Legislative Committee and a more or less intimate relation with problems of legislation for the profession for more than a period of thirty years, may I not, in retiring from this place of now greater and greater responsibility, bespeak the necessity of commanding for the profession through this Association, in selecting a future directing head of this committee, one familiar with legislative fields of action, one who can afford to give the major part of his time to this service, and an ample financial support in this most needful field for a better support of the profession and greater assistance to and a more adequate support of veterinary education.

The prospects this year of the smallest entering classes in our veterinary schools for thirty years; the almost extinction of the private veterinary schools with their splendid groups of unselfish men contributing of their ability, their time and money to promote the advancement of veterinary science, will not be supplanted well by the multiplication of weak State schools, inadequately supported and equipped, and the withdrawal of that great body of teachers who were imparting knowledge to student bodies on the subjects they were daily dealing with in the field of personal experience and practice. We need to restrain these tendencies of new State veterinary colleges who draw one or two from the staffs of other colleges from the already small number of capable teachers in our land.

We need sitting representatives in the halls of Congress. We should have one or more representatives in every State legislative body, for the paucity of knowledge among the legislators of matters pertaining to State veterinary sanitary police measures, economic veterinary medicine, the relation of the veterinarian to public welfare, is appalling and its further neglect fraught with tragic sequences.

No committee of this body has a larger field of needful service than the

Committee on Legislation. There has been no time in history when better legislation was demanded to conserve the food and raiment of our more than one hundred millions of people, not to speak of what we must contribute to other nations. Our own nation is increasing in numbers at a rapid rate. The animal food supply is steadily decreasing. Idle lands and congested factories are fraught with danger. No body of men conserve more a people's comfort—comfortable from being well fed, comfortable from ample raiment to protect us from the elements, comfortable minds, free of fear—these are the world's best securities. In milk, in wool, in meat, in leather, in cereals, in the fertility of the soil, in the relationship of animal diseases to mankind, we play the leading part. Shall we measure up to our obligations and responsibilities? Shall we fully serve in guiding and directing wise legislation?

THE PRESIDENT: Gentlemen, you have heard the report of the Committee on Legislation. What shall we do with it?

(It was voted, on motion of Dr. Kinsley, duly seconded, that the report of the Committee on Legislation be adopted.)

REPORTS OF COMMITTEES

THE PRESIDENT: The next is the report of the Committee on Resolutions. I don't know whether they are ready. If you have any resolutions, let them come before the committee. Dr. David White is the chairman.

(The following committees were called upon to report but were not ready: The Auditing Committee, Committee on Necrology, Committee on Anatomical Nomenclature, International Committee on Bovine Tuberculosis, Committee on History, Committee on Abortion, Committee on International Veterinary Conference, Budget Committee, Salmon Memorial Committee, Liutard Memorial Committee.)

THE PRESIDENT: That covers our committee reports.

REPORT OF EXECUTIVE BOARD

SECRETARY MAYO: That reminds me of one item that the Executive Board has recommended.

THE PRESIDENT: If there is no objection, we will go back to the Executive Board report and hear another recommendation from that Board.

SECRETARY MAYO: I have received, as Secretary, the following letter from Professor H. Vallée, Principal of the National Veterinary School of France.

(Secretary Mayo read the letter.)

(The Executive Board voted to recommend that the sum of \$500 be sent to the Anglo-American-French-Belgian Relief Committee, and that we ask for a report as to how the funds have been expended. It was voted, on motion of Dr. W. H. Hoskins, seconded by Dr. Kinsley, that the recommendation of the Executive Board, concerning the above relief sum, be approved.)

THE PRESIDENT: There are some other special committees. If Dr. Welch is in the house, we will hear from the Committee on Coöperation of Veterinary Associations.

DR. W. H. WELCH: I just arrived. I have not been able to get in touch with my committee, and I will ask for more time.

REPORT OF COMMITTEE ON UNOFFICIAL VETERINARY REMEDIES

THE PRESIDENT: We will then hear from the Committee on Unofficial Veterinary Remedies, Dr. H. J. Milks.

(Dr. H. J. Milks read the report of the committee on the feasibility of establishing a permanent committee for investigating and reporting on unofficial veterinary remedies, as follows:)

By "unofficial veterinary remedies" are meant the multiplicity of proprietary articles or preparations now being advertised to the veterinary profession, and in addition such simple non-proprietary and unofficial substances as have also come into general use by the profession.

The term "proprietary article" as here used refers to any chemical, drug or similar preparation used in the treatment of diseases, if such an article is protected against free competition as to name, product, composition or process of manufacture by secrecy, patent, copyright or in any other manner.

The growth of the proprietary remedy goes back to the time when there were introduced to physicians and veterinarians preparations under pharmaceutical names, of known composition, and which were prepared by manufacturers who took pride in their product. They included elixirs, sirups, pills, etc., and were well received by the practitioners. Along about 1875 in human medicine, but somewhat later in veterinary, there began to appear preparations with coined names, protected by law, and with secret formulæ, for which extravagant therapeutic claims were made. Many of these preparations were simple mixtures easily and cheaply made, and consequently there was opened a promising field for commercialism.

The number of proprietary remedies has increased rapidly, and at present the veterinary profession is exploited by numerous manufacturers of proprietaries as thoroughly as are the laity in the use of similar preparations. Added to the almost innumerable list of pharmaceuticals are the bacterins and other biologics which are constantly kept before us.

Your committee does not wish to carry the impression that it considers all proprietaries of questionable value. Such indeed is not the case. There are many that are of great value and which the veterinarian may use with confidence, and furthermore it must be admitted that not all healing agents can be best prescribed or combined extemporaneously. The great difficulty is that we have no way of separating the worthy from the worthless. We are not all chemists or pharmacists, and if we were, we would not have the time to make the necessary examinations.

There is also another side to this question, in that the legitimate manufacturer of pharmaceuticals, or producer of biologics, is working at a disadvantage when compelled to compete with the unethical manufacturer. Just recently a large manufacturer of biologics made a strong appeal for standardizing bacterins. Your chairman also recently received a letter from a manufacturing establishment referring to the "work of this special committee which marks an epoch in the advancement of the veterinary profession."

Of course, compared to official preparations, we see a great deal of propaganda in favor of unofficial ones, but one must consider that the official ones are supposed to be so well known as to need no propaganda. Likewise we should consider that the official preparations of the Pharmacopœia and National Formulary are the result of the labor of the best minds in the country.

The question resolves itself into what can be done to correct this evil, if there be one. The American Medical Association had the same problem to solve. In 1895 its Board of Trustees appointed a committee to look

after the advertising in its journal. In 1900 a board of control, composed of pharmacists and chemists, was appointed, which was to pass on all medicines offered for advertising in the *Journal of the American Medical Association*. The name of the board was changed to "The Council on Pharmacy and Chemistry" in 1905. This Council has always been composed of experts in pharmacy, chemistry, pharmacology and therapeutics. The purpose of the Council is to protect the medical profession and the public against fraud, undesirable secrecy and objectionable advertising in connection with medicinal articles. Among its activities is the publication of a book, "New and Non-Official Remedies," an annual volume describing both proprietary and unofficial non-proprietary remedies which are deemed worthy of use by the medical profession. In order to be admitted to this book an article must conform to certain rules formulated by the Council. The following brief résumé will give some idea of the requirements that must be met in order to be included in this book:

"*Rule 1. Composition.*—No article will be accepted in 'New and Non-Official Remedies' or retained therein unless its composition be furnished the Council for publication.

"*Rule 2. Identification.*—No article will be accepted or retained unless suitable tests for determining its composition be furnished the Council.

"*Rule 3. Direct Advertising.*—No article will be accepted or retained that is advertised to the public. (There are exceptions for disinfectants.)

"*Rule 4. Indirect Advertising.*—No article will be accepted or retained if the label, package or circular accompanying the package contains the names of diseases in which the article is said to be indicated. (Exceptions for bacterins and emergency remedies.)

"*Rule 5. False Claim as to Origin.*—No article will be accepted or retained concerning which the manufacturer or his agents make false or misleading statements as to source, raw material from which made, or method of collection or preparation.

"*Rule 6. Unwarranted Therapeutic Claims.*—No article will be accepted or retained concerning which the manufacturer or his agents make unwarranted or misleading statements as to the therapeutic value.

"*Rule 7. Poisonous Substances.*—The principal label on an article containing poisonous or potent substances must state plainly the amount of each ingredient in a given quantity of the product.

"*Rule 8. Objectionable Name.*—Among other things, articles bearing objectionable or suggestive names will be refused admission.

"*Rule 9. Patented Products or Protected Names.*—The number of which must be submitted.

"*Rule 10. Unscientific and Useless Articles.*—No such article will be accepted or retained which, because of its unscientific composition, is useless or inimical to the best interests of the public or medical profession."

"New and Non-Official Remedies" contains information about the newer agents that can be found in no other book, and it is the only book upon which we can find information upon proprietary remedies worthy of patronage.

Believing that some effort should be made by the American Veterinary Medical Association to solve the problem of unofficial remedies as used by the veterinary profession, and that a body similar to the Council on Pharmacy and Chemistry is essential, your committee respectfully submits the following recommendations:

1. That the Executive Board appoint a body similar to the Council on Pharmacy and Chemistry of the American Medical Association, whose duty it shall be to formulate such rules and interpretations as may be deemed necessary in handling the problem and submit them to this Association for approval at the next annual meeting.

2. That funds be provided whereby this committee may meet to discuss its problems.

H. J. MILKS, *Chairman*,
H. D. BERGMAN,
H. B. COX.

THE PRESIDENT: You have heard the report from the Committee on Unofficial Veterinary Remedies. What shall we do with it?

(It was voted, on motion of Dr. W. H. Hoskins, duly seconded, that the report of the Committee on Unofficial Veterinary Remedies be received and the recommendations referred to the Executive Board.)

THE PRESIDENT: The next committee to report has already reported to the Executive Board and we will not call on the Committee on Combining Offices of Editor and Secretary.

Committee on History. Are you ready, Dr. Adams?

REPORT OF COMMITTEE ON HISTORY

DR. J. W. ADAMS: I was notified on the first of May that I was the chairman of the Committee on History. That notice comes very late in the year, just when the school men are busiest with examinations every day, and I have had no time, up until the latter part of July, to give the matter any thought whatever. I know, however, that, consulting some of the members of the committee, it is not a matter that can be taken up in a short time. For instance, Dr. Higgins, of the committee, has been working, trying to dig up the early history of the Association, and very little of it is recorded. Most of it is in the minds of the older men, some few of whom are still living, and it will have to be gotten by tedious and painstaking correspondence.

Two members of the committee have done some work, but the results are not in shape so that it can be written. I would suggest that the committee for next year be notified before the end of this week, so they may have the winter months to do this reading and carry on this work. If I am a member of the committee next year, it will be a pleasure to do what I can. It is an impossibility for a man to do any of this work in August. He hasn't the time. I think the members of the committee who have done some work should be continued, and it may be that the report next year will be more complete.

DR. R. C. MOORE (Kansas City, Mo.): Last year, or a few years ago, I was made chairman of this committee, under protest, and last year the committee's report was accepted, by motion, I think, of Dr. Hoskins, about continuing the committee. I want to make an explanation, because I feel that an explanation is due the members of this Association. I took it for granted that the committee was continued, and the new committee was not aware that it was appointed. Not hearing anything to the contrary, I started, as best I could, in the winter months, to get the committee to work, and I guess I was at fault by not consulting the JOURNAL. If I had done so, I would have had the copy in my hand, giving the appointment of that committee. Consequently I sent out letters to all our Association secretaries, asking for information and history pertaining to their individual States. I asked the other members of the com-

mittee what plans they thought we should follow, and I have replies from quite a good many of them.

I found out that there had been a change, and I feel that I have put myself in an unfortunate position by "butting in." I have quite a good deal of correspondence from various State associations, some very nicely written reports of the profession in the individual States, and I have all those documents with me and will turn them over to Dr. Adams, as soon as I can arrange it. Doctor, I want to say I am glad I am relieved of the responsibility, but if you need me at any time, I shall be glad to help. The committee can not do much in one year.

I think the wording of the name of that committee is just a little bit wrong. I think the original motion was "The History of the American Veterinary Medical Association." I think our minutes are a history of that Association, but they are a history also of the veterinary profession of America, and that calls for going back even to the first days of this Association.

I was talking with Dr. Higgins a little while ago. He found in Canada, where we have had so much of our education going on, that it takes a great deal of digging to dig up the whole record and get the material that is valuable.

I think, when the report is finished, that we will have a history of our profession that in years to come will be worth a great deal to us. I heartily indorse it. It was not my intention, in going on with this work, to impose on anybody else.

THE PRESIDENT: Gentlemen, you have heard the report of the committee and the explanation of Dr. Moore, and I want to say that possibly I was a little in error in handling this committee because I did not have the printed reports of the meeting in New Orleans, and I did not hear the reports there. However, I think everything has worked out satisfactorily, except notifying the committee earlier, and that was probably my fault. I take the blame for that. I think that committee should be continued without any changes. I would not have made any changes, but I understood that Dr. Moore did not want to be a member of the committee. What will you do with the report?

(It was voted, on motion of Dr. Hershheim, duly seconded, that the report be received, the motion having been amended on motion of Dr. Adams that Dr. Moore's name be added to the committee.)

THE PRESIDENT: I think that covers all the committees. We can not call up any more this evening unless some committeeman has come in who can make a report.

Is there any business that anyone wishes to introduce?

COMMITTEE ON PHARMACOPŒIA

DR. C. H. STANGE: I would like to make a motion that the President appoint a committee of three to arrange for recognition of this Association in connection with the revision of the next Pharmacopœia. (Seconded by Dr. Kinsley.)

THE PRESIDENT: I would also suggest that this committee prepare a list of drugs that we want to take in.

(It was voted, on motion of Dr. Stange, seconded by Dr. Kinsley, that the President appoint a committee of three to arrange for recognition of this Association in connection with the revision of the next Pharmacopœia and also to prepare a list of the drugs that this Association wants to have included.)

THE PRESIDENT: Is there any other business to come before us at this time?

(It was voted, on motion of Dr. Glover, of Colorado, seconded by Dr. R. C. Moore, that the receiving of invitations for the next meeting be made a regular order of business and to come immediately following the election of officers.)

Adjournment.

(Proceedings to be continued)

ECHOES FROM COLUMBUS

At the Columbus meeting the Secretary was instructed to telegraph the greetings of the Association to Dr. E. A. A. Grange, of Toronto, who is confined to his room on account of a cerebral hemorrhage. A letter received from Mrs. Grange states that the Doctor appreciated very much the kind greetings sent by the A. V. M. A. and asked her to express his thanks for the good wishes and his own regret that he is still unable to write himself.

For continuous attendance at A. V. M. A. meetings Mrs. W. Horace Hoskins has made an outstanding record, the Columbus convention being her twenty-fifth consecutive pilgrimage. The JOURNAL extends congratulations and appreciation for this indication of deep interest in the Association's welfare.

As a result of the change in the By-Laws of the Association, the office of Secretary was removed from those filled by the ballot, whereupon both the Secretary and the Editor were appointed by the Executive Board to succeed themselves. This action was subsequently approved by the Association.

The clinic held at the Ohio State Veterinary College on Friday afternoon in connection with the Columbus meeting was of unusual interest, and the attendance was even greater than expected. Prof. D. J. Kays' fine exhibition of the University live stock was the first feature on the program.

This was followed by the demonstration of the reaction to the tuberculin test and the intra-palpebral mallein test with subsequent

autopsy examinations; technique of autopsy on hog-cholera cases; ovariectomy operation on bitch; standing operation for hemiplegia laryngis; scrotal hernia reduction without operation; display of anatomical and pathological specimens.

As it is impossible at this time to do justice to this highly instructive clinic, Dr. Brumley has consented to furnish a detailed report on this subject which will appear in a subsequent issue of the JOURNAL.

During the A. V. M. A. convention at Columbus, a six-course dinner of equine meat products was given under the direction of Dr. W. Horace Hoskins. The menu was as follows:

Dried meat and salami on the table.

First course: Meat and vegetable soup and saltines.

Second course: Steamed roast meat.

Third course: Meat and vegetable stew and rolls.

Fourth course: Liver pudding sandwich; dill pickles.

Fifth course: Lettuce and tomato salad (our own oil for dressing).

Sixth course: Mince-meat pie (our own shortening).

Seventh course: Coffee and cigars.

The following members were participants: Lester H. Howard, Boston; A. T. Kinsley, Kansas City; Editor D. M. Campbell, Chicago; Major Towner; W. G. Hollingworth, Utica; J. F. DeVine, Goshen; S. Brenton, Detroit; David McAuslin, New York City, and William H. Kelly, Albany.

Everyone present heartily partook of the products and all expressed their delight in the opportunity afforded.

DON'T GO BACK ON THE HORSE

"Don't go back on the horse—don't surrender—don't quit the game of raising good horses and mules," so says Secretary Jewell Mayes of the Missouri State Board of Agriculture. The horse and mule business is just now wading through a slough of despondency, a sort of panic or a scare—but public sentiment and farm demands will again turn back quite soon to the horse and mule, it is safe to expect. The tractor and the truck are relentless enemies of the scrub horse, but the worth while horse and mule have a permanent place in the agriculture and transportation of every state and nation.—*K. C. S. Ry. Agricultural and Industrial Bulletin*, August 1.

"The tuberculin test is a prerequisite to the entry of herds at the Trenton Fair, New Jersey, this year."—*Jersey Bulletin*.

OTHER MEETINGS

WASHINGTON AND OREGON VETERINARY MEDICAL ASSOCIATIONS

THE Washington and Oregon Veterinary Medical Associations met in joint session at the Imperial Hotel, Portland, Oregon, August 5 and 6. In the absence of Dr. Smith, president of the Oregon Association, Dr. Ferguson, the president of the Washington Association, presided throughout the meeting. The program was one of the best which has ever been presented at a joint meeting of the two associations. The first paper was prepared by Dr. E. T. Baker of Moscow, Idaho. In his absence it was read by Dr. E. E. Wegner of Pullman, Washington. It was entitled "Some Pointers Learned in Practice." This was followed by the paper by Dr. E. R. Derflinger, Assistant State Veterinarian of Oregon, entitled "An Observation of Some Malformations." Dr. Derflinger reported visiting a farm upon which the last crop of calves had been born with various malformations of the head and especially of the nasal passages.

Dr. A. C. Brown of Vancouver presented a very interesting paper entitled "Veterinary Ethics and Prices." After this had been discussed at length a committee of the two associations was appointed to investigate prices charged and make recommendations to the associations. This committee is distributing a questionnaire for the purpose of gaining information which will lead to definite recommendation to be presented at the joint meeting next year.

Dr. W. H. Lytle, State Veterinarian of Oregon, was next on the program with a paper on "Demineralization." This proved to be a very popular subject. A large proportion of those veterinarians who took part in the discussion seemed to believe that deficiency in mineral content of the food is quite common in both Oregon and Washington. Dr. F. W. Miller of the Agricultural Experiment Station of Oregon read a paper on "Experiences in Forage Poisoning." He reported an outbreak of what seemed to be forage poisoning among horses in a logging camp. The trouble was controlled very satisfactorily through a change in the feed. Dr. J. N. Show of the Oregon Agricultural College gave case reports on the use of bismuth paste in fistulous tracts.

At the evening session, Dr. J. W. Kalkus of the Washington Experiment Station, Pullman, Washington, gave an illustrated talk on "Goiter." This covered the research work which has been con-

ducted by him for the past five years. The lantern slides gave concrete evidence of the success which has been obtained in controlling goiter, since goiter is quite prevalent in several of the Northwestern States, and his paper was very well received.

A large part of the morning of August 6 was devoted to the discussion of tuberculosis and papers on this subject were read by Dr. Clifford Ackley of the Department of Agriculture of Washington and Dr. L. C. Pelton, Chief in Dairy and Live Stock in the Department of Agriculture of Washington. This discussion was followed by a paper by Dr. T. O. Anders of Seattle on "The Marketing of Veal." During the afternoon of August 6, Dr. E. L. Glaisyer of Tillamook opened a very live subject with a paper on "Mastitis." Many of the practitioners joined in the discussion following this paper.

Dr. R. J. Donahue of Tolt, Washington, who is with the Carnation Farm, discussed a breeding record for cows. He emphasized the fact that the veterinarian who is usually called to treat breeding diseases of cattle does not get anything like a complete history of the animals which are to be examined.

The two associations voted to meet together again in 1921, selecting Seattle, Washington, as the meeting place. The time of the meeting will possibly be about August 1. Both the Idaho veterinarians and those of British Columbia are to be extended special invitations to meet with the Oregon and Washington men.

Officers selected for the following year are as follows:

Oregon Association—President, W. B. Coon of Forest Grove; first vice-president, W. G. Morehouse, Salem; second vice-president, C. M. Gardner, Portland; third vice-president, E. L. Glaisyer, Tillamook; secretary-treasurer, B. T. Simms, Corvallis.

Washington Association—President, R. A. Button, Tacoma; vice-president, G. A. Jones, Sedro-Woolley; secretary-treasurer, Carl Cozier, Bellingham.

Dr. L. C. Pelton was toastmaster at the banquet on the night of August 6. The feature of this banquet was a chalk talk by Dr. E. V. Edmonds of Mt. Vernon, Washington.

The two associations decided to invite the American Veterinary Medical Association to meet in Portland some time in the near future. The fact was brought out that the American Association has never met in any of the States of the Pacific Northwest.

CARL COZIER, *Secretary.*

NORTHEASTERN VETERINARY MEDICAL CLUB

The Northeastern Veterinary Medical Club met at Wilkes-Barre, Pennsylvania, July 16. Those present were taken to the hospital conducted in connection with the Lehigh and Wilkes-Barre Coal Company and supervised by Drs. E. E. and Ernest Hogg, where a clinic was held. Dr. John W. Adams of the University of Pennsylvania operated on several subjects.

Dr. F. A. Marshall demonstrated the uterine douche treatment for abortion and sterility and also performed rumenotomy on a cow.

Following this clinic the meeting reconvened at the hotel, where luncheon was served to the following members:

Howard C. Reynolds, E. E. Hogg, Ernest Hogg, Thomas James, E. P. Althouse, V. R. Lidstone, J. W. Adams, N. H. Allis, F. A. Marshall, F. A. Davis, E. E. Brosnan, G. B. DuBois, H. T. McNeal, Fred Catlin, Fred Stehle, Calvin Bennett, H. Leutholt, A. B. Cole, R. S. Detwiler, E. S. Stone, John Rink, A. E. Hollister, P. N. McNeal, F. J. McNeal, L. E. Meade, H. W. Barnes, F. H. Chandler, and H. R. Church.

Following this luncheon, Dr. Adams gave a very interesting talk on anesthetics, surgery, and restraint of animals.

Dr. F. A. Marshall talked on abortion and sterility disease and rumenotomy.

Deputy State Veterinarian H. R. Church outlined work as it is carried out by the Pennsylvania Bureau of Animal Industry.

These talks brought out very liberal discussions in which practically everyone present participated.

Dr. Ernest Hogg, Wilkes-Barre, Pennsylvania, was elected president for the ensuing year.

H. R. CHURCH, *Secretary*.

UNIVERSITY OF PENNSYLVANIA ALUMNI MEETING

The Veterinary Alumni of the University of Pennsylvania assembled at the Veterinary School at 9:30 a. m., June 12, 1920, to celebrate Alumni Day.

Dr. C. J. Marshall gave the welcoming address and then conducted a clinic in which the Albrechtsen uterine douche treatment, the serum-virus method of treating hogs, and the proper method of tuberculin testing were thoroughly and capably demonstrated by the members of the graduating class, who also gave statistics regarding their work in Dr. Marshall's Ambulatory Clinic.

Dr. John W. Adams then demonstrated the operation for the relief of roaring.

Dinner was served at noon in Leonard Pearson Hall to the alumni and their guests.

Various alumni affairs were discussed at the business meeting which followed the dinner.

At 2:30 p. m. the members proceeded to Franklin Field, where a ball game was played between the universities of California and Pennsylvania, after which many of them attended numerous other university activities.

During the day approximately 125 alumni were present. All seemed to enjoy themselves and unanimously expressed the hope that a similar program would be arranged for next year.

M. F. BARNES, *Secretary*.

OKLAHOMA VETERINARY MEDICAL ASSOCIATION

The Oklahoma State Veterinary Medical Association held its fifth annual meeting on July 6 and 7 at the Lee Huckins Hotel, Oklahoma City, with fifty-five members present.

Thirteen new members were accepted by the association.

Papers presented for discussion included "Notes on Transportation of Cattle and Hogs," by Dr. H. A. Roscoe; "One Million Sheep in Oklahoma by 1923," by C. L. Nelson; "Notes on Tuberculin Testing," by Dr. T. A. Jones; "Progress of Tuberculosis Control in Oklahoma," by Dr. E. V. Robnett, State Veterinarian; "Professional Ethics," by Dr. O. S. Gould.

The round-table talk was conducted by Dr. Walter H. Martin.

On the evening of the 6th, a banquet was held at the hotel. About sixty members with their wives and friends were present, and an enjoyable program was offered.

New officers elected for the following year are: Dr. C. H. Anthony, president; Dr. J. E. Nance, vice-president; Dr. H. Wood Ayers, secretary; Dr. C. C. Hooker, treasurer.

H. WOOD AYERS, *Secretary*.

JOINT PRACTITIONERS' MEETING

A joint practitioners' meeting, arranged by the British Columbia and Washington State Veterinary Associations, was held in the Chamber of Commerce, Bellingham, Washington, on July 24.

There were fifteen members present from British Columbia and about the same number from Washington State.

Mayor E. T. Mathes and J. A. Miller, secretary of the Chamber

of Commerce, made short speeches of welcome, after which Dr. L. C. Pelton, State Veterinarian, and Dr. A. J. Damman, president of the British Columbia Veterinary Association, were elected as joint chairmen, this being necessary on account of the fact that Dr. Pelton had to leave before the finish of the meeting. Dr. K. Chester, secretary of the British Columbia Veterinary Association, was chosen secretary of the meeting.

After a few words from Dr. Pelton he called upon Dr. G. Jones of Sedro-Woolley, Washington, to read his paper on "Torsion of the Uterus in Cows and a Method for Its Reduction." This was followed by general discussion of the different methods used by different practitioners and the results. Dr. T. H. Jagger of Vancouver, B. C., then gave a very interesting address on "Some Phases of the Causes of Sterility." Dr. Jagger's remarks showed how necessary it was to make a very careful and thorough manual examination of all the genital organs in trying to ascertain the cause of sterility. Dr. Jagger is specializing in this work and is following the method of Dr. Williams, who visited this Province as the guest of the British Columbia Veterinary Association. At the conclusion of the remarks, considerable interesting discussion ensued which lasted for an hour. Mention should be made of a highly educational discussion between Dr. A. Donahue of Seattle, Wash., and Dr. Jagger, the former having lately taken up the subject as the result of being in charge of a large dairy farm. The account of his difficulties and conclusions, brought out in his questions to Dr. Jagger, and their answers, were most useful to the others present.

Dr. J. W. Kalkus, Pathologist of the State College at Pullman, Wash., questioned whether Dr. Jagger's method, which he has found financially beneficial in British Columbia, would be practical in small grade herds of the State of Washington.

The next paper read was by Dr. C. S. Phillips of Mt. Vernon, Wash., on "Various Obstructions in Cows' Teats." Dr. Phillips described his method of removing them, having lately had better results than formerly.

Then Dr. T. E. Sleeth of Vancouver, B. C., gave a very technical paper on "Abdominal Operations in the Dog."

Dr. Sleeth is a very successful canine surgeon, and his preparation of the patient and surgical technique would do credit to any human surgeon. Considerable discussion followed, particularly in regard to the Cæsarian operation, with which Dr. Sleeth has had good success.

Prof. H. E. Upton of the Canadian Soldiers' Settlement Board then spoke on the "Opportunities and Chances of Financial Success of the Treatment of Diseases of Poultry by the Veterinary Practitioner." Prof. Upton explained that he was asked to come to this meeting of veterinarians by Dr. K. Chester, who stated that he thought considering the amount of vaccination now being done on poultry and the various diseases occurring in poultry, together with the increased value of the birds, that the time was now opportune for the practicing veterinarian to add the poultryman to his list of clients.

Prof. Upton gave a most interesting address on some of the diseases of poultry, and the preparation and administration of the various vaccines, which he has found as the only way of treating and preventing such diseases as diphtheritic roup, etc. He mentioned the fact that coccidiosis was causing considerable loss to the poultryman, and not very much was known about it, and he thought the veterinarian was the man that the poultryman should look to for relief.

Lively discussion followed and Prof. Upton was accorded a hearty vote of thanks.

The meeting then adjourned to the Hotel Leopold, where the members partook of a fine chicken supper. They then returned to the Chamber of Commerce, where humorous cartoons and drawings were made by Dr. E. V. Edwards of Mt. Vernon, Wash., after which Dr. J. W. Kalkus of Pullman, Wash., gave a detailed address on "Goiter in the New Born." He explained the subject by lantern slides, showing experiments carried on by the State College of Washington in investigating the cause of goiter in the new born, which is very prevalent in certain valleys of the State, where there has been no normal increase in some classes of stock for some years.

Dr. Kalkus' experiments, however, showed conclusively that if iodine is administered either in the form of potassium iodide, or tincture of iodine rubbed into the skin during the period of gestation, a normal birth occurred in every case, even in animals that had given birth to an abnormal fetus the previous year.

The arrangements for this most successful meeting were excellently carried out by Dr. C. Cozier of Bellingham, Wash., the secretary of the Washington State Association, and it was the expression of all present that similar joint meetings should be held in future.

KENNETH CHESTER, *Secretary.*

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INTERNATIONAL CONGRESS ON FOOT-AND-MOUTH DISEASE

AN international congress on foot-and-mouth disease was called to be held at Buenos Aires, September 6 to 11, under the auspices of the Argentine Government. The congress was divided into three sections, scientific, sanitary, and economic.

According to the program the subjects for discussion in the scientific section included the susceptibility of various species of animals in different parts of the world to foot-and-mouth disease; the clinical study of the disease in the affected species; symptoms and lesions in mild, septicemic and abnormal forms; diagnosis in each country; the present state of research relative to the causative agent, whether a filterable virus or other microörganism; virulent materials; exaltation and attenuation of the virus, mode of penetration, and differences in severity in different epizootics; immunity following a first attack; cause of recurrence in the same animal within a year, as is frequently observed in Argentina; possibility of preventive inoculation; therapeutic and prophylactic treatment; transmission of the disease to man.

Subjects for the sanitary section were: The history of outbreaks in various countries; existing sanitary regulations, and reasons for the unsatisfactory results in most countries; veterinary sanitary organization in each country in South America, and mode of remedying insufficiency by the establishment of sanitary zones, laboratories, etc.; differential diagnosis of maladies likely to be confounded with foot-and-mouth disease; importance of immediate notification of the central authority when the infection appears; results obtained in the United States and England by the prompt slaughter of affected, exposed and suspected animals; results obtained by isolation of diseased and suspected animals; rigorous inspection of markets, fairs, expositions, etc.; spread of the disease by railway and other transportation; most efficacious modes of disinfection; international sanitary measures; necessity of general compulsory inspection of foods of animal origin; official control of products offered for sale for curative and preventive treatment; necessity of an organization in each country for applying sanitary police measures; interest of agricultural and stock-raisers' societies in the strict application of sanitary measures.

The economic section considered the losses caused by foot-and-mouth disease in different countries during the past century; morbidity and mortality in different species of animals; appearance of other diseases concomitantly with or immediately following foot-and-mouth disease; damage caused to breeding and fat stock; damage caused to milk production; economic advantages of slaughter with indemnity over isolation; economic history of epizootics in the United States and England where slaughter has been employed in preference to isolation; economic value of saving and treating valuable animals for breeding stock; resources for supporting sanitary police service; live-stock insurance.

In reviewing this formidable list of subjects we have reason to feel that the United States is fortunate in not having to deal with most of them at this time and that our effective methods of eradication in the past have spared us many of the problems and difficulties that now beset many other countries.

FOOT-AND-MOUTH DISEASE SEVERE IN EUROPE

FROM a recent Belgian official report we learn that the present epizootic of foot-and-mouth disease presents an exceptional gravity in the greater part of Europe, with an increased mortality among

young animals and frequently also among adult animals. The Government of the Netherlands, it is said, has had to abandon its system of combating the disease by slaughter and has officially adopted the general application of serum therapy. The operation consists in injecting the defibrinated blood of bovine animals that have recovered from the disease. The blood is drawn not less than 15 days nor more than a month and a half after recovery. The dose is 120 c.c. for adult cattle, 50 c.c. for calves and 10 to 30 c.c. for pigs. Vaccinated animals do not contract the disease as a rule, or, if they do, it is generally in a mild form, and the mortality is almost nothing. The immunity, however, is of short duration.

THE JOURNAL COSTS MORE

BEGINNING with the October number, the subscription rates for the JOURNAL have been increased by direction of the Executive Board. This action was made necessary by the greatly increased cost of everything that enters into the production of a magazine. The amount of the advance represents only a small part of the increased cost, which appears to be permanent. In deciding upon this step we have merely done, after considerable delay, what the publishers of most other magazines did some time ago.

The new subscription rates for non-members of the A. V. M. A. are \$4.00 instead of \$3.00 in the United States, \$4.25 instead of \$3.25 to Canada, \$5.00 instead of \$3.60 to other foreign countries, and 40 cents instead of 30 cents for single copies. The subscription price for Association members is included as heretofore in the amount of their dues, which remains unchanged; so the increase does not affect them.

AS the political campaign warms up, it begins to appear that either a certain donkey or a certain elephant will be in great need of skilful veterinary attention early in November.

ALTHOUGH the United States Supreme Court has not yet passed on the subject, it is feared that the Eighteenth Amendment to the Constitution nullifies the passages in the Government books on diseases of horses and cattle in which the administration of such remedies as alcohol, whiskey and milk punch is advised.

THE RELATION OF THE AGRICULTURAL PRESS TO THE VETERINARIAN¹

By E. S. BAYARD

Editor of The National Stockman and Farmer, Pittsburgh, Pa.

AT your Philadelphia meeting your Association honored me by making me an honorary member. I have had no previous opportunity to express my appreciation of such a high compliment. I may say, however, that I didn't fully appreciate it until I perused the list of honorary members and found my name on a roster of distinguished men, where any man might take pride in being enrolled. I would not refer to this matter except that this is my first opportunity to express appreciation of your gracious act.

You are well aware that I can contribute nothing to the store of research and experience which you pile up at these meetings every year. I know it too. I have even tried once or twice, as a member of a committee of the Livestock Sanitary Association, to unload a few of my scientific ideas, but I do not recall that any of them ever saw the light. I have concluded, therefore, that I didn't know so much as I thought I did; that the committeemen realized it but were too kind-hearted to tell me. They were all veterinarians and humanitarians too I think now. This is one of the ways I found out, what the rest of you knew better than I, that I could not enlighten you in the science to which you are devoted.

If I have no ability to enlighten you, what excuse, then, have I for taking a place on your program? None at all. You must blame your Secretary. A friend of mine was eating an apple one day when somebody said to him, "Look out, Bill, there's a bug on your apple." "Well," said Bill, calmly munching away, "he's there at his own risk." I am here at your risk.

When I appeared before the Agricultural Committee of the House of Representatives to try to secure just salaries for veterinarians in Government service I could say a few words that your own members could not say without appearing to indulge in self-praise. I said them as best I could, paying due tribute to your profession, its present high standards, and also the attainments and character of its practitioners. May we not hope that for the sake of your friends, for the sake of your profession, and above all for the sake of the

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

world which is becoming more and more dependent on your profession for food and raiment, you will continue to maintain the standards you have set for yourselves and those who follow you? Maintain them not merely in education but in all things that tend to make your profession of greater service in this world—and yourselves more happily located in the next. This is not a wholly unselfish desire on the part of any man with vision reaching beyond the mere present in our livestock industry. It is for the sake of the animal industry of the Nation, for the sake of those who must be fed and clothed by it, that I express the hope that you will abate not one jot or tittle of your high educational and professional ideals. (Applause.)

Where does the agricultural press come in? It comes in right here. The agricultural press, if it supports your cause (which is likewise its cause), must see in your profession the same kind of high-grade men and men as well qualified as it demands in agricultural colleges and other institutions which it endeavors to promote. Let me ask you, where would this country have been with pee-wees or even mediocrity in the places held by Melvin, Mohler, Marshall, Wills, McNeill and others during the foot-and-mouth epidemic? What if these men had lacked vision and knowledge and guts? (Perhaps the term I should have used in this highly professional company is “intestinal investiture.”) Or what if they had lacked ability to command the support of the press and of their chiefs in Nation and State?

Not so many years ago a man came in to consult me about the profession of veterinary medicine. He was much disturbed because the horse was going out of the cities and the poor “vet” would soon find his occupation gone. I showed him the constantly increasing numbers of people in towns and cities, the constantly decreasing numbers on farms, and I told him that he would live to see a cow worth more than any horse he had ever seen and a hog worth as much as the average horse of the United States. I told him that as the country grew older, as its soils and yards and barns became infested or infected through successive generations of animal production, there would be increasing need of the veterinary medical profession. I showed him the possibility of great losses through epizootics, and the relation of animal health to national wealth, to a sound, wholesome and adequate food supply, and to a prosperous animal industry. I didn't tell him then, for I didn't know it, that it would be a God's blessing to a lot of veterinarians if the

livery stable did wink out and they would get their offices into other places like other professional men, and have the same pride in their profession as other men have in theirs. (I hope I am not offending any of you gentlemen, but this is what I think.) All of these things have come to pass, and still the horse travels the streets and will continue to do so wherever he is cheaper than mechanical power—which is in quite a few lines of work.

As I have just intimated, the agricultural press is interested in you primarily because it is interested in the animal industry of this country. And the animal industry means more to us than a mere meat supply—it means the maintenance of the fertility of our soils, and that means a prosperous agriculture, an adequate national food supply, cereal and vegetable as well as animal. We are interested in you for business reasons, not merely on account of your personal charms. Farmers are going to demand more service of you in the future than in the past, and more of you are going to live in the country or country towns. A day of closer relations between farmers and veterinarians is coming. Look at the purebred livestock being put on farms; look at the value of all livestock; look at the steady advancement of agriculture and animal industry if you doubt it.

If this is true, here are a few things for you to remember. If your young men are to practice among farmers to their mutual benefit, they must strive to understand. Here the agricultural press may be of some service, in helping to an understanding. I'd like to preach a baccalaureate sermon to every graduating class of every college of veterinary medicine, and my text would be, "With all thy knowledge, get understanding." Our animals mean so much to us who have bred them for successive generations. Our faithful servants mean so much to us. We have on our farm a horse twenty-six years old. Thank God nobody has money enough to buy him! For whosoever could buy him could buy our gratitude, our affection, our self-respect! Such animals are more than mere cases to us—they represent years of thought, years of service, and we want them to mean something to you. I have mentioned this merely as an example of many similar relations. We should be real friends with a real interest each way, and not merely acquaintances, ye who practice in the country. I have heard some veterinarians make fun of their farmer patrons, and some farmers make fun of the veterinarians; but one friend is worth a dozen neutrals, to say nothing of enemies, and such things merely show a lack of understanding. Let me appeal to you leaders in your profession to teach under-

standing, for doubtless you do not need such exhortations yourselves.

I am aware that the agricultural press has been criticized by some veterinarians for two things, to which I refer briefly. First, for giving veterinary advice through its columns. I believe this is no longer condemned. At any rate it helps your profession instead of hurting it as some of you used to think. In our own case we have tried to make this department a work on animal husbandry rather than a prescription counter. Second, the advertisements of veterinary medicines carried by the press. I must here plead not guilty and shift the accusation. Some years ago I offered, twice, to submit all such advertising to the proper committee of this body, and received no answer to my proposition. Let me tell you another story. A few years ago in this city a man who wanted us to advertise a hog-cholera cure took me to his office to convince me that we should do it. And to convince me he showed me a stack of indorsements from veterinarians. But a trial by leaders in veterinary research, we buying the material and they furnishing the animals, showed that the remedy was no good. Here at least press and profession coöperated. And we can coöperate some more.

I must apologize for taking so much of your time on matters which some of you may consider of little importance. However you may regard them or us, we are beginning to understand you and your work better. We see, not thirty miles from here, cattle from former tick country on feed and more to come from all over the South. We see our herds being certified—and the press has held back a little for your sake on this. We see scab of sheep and cattle being controlled. We see hog cholera's annual ravages reduced and rapid progress toward its conquest. We see the old problem of abortion being tackled anew—and not despairingly. We see parasites, internal and external, of all kinds being brought under control. And finally we see trainloads of livestock moving to market without quarantines and not reduced by apthous fever! And in all of these and more we recognize the value of your profession and yourselves.

“Never has there been a greater campaign than the one which is now being launched by the United States Department of Agriculture in behalf of ‘Better Sires—Better Stock.’ The campaign will revolutionize the livestock industry of America if livestock owners will only coöperate with State and National Departments of Agriculture, as good business judgment requires they should.” *Dairy Farmer*.

STRONGYLOSIS (OSTERTAGIA) IN CATTLE¹

By JAMES E. ACKERT and WILLIAM E. MULDOON, *Manhattan, Kans.*

OUR attention was recently attracted to a herd of unthrifty yearling steers, many of which were suffering from a severe attack of strongylosis, which was so acute that several of them died. The autopsies revealed heavy infestations of the encysted stomach-worm, *Ostertagia ostertagi*, which apparently was responsible for the loss of the stock.

Little of the history of these steers was obtainable, except that they had been summered in Missouri, purchased in the Kansas City Stockyards and shipped to the vicinity of Manhattan, Kans., during the month of January, 1920, all of them being in poor physical condition. Of the 84 steers purchased, about one-half became visibly affected; 12 were so diseased that they had to be segregated from the herd, and 9 died. A brief description of the clinical symptoms and of the post-mortem findings of one of these fatal cases was reported by Muldoon (1920, p. 89).

SYMPTOMS

All of the affected animals presented practically the same clinical picture, the most noticeable features being their extreme emaciation and anemia. There was marked pallor of the visible mucous membranes and skin, and some of the more severely affected animals had dropsical swellings in the submaxillary region (fig. 1) and along the brisket. The hair had an unthrifty aspect with an excess of dandruff, and the skin seemed to cling to the structures beneath. Subcutaneous fat was lacking, the eyeballs were sunken, and the branding marks, placed upon the animals some weeks previously, had not healed but had begun to ulcerate. Decubitus sores were present upon some of the animals which were down and unable to rise. The severe cases showed a profuse watery diarrhea, the stools being voided in a stream and containing small air bubbles. That the animals retained good appetites was evident from their feeding until death, one steer having died with his mouth full of food. The temperatures of the sick animals ranged from normal to 104°, while the respirations were slightly below normal and the pulse weak. As might be expected, thirst was increased in those cases suffering

¹ Contribution No. 28 from the Department of Zoology and from the Department of Medicine and Surgery, Agricultural Experiment Station of Kansas State Agricultural College.



Fig. 1. Steers affected with strongylosis, showing general emaciation and edema in the submaxillary region.

from marked diarrhea. The severely infested animals lived approximately a week after the profuse diarrhea began, when they became weaker, more emaciated and anemic, and finally died, apparently from exhaustion.

ANATOMICAL CHANGES

Each cadaver autopsied showed marked emaciation, anemia and hydremia. The mucosa of the abomasum was swollen, edematous, and raised in gelatinous folds. There were reddened spots here and there and the whole mucosa seemed beset with grayish white nodules (fig. 2) varying in size from a pinhead (*a*) to a pea (*b*). In many of the nodules could be seen a small opening through which the worm had passed. Many of the nodules were extremely superficial and could be readily ruptured under finger pressure. A number of erosions (*c*) from the size of a lentil to that of a finger nail were present throughout the mucosa and were due to the superficial sloughing of the nodule after the passage of the parasite into the alimentary tract.

PARASITES

The autopsy of one animal revealed a fluke, *Fasciola hepatica*, in the large bile duct of the liver. In another case a few lungworms,

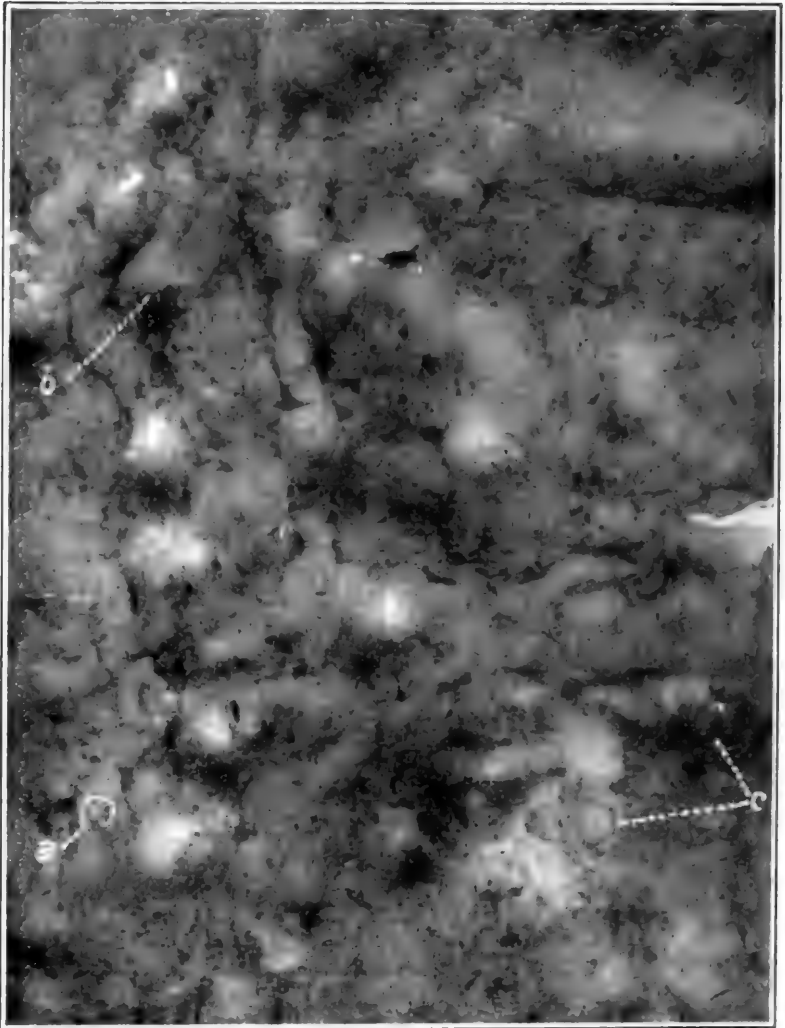


Fig. 2. Portion wall of abomasum of steer, showing nodules caused by *Ostertagia ostertagi*. A, beginning nodule. B, fully developed nodule. C, abandoned nodules showing eroded surfaces. (Slightly reduced. Photograph by F. E. Colburn.)

probably *Dictyocaulus viviparus*, were present. The small intestines of the two others contained a few hookworms and a small number of nematodes belonging to the genus *Cooperia*. But in the abomasum of every animal autopsied very large numbers of the trichostrongyle *Ostertagia ostertagi* were found, mostly free in the

lumen, but many slightly protruding through the nodules in the stomach walls.

DESCRIPTION OF OSTERTAGIA OSTERTAGI

These parasites are slender, hair-like nematodes, yellowish white in color. They range from about one-fourth to one-third of an inch in length, and occur in the abomasum, where they may be free or in the mucous membrane. As these nematodes are easily confused with other strongyles inhabiting the stomach and intestine of cattle, a rather full description of them is given.

The males (fig. 3, A) vary from 6.4 to 7.2 mm. in length. Their greatest thickness is just in front of the bursa, being 106 to 119

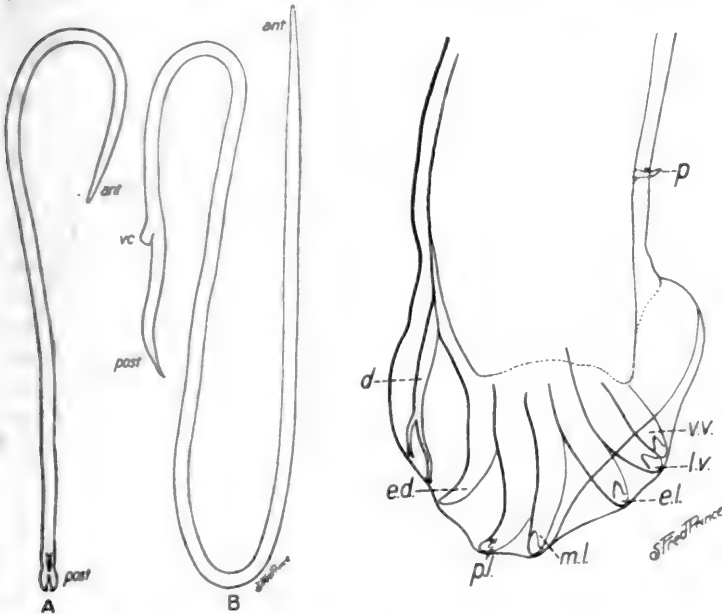


Fig. 3 (left). *Ostertagia ostertagi*. A, male; B, female; vc, cuticular cover of vulva. x 15.

Fig. 4 (right). Bursa of male, dorsolateral view. d, Dorsal ray; e. d., externodorsal ray; e. l., externolateral ray; l. v., lateroventral ray; m. l., mediolateral ray; p., prebursal papilla; p. l., posterolateral ray; v. v., ventral ray. x 280

microns. The head ranges from 14 to 21 microns in diameter. At the level of the nerve ring the diameter of the body is 47 microns and at the base of the esophagus it is 70 microns. The esophagus is 672 microns long and is encircled by a nerve ring 252 to 276 microns posterior to the mouth opening. At a distance of 311 to 315

microns from the anterior end is the excretory pore, which is 13 microns in front of the cervical papillae. Beginning with a diameter of 15 to 17 microns, the esophagus gradually widens to from 42 to 50 microns at its posterior end. The rather small bursa with lobes outspread is about twice as wide as the greatest diameter of the body. The latter terminates abruptly between the wings of the bursa.

In the walls of the bursa (fig. 4) are a single dorsal ray and six pairs of rays. The paired ones are of nearly equal diameter, except the lateroventral one, which is somewhat thicker than the others. In each lobe the tips of the ventral and lateroventral rays lie close together, as do also those of the medio-lateral and posterolateral rays. The dorsal ray, approximately 56 microns long, divides in its distal half into two divergent branches which bifurcate just before they end. The length of the forked spicules is 213 microns, while that of the gubernaculum is 45 microns.

The females (fig. 3, B) are approximately 8.5 mm. long by 136 microns wide at the vulva. Diameters of different regions of the body are as follows: Head, 22 microns; at nerve ring, 56 microns; at base of esophagus, 70 microns; and at anus, 41 microns. As in the male, the esophagus gradually widens as it extends posteriorly, and is surrounded by a nerve ring at a point 262 microns from the oral opening. A prominent cuticular flap (fig. 5, v. c.) covers the transverse, slit-like vulva, which is slightly over 1 mm. from the posterior end of the body. The tail gradually tapers to a rounded tip which is 106 microns posterior to the anus. The muscular parts of the ovijectors form a cask-shaped structure 213 microns long by 73 microns in diameter at its maximum thickness. The oval,

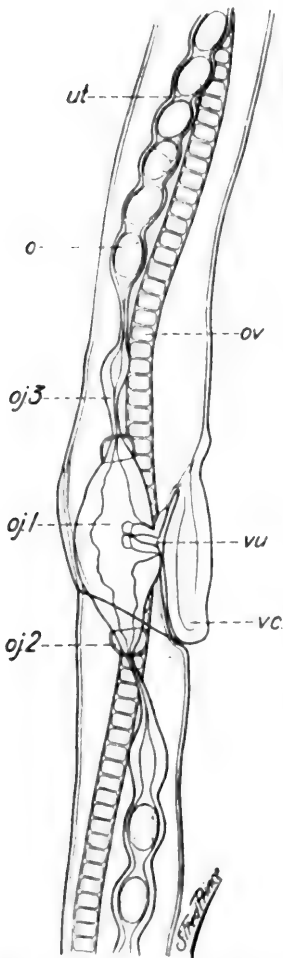


Fig. 5. *Ostertagia ostertagi*. Part of female body, viewed from right side. o, Ovum; ov, ovary; oj.1, oj.2, oj.3, portions of ovijector; ut, uterus; vc, cuticular flap covering vulva; vu, vulva. $\times 133 \frac{1}{3}$

thin-shelled eggs measure from 60 to 73 by 42 microns in diameter.

The size and structure of these nematodes make it evident that they are *Ostertagia ostertagi* (Stiles, 1892) Ransom, 1907, formerly known as *Strongylus ostertagi* Stiles, and as *Strongylus convolutus* Ostertag.

LIFE HISTORY OF PARASITE

The present writers made no attempt to incubate the eggs of *Ostertagia ostertagi* or to work out its life history, although segmentation had proceeded to the 4-cell stage in the uteri of the females under observation, and ejected eggs free in the normal saline solution had reached the 16-cell stage in 24 hours after their removal from the steer. Concerning this species, Stödter (1901, p. 52) states that in the uteri the eggs are usually in the 2 to 8-cell stage and only rarely are they sufficiently developed to show the outline of the embryo. According to this author the eggs after passing out with the feces develop rapidly in warm weather, forming complete, motile embryos in 12 to 24 hours. During the second day the embryos hatch and are very active in the surrounding medium (p. 56).

The free embryos range from 0.2 to 0.3 mm. in length, the anterior end being rounded and the posterior end pointed. Entering upon the larval stage, the young nematodes attain a length of 1.5 mm. In Stadelmann's opinion (1891, p. 37) the larvæ in this stage are taken in with the food, soon reaching the fourth stomach of the host. The parasite now bores into the mucous membrane, probably with the aid of two well-developed larval teeth, and assumes a spiral position close to the muscularis mucosa. An exudate with round-cell infiltration then appears, and the nodule formation begins. The developing nematode molts, passing into the second larval period. The reproductive organs begin forming and the digestive tract soon becomes plainly recognizable. The size of the larva is materially increased, as is also that of the surrounding nodule. After a second molt in the nodule the young parasites become sexually mature. In these swellings Stödter frequently observed larvæ, larval molts and sexually mature worms, but he never succeeded in finding ejected eggs or free embryos in them. Sooner or later the mature males and females pass into the lumen of the abomasum, abandoning the nodules, which begin to degenerate and to show the characteristic erosions (fig. 2, c).

The fecundity of these nematodes apparently is not marked, as there were but 9 to 11 ripe eggs in the uteri of the females studied

by the writers. This is in accord with the observations of Stadelmann (p. 37), who remarks that from the number of eggs produced in this species the fecundity in comparison to that of other nematodes is not great.

The length of life cycle probably depends upon the climate. At the latitude of Berlin, the observations of Stadelmann (p. 36) indicate that a life cycle of this parasite was completed in approximately four months. However, with the embryo hatching in two days under favorable conditions, it is probable that in warmer climates the length of life cycles does not require more than half of that time.

PATHOGENESIS

The nodules in the wall of the abomasum may be inhabited by a single larva, or as many as five, according to Stadelmann (p. 37), who also proved that these larvæ are blood-suckers, he having found their digestive tracts filled with blood corpuscles. This would disturb the nutrition of the host in a degree proportionate to the number of parasites present. Another and probably more detrimental factor than the loss of blood would be the absorption of the toxic metabolic products of the parasite. The erosions from the abandoned nodules and the attacks by the adult parasites on the mucosa afford opportunities for bacterial infection and other complications. The blood-sucking habit of these parasites accounts for the catarrhal condition of this portion of the digestive tract, the deleterious results of which are well known.

TREATMENT

In our cases, as in Stiles's, treatment was of no avail. It was practically impossible to check the severe diarrhea, and the animals grew weaker and became more emaciated rapidly. Astringents and intestinal sedatives in the form of tincture of opium, bismuth subnitrate, tannic acid, and oil of terobenthinæ, with large doses of linseed and mineral oil, were tried without result. Strychnine sulphate in medium-sized doses seemed to combat the extreme weakness but little. Law states that perhaps arsenious acid 1 dram, sulphate of iron 5 drams, powdered nux vomica 2 drams, powdered areca nut 2 ounces, and common salt 4 ounces, mixed and divided into 30 powders, and 1 powder administered daily, might be of service. Underhill (1920, p. 278) recommends 3 to 4 ounces of 1 per cent solution of copper sulphate in water for calves and 6 ounces for yearling cattle, mentioning the necessity of keeping the

bovines from drinking water during the day they are dosed. As the young *Ostertagia ostertagi* are protected in the nodules of the abomasum wall and leave it only when they are mature, it is obvious that treatments would have to be repeated to rid the hosts of these parasites.

Preventative treatment is probably more important, but specific directions on this line will have to be withheld until the behavior of the eggs and larvæ outside the body of the host is more completely known. In the meantime general prophylactic measures against nematodes should be employed, such as the ample provision of salt, which is thought to be destructive to embryos as they enter the stomach, and general cleanliness about the feed yard.

STRONGYLOSIS OUTBREAKS DUE TO OSTERTAGIA OSTERTAGI

This small nematode was first reported in Berlin by Ostertag (1890, p. 457), who, on examining the inflamed wall of the abomasum of a yearling steer, found it in the nodules. The ease of overlooking it is probably responsible for the few records of its occurrence in gastro-intestinal outbreaks.

Concerning a verminous outbreak among young cattle Stiles (1900, p. 361) states: "This parasite (*Ostertagia ostertagi*) was found in every calf, steer, and cow examined on postmortem during my second trip to Texas. Although the worm is small, I can not escape the conclusion that it was the chief factor in the disease found among the cattle."

Heavy infestations of *Ostertagia ostertagi* were mentioned by Moras (1907, p. 182) as the cause of a gastric enteritis of calves in Argentina in 1898. Gardener (1911, p. 493) reported outbreaks of parasitic gastritis in young cattle due to *O. ostertagi* in different localities in England in 1907 and 1909. A similar outbreak occurred in New Zealand, as reported by Gilruth (1900, p. 303), who described a parasitic gastritis in calves, due to a small species of nematodes which he thought to be *Strongylus cervicornis*, but which really was *O. ostertagi*, according to Ransom (1911, p. 56). So numerous were these nematodes in the abomasum that Gilruth after making a few counts estimated the presence of 40,000 of these parasites in a single calf. The present writers made no counts of the *O. ostertagi*, but the latter were exceedingly numerous on the abomasum wall and in the periphery of the ingesta. The only other record from the United States of an outbreak of strongylosis due to this parasite appears to be that of Stiles in Texas.

SUMMARY

1. An outbreak of strongylosis due to *Ostertagia ostertagi* occurred at Manhattan, Kans., U. S. A., in March, 1920.
2. Forty steers were visibly affected, 12 seriously, and 9 died.
3. The most obvious symptoms were extreme emaciation, anemia, and edema in the submaxillary region, and, in advanced cases, profuse diarrhea.
4. The parasites are small, yellowish-white, hair-like nematodes, about one-third of an inch in length.
5. They cause the formation of nodules on the abomasum walls in which they develop and which eventually result in erosions of the mucous membrane.
6. The life history is not completely known, but it is probable that infection is direct, the eggs or larvæ gaining entrance in food or water, or by the host licking itself.
7. The parasites are blood-suckers.
8. Treatment is difficult and uncertain.
9. All recorded outbreaks due to this parasite have been among calves or yearlings.
10. This report is the first record of such an outbreak in Kansas and the second in the United States.
11. Strongylosis outbreaks due to *Ostertagia ostertagi* have been reported from Germany, the United States, England, Argentina and New Zealand.

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ERADICATING TUBERCULOSIS IN PENNSYLVANIA¹

By SAMUEL E. BRUNER, *Harrisburg, Pa.*

IT was recognized in Pennsylvania as early as 1896 that, in order to check the spread of tuberculosis, it was necessary to have a definite plan of procedure. On February 19, 1896, the following plan was adopted by the Pennsylvania State Livestock Sanitary Board, now the Pennsylvania Bureau of Animal Industry, and it became known as the "The Pennsylvania Plan:"

"On application from the owners of tuberculous herds, the State Livestock Sanitary Board will furnish free inspection and tuberculin, on condition that the cattle owner will agree to (1) assist in the examination; (2) separate the tuberculous from the healthy cattle and have them cared for separately as directed by the State Livestock Sanitary Board; (3) disinfect stables and correct faulty sanitary conditions as directed by the State Livestock Sanitary Board; (4) Discontinue the use of milk and cream from infected cows, except when boiled or heated to 185° F. and kept at that temperature for seven minutes."

This plan, with the exception of a few slight alterations made to meet changing conditions of the times, was continued in operation for twenty-three years. The results were satisfactory and proved to herd owners that eradicating tuberculosis was practicable and economical.

The records show that under this plan 20,237 herds, comprising 276,895 cattle, were tested, of which 32,392, or 11.6 per cent reacted. During the first five years of the Board's existence—1898 to 1900, inclusive—17.3 per cent reacted, 60 per cent of the herds tested were infected, and 30 per cent of the reactors when slaughtered were tanked. During the last five years—1915 to 1919, inclusive—9.4 per cent reacted, 32 per cent of herds tested were infected, and 15 per cent of reactors were tanked. These facts indicate that tuberculosis has been reduced approximately 50 per cent in Pennsylvania since 1895.

The Pennsylvania plan was discontinued July 15, 1919. A large number of these herds are now working under the accredited plan. This accounts for what we consider the remarkable showing in Pennsylvania that has been made under the accredited plan. We have remaining about 350 herds in operation under the former

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

agreement. We recommend that they be placed under the accredited plan.

In the eradication, control and suppression of tuberculosis it is necessary to protect the healthy herds and remove the tuberculous animals from the infected herds in the shortest possible time. In order to accomplish these results the following policy is executed in the testing of herds that are under supervision in Pennsylvania:

1. Should the initial test reveal one or more reactors and the autopsy show slight lesions indicating that they are not spreaders, the following action will be taken: Ascertain history of herd, in particular if any animals have been sold, or have died, cause of such removals and changes. Should the report indicate that no changes in herd have been made, it is reasonable to assume that a spreader remains in the herd. The next test applied shall be the combination.

2. Should the initial or a subsequent test reveal 10 per cent or more reactors, the following action will be taken: Apply the combination test to the entire herd 60 to 90 days from date of last subcutaneous test. Animals under 6 months of age are to be given only intradermal and ophthalmic test.

3. In herds or parts of herds which the history and records indicate have been tested at regular or irregular intervals under the unofficial plan, and from which a number of tuberculous animals have been removed, the following action will be taken: Combination tests to be applied to entire herd; animals under 6 months of age to be given intradermal and ophthalmic; next test not to be applied within 9 months.

4. In herds credited with one or more negative tests, in which on subsequent tests one or more animals react, the following action will be taken: If autopsy reveals visible lesions, the combination test is to be applied to entire herd 6 months subsequent to date of last test. Animals under 6 months of age are to be given intradermal and ophthalmic test.

5. Retesting of suspects will be greatly reduced by the more liberal use of the combination tests. However, when it is required to retest suspects, use the combination test. This will, no doubt, assist in arriving at a more definite and satisfactory decision.

6. All combination tests should be applied in the following manner: Inject intradermal tuberculin in the left caudal fold. At this time instill in the left eye a 4 per cent ophthalmic solution or one ophthalmic disc. Make intradermal reading 48 and 72 hours after injection; on the third day make second reading. On this third day take the usual number of pre-injection temperatures for the subcutaneous test. Inject the tuberculin, using the prescribed dose. Should this test be a 60-day retest, inject double the amount of tuberculin given for the initial test. Following the subcutaneous injection, instill in the same eye that received the 4 per cent ophthal-

mic solution or one ophthalmic disc an 8 per cent solution or two ophthalmic discs. Resume the subcutaneous test. Take the first post-injection temperature at the third hour following the injection, the second at the sixth hour, and continue at regular two-hour intervals up to and including the twentieth hour. Following each temperature measurement, observe the eye. Observe the caudal fold again at the ninety-sixth hour. In interpreting the results, consider the animals that give a definite reaction to either the intradermal or subcutaneous as positive, but those that react only to the ophthalmic should not be classed as positive unless there is abundant purulent exudate.

7. In disposing of reactors, agents are instructed to give owners more assistance in obtaining actual market value from butchers.

8. Agents will impress upon owners the importance of having the stables thoroughly and promptly cleaned after removal of reactors, in order that the disinfecter can do his part and is not required to supervise the cleaning.

9. Continue the educational work.

Since the adoption of this policy it has been pointed out by work in Pennsylvania and elsewhere that the order of applying combination tests might be improved. If further work along this line confirms this belief the Pennsylvania policy in this respect will be amended.

By following this policy in the testing of herds we consider that rapid progress has been made in so far as eradicating the disease is concerned.

In reference to herds tested under the accredited plan, as the result of the first tests of 964 herds, 643 herds were credited with negative tests, and 321 herds were infected. In testing the 321 infected herds we were able to remove all tuberculous animals from the infected herds on the first test except from 42 herds, or 13 per cent of the 643 herds credited with one negative test, on a subsequent test tuberculous animals were removed from 18 herds, or 2 per cent.

Nine of the 254 accredited herds have been retested, and all have passed a clean test except one herd in which one animal was classed as a reactor by tester and held for a retest. This animal passed a successful intradermal test.

Unfortunately it is a national fad to chronicle all the "successes" and only occasionally call attention to the "failures." But for the latter there would be none of the former. We assume this may be one of the reasons that practically nothing has been written about the apparent present-day inefficiency of the tuberculin tests, in not being able to demonstrate the disease on autopsy and laboratory

examination, or better results in this respect have been obtained elsewhere.

As to what constitutes a reaction, as well as the efficiency of the tuberculin tests, Pennsylvania seemed to be in accord, up to 1915, inclusive, with recognized authorities such as Nocard, Eber, Ostertag, Bang, Hutyra and Marek, and others, also with the conclusions reached by the International Veterinary Congress held at Budapest.

In the disposal of reactors the records show the percentages of inefficiency or error to have been as follows:

Year.	Number of reactors.	Percentage of inefficiency.
1913.....	1,133	3
1915.....	701	3
1916.....	1,416	6
1917.....	1,750	6
1918.....	1,350	7
1919.....	1,723	11

During the 26 months of operation of the accredited plan in Pennsylvania in the disposal of 1,587 reactors (as shown in Table 1) we were unable to demonstrate the disease on autopsy or laboratory examination in 148 animals, which shows an inefficiency of 9 per cent. Had the reactions been interpreted according to the above-mentioned authorities and the instructions issued by the Federal Bureau of Animal Industry, we would have been justified in classifying 113 of the 148 animals as positive and the inefficiency would have been 7 per cent instead of 9 per cent.

By interpreting in the same manner the tests of another group of cattle (Table 2) we would have been justified in classifying 71 of the 118 animals as positive, and had this interpretation been made the inefficiency would have been 19 per cent instead of 29 per cent.

Tables 1 and 2 include 266 condemned cattle which on autopsy showed no visible lesions of tuberculosis. In the majority of cases specimens were submitted for laboratory examination. The latter included macroscopic and microscopic examination and guinea-pig test. In every instance the findings were negative. The 12 herds represented in Table 2 are owned by public institutions and are under the direct control of the Pennsylvania Bureau of Animal Industry in so far as transmissible diseases are concerned.

In testing today conditions are better than they were five years ago. In fact there is marked improvement each year. Practitioners and Federal and State employees are better qualified to conduct tests; more coöperation is received from the owner; sanitation is improved

TABLE 1.—Results of Testing Herds under Accredited Plan, April, 1918, to June, 1920.

Test	Herds	Cattle	Reacted		Autopsy				Tanked	
			Number	Per cent	Positive	Efficiency, Per cent	Negative	Inefficiency, Per cent	Number	Per cent
First	964	16,693	1,532	9	1,285	91	114	8	191	13
Second . . .	473	8,306	218	2	133	84	25	16	10	6
Third	78	1,801	33	1	20	71	8	29	2	7
Fourth . . .	5	193	1	0.5	0	0	1	100	0	0
Total		26,993	1,774	6	1,438	91	148	9	203	12

NOTE.—187 reactors have not been slaughtered.

TABLE 2.—Results of Testing 12 Herds Owned by Public Institutions.

Test	Herds	Cattle	Reacted		Autopsy			
			Number	Per cent	Positive	Efficiency Per cent	Negative	Inefficiency Per cent
First	12	1,220	161	13	71	80	14	20
Second	12	1,272	66	6	74	89	9	11
Third	12	1,334	107	7	79	87	12	13
Fourth	10	994	75	7	47	63	28	37
Fifth	9	1,051	51	4	16	31	35	69
Sixth	6	779	15	1	1	6	14	94
Sev'th	3	399	9	2	3	33	6	67
Total	12	7,049	504	7	291	71	118	29

NOTE.—81 reactors have not been slaughtered.

to a great extent; tuberculin is prepared in a uniform manner; autopsy reports, taking them as a whole, are more accurate.

With all this in favor of increased efficiency, the actual results show that our inefficiency is increasing to an alarming degree in reference to no-lesion cases. Our accuracy is practically 100 per cent in herds that are tested the first time, but in each succeeding test of these same herds our inefficiency increases. The inefficiency increases as the disease decreases.

A number of no-lesion cases can be charged to the following: (1) Conditions producing pus; (2) parasitic diseases; (3) acute unrecognizable diseases; (4) actinomycosis; (5) dietetic trouble;

(6) retention of milk, or inflammation of udder; (7) animals under milk test; (8) feeding and watering; (9) sudden changes in atmospheric temperature; (10) pregnancy; (11) dosage of tuberculin; (12) inaccurate thermometers; (13) inexperienced testers; (14) over-anxiety of owner and testers; (15) purpose of autopsy mainly to determine food value, rather than a scientific postmortem examination; (16) unusual stabling conditions.

These causes or conditions do not, in our opinion, account by any means for all of our no-lesion cases. We believe that some animals that are not tuberculous are susceptible to tuberculin and at times give typical reactions and that some animals run erratic temperatures normally.

Time does not permit us to discuss each individual lot of cattle in the two groups represented in the tables. However, we want to call attention in passing to several facts.

The 12 lots in Table 2 may be, in a number of ways, considered our experimental herds. Three lots of this group were reinfected by added animals. In another lot of this group the Bang method proved a failure to a certain extent. Seven of the 32 animals slaughtered showed no lesions, indicating that on the initial test severe judgment was used. Yet on the second and third test 20 animals were removed from the free herd. This, no doubt, was due to poor coöperation at that institution. Bang herds were maintained in connection with two other lots; excellent coöperation was given and the results were quite satisfactory.

We believe that a number of animals in two herds in Table 1 showed erratic normal temperatures. In one of these herds in the test of 1919 a large number of the young cattle gave typical reactions or a very high temperature at the sixth or eighth hour after injection. All were retested in six months with negative results. In the last test indicated, in which 5 animals reacted, they were given a careful autopsy and on postmortem showed no visible lesions. Specimens were submitted to the laboratory with the same results. All of these animals were raised under the Bang method, and postmortem examination was made on all animals from this herd that were slaughtered for beef or other purposes and in no case was tuberculosis found.

Another herd in Table 1 had a number of animals that showed high post-injection temperatures and in which we were unable to demonstrate the disease on autopsy or by laboratory examination.

In the last test of 146 animals 6 gave rather high pre-injection temperatures. They were retested and passed a satisfactory test.

Of the 266 animals in both groups which were classed as reactors and in which we were unable to demonstrate the disease, 35 gave late reactions and 21 others gave early reactions, which confirms our belief that we must be rather cautious in condemning animals which give either an early or a late reaction.

Sixty of the 85 lots in Table 1 were from herds in a section of the State in which only 2 per cent of the animals tested reacted. This again shows that most of our no-lesion cases come from herds in which we have very little disease.

One hundred twenty-nine, or 47 per cent of the 266 animals indicated in the tables had post-injection temperatures of 104.5° F. or less, showing that we should use care in considering animals positive with temperatures of 104.5° F. or less. Of these 266 animals 16 gave post-injection temperature measurements less than 103° F., 66 gave post-injection temperatures between 103 and 104° F., 104 gave post-injection temperatures between 104 and 105° F., and 80 gave post-injection temperatures above 105° F.

CONCLUSIONS

1. A definite plan for suppressing, controlling or eradicating tuberculosis is indispensable. While the officially accredited-herd plan, as now drawn, can be improved upon in some respects, yet it is recognized as the best plan so far advanced for dealing with the proposition on a nation-wide basis.

2. A definite method for applying the different tests has worked well in Pennsylvania, as it acts as an excellent guide for the field men.

3. After seven years' trial we have proved beyond a doubt in dealing with most of the infected herds that in order to free them from tuberculosis the combination tests must be used.

4. As the disease decreases the inefficiency of the tests increases, in so far as not being able to demonstrate the disease on autopsy or laboratory examination.

5. Idiosyncrasies of certain persons or animals to certain drugs may possibly apply to the use of tuberculin on healthy animals, thus obtaining a false reaction.

6. We hope to profit by our mistakes and reduce our no-lesion cases by at least 50 per cent and at the same time free the diseased herds as we have and are doing at the present time—

(a) By taking a complete history of the herd into consideration before classifying animals as tuberculous, even though their temperature measurements indicate a reaction, a swelling of the caudal fold, or purulent exudate in the eye.

(b) The field men will submit reports with as much history as they are able to obtain. With their opinion, final judgment will be passed at the central office instead of in the field as at present.

(c) We have found an excellent method where we have a number of animals as the result of a test what we can not properly classify—to slaughter first those which give the strongest reactions and which we have some reason to believe are tuberculous, and to continue slaughter of animals as long as we can demonstrate the disease, or to slaughter one or more to determine definitely the disposition of others.

7. After all, the proper application and interpretation of the different tests can only be accomplished by those who regard and treat the tests as a delicate major operation.

A glaring instance of the dangers of marketing milk from untested tuberculous cows was recently reported to the Bureau of Animal Industry by one of its field men engaged in tuberculosis-eradication work. At the request of the city meat inspector of New Haven, Conn., the Federal inspector examined the carcass of a cow recently killed at a local slaughterhouse. The animal showed extensive lesions of tuberculosis in the lungs, liver and other parts of the body. Investigation revealed that the cow had been sent to the city by a dairyman who was delivering the milk from his herd to an orphan asylum of the city, and also that the milk was not pasteurized. Upon further investigation, in which the State authorities at Hartford cooperated, a test of the entire herd was made. Of a total of 25 cattle, 23 reacted to the tuberculin test.

“Some one has recently stated with wisdom that 2,000,000 cows that should be eliminated are being milked in the United States. We heartily agree with this statement and add that the method of locating these cows should be the tuberculin test. Thus far the accredited-herd system has proved to be the method most acceptable to dairymen and livestock breeders. It has now reached the point of ‘First come, first served.’” —*The Dairy Farmer*.

DISPOSITION OF TUBERCULOUS CATTLE¹

By O. H. ELIASON, *State Veterinarian of Wisconsin*

THIS may not be a very scientific topic, but it is one which must be given more attention by State and Federal veterinarians if they want to succeed in tuberculosis eradication.

A survey of the methods used in the various States reveals a motley array, but variety is not the worst part of it. *No practical or scientific method is in use at the present time.* The reason for this is no doubt because sanitarians have busied themselves in furthering the testing rather than in giving their attention to the subject under discussion.

Dr. Bang, of Denmark, seems to be the outstanding figure in this work. His success, however, was largely made possible by the small size of his country.

Whether the slaughter method should be adopted or not depends upon the prevalence of the disease in the territory within which the work is being carried on. This may vary in different States or in different parts of the same State. It may also vary in individual herds. When 50 per cent of a herd reacts to the test, it is questionable if the balance is worth saving. If a lesser percentage appears, the reactors should be removed and consistent eradication work started. Our experience in Wisconsin has been that privately-owned segregation herds, as a rule, are not a success; but credit must be given those few owners who had courage and perseverance enough to manage it right, and what is more, made it pay. In other words, they made the tuberculous herd replace itself with progeny which stood the test of time.

What to do with a reactor depends upon its quality. Unless the owner can safely segregate the animal himself, the reactor should be taken over by the State. The State should be equipped to utilize it in a manner which will most conserve its usefulness. Few people are able to segregate properly on one farm.

In order to treat this subject comprehensively it will be necessary to touch on the question of indemnity. Some will contend that the latter is not essential in this program. Perhaps it is not, but as the majority of States proceed with the slaughter and indemnity, it is necessary to supply the best means for that purpose.

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

In the early attempts at tuberculosis eradication in this country, reacting cattle were killed, autopsied and buried, and I am ashamed to say that such practice is still to be found in this supposedly enlightened country. Only about 20 per cent of the reactors when slaughtered are condemned as unfit for food, and even a tanked animal is now worth from \$20 to \$30; therefore salvage becomes a matter worthy of consideration.

Wisconsin has tried several methods on which to base the payment of indemnity, which, briefly stated, are as follows:

During the biennium 1915-16 the maximum appraised value was \$70. The owner received one-half of the appraised value for a tanked carcass, three-fourths of the appraised value when lesions were found and the carcass passed for food, and full appraised value when no lesions were found. The cattle were shipped directly to some packing house and the proceeds deposited in the State treasury. (Let me say in passing that there should be nothing further paid for a tanked animal other than tankage price. Such an animal is of no value to the owner or to the commonwealth.)

In 1917 the maximum appraised value was raised to \$200 and one-half of the appraised value allowed in all events. The legislature also instructed the department to dispose of reactors by the most advantageous method.

The disposal of reactors had always been a source of considerable worry to the department. Sometimes they were sold after slaughter; at other times according to live weight; but there was always the feeling that we did not know whether we were being imposed upon or not, and there was always room for an argument on that point. Not all of this should be regarded as the fault of the packer. The indiscriminate shipping of these cattle directly to a packing house is an unbusinesslike procedure. Many of the animals were temporarily unfit for food, some being close-up springers; others had just calved or were suffering from the after effects. It was a common sight during certain seasons to find the slaughter floor littered with unborn calves. At other times of the year the shipments would reach the plant in lots ranging from one upward. The slaughter of a few reactors now and then on a killing floor occasions considerable extra labor, due to the necessity of cleaning and disinfecting afterwards. If these cattle could be delivered exclusively in large numbers the slaughter could continue until the shipment was done.

In May, 1918, with the pressing necessity for war economy, it occurred to me that a large part of this material could be salvaged under other conditions.

An abandoned farm consisting of about a section of land, well isolated, having a large pasture area and considerable usable buildings, was rented. The fences were not as good as desired, but that was overcome by maintaining a daily patrol. This place was equipped like any regulation farm, with milking machine, boiler, horses and tractor. Hay land and two large silos supplied feed for the winter. There being a demand for large quantities of condensed milk during the war, an outlet was readily found for the milk. Under normal conditions condenseries would refuse to take it, for fear of malicious detrimental advertisement. The condensing process naturally sterilizes the product, but their wares being widely distributed, one statement in a newspaper, when probably only half the truth is told, might no doubt injure their trade. It is too bad, but it is only one of the times when public opinion stands in its own light.

The receipts from the sale of milk for nine months was \$9,471.12. This helped considerably to reduce the overhead expense. Only the physically fit cows were milked. The unfit were kept in the open sheds. The sale of veal calves amounted to \$965.15. After an impartial inventory, giving due credit to depreciation, the average cost of handling each reactor through this farm was 19 cents. Some of the 3,315 head of cattle received at this farm remained there only a few days. Apparently healthy milch cows were sometimes kept for quite a period. All were sold by live weight according to current prices for their class and were weighed at the station *before being loaded on the cars*. Those of you who are familiar with the process of marketing cattle will appreciate that there is a 75 to 200-pound shrinkage on an animal after a 24-hour shipment, and that alone may constitute an item of \$5. Those of us who saw these cattle sold and also those of previous years feel that there was at least one cent difference in the sale price. That makes a difference of \$10 on a 1,000-pound animal. Tabulations show an average net saving of \$9 a head.

During 1917-18 the average salvage was \$35.32, and during 1918-19, the time during which the segregation farm was maintained, the average salvage was \$47.93. Due consideration was given to the difference in market prices prevailing during the two periods

and allowances made. The segregation farm was abandoned July 1, 1919, and our records from that time to July 1, 1920, show an average net salvage of \$41.02, or \$6.91 less than during the previous years when the retention farm was in operation. No attempt was made to salvage calves for other purposes than veal. A number of valuable calves were dropped on the farm, but since proper facilities for their care were lacking, they were disposed of for veal.

Naturally, the question is asked, "Why was this project laid down?" The answer is this: During the period when the farm was in operation the cattle owner had no further interest in the cattle after they were appraised and delivered at the station. After that they were State property. It did not matter to the owner what became of them, because he received one-half of the appraised value regardless of whether the animals died in transit or on the farm or were condemned on the killing floor. In order to conduct a concentration farm the cattle *must belong to the State* without any reservation. Occasionally an animal was injured and had to be destroyed, and in that case there was no salvage.

The cattle on this farm were sold collectively and not as individuals. In this way some good animals would help to sell the more inferior. Consequently if these belonged to different owners, or if the owners had any interest in the amount of salvage received for his animals, a concentration farm such as this would be an impossibility.

With the accredited-herd project came the coöperative payment of indemnity. The Federal plan opens the question of salvage to the owners. After careful consideration it was decided to discontinue the concentration farm, at least for the present. Furthermore, this was rented property and improvements which were necessary could not be made. Meanwhile the urgent need for its maintenance had ceased to exist, as the war had closed.

This project has wonderful possibilities in the hands of men who are willing to work for its success. The salvage of purebred calves has an unlimited scope.

Should this be undertaken as a permanent State project—and I think it ought to be—it should consist of, first, a concentration farm connected by a private switch and unloading yards, to which all reactors should be shipped. Valuable purebreds should be conspicuously marked and their history sent to the farm manager. Val-

uable females should be sent to a second farm where they would receive better care and where they could be watched until parturition took place. In some instances the animal should be kept as long as it bred regularly. Calves should be sent to a third farm where no tuberculous cattle were harbored, and should stay there until tested and passed by two tuberculin tests. It is to be hoped that at some time, not too far distant, the Federal law will be so amended as to permit of this plan.

At the present time Wisconsin pays on the coöperative basis, one-fourth of the difference between the appraised value and the amount received as salvage, or a maximum of \$20 in the case of grades or \$45 for registered cattle. In herds not under the coöperative arrangement, such as those in our county eradication plan, or herds under the supervision of the local veterinarian, the State pays an amount equal to that paid jointly on the coöperative project. All owners receive the same proportionate indemnity in our State. Each owner agrees, however, before indemnity is paid, to continue testing and not to expose his herd unnecessarily.

It is my conviction that the majority of the cattle owners of Wisconsin are ready to attack this disease. There must be no overzealous enthusiasm injected which will overfeed the machinery. The people must be convinced that they are receiving value for their labor.

It is not the extensively diseased animal that the owner questions whether you were right in condemning, but it is the "casual" or the "suspect"—the animals which show only very small lesions, and often none at all, that it is difficult for him to see. The concentration camp is the place for such animals. Here they may at least redeem part of the cost by helping to produce, and the public will be protected.

While I was instrumental in originating the concentration farm. I take pleasure in crediting the success of the enterprise to the untiring efforts of Dr. J. P. West, to whom the responsibility of conducting the farm was detailed.

Tuberculosis among dairy cattle in Ohio has been reduced from about 20 to 5 per cent during the last 5 years, according to estimates of the State Veterinarian. There are now 2,000 herds under supervision, 500 herds have passed one test and 110 herds are fully accredited.—*National Stockman and Farmer*.

THE PREPARATION OF TUBERCULINS FOR THE DIAGNOSIS OF TUBERCULOSIS IN ANIMALS¹

By FRED BOERNER, JR., and M. F. BARNES,
Harrisburg, Pa.

THERE has been a great amount of discussion of recent years on the subject of tuberculin, the method of its preparation, its potency and variability, its proper dosage, the many forms in which it is placed on the market, and the results obtained from its practical application in the field. The purpose of this paper is to call attention to the importance of the adoption of uniform methods for the preparation of this product.

It has not been long since many of the States had methods practically their own for tuberculin testing of cattle. Some of the differences were of only minor importance, but in other instances one State would not recognize a test that was satisfactory to another. The accredited-herd plan for eradicating tuberculosis provides that tuberculin prepared by the Federal Bureau of Animal Industry must be used. This ruling was a step forward in the use of a standard tuberculin.

If one should compare in detail the methods of producing tuberculin by various laboratories only a few instances would be found where the methods are identical, all of them being modifications of Koch's original method. These differences are often sufficient to cause considerable variance in the potency of the product, and on this basis tuberculins can well be grouped into three classes, namely: impotent, potent and superpotent.

Probably all laboratories engaged in the preparation of tuberculin, and particularly those operating under a Federal license, are putting out a potent or superpotent product. Undoubtedly all tuberculins would come in the potent class if the dose were properly regulated for each product. There should be a standardized product for which the proper dosage has been ascertained. Until such a product is available tuberculins uniform in potency can not be obtained. Possibly the various lots of tuberculin prepared in the same laboratory with exactly the same conditions for each individual lot will run more or less uniform, and such a product could be well used as a standard for gauging the potency of other tuberculins.

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

Under the officially accredited plan the necessity of a uniform tuberculin has already been demonstrated. If this is true for accredited herd testing, then it is equally important that we have a uniform product for an accurate test under any other plan as well as for interstate testing.

In the past 2 to 4 c.c. of tuberculin solution has been recognized as the dose for an average-sized cow. This solution contained varying quantities of the concentrated tuberculin as prepared after the Koch method or modifications of it. There being a variation in the potency of tuberculins prepared by various modifications of Koch's method, there should also be a variation in the dosage of such tuberculins. There are variations in the sensitiveness of tuberculous animals to tuberculins, that is, one tuberculous animal may show a typical reaction when inoculated with a certain tuberculin while another animal of the same size may require a much larger dose. It has been proven that nonaffected animals can withstand comparatively large doses with no serious harmful after-effects and at the same time show no temperature reactions. The dose should be regulated large enough to detect affected animals that are not very sensitive. The dose of a certain tuberculin can only be determined by knowledge of its potency. An animal that would require 4 or 5 c.c. of a potent tuberculin to cause the typical reaction would require possibly only 2 or 3 c.c. of a superpotent tuberculin, while on the other hand 8 to 10 c.c. of a tuberculin low in potency would be required.

During the past two years our Bureau has noted some observations with reference to the preparation of tuberculins. The object was to determine if possible the influence of certain changes of technic upon the potency of the product. Various tuberculins are prepared from concentrated or old tuberculin, and it is in this product that our interests have been mainly centered. We shall therefore attempt to discuss briefly the various steps in its preparation and at the same time cite our observations pertaining to each.

CULTURE MEDIA

For a number of years fresh veal was used for the preparation of broth for the growth of the tubercle bacilli, and it was not until after the World War was well on its way and materials in general difficult to obtain that we learned that lean beef was just as satisfactory as veal. A comparative potency test applied to the two products showed beef bouillon tuberculin to be equally as potent as that

prepared from veal. We have found that the growth is apparently as luxuriant on 5 as on 7 per cent glycerin broth, but bouillon containing only 3 per cent glycerin did not grow as well. There was no difference in the amount of growth when acid potassium or acid sodium phosphate was substituted for sodium chloride. We believe that the proper reactions of the culture media and the proper incubator temperature are two very important factors.

TYPES OF TUBERCLE BACILLI

It seems to be well known that tubercle bacilli of either bovine or human type are suitable for producing tuberculin to be used in testing cattle. It has been our custom to use both types, and comparative guinea-pig tests showed neither one to be superior.

GROWTH OF CULTURES

There is a variation in the different laboratories of the length of time that cultures are grown. Most laboratories, however, grow them 8 weeks or longer. By application of the guinea-pig test we have observed that in cultures older than 8 weeks and up to 12 weeks, which is as far as our observations have gone, proper allowance being made for loss by evaporation, there is very little, if any, difference in the potency of the final product; but in 4 weeks cultures, though the growth may be apparently very heavy and well wrinkled, the product is usually impotent.

KILLING OF CULTURES

It is generally believed that tuberculin is quite resistant to heat. In our experiments tuberculin heated for 1 hour in the autoclave under 15 pounds pressure was not as potent as when the same lot was heated at 100° C. for 3 hours in the Arnold steam sterilizer. Experiments were then carried out to determine if the unheated was more potent than that obtained after heating at 100° C. In most instances the latter was found to be the more potent of the two. This can be accounted for by the maceration and extraction brought about by the heating process.

CONCENTRATION

After the cultures are killed the extract is concentrated to one-tenth its volume and the product is termed "old tuberculin." Some laboratories concentrate only sufficiently to allow for the addition of a preservative. The strength of the tuberculin, whether concentrated to one-tenth its original volume or only sufficiently to add

the preservative, will depend upon when the liquid is measured, whether before or after the growth has been removed.

Dr. M. Dorset¹ states that "it should be emphasized that the veterinarian who is making tuberculin tests should think, when he is determining dosage, in terms of 'old tuberculin' and not in cubic centimeters of the product he happens to be using." We believe he would be better able to calculate his dosage by keeping old tuberculin in mind if all old tuberculin was nearly the same strength, which would be the case if the methods of preparation were uniform.

Many claim that tuberculin kept in the concentrated form is more stable than when stored in the diluted form. While we believe this is true, we have tested tuberculins of various ages that were kept in the diluted form and found that these products remained potent for considerable time. Two years seemed to have practically no effect upon the potency. Tuberculins that had been kept five to six years in the diluted form were found to be still potent. In one case we tested some tuberculin which was prepared in 1896 against some prepared in the same laboratory in 1920. The 1920 tuberculin killed 100 per cent of the infected guinea-pigs in the dose of 1 c.c. per 500 grams weight, while that made in 1896 failed to kill any in four times that dose.

MIXTURES

To overcome any variances in individual lots as they are produced, we make mixtures of several lots, and feel that by so doing our product will be more uniform. Each mixture is submitted to a guinea-pig test.

BERKEFELD FILTERING

It has been our practice to filter our tuberculin through a Berkefeld filter, after it has been rediluted and the preservative added, and inasmuch as filtering does not alter the potency, it seems that this procedure should be practiced.

PRESERVATIVES

Carbolic acid is the preservative most commonly used for preserving tuberculin, and within certain limits the percentage seems to play no important part. We have tested tuberculin containing graduated amounts of carbolic, ranging from none to 1½ per cent, and our readings show that there was practically no difference in potency. Many laboratories dilute their crude tuberculin with 0.5 per cent carbol saline, thereby making it less than 0.5 per cent car-

¹M. Dorset. Paper presented to the Tuberculosis Eradication Conference of State and Federal Livestock Sanitary Officials held in Chicago, October 6 to 8, 1919.

bolic. It has been our practice to dilute the crude tuberculin with 1 per cent carbol saline, using 1 part of tuberculin and 7 of saline, thus making the final product about 0.85 per cent carbolic. This insures a more sterile product and at the same time does not influence the potency.

GUINEA-PIG TEST

A modification of Koch's method of testing tuberculin on tuberculous guinea-pigs has for several years been used by the Federal Bureau of Animal Industry and has been fully described by Schroeder and Brett.¹ Our method differs from their in the number of guinea-pigs employed for testing each sample and the dosage. For each lot 12 affected pigs are used; 3 receive 4 c.c., 3 receive 3 c.c., 3 receive 2 c.c., and 3 receive 1 c.c., for 500 grams body weight. This test has proven a valuable method for comparing the potency of tuberculins, and we believe that all tuberculins should be subjected to it. It is doubtful if by this method the proper dose for a cow can be ascertained until a standard tuberculin is obtained, the dose of which is known. At present we have been using Government tuberculin as our standard.

In concluding we wish to emphasize the necessity of uniform methods of producing tuberculin, as we believe that if all laboratories prepared their bouillon the same, used the same type if not the same strain of tubercle bacilli, the same proportions of surface growth, etc., and subjected the product to the guinea-pig test, this product would be of a more uniform potency. Furthermore, the dose of tuberculin in general could be more readily ascertained.

"Federal and State veterinarians, working in Oklahoma, tested for tuberculosis in July 110 herds containing 1,821 cattle and found only 29 head affected with the disease, or only 16 per 1,000, while the average rate of all herds tested in that month was 39 per 1,000. These figures confirm the hope that careful and prompt work will eradicate tuberculosis from all cattle in Oklahoma without great expense."—*Oklahoma Farmer*.

Hoard's Dairyman says editorially in a review of the tick eradication and tuberculosis eradication work of the various States and Federal Government: "We are moving forward but we must expect resistance and prejudices to follow new ideas or when an attempt is made to improve live stock conditions."

¹ E. C. Schroeder and G. W. Brett. *Journal of the American Veterinary Medical Association*, Vol. 7, No. 4, p. 357.

COMBINATION TUBERCULIN TESTS¹

By HENRY W. TURNER, *Harrisburg, Pa.*

THE Pennsylvania Bureau of Animal Industry has always recognized the subcutaneous tuberculin test as its official test, and has constantly endeavored to perfect the technique and safeguard the interpretations.

When in 1907 Vallée demonstrated the possibilities of the ophthalmic test, and the same year projected the intradermal test, which was afterwards perfected by Moussu and Mantoux, Pennsylvania was early to try out these tests experimentally. After a number of experiments to determine the preparation, dose and dilution of tuberculin to use, as well as the method of application, it was decided in 1909 to try these tests as a check, or in combination with the subcutaneous.

Our Bureau in 1912 applied the ophthalmic tuberculin test in combination with the subcutaneous in the following manner: First, the subcutaneous test was applied and three days later the eyes were sensitized by the instillation of 2 drops of a 4 per cent solution of powdered tuberculin; four days after this sensitization a second instillation of an 8 per cent solution was applied. The tuberculin used was an aqueous solution of an alcoholic precipitated tuberculin in 4 and 8 per cent dilutions. For this test there were 69 animals presented, 39 of which reacted to the subcutaneous test, while but 31 reacted to the ophthalmic. All of the reacting animals showed lesions except 3 which were reactors to the subcutaneous test only.

From the satisfactory results obtained with the subcutaneous and ophthalmic tests combined our Bureau next decided to try a combination of the three tests—intradermal, subcutaneous and ophthalmic—in the order named. The herd selected (November 28, 1913) was composed of 20 grade animals, 18 of which were aged. There were no records of any previous tuberculin tests on this herd. The results of these tests are shown in Table 1. In this table we show 20 animals, the results being clear and decisive. In applying the tests in this order we observed the intradermal had a modifying effect on the subcutaneous test, but the efficiency of the ophthalmic test seemed to have been increased by the previous intradermal and subcutaneous injections.

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

TABLE 1.—*Results of Intradermal, Subcutaneous and Ophthalmic Tests Combined.*—Number Tested 20.

TEST	DATE	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
					LESIONS	NO LESIONS
Intradermal..	1913					
	Nov. 26	6	0	14	18	0
Subcutaneous	Nov. 28	5	4	11	18	0
Ophthalmic..	Nov. 30					
	Dec. 4	2	0	18	18	0

With these facts before us it was decided to conduct experiments to determine what effect or inhibitive action one test had upon another. For this work we used the tuberculous herd of 24 animals at our Bureau's experimental farm. All of these animals had at some time reacted to the subcutaneous tuberculin test, and all had been subjected to a previous test within six months. They were divided into 4 groups of 6 animals each. The order in which the tests were applied and the results are shown in Table 2.

Tests 1 and 2 were a combination of the intradermal and subcutaneous tests simultaneously. Group 1 received only intradermal tuberculin, and was used as a control, all 6 animals reacting. Group 2 received intradermal and 5 c.c. of subcutaneous tuberculin. Group 3 received intradermal and 15 c.c. of subcutaneous tuberculin. Group 4 received intradermal and 20 c.c. of subcutaneous tuberculin. Of the 18 animals in Groups 2, 3 and 4, only 2 reacted to the intradermal and 12 to the subcutaneous test.

The third test was an intradermal retest. This was made on the four groups 9 days after the first test, with these results: Five reacted in the first group, 1 in the second group, 3 in the third group, and 1 in the fourth group.

The fourth test, an ophthalmic, applied 7 days subsequent to the intradermal retest, resulted in 20 of the 24 animals reacting.

The fifth test, a subcutaneous, was applied 10 weeks after the first test, the dosage of tuberculin being the same as used in the original subcutaneous test; 22 animals were tested; only 6 reacted.

The sixth was an intradermal, applied 3 months subsequently to the second subcutaneous test; 19 of the 24 animals reacted.

The seventh and last test, an ophthalmic, was applied 3 months

TABLE 2.—A series of Tuberculin Tests, Intradermal, Subcutaneous and Ophthalmic, 1913-14.

Group	Animal No.	Test No. 1, first intradermal, Oct. 7, 8, 9	Test No. 2, first subcutaneous, Oct. 7, 8, 9	Test No. 3, second intradermal, Oct. 16, 17, 18	Test No. 4, first ophthalmic, Oct. 23, 24	Test No. 5, second subcutaneous, Dec. 19, 20	Test No. 6, third intradermal, Mar. 11, 12, 13	Test No. 7, second ophthalmic, June 11, 12	Postmortem
1	1	P		P	P	5 c.c.	S	P	L
	2	P		P	P	N	P	P	L
	3	P		P	P	N	P	P	L
	4	P		P	P	N	P	O	L
	5	P	Not injected	S	S	N	P	P	L
	6	P		P	P	N	P	P	L
2	7	N	5 c.c.	P	P	5 c.c.	P	N	L
	8	S	P	N	P	P	N	O	L
	9	N	S	N	N	N	P	P	L
	10	N	N	S	N	P	S	P	L
	11	N	P	S	N	N	P	P	L
	12	N	N	N	P	P	P	P	L
3	13	N	15 c.c.	P	P	15 c.c.	P	P	L
	14	P	P	P	P	N	P	P	L
	15	N	N	N	N	O	P	P	L
	16	S	N	N	N	N	P	P	L
	17	P	P	N	P	S	P	O	L
	18	N	P	P	P	N	P	P	L
4	19	N	20 c.c.	N	P	20 c.c.	P	P	L
	20	N	P	P	P	P	P	P	L
	21	N	P	N	P	P	P	P	L
	22	N	P	N	P	S	N	O	L
	23	N	P	N	P	O	P	O	L
	24	N	N	N	P	N	S	P	NVL

NOTE.—P denotes positive; N, negative; S, suspicious; L, lesions; NVL, no visible lesions; O, no test or no postmortem.

after the third intradermal, or 8 months after the original test. Of the 21 animals tested 18 reacted.

All of the animals used in these experimental tests, 24 in number, were slaughtered. Of these 20 showed lesions, 1 no lesions, 3 no records of the postmortem findings.

In this series of tests we observed that after repeated injections of intradermal or subcutaneous tuberculin at short intervals, animals developed a marked immunization against tuberculin and did not re-

TABLE 3.—*Intradermal Test Followed by Subcutaneous and Ophthalmic Tests on 48 Cattle.*

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Intradermal..	7	0	41	41	0
Subcutaneous	18	3	27	41	0
Ophthalmic...	13	1	34	41	0

act with any degree of accuracy; but these repeated tests seemed to increase the action of ophthalmic tuberculin.

The intradermal tuberculin used in all these tests was a 5 per cent solution of an alcoholic precipitated tuberculin.

Tables 3, 4 and 5 represent data collected from field tests in which the intradermal was applied 3 days prior to the subcutaneous and ophthalmic tests. The purpose is to show the effect of the intradermal upon the subsequent subcutaneous test.

The herd covered by Table 3 was composed of 48 animals of various ages; practically all had been raised by the owner, and had never been subjected to the tuberculin test. In the original subcutaneous test there were 28 reactors. These as well as the negative animals in the herd were, for experimental purposes, retested after a period of 60 days by the combination method, the order of application being intradermal applied 3 days prior to the subcutaneous and ophthalmic tests.

The herd covered by Table 4 consisted of 197 animals, mostly

TABLE 4.—*Intradermal Test Followed by Subcutaneous and Ophthalmic Tests on 45 Cattle.*

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Intradermal..	10	8	27	16 ¹	0
Subcutaneous	34	6	5	16 ¹	0
Ophthalmic...	6	0	39	16 ¹	0

¹ The 16 animals in which lesions were found were all that were slaughtered.

purebred, and had been raised on the premises. There was no record of a previous test of the entire herd. As the result of the original subcutaneous test there were 106 reactors. A combination retest was made on the negative animals 60 days after the first test, the order of application of the tests being the same as in the preceding lot.

The results of this test practically confirm the previous one.

The herd covered by Table 5 was composed of 101 animals. As a result of the original subcutaneous test there were 60 reactors. A combination retest was made 60 days after the first test on the remaining 39 negative animals, the order of application of tests being the same as in the two preceding lots.

TABLE 5.—*Intradermal Test Followed by Subcutaneous and Ophthalmic Tests on 39 Cattle.*

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Intradermal . .	35	0	4	4	0
Subcutaneous	37	0	2	2	0
Ophthalmic . .	35	0	4	4	0

NOTE.—The total number of reactors to these tests was 5. Two of them reacted to all tests, 1 reacted to the ophthalmic and intradermal, 1 to the ophthalmic only, and 1 to the intradermal only. Lesions were found in all of the reactors.

We have tested in this manner 15 herds, comprising 1,002 animals, with a total number of 322 reactors. Of this number 278 reacted to the intradermal, 275 to the ophthalmic, and 165 to the subcutaneous test. These results demonstrate that the intradermal test when applied 3 days prior to the subcutaneous test interferes with the action of subcutaneous tuberculin.

The next series of combination tests was applied simultaneously to demonstrate to what extent subcutaneous tuberculin interferes with intradermal, and Tables 6, 7 and 8 present some of the results.

The herd covered by Table 6 consisted of 30 animals, all purebred Holsteins. The aged animals had been acquired by purchase. The results of the original subcutaneous test showed 13 reactors. A combination 60-day retest was applied, using the three tests simultaneously.

TABLE 6.—*Three Simultaneous Tests on 24 Cattle.*

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Subcutaneous	18	0	6	6	0
Intradermal..	17	0	5	5	0
Ophthalmic..	19	0	5	5	0

NOTE.—Seven animals became of testable age in the interim between the original test and the retest. Comparatively uniform results were obtained from this combination.

There was no history of any previous tuberculin test on the herd covered by Table 7.

TABLE 7.—*Three Simultaneous Tests on 22 Cattle.*

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Subcutaneous	7	0	15	17	0
Intradermal..	13	0	9	17	0
Ophthalmic...	7	3	12	17	0

The herd covered by Table 8 was composed of 24 purebred Brown Swiss cattle. The aged animals had been purchased, the young stock raised on the premises. There was no record of any previous tuberculin test on any of the animals.

TABLE 8.—*Three Simultaneous Tests on 24 Cattle.*

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Subcutaneous	4	0	20	20	0
Intradermal..	9	2	13	20	0
Ophthalmic..	Not applied	.....	.....	.....	.....

NOTE.—The accuracy of the subcutaneous test was strongly marked in this combination, there being 20 reactors to it, while but 13 reacted to the intradermal.

Seven herds composed of 448 animals were tested by this simultaneous method, resulting in 31 reactors to the intradermal, 28 showing lesions, and 52 to the subcutaneous, 48 showing lesions. The results of the ophthalmic are not included in this summary, as that test was not applied to all herds.

Another manner of combining the tests was employed in a series where the subcutaneous was used as the original test and 3 to 7 days later the intradermal was applied. The results are shown in Tables 9, 10 and 11.

Table 9 shows the results in a herd of 46 animals, with no record of any previous tuberculin test.

TABLE 9.—*Subcutaneous Test Followed by Intradermal and Ophthalmic on 46 Cattle*

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Subcutaneous	19	1	26	28	0
Intradermal, 3 days later	29	0	17	28	0
Ophthalmic, 3 days later	15	6	25	28	0

There was no record of any previous tuberculin test on the herd covered by Table 10.

TABLE 10.—*Subcutaneous Test Followed by Intradermal Test on 46 Cattle.*

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Subcutaneous	2	0	44	41	3
Intradermal, 5 days later	6	1	39	36	3
Ophthalmic	Not applied	.....	.....	.....	.....

Table 11 covers a herd of 55 animals. No tuberculin test had been made within two years. A number of animals had been purchased in the meantime.

TABLE 11.—*Subcutaneous Test Followed by Intradermal Test on 55 Cattle.*

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Subcutaneous	6	1	48	47	1
Intradermal, 7 days later	8	1	46	47	1
Ophthalmic	Not applied				

These last three tables show that the tests have checked each other closely. We have had the opportunity to test but 6 herds, 175 animals, by this method (using the intradermal 3 to 7 days after the subcutaneous). There were 141 reactors to the subcutaneous, 136 with lesions, and 127 reacted to the intradermal, 124 with lesions; a total of 148 reactors, 143 of them showing lesions on postmortem.

CONCLUSIONS

1. It was observed in the work of the Pennsylvania Bureau of Animal Industry, in 1913, as shown in Table 2, when the subcutaneous and intradermal tests were applied simultaneously, that the subcutaneous had a modifying effect upon the intradermal reactions. This has been confirmed by our subsequent work.

2. It is shown in Tables 1, 3, 4 and 5 that the intradermal test when applied 3 days prior to the subcutaneous interfered with the subcutaneous reaction.

3. When the subcutaneous test is applied a few days prior to the intradermal it has a marked influence on the latter, but the interference is not as decided as when the intradermal precedes the subcutaneous test.

4. The ophthalmic test can be applied in any combination without being interfered with, or influencing the other tests. We have observed in animals which have reacted to the ophthalmic test a return of the ophthalmic reaction when later retested by the subcutaneous method. In one herd this occurred after a period of 78 days; of the 18 animals which had reacted to the previous ophthalmic test 13 showed a return of the local reaction.

From the results here shown, as well as from the observations of others, it is evident that we are in need of a uniform plan for applying the combination tests.

THE SUPERIORITY OF COMBINATION TUBERCULIN TESTS OVER ANY OTHER METHOD¹

By L. B. ERNEST, *Washington, D. C.*

IN the presentation of any material bearing on the subject of tuberculosis and tuberculin testing, a wide field for discussion is opened. No problem ever presented to the veterinary sanitarian has brought forth more divergent opinions. Therefore this paper will contain only such of the experiences of inspectors of the Federal Bureau of Animal Industry actively engaged in the campaign for the control and eventual eradication of bovine tuberculosis as bear on the use of the combination tests.

Were tuberculin an unailing agent to be used in detecting the disease in livestock, the problem would resolve itself into one of selecting one of the various tests which would give the desired results by the simplest and least expensive method. Ever since tuberculin was discovered, however, it has been found to have certain limitations, the chief of which is that in some instances animals left in herds will be classified as healthy or non-reactors when they are in fact diseased and in many cases would be classed as spreaders of the disease.

Since the organization of the Tuberculosis Eradication Division in May, 1917, efforts have been made to reduce to a minimum the possibility that tuberculous animals may be classified as non-reactors and left in the herds to spread the infection further. That these efforts have been generally successful is shown by a recent investigation of 3,492 accredited herds. Altogether only 73 were found to contain reactors on subsequent tests. Of this number less than half can be attributed to failure of the tuberculin test, the others being directly attributable to negligence on the part of the owners in unnecessarily exposing their herds.

The records of the Bureau indicate that during the fiscal years 1918, 1919 and 1920 approximately 1,100,000 head of cattle were tuberculin tested under the coöperative plan. This amount of systematized work has afforded opportunity to demonstrate the practicability of using the intradermic and ophthalmic tests in conjunction with the method previously used.

The question of what check tests should be applied is not always easy to determine even though complete histories of herds to be

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

tested are available. Generally speaking, a combination of two or more tests should be applied to herds known to be infected or which contain animals of doubtful health. In grade herds animals are frequently found that have repeatedly changed ownership and the history is impossible to obtain. In stockyard cattle the same condition prevails.

In retesting suspects, a combination of tests should always be applied, since in these cases one application of tuberculin has failed to give satisfactory results. The previous history of retesting suspects, in all its aspects, has been unsatisfactory. Many methods have been advocated which were recommended as giving accurate results. However, it is known that suspects retested by the subcutaneous method after a previous subcutaneous test will fail to react in possibly 25 per cent of the cases, even though this percentage will be later found infected. This holds true if the retest is applied any time between 7 and 90 days. One lot of 14 suspects to the subcutaneous test slaughtered without retesting in 1918 were found to be 100 per cent tuberculous, 4 of them being unfit for food purposes.

During the last fiscal year the Bureau, in an endeavor to demonstrate the value of the 7-day method which has been advocated for retesting suspects, submitted to retest 343 known reactors. The result of this experimental testing showed that 214 of these reactors, retested within from 4 to 7 days, gave positive reactions, leaving 129 diseased cattle which failed to react the second time, of which 21 were found to be generalized cases, the entire lot having been slaughtered and careful postmortem examinations made. While no such extensive statistics have been gathered relative to the 60-day and 90-day retesting of suspects by the subcutaneous method alone, it is thought that possibly as large a percentage of diseased cattle are not being detected.

It is well to bear in mind that in considering any policy which would incorporate the continuous use of the combination of tests the practicability of the scheme must be considered, especially as it pertains to the amount of time involved and the number of available inspectors. In the classes of cattle previously referred to it is recommended that a combination of the three methods be employed, starting with the intradermic injection and the sensitizing ophthalmic disk. Observations may be made to determine the results of the sensitization tablet. At or about the seventy-second hour, when the intradermic test is completed, it has been usual to inject by

the subcutaneous method and check with the diagnostic ophthalmic disk, making the second instillation at about the eighth or tenth hour after the injection of the subcutaneous tuberculin. This method requires practically four days to complete a test. Results obtained from it have been splendid and have proved that in badly infected herds it should be carried out in order that the best results may be obtained.

Some experimental work covering application of the three tests was conducted during the period from December 1, 1919, to May 3, 1920. The cattle tested, approximately 200 in number, were of the canner type and were for experimental purposes a particularly favorable lot of cattle in that a large percentage of tuberculosis was found to exist. This method showed the ophthalmic method of testing to be somewhat superior to the other recognized methods in that fewer diseased cattle failed to react to that method. However, the advantage of a combination test was fully demonstrated, as two reactors and one suspect were taken as a result of the subcutaneous method, and two reactors and one suspect were found by the intradermic, which did not react to any of the other tests. Further, the fact was established that not a single generalized case of tuberculosis was missed as a result of the combination tests.

These data and many more which have been submitted at frequent intervals caused the Bureau to endeavor to determine the value of the various tests, namely, the subcutaneous, ophthalmic and intradermic. During 1919, experiments in tuberculin tests gave the following results:

Subcutaneous test: Number of cattle tested, 1,216; number reacted, 251; per cent of negative animals showing lesions on post-mortem, 5.39.

Ophthalmic test: Number of cattle tested, 1,538; number reacted, 278; per cent of negative animals showing lesions on post-mortem, 6.75.

Intradermic test: Number of cattle tested, 1,076; number reacted, 328; per cent of negative animals showing lesions on post-mortem, 11.51.

From these figures it will be noted that from 5.39 to 11.51 per cent of the animals negative to the single applications of tuberculin were found to be diseased when final examination was made on the killing floor.

A more recent report from a number of Bureau stations covering the application of the three methods of testing is as follows:

Per cent of lesions found, three tuberculin tests, fiscal year 1920

Locality	Subcutaneous reactors	No. lesion cases	Per cent lesions found	Intra-dermic reactors	No. lesion cases	Per cent lesions found	Ophthalmic reactors	No. lesion cases	Per cent lesions found
Iowa.....	1,977	68	96.57	1,187	33	97.23			
Missouri.....	41	10	75.63	327	49	85.00	1	1	
Illinois.....	1,064	34	96.81	87	2	97.70	4	0	100.00
So. Dakota.....	373	27	93.00	60	5	91.67	3	1	67.00
Vermont.....	2,895	31	99.00	42	1	97.62	426	10	97.66
Nebraska.....	479	19	96.04	195	5	97.44	36	12	66.67
Boston, Mass.....	2,026	149	92.65	27	2	92.60	28	0	100.00
Salt Lake City.....	121	3	97.53	859	32	96.28			
Portland, Oreg.....	250	17	93.20	1,387	31	97.77	35	2	94.30
Totals.....	9,226	358	96.12	4,171	160	96.17	533	26	95.12

From this report it will be observed that the three tests have been shown to be relatively of the same degree of accuracy in that the percentage of lesions found in reactors from each test is approximately the same. It is believed that with a greater degree of knowledge concerning intradermic and ophthalmic tests this percentage can be maintained in all work of this character.

Other combinations besides the use of the three methods are possible and have given excellent results. In Vermont, under the supervision of Dr. A. J. DeFosset, many herds have been tested by combining the subcutaneous and ophthalmic methods. As an indication of the service rendered by these methods I can do no better than quote this capable inspector in charge. He states:

"There have been check-tested recently in Vermont by the ophthalmic method 39 herds of purebred cattle, representing practically all breeds, and the results have been most astounding. Had the ophthalmic test not been employed there would have remained in these herds 148 diseased cattle and a number of these herds would have been listed on the free list. Can you conceive of our eradicating tuberculosis unless we look carefully into each case to determine what method of test is required? These ophthalmic reactors were all slaughtered and showed unmistakable evidence of tuberculosis."

A still later report from this State shows that from 3 herds totaling 130 cattle 36 animals were removed which reacted to the ophthalmic method but which would have been classed as healthy as a result of the subcutaneous test.

This combination should be employed, as it is possible to make such check tests within the time consumed by the subcutaneous test alone.

The question of the period of time which should be allowed for sensitizing the eye after the instillation of the first disk has been discussed, and many persons recommend that three days be permitted to elapse prior to the use of the diagnostic disks. However, many herds have been tested and checked by the ophthalmic method by sensitizing the eye at the time the first preliminary temperature is taken, the diagnostic disk being used at the tenth hour after the injection of tuberculin by the subcutaneous method. This will allow a period of from 8 to 10 hours for observations to be carried on during the time the temperature readings are being taken. Pending more definite knowledge concerning the necessity for allowing 72 hours for sensitization of the eye, the ophthalmic test should be used wherever possible on herds undergoing test by the subcutaneous method.

Another combination possible is the use of the intradermic and ophthalmic tests, the former to be regarded as of major importance and the latter as a check against possible doubtful intradermic reactions. In using this combination it is recommended that the injection by the intradermic method be made and the eye sensitized for the ophthalmic test at the same time. No observations need be made to determine the results of the sensitizing tablet. At or about the sixty-seventh hour the diagnostic ophthalmic disk should be instilled, and an observation should be made on both tests at the seventy-second hour or possibly later.

A herd recently tested by this method resulted in 43 reactors being obtained from a herd of 55 purebred Holsteins. One observation was made at the seventy-second hour to determine the results. Forty-one of the reactors were classified as typical to the intradermic test, while 40 were classified as diseased by the ophthalmic method, 3 others being listed as suspects. It was shown further that the 3 suspects to the ophthalmic had given typical reactions to the intradermic and that 2 had reacted to the ophthalmic test alone, one of which was a 7-months-old calf and one an older animal. Of the 12 animals which passed the test, only one was over 6 months of age, and it was observed that these animals gave no indications of intradermic reactions and that the treated eyes were absolutely normal. The postmortem report made on the slaughter of the reacting cattle showed 5 generalized cases, 36 localized cases and 2 no-lesions. The 2 no-lesion animals gave positive reactions to both tests. This method of testing was tried on another herd a few days later with equally good results.

It is fully understood that the best results can not be obtained from the ophthalmic test where such a limited number of observations are taken. However, it proved its value in these instances in checking the intradermic test. A combination of this character is of especial value where the operator is not entirely familiar with intradermic reactions, in which case he will very probably, if the animals in question are tuberculous, have some eye disturbance to guide him in his classification.

The intradermic method of testing having been recognized by the Bureau on March 1, 1920, as official under the accredited-herd plan to be used as a first test of herds in those States which have also given it recognition, it would seem advisable to make a wider use of the combination presented. If this were done in all States in which the tuberculosis-eradication campaign is being conducted, much more ground could be covered. It is entirely possible that an inspector with a motor car could easily test from six to eight herds a week when the premises are conveniently located. A report recently received showed that one Bureau inspector in Iowa during the month of July had alone tested 61 lots containing 362 head of cattle, and in addition, with the assistance of another inspector, had tested 10 lots containing 227 head, a total of 71 lots and 1,009 head. Early clean-ups of many badly infected herds could be accomplished if this policy were adopted.

Another possible combination is that of the subcutaneous and intradermic methods. This, as a matter of check testing, is also very valuable, but it offers little opportunity for reducing the time required. One or two herds which have been tested by combining these two tests are of special interest. A test was applied to the herd of a State institution during May, 1920. This herd has a history of reactors being found in a number of successive tests. This particular test revealed 17 reactors, 16 of which reacted to the intradermic test and only 3 of which were found by the use of the subcutaneous. On slaughter of these 17 animals, 16 were found to be tuberculous. Another herd of 170 head was tested during December, 1919, from which 113 animals were removed as a result of the subcutaneous test. An intradermic injection was immediately given to the 52 animals which had failed to react to the subcutaneous, with the result that 14 additional reactors were obtained, all of which showed lesions of disease on slaughter. Another herd of 172 animals tested in June, 1920, revealed 32 reactors, 23 of which were slaughtered. Summarized, this report shows 10 reactors to both subcutaneous and

intradermic—postmortem results, 1 no-lesion; 3 reactors to subcutaneous which passed intradermic—postmortem results, 2 no-lesions; 14 reactors to intradermic which passed subcutaneous—postmortem results, 1 no-lesion; 1 reactor to intradermic which was suspect to subcutaneous; total, 28 reactors, 1 no-lesion. Many more such reports received by the Bureau are especially interesting in bearing out the conclusions regarding the necessity for using two or more of the methods in testing herds known to be badly infected.

In the follow-up work in establishing free herds, one important requirement should not be neglected. This refers to the postmortem examination of reacting cattle. Wherever it is possible special arrangements should be made to handle this class of postmortem work. When reacting cattle are consigned indiscriminately to slaughter centers, or are "posted" in the field by unqualified postmortem men, the results reported are frequently detrimental to the best interest of the eradication campaign. It is suggested that special arrangements be made to have this class of cattle slaughtered under the supervision of one man, or of a limited number of men, who are known to be particularly qualified, and under conditions which will enable them to give the best results. This condition does not exist at all slaughter points, as one or two animals may be slaughtered with a large number of other cattle where the conditions of light are insufficient and where the necessity of speed does not permit of the most careful examination being made. Results reported to the Bureau from single establishments where this class of postmortem work is conducted have shown its value. Vermont requires, with few exceptions, that all reacting cattle in the State be slaughtered at the establishment of the Burlington Rendering Company, Burlington, Vermont. During the fiscal year 1920 there were slaughtered under the supervision of Dr. C. C. Conley, inspector in charge at that point, 2,708 reacting cattle, of which 98.68 per cent showed lesions of disease. This inspector is considered by the Bureau as one of the most capable on this particular class of work. In a paper which he presented at the Portland (Maine) Tuberculosis Conference he calls particular attention to the fact that tuberculosis may be found in any part of the carcass and that the mere fact of no lesions being found in the regular lymph channels must not be accepted as proof that infection of tuberculosis is not present in an animal responding to the tuberculin test. A wonderfully satisfactory report was also received from Dr. W. N. Neil, inspector in charge at Chicago, indicating that from January 1 to March 8, 1920, 1,212 reactors were

slaughtered at that station, lesions being found in the entire number. This question of postmortem work is presented because of the fact that in using a combination of tests it is known that a considerably larger number of reactors will be obtained from infected herds and that among these will be very many old, pin-point, calcified lesion cases or animals in the early stages of the disease, and some with isolated lesions. More than that, it emphasizes the necessity of bearing out the results of the test by demonstrating lesions on postmortem examination.

In summarizing the results obtained from combination tests, the following points stand out:

1. Each method of testing has its value.
2. The use of all methods should be encouraged.
3. The combination of methods, having proven its superiority, should be used on all badly infected herds or on any animal of doubtful health, and in retesting suspicious animals.
4. There should be fewer animals classified as suspicious as a result of combination tests.
5. The most careful postmortem work is essential.

In conclusion, let it again be emphasized that it is imperatively necessary in the best interest of the tuberculosis-eradication campaign, which is directed toward the betterment of the live-stock industry, that every veterinarian should be familiar with the application of all the recognized tests.

DISCUSSION OF PAPERS ON TUBERCULOSIS

CHAIRMAN DAY: The discussion of papers on tuberculosis will be opened by Dr. Veranus A Moore, of Ithaca, N. Y.

DR. MOORE: Mr. Chairman and Gentlemen: When the Secretary asked me if I would give a paper on this occasion, I told him I didn't see how I could, but I would be glad to give a discussion of one. I didn't know I would have the whole battle.

I feel it is exceedingly difficult to discuss a series of papers giving results in experimental work and recording facts. There are, however, a good many things in connection with tuberculosis that I am afraid are being overlooked, because the tendency is always to accept the latest thing out as the most efficient.

The first paper presented has the very distinguished merit of being consistent in method, and the results are very promising. I say method, because I believe to get rid of this disease or any disease there are certain fundamental biological facts to be taken into account, and any method that meets this condition will be successful. I do not believe there is a method or the method for eradicating certain diseases except one, the method of extermination, as in the foot-and-mouth disease. The control and elimination or reduction of disease widespread like tuberculosis introduces a complicated order of procedure. The first problem is to pick out the animal. The second problem is to dispose of the animal in such a way as to protect other animals, and the third problem is to get the owner of the animal so interested that he will do his part—and his part is the largest part of the whole proposition. That is amply demonstrated in

the control of tuberculosis in this country. Several times in the past thirty years, Professor Bang has told me that the success of his method and the real value of his method were in the fact that when the owner of an infected herd had reached the point where he had a sound herd, he knew enough not to expose his herd to reinfection. This is the whole crux. This is the whole thing—the education of the owner in getting rid of the disease. This is the most important thing.

If you will go back to the early work in Massachusetts, New York and Pennsylvania, where in testing the herds they killed the reactors, gave disinfectants and advice and went away, in four or five or ten years' time the herds were as badly infected as before. So I believe in the elimination of the disease through some definite and tried method. You older men know what I mean when I say that the older veterinarians in this country cleaned up a great many herds through the physical examination process alone. Dr. Law cleaned up a herd in New York before tuberculin was known, and when the herd was tested with tuberculin there were no reactors. As soon as the change in stewardship was made and a new man came in, that herd was tested and proved to be one of the most infected herds I ever heard of. I say the education of the owner is the first and most important thing.

The next is to pick out the infected animal and dispose of him. It is said that a 50 per cent infected herd is not worth saving. That depends upon conditions. I think when 25 to 40 per cent react, the whole herd should be considered with a great deal of suspicion. We have tested herds without reaction and later found them infected, we can't tell how long. I have one record where an animal was tested fifteen consecutive times, and the sixteenth time it was a reactor and when slaughtered was found to be a very pronounced case.

We have to consider also the disposition of these infected herds, which is a matter of detail and in the main an economic question. In this country we have lost many, many valuable animals through the slaughter method. The Bang method has not been a success in this country. It has not been recognized in this country because people have not understood it, and because the laboratory method of employing tuberculin has been approved. Consequently, hundreds and thousands of very valuable animals have been destroyed that might have given us their progeny.

In following the Bang method, in every case the owner had become interested through the advice of his practitioner and he had close and careful supervision during the time the herd was undergoing treatment, and consequently he was able to take all the precautions necessary to protect the sound animals. That is the case largely and results in maintaining sound herds.

While in Germany I spent some time where Dr. Ostertag was carrying out the physical examination. He tested to see what progress was being made. He picked out the bad animals. They did away with the tuberculin method as it had failed.

I think we ought to be very, very careful as to the indemnity. I believe that we can break up the practice entirely. I believe you will get better results and cleaner, healthier herds. As long as the Government will pay good prices, it will put a premium on diseased animals. Let us put the question, why should we pay a man who has had opportunity to read scores of articles and bulletins, but does not do anything for himself and turns over diseased animals to the State? Of course if a plague which he can not prevent gets into the herd, it is different. If we would reverse this and put a premium on sound herds, we would get along better than to put a premium on disease. In purebred herds it is different. I think those men will see to it that when they get a clean herd they will not admit infected animals. What I have said about indemnity I think it was borne out by what Dr. Eliason said in his paper that the owner will lose interest when he knows he will get paid for condemned animals.

In the early days it was done through the health department and not through the veterinary organization. Consequently the question of tuberculin was considered by the American Public Health Association. I had the honor of being chairman and published the report which it prepared on the preparation of tuberculin. There had been a lot of bad accidents where impotent tuberculin had been used. This was probably twenty or more years ago. These methods had been followed pretty largely by men with a good many variations. Naturally great advances have been made in recent years. Great care should be taken that the tuberculin is properly made.

Years ago when I was working on tuberculosis I had an organism which did not produce a tuberculin that was very efficient in case of bovine or human tuberculosis. We know that the bovine organism does not produce very efficient tuberculin. My experience is that the human variety is better than the bovine. I think there is considerable difference in different cultures. As to the dose, it was purely arbitrary in amount. We used that amount and everybody accepted it. It is a curious thing how we accept what other people do. There was a man in Minneapolis who wanted to use an extremely small dose. He maintained that you got more accurate and positive results than when you used the larger dose.

I don't know that we have any evidence as to just what tuberculin should be. With the larger dose and with repeated injections we will get such confused results that we can not tell which tuberculin is the best. Why does one tuberculin cause reaction and another not? We can explain better today just what the tuberculin reaction is. Are we going to be able to pick out this or that method as the best method? I am reminded of the two Irishmen who were looking at a flag. One said it was white and the other said it was red, and after a good fight they went and examined the flag and found it was red on one side and white on the other.

We have got to find where the cause becomes localized. If it is restricted to the lungs, it is not in the skin. It must be somewhere in the tissues. Where in the tissues should the injection be made to give the reaction sought? I think the problem is to find out what causes the reaction, and how much tuberculin is necessary, and what effect the tuberculin has on the tissues after this or subsequent reactions. I think that is exceedingly important.

I believe that if the three methods are better than one we should use the three; if two are better than one we should use two.

I think we should take this thing into account in its entirety, and educate the owner in the fundamental principles of eradication and control. We will make much progress. The accredited herd plan is interesting. You have heard other interesting things which speak for progress, and I hope they will continue.

CHAIRMAN DAY: This is a very important subject and of great interest to all of us, but I realize that we have a tremendously long program. I think we ought to devote a little time in discussing the questions that some may desire to ask.

DR. REICHEL: In the application of subcutaneous and intradermal tests at the same time, by the injections of tuberculin, practically all the tuberculin is absorbed later. I would like to hear from those making the tests as to how they inject the intradermal and subcutaneous at the same time.

DR. C. E. COTTON: What constitutes a typical subcutaneous and a typical intradermal reaction? There are various reactions in intradermal testing. This is the test recognized by twenty-five authorities working in accredited herds. We depend upon individual men to make individual readings. I find that the readings vary with the men and with the inspectors in charge. We are grasping at straws. If we are to maintain the continued support of our breeders in this country we ought to know where we are at.

CHAIRMAN DAY: Will somebody answer Dr. Reichel's question?

DR. REICHEL: In applying the combination intradermal and subcutaneous test, why is that not sufficient to sensitize the eye for a subsequent ophthalmic test?

DR. HEALEY: In looking into the various combination tests, the more I studied them the more puzzled I became, until the statement came up as these intradermal tests were being made, that thermal readings would be of great assistance. Out of 11 animals on which we conducted an intradermal test a short time ago 3 animals gave a typical thermal reaction. By all the rules they had to be considered as thermal reactors, but they gave only slight local swellings. You could not take them as intradermal reactors, but you could as thermal reactors with a typical rainbow curve.

However, I don't accept the statement that you can not make intradermal injections without receiving thermic reactions. On the other hand I would not feel it safe to make an intradermic reaction depend upon thermic reactions alone, for I do not believe you would uncover the large proportion of the reactors.

I did some work with the combination tests on 114 reactors by the sensitizing ophthalmic test. The subcutaneous test followed 72 hours later, when the second ophthalmic was given simultaneously with the intradermal, immediately after the postsubcutaneous temperatures were taken. All but one reacted to the intradermal and ophthalmic test. Not 70 per cent reacted to the subcutaneous test. One animal among these had a history of having been a reactor to the ophthalmic test and did not respond to a subsequent test.

As to the combination of ophthalmic and subcutaneous tests, we tested 40 reactors. We sensitized the eyes of 20 and they all gave very intensive reactions. The other 20 we did not sensitize at all, but depended largely upon the subcutaneous reaction, but the results were not so good.

CHAIRMAN DAY: Dr. Ernest, will you answer Dr. Cotton's question?

DR. ERNEST: What is a typical intradermic reaction? In so far as it can be put into writing it is generally known. One may take a so-called typical intradermic reaction and not be mistaken. At the same time there might be no visible swelling, but you would know there was an enlargement by manipulation. A close examination may show no enlarged lymphatics. I believe the simplest, surest and best way is to use it in conjunction with other tests until the operator is acquainted with the results.

DR. TURNER: One test interferes with the other. I thought the members could be left to draw their own conclusions from my paper. We have got to know more of the action of tuberculin. Some say that with anaphylaxis in the tuberculin test there is a certain time limit. We are going to stick to the Pennsylvania method for the present.

DR. COTTON (to Dr. Turner): Will you answer my question.

DR. TURNER: I studied eight months to learn what an intradermal test is. I don't feel qualified today as an expert.

DR. COTTON: All you need is experience. I say again I want to sound a note of warning, if we are to maintain the continued support of the breeders.

DR. REYNOLDS: Dr. Reichel, in taking thermal records, would a large dose by subcutaneous injection be likely to have an anaphylactic effect?

DR. REICHEL: It is true you can not always expect thermal reactions with the usual amount of intradermal tuberculin given. I don't say you can not at any time get the thermal reaction. It is fundamental that when once an animal is infected with tuberculosis and you give a tuberculin, you will get a reaction either locally or systemically or both.

DR. A. T. KINSLEY: I have had the privilege of conducting tests by the intradermal method. We have suspects or no-lesion cases in about 5 per cent of the total. We conduct our tests for 72 hours. When swellings are larger than the ordinary pea, we consider them large enough to make a diagnosis of tuberculosis.

DR. J. A. KIERNAN: We have the support of the livestock owners in the eradication of this disease. The whole campaign is founded on that prin-

ciple. It is based on the coöperation that exists between the livestock owners and the State and Bureau officials. What little success we have made in this campaign is because the livestock owners have assumed their responsibility in suppressing the disease. Every purebred cattle association in the United States is coöperating in making the tuberculosis eradication campaign a success. The swine growers are supporting the work in a splendid way; in fact, the keynote of the whole campaign is practical coöperation.

Another question is the paying of indemnities by the Federal Government. The first appropriation by Congress made no provision for reimbursing owners of condemned animals. The livestock owners went to Congress, however, and asked for indemnity for animals destroyed for the public welfare. Then Congress provided, not a premium for diseased animals, but a very small compensation to help out those owners, based on one-third of the difference between the appraised value of the animals and the salvage received; not to exceed \$25 for a grade animal and not more than \$50 for a purebred animal. Congress further provided that no money could be paid by the Federal Government unless at least the same amount is paid by the State, county or municipality.

As far as the Government is concerned there is not one single iota of law telling the owner how he shall dispose of his animals. The experience in most States is that purebred herd owners do not want to place their animals on a Bang farm because they do not want a Bang herd either on their farm or on a neighbor's farm.

Dr. S. O. Fladness, for the last few years Assistant Chief of the Field Inspection Division of the B. A. I., has been transferred at his own request to the State of Washington, where he will assume charge of the coöperative disease control work, with headquarters at Olympia.

Dr. W. P. Ellenberger, formerly Assistant Chief of the Tick Eradication Division of the B. A. I., has been appointed Assistant Chief of the Field Inspection Division.

Dr. R. E. Jackson, Inspector in Charge of coöperative disease control work in Texas, has been ordered to Washington, D. C., to assume the duties of Assistant Chief of the Tick Eradication Division.

Dr. R. A. Kelser of the Pathological Division of the B. A. I., has resigned his position to accept a Captaincy in the Veterinary Corps, United States Army.

Among those present at the recent Atlantic City convention of the Institute of American Meat Packers were Drs. R. Fred Eagle, John J. Hayes and Alvin O. Lundell, formerly of the B. A. I., but now in the employe of Wilson & Company, Armour & Company and Allbright-Nell Company, respectively. These veterinarians continue to manifest great personal interest in the success of all bureau activities.

VERMINOUS COLITIS OF DOGS, ITS MEDICAL AND SURGICAL TREATMENT¹

By FRANK H. MILLER, *New York, N. Y.*

BEFORE entering upon the subject-matter of this paper I would beg to be allowed to qualify its title to the extent of saying that it might perhaps be more appropriately designated as the surgical treatment of a certain form of colitis in the dog.

You may be pleased, or perchance disappointed, that I entirely disregard the time-honored custom of asking you to wade with me through a veritable sea of the literature of human and comparative medicine to assist me in establishing any points I may wish to make. I simply thank you, gentlemen, for the opportunity of being allowed in my own way to place before your distinguished body a few clinical observations of one who consistently tries to make his failures no less than his successes lend an equal and honest hand in helping to clear up some of the perplexing conditions under which comparative medicine is sometimes taught and oftentimes practiced.

I am entirely mindful of the fact that I may be termed something of a radical for even suggesting that any form of verminosis of the intestinal tract of animals should at any time come purely within the sphere of surgical procedure, but that is precisely where my experience leads me in this case.

With these things understood, I wish to submit carefully verified data in so far as they may be considered as evidence, and ask you in the light of your own experience to pass upon them.

In the practice of canine medicine, as we are all aware, the ratio of diseases of digestion and the digestive tract to other ailments is relatively high; and taking into consideration all patients at all ages, it is not too much to say that entozoal infections form a preponderant percentage of all cases demanding our professional attention within this field.

Throughout my active experience I have always—and perhaps rather obstinately, too—claimed the privilege of making my own diagnosis as against accepting that too often furnished by the client. It has become an almost inflexible rule with me to carry out a careful microscopic examination of the stools of all my cases wherever any purely intestinal disturbance (barring perhaps simple constipation and obstipation) has been under consideration, before

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attempting to form a diagnosis, much less lay down a definite line of treatment to be followed. I consider the careless handing out of a treatment for worms in dogs—and, for that matter, in all other animals, where no worms have actually been seen, without such microscopic examination—nothing better than the rankest quackery, which invariably takes a heavy toll of perfectly innocent animal life and is eternally bringing this profession into well-deserved disrepute.

As years have gone by, these routine methods, while making clearer for me the pathway to more accurate, therefore more effective and safer, treatment of many of the conditions due to various species of worms, have also opened up vistas the width and depth of some of which I can not at present quite clearly define. For years, while making health surveys of large and small kennel establishments, which among other things comprises a painstaking recorded examination of the intestinal contents of each and every animal by name or number, I had never been able to understand why a very heavy percentage of all the grown-up animals examined, many of them showing relatively great numbers of eggs of *Trichocephalus depressiusculus* (commonly known as whipworms), remained permanently throughout their lives in perfect health, whereas isolated individuals at times broke down under the infection and invariably gravitated into a state of hemorrhagic colitis, which seemed in the vast majority of cases—I may say in all cases—to be beyond the possibility of successful medical treatment. It has indeed been most difficult to understand why this worm, the direct representative of what is known as *Tricocephalus dispar* in the human family, which, notwithstanding its broad distribution and well-known tendency to perforate the mucous membrane of the large intestines of men after the manner of a basting thread in the hands of a tailor, yet accounted by great clinicians as indeed nonpathogenic in man, can be, I will not say rapidly, but so certainly fatal in dogs, and that evidently without regard to their size, breed or stamina.

These cases marked by diarrhea or dysentery cropping up from time to time in my practice, coming almost invariably like a bolt from a clear sky, the only visible antemortem evidence of possible cause of disease being whipworm eggs, and those not invariably in great numbers, in the stools, have caused me to carry out a number of careful autopsies with the somewhat astounding result that in every single case the cecum of the victim has been found to be the

seat of heavy infection with these worms, very few parasites in these fatal cases having been found outside of that organ. In plain terms, the animal had in every case succumbed to marasmus due to intense subchronic inflammation of the ceca-colic mucosa. The appearance of perhaps half a score of these remarkable cases scattered over as many years in my practice, almost invariably occurring in animals of real or imagined high value, made speculative or experimental operations practically out of the question.

Fortunately, on January 27 of the present year we were permitted to do our first operation in the treatment of such cases, the remarkable results of which have made it comparatively easy since that time to secure operations in similar cases in numbers sufficient, I think, to warrant us reasonably in assuming that our deductions are being based upon sufficiently solid foundations. I cannot, perhaps, do better than to epitomize the history of some of these operated and other cases, specimens from which I am here fortunately able to place in your hands for critical examination, that you may the more readily appreciate the comparative ease and accuracy of diagnosis and realize the advantages to be derived from early operation in similar cases.

CASE NO. 1

Male Aberdeen terrier, about 18 months of age, owned by Miss M. K., a well-known animal painter, of New York City.

The animal, weighing about 22 pounds in fair state of flesh, was presented at my office for examination for purchase on or about December 12, 1919, and was refused owing to the microscopic examination of the stool showing him as being infected with both hookworms and whipworms. Several days subsequently the owner presented him for treatment, with the statement that he was subject to periodic attacks of severe intestinal indigestion marked by frequent, copious, gaseous dark-colored evacuations, oftentimes passing considerable blood and mucus; would lose flesh rapidly during, and rally between, attacks, which were essentially intermittent in character.

The owner, under my direction, carried out a carefully regulated medication of ascending doses of thymol, which ultimately reached 18 grains per day and was continued until gastric irritability showed it could not be continued. On December 28 the patient was presented for stool examination, with the result that there was shown a perceptible diminution of the hookworm eggs, but no visible change being evident in those of the whipworm. The owner was directed

to reduce the amount of thymol to 10 grains daily and take up the use of oil of chenopodium in 5-drop capsules, giving one capsule morning and night for 3 days. The dog tolerated this dosage well, but owing to another heavy attack of dysentery, was placed in hospital January 19, and we were instructed to use our judgment as to further medication. From that date the dog was given one 5-drop capsule oil of chenopodium morning and night for four days. On the morning of the fifth day there was marked muscular weakness and incoördination up to a point where the animal had a trembling gait. The drug was therefore temporarily discontinued. After 24 hours the animal again appeared normal in movement; incoördination had entirely disappeared; but the intestinal discharges were alarmingly profuse, fetid, and contained much blood-stained mucus.

These conditions were serious, and were treated by me to the best of my ability, but absolutely no impression could be made upon them with various astringents. He was therefore given on January 25 7 drops oil of chenopodium in 1 teaspoonful castor oil, with a like dose in the evening. Incoördination being again quite noticeable on morning of January 26, and examination of the stool showing total absence of hookworm eggs, but the number of whipworm eggs appearing to be uninfluenced, we advised experimental operation, which was readily accepted by the owner as her contribution to science.

For diagnostic purposes, which will later appear, 1 grain of phenolphthalein was administered by the mouth on the evening of January 26. At midday January 27 the excreta received the caustic potash test for phenolphthalein, which was found in abundance.

The animal being somewhat weak, received 1 ampule camphorated olive oil by intramuscular injection with 1/100 grain atropin sulphate hypodermatically, followed in one hour by other anesthesia, which was well borne. The abdomen was clipped and sterilized as for any abdominal section; a short longitudinal incision was made at the right side of the propuce; the cecum, located with great ease, was lifted out and separated from contiguous intestines by screeding, small bleeding points being closed by torsion. Two strong and carefully placed chromicized gut ligatures being thrown about the proximal end of the appendix and firmly tied, excision was made, the stump being thoroughly treated with iodine. The patient was then placed in the inverted position to facilitate suturing of the wound with ordinary sterilized gut. Owing to the proximity

of the wound to the prepuce, bandaging for obvious reasons was not used.

The patient made an uneventful recovery, although, owing to the intestinal irritability, which was gradually overcome, convalescence was not quite so rapid as from oöphorectomy in the normal animal. The wound was, however, solidly healed within six days. Full health, vigor and strength was regained in about one month.

Careful stool examination made upon third day after operation showed the animal to be entirely free of all whipworm eggs.

The physical appearance of the cecum in situ showed a decided dilation, the organ being flabby in appearance but entirely free of all evidence of peritoneal inflammation, present or past. There was, however, well-marked enlargement of the mesenteric lymph glands in the ceco-colic region. When removed the cecum was found to be filled almost to capacity with whipworms. A smear examination was made of the contents which revealed myriads of whipworm eggs. The caustic potash test of the cecal contents was also carefully made for phenolphthalein, which was entirely absent, although abundance of it was demonstrated in the rectum prior to operation, conclusively showing that the intestinal contents did not circulate in the appendix to any extent. Examination of the muscularis and mucosa of the organ showed them to be perceptibly thickened.

At the end of two weeks stools began to show formation and they were quite normal at the end of one month. The animal's health remains perfect.

CASE NO. 2

Adult wire-haired fox terrier, male, owned by Mrs. E. B. C., New York City, brought to hospital from Williamstown, Mass., February 6, 1920, with the history that the animal had been suffering for several weeks from periodic attacks of diarrhea and dysentery, much mucus being in evidence. The animal had received good rational treatment along the lines of intestinal antiseptics and astringents by the local practitioner. The period between attacks had grown continually shorter until time of arrival, when they were practically continuous.

The usual examination of the stool showed a few scattering eggs of ascarids and an abundance of those of whipworms. The spirit and appetite were good, but the animal was emaciated, and the skin, while loose, had lost much of its resiliency; the coat was staring and rough.

The patient was put upon treatment of 5 drops oil of chenopo-

dium morning and night, with the result that all *Ascaris* eggs were absent on the third day, and whipworm eggs were notably diminished. February 10 the dose of chenopodium was raised to 5 drops with 1 teaspoonful castor oil three times daily, with the result that well-marked incoördination was present on the morning of the 11th. Medication was therefore discontinued until February 14, when, the animal seeming to be fully recovered in movement and the stool still showing a few whipworm eggs, the dosage was again taken up at 5 minims chenopodium plus 1 teaspoonful castor oil three times daily, all of which was retained. On the morning of the 15th incoördination was again present to a marked degree, with complete anorexia. Stool examinations on the 16th and 17th showing no appreciable reduction of the whipworm eggs, operation was advised and accepted by the owner.

For diagnostic reasons the animal was placed under anesthetic February 19 and a careful but energetic massage and kneading of the abdomen over the region of the cecum was made, with the result that stool examination made January 20 showed a greatly increased number of whipworm eggs over the last previous examination, in fact, exceeding the number seen upon his entry. February 22 at midday the animal received 1 grain phenolphthalein by mouth, and February 23 a final stool examination was made, which showed a few whipworm eggs still remaining. The test for phenolphthalein also revealed the presence of that drug in abundance in the excreta.

The animal, having been duly prepared, was operated on February 23 at 3 p. m. in a manner identical to case No. 1. Conditions on adsppection were similar in all respects to that case; viz., absence of evidences of acute or chronic peritoneal inflammation, cecum slightly larger than normal and flaccid, well-marked enlargement of the mesenteric lymphatic glands corresponding to that region.

The cecum was found to be choked with whipworms and smears of its contents showed a great abundance of their eggs. The potash test for phenolphthalein here also failed to show that drug to have entered the appendix, at least in quantities sufficient to give reaction.

The animal made an extremely rapid convalescence.

Examinations of the stools made February 25, or two days after operation, showed entire absence of all kinds of worm eggs. Stools were well formed on the sixth day, and after three weeks the animal seemed to be in normal weight and vigor and so remains.

CASE NO. 3

A small, indifferently bred male Irish terrier puppy, approximately 6 months of age, owned by Dr. S. C., New York City, was prescribed for in December, 1919, as suffering from distemper, from which it made a satisfactory recovery. Was again presented February 12, 1920, for intestinal irritability, which had caused much emaciation.

Stool examination showed presence of ascarid, hookworm and whipworm eggs in abundance, the history and symptoms being practically identical to cases 1 and 2. The animal, which was very light and anemic, was given triurnal doses of 4 drops oil of chenopodium plus $\frac{1}{2}$ teaspoonful castor oil. Microscopic examination made on the third day of treatment showed total absence of all ascarid eggs and great reduction in the number of hookworm eggs. Symptoms of gastric uneasiness and decided muscular weakness appearing on the third day, treatment was discontinued for two days and again taken up at the same dose.

Stool examination made February 19, when almost complete anorexia had developed, showed total absence of hookworm eggs with a few whipworm eggs still in evidence.

Operation was decided upon and was performed without incident, on February 23, as in cases 1 and 2. The findings corresponded in all ways to those cases, with one noticeable exception, that in this case there was well-marked evidence of some chronic peritoneal inflammation as manifest in slight local adhesion. The cecum was well filled with a felt-like mass of whipworms. Stool examination on the fifth day after operation showed complete absence of worm eggs. Recovery was rapid and seemed complete on the twelfth day. The animal remains in good health.

CASE NO. 4

A red male Dachshund, about 8 months of age and medium size but greatly emaciated, owned by Dr. A. V. M., New York City, was presented March 24, 1920. The animal had been suffering from an intense diarrheal condition for some time, passing much mucus and blood, and had utterly failed to respond to rational home treatment and simple medication.

Microscopic examination showed many eggs of the whipworm.

Astringent treatment in the form of tablets salol compound in comparatively heavy doses was used without result. The animal was placed in the hospital March 27 and received 1-drop doses oil

chenopodium plus castor oil twice daily for 2 days, when the dose was raised to 3 drops of the drug. At the end of 2 days, or on the evening of March 30, when his appetite became almost nil and pulse poor, the drug was discontinued and stool examination was made, showing marked reductions of the whipworm eggs. Compound salol tablets were again used in an effort to check bowel activity, which was great. On April 4 the bowels were apparently checking, but they opened again the same night.

On the morning of April 5 there were indications that the animal had undergone convulsions of some kind during the night, but he did not show it in his mental state. He took some food, but was extremely weak and had several copious black gaseous bowel discharges during the day; was found dead at 4 p. m.

Autopsy showed the cecum to be absolutely blocked with whipworms, no worms being discovered in any other part of the tract. As in cases 1 and 2, there was not the slightest trace of peritoneal inflammation. The mucosa of the colon was visibly thickened and moderately inflamed, but no ulcerative changes were marked. The mesenteric lymph glands of that area were much enlarged and infiltrated.

This case is of particular interest as showing that we probably erred in trying to defer operation in the hope that such an animal, at that stage of the disease, might be built up, as it were, for operation. In these cases they constantly lose weight, and with it strength, and after a certain time become poor operative risks.

CASE NO. 5

Male Irish terrier, 10 months of age, owned by M. C. J., New York City. Patient was a nervous, well-grown, but poorly nourished animal that had appeared at my hospital at various times for gastrointestinal indigestion.

The stool examination showed plenty of ascarid and a few whipworm eggs.

Owing to the weakness of his digestion he received 6 grains of santonin, which expelled all ascarids, this being followed up with 5 compound salol tablets 3 times daily and suitable diet. This having the effect of establishing a more or less satisfactory function, the animal was discharged. In this particular case, owing to the paucity of whipworm eggs associated with a very weak stomach, we elected not to use chenopodium.

On April 13 the animal was again returned to the hospital much

emaciated due to an almost continuous state of diarrhea with vomiting. The stools contained much mucus and at times large quantities of blood. Although the appetite was fickle, the spirit was amazingly good.

Triurnal doses of 5 drops oil of chenopodium with 1 teaspoonful of castor oil were well borne until the third day, when vomiting, muscular weakness and thready pulse appeared, indicating its discontinuance. Stool examinations showed only a very limited number of whipworm eggs.

Alarming symptoms having passed, on April 19 the dog was again placed upon the same dose of chenopodium (5 drops t.i.d.), with the result that on April 22 well-marked incoördination was present with all but complete anorexia. Treatment was again suspended and the animal rallied, but the number of whipworm eggs had not visibly diminished.

Appendectomy was advised and was accepted by the owner, and was performed April 29, resulting in rapid and complete restoration to perfect health and vigor, in which state the animal remains.

This case is of particular interest in that it shows the cecum quite choked with the parasites, whereas the stool examinations at no time showed great numbers of the eggs. Hence, the gravity of cases can not at all times be reliably computed by the microscopic findings.

CASE No. 6

A pedigreed male Welsh terrier, approximately 10 months of age, owned by L. T. D., New York City. This animal, which had been prescribed for some months before as suffering from follicular mange and successfully treated, was presented at the hospital April 1, 1920, for general unthriftiness and periodic attacks of dysentery.

The stool showing an abundance of whipworm eggs, the owner was instructed to give daily doses of 5 drops oil of chenopodium, which was more or less strictly followed out until April 26, when he was again examined only to find plenty of the eggs remaining.

May 1 the dose was raised to 4 drops of the oil morning and night, which had to be discontinued after 3 days owing to general weakness of the patient. The muco-sanguineous discharge continuing, operation was accepted and carried out as on all other cases on May 16, the animal having received 1 grain of phenolphthalein and a heavy abdominal massage on the previous day.

The findings on operating were identical in all respects to the other cases. Test of the rectal stool for phenolphthalein was positive.

while that of the contents of the cecum was entirely negative. Myriads of whipworm eggs were found in both. The cecum was well filled with the parasites. Recovery was rapid and complete. The usual tumefaction of the mesenteric lymphatic glands was well marked. The animal, although nervous, still remains in fine health, with no evidence of the parasites.

CASE NO. 7

A fine male Belgian police dog, about 2 years of age, owned by A. F., New York City, entered the hospital July 7, 1920, under suspicion of distemper, having a cough, some irritation of the eyes, emaciation and diarrhea, a diagnosis which was perhaps too easily made by reason of there being other positive cases of the disease in that kennel, but which diagnosis was found to be absolutely incorrect, the animal having beyond question passed through the disease in the puppy form.

His symptoms from the side of the respiratory organs and eyes cleared almost immediately, but the intestinal discharge became most frequent, great quantities of dark brown gaseous fluid being passed with much tenesmus. Microscopic examination showed the stool to be carrying great numbers of whipworm eggs and a few hookworm eggs. Anemia was marked, but spirit and appetite were remarkably good. Expectant treatment of intestinal astringents and antiseptics were adopted in preference to operation, since we were still to some extent uncertain about distemper. These made absolutely no change in the case, and as he emaciated very, very rapidly, we placed him upon 8 drops oil of chenopodium plus 1 teaspoonful castor oil morning and night for 3 days, when vomiting became marked, causing us to discontinue its use.

Stool examination July 15 showed the total absence of hookworm eggs and a gratifying diminution of those of whipworms. The patient had, however, grown so gravely anemic and emaciated that I feared chenopodium in doses likely to be effective, and asked for operation as a last resort, which was gladly allowed. July 17, after receiving 2 ampules camphor olive oil intramuscularly and 1/75 grain atropin sulphate hypodermatically, he was operated on under careful ether anesthesia, as in all other cases. The animal rallied quite satisfactorily. Two large liquid stools and some blood were passed during the night. Pulse and temperature were satisfactory on the morning of the 18th, but at midday the temperature began to go up, reaching 105 at 6 p. m., and dropped to 99 at 11 p. m., death following during the night.

The cecum of the animal contained a mass of whipworms, and there was evidence that the peritoneal coat of that organ had at some previous date been at least mildly involved. There was, as in all the other cases, great enlargement of the mesenteric glands. No parasites whatever could be found in the tract outside of the appendix.

This case is of equal importance with case 4, as clearly showing that there is a decided time limit in all these cases which must be taken fully into account when forming our prognosis.

Finally, in submitting these reports, I wish to make it clear to all that there is no single word of mine, expressed or implied, that would even remotely convey the impression that the simple fact of an animal carrying whipworms stands in imminent danger, since, as in the human family, we know the percentage of animals carrying the whipworm, without obvious impairment of health, is extremely high, and, as in man, the number of cases where they give rise to symptoms are exceedingly low. Neither do we wish to popularize the word appendicitis, since the condition produced by the worms in no degree resembles appendicitis as known in the human, since the aberration of function which ultimately brings about death in the animal appears to be practically always confined to the colon, a condition seemingly induced by long-continued irritation by these worms when they become lodged in mass in the cecum, where they seem to produce but little local change. We are, however, by reason of our experience, forced to the belief that when these rare but exceedingly grave complications do arise in the dog not 2 per cent of the cases will be recovered under medical treatment, since, as our tests seem to show clearly, the seat of the disease can not be reached by the anthelmintic, whereas timely surgical treatment will in itself carry slight danger to the animal and holds out the highest possible prospects of a speedy and complete recovery.

I venture to forecast that the next decade will place this almost certainly fatal form of worm infection of the canine species within the class of easily diagnosed and most successfully treated of the diseases of animals.

DISCUSSION

THE CHAIRMAN: We are ready for questions on this interesting and well-prepared paper of Dr. Miller's.

DR. FLYNN: I would like to know how early you are able to detect parasites in the animals.

DR. MILLER: In making examinations we find this condition in adult dogs. We don't find it under 5 or 6 months. We find a low percentage

in adult dogs. In some countries they put the percentage of those affected at about 40 per cent. I think it is more than that here. About 60 per cent of the dogs in this country carry that. It occurs only sporadically, but when it does, it means something.

DR. McAUSLIN: I would like to ask Dr. Miller if in his opinion the whipworm is exclusively responsible for this condition—if there are not some others, say the hookworm, that are responsible. My reason for asking that is that he made reference to the use of thymol and then switched to chenopodium.

DR. MILLER: We use thymol because it will remove almost any kind of worm. We have used it in the eradication of hookworms. Possibly hookworms do figure to some extent in those cases because they do weaken all dogs. You can go through these appendices and you will find no traces of anything but the whipworm. It is my opinion that there is a long-continued local irritation set up there by which the colon ceases to function properly. I don't think the hookworm figures in this case at all. We get the hookworms so frequently and treat them successfully, so I doubt if they have any debilitating effect upon the patient which would be a predisposing cause for any disease.

Notice has been received of the establishment at Pretoria of the South African Veterinary College in connection with the University of South Africa. A veterinary faculty will be organized by the Institute of Veterinary Research under the direction of Sir Arnold Theiler, Director of Veterinary Education and Research. It is proposed to require a five year course of which the first two years can be undertaken at any university or college teaching pure science subjects and veterinary anatomy and physiology, the final three years being devoted to specialized professional training and leading to the degree of Bachelor of Veterinary Science in the University of South Africa. It is recommended by the Commission on this subject that provision be made for a Doctorate of Veterinary Science in the University, but this plan has not been developed.

France has published a decree effective August 7, 1920, prohibiting the importation into France of cattle, sheep, goats, and swine from all countries except from French colonies and protectorates.

"Because the anthrax now spreading among livestock in Oklahoma is of an unusually violent form, the serum used so far in treatment has not rendered the animals completely immune, said Dr. Robnett, State veterinarian, recently. About 3,000 cattle, horses and mules have been inoculated with antianthrax serum. Nearly 500 head of cattle and horses have died in Pittsburg County within the last week. Over a quarter of the county is under quarantine."

- *Wichita Daily Stockman*.

CÆSAREAN SECTION IN SWINE¹

By W. E. MACKLIN, *Coon Rapids, Iowa.*

THERE is an increasing demand for this operation, brought about by the high market value of swine. I am forced to believe that a great many qualified veterinarians avoid this work, as the practitioners in two of the near-by towns turn down such calls. The veterinarian who does this operation will find out that it not only pays but will help him in building up a good hog practice, an essential part in a paying practice, at least in the great Corn Belt. The operation is most commonly performed on the farm, under conditions most unfavorable, though sometimes such cases are brought in to the hospital.

To be practical, the operation will be described as performed on the farm. In cases of dystokia it is necessary to decide to operate early if the operation is going to be successful. A few points will be mentioned to help one in deciding when to operate at once and when to attempt the slower method of delivery.

All cases in which the birth canal is found to be too small should be operated on at once, while cases of slow uterine contractions can often be relieved by the use of pituitary extract. Cases of dystokia due to abnormal presentation of the fetus can be relieved without an operation.

If the sow has delivered quite a number of pigs it is permissible to attempt delivery through the birth canal. On the other hand, the same kind of a sow with no pigs by her side should be operated on at once.

When not to operate:

- (1) When there is a complication of an infectious disease.
- (2) When the sow is badly lacerated by the improper use of instruments.
- (3) When the case has advanced so far that gas is present in the uterus. Gas, in my experience, is sufficient to spoil all chance of a successful operation.

No certain time limit can be put on the time between when labor sets in and when it is too late to operate. Each individual case must be decided on as it is presented, the history, symptoms, etc., being an aid in deciding on the prognosis. Never operate when

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

there are no pigs in the uterus, as it is rather embarrassing; at least that is my experience.

An operation decided upon, sterilize the following instruments: Scalpel, probe-pointed bistoury, a pair of blunt-pointed curved scissors, several artery forceps, pincers, needle holder, needles, vulsellum forceps, suture material, sterile linen thread. An anti-septic solution and a white cloth to cover the field of operation should be on hand.

Provide a temporary operating table out of anything available; a couple of saw horses with an old door or scoop board on top, or a crate laid on its side. Never operate on the floor, as you will be badly handicapped.

When the sow is in the nest, give her morphine sulphate hypodermically, from 1 to 3 grains, according to her size, so it will be acting by the time you are ready to operate.

Place the sow on the table, and fasten her securely, the front legs and under hind leg. The upper hind leg can now be held backward by one man.

Clip the hair and shave from the region of the flank, and paint with tincture of iodine. Wring out the white cloth from the anti-septic solution, and cover the entire side of the sow with it. Cut a hole through the cloth to expose the operative area.

Make a bold incision through the skin down to the muscle, about 8 or 10 inches in length. Divide the muscles in the direction of their fibers. Incise the peritoneum. Reach in and bring out the entire cornua. Make the incision into the horn as near as possible to the body of the uterus. Remove the fetuses with the aid of vulsellum forceps. Grasp each pig, whether dead or alive, firmly with the forceps, as it can be done more quickly in that way. Return the empty horn, keeping the incision in it to the outside.

Bring out the lower horn, and if the pigs can be readily removed from the first incision, all well and good; if not, after closing the incision in the first horn, make a new incision wherever convenient in the last horn. Don't waste time by trying to deliver the pigs through one opening in the uterus. If the fetal membranes come away readily, remove them; if not, leave them. In many a case where it was impossible to remove the membrane it was left. They are always found behind the sow in a few hours.

Close the uterine incision, using a Lembert's bowel stitch. Replace the horn, make a manual exploration of the abdominal cavity to see if both the cornua are in place and if any pigs have

been left behind. Suture the peritoneum, using a continuous suture. The muscles will come into position, but a stitch may be put in to keep them in position. Unite the skin with four interrupted sutures, started well back from the edges of the incision, leaving a slight opening at the lower end of the wound for drainage if necessary. Sponge dry and paint with tincture of iodine. Apply a dry dressing of iodoform and boric acid.

Place the sow in a clean, dry, well-ventilated pen. She will probably not care what happens for from 12 to 24 hours. Provide fresh water. After 24 to 36 hours give sweet milk or other nourishing food. Remove outside stitches in from four to five days.

In closing let me emphasize a few points which are firmly impressed on my mind. A great deal of judgment is required in selecting cases to be operated on, as there is no chance of building a reputation on a fatal case—at least not the kind of reputation we are after.

As to an anesthetic, do not operate without some agent, for if you do, many hopeful cases will die of surgical shock. In my work without competent help a general anesthetic was dropped as impracticable. For a time nothing was given, with the results mentioned above. When I started with morphine hypodermically my percentage of successful cases rose at once.

The more speedily the operation is performed the better the results. Make sufficiently large openings so as not to be handicapped in time.

Above all, use antiseptic precautions. Choose the cleanest place available for the operation, which may be out in the open.

As to the percentage of successful cases, if you select the cases you can have 65 or 70 per cent of recoveries. Often I am influenced by the farmer in operating, but I am satisfied that if you select the better cases the successful results will be at least 70 or 75 per cent.

DISCUSSION

DR. SIGLER: I would like to ask how you handle those cases where you find the bladder greatly distended.

DR. MACKLIN: In those cases where the bladder is greatly distended with urine, you can relieve that by drawing back on the bladder with the hand. In other cases, where it is too badly distended, you can use a catheter. In those cases that have gone too far, when a fetus has been lodged in a pelvic cavity for a good many hours, it is an absolute obstruction to the passage of urine. Those are pretty bad cases. They have been in that position too long, but sometimes you can empty the bladder.

We all know that morphine brings on constipation, but if your sow has been healthy and in good condition up to farrowing time and she has gone up to that labor in that condition, one dose of morphine doesn't bring

any bad results. The cases that live through the first 24 hours generally recover, and constipation won't hinder the case until later than that. That has been my experience.

When you open up the abdominal cavity and find the bladder already ruptured, you might just as well quit.

DR. STANGE: I would like to ask the Doctor from which side he operates; also as to results in hot or cold weather.

DR. MACKLIN: You can operate on either side. I prefer the right side. As to hot or cold weather, the best results I ever had have been in the month of August. I operated on three sows for one owner. He had brought home a lot of old meal and left it where the sows got to it. They didn't deliver the pigs. That was in the hottest weather. However, most of the cases we have to operate on are in the cold spring months.

DR. SIGLER: How about the seat of operation?

DR. MACKLIN: The seat of operation is about the short ribs, the lumbar vertebrae, and right there in the region of the flank.

DR. CAUGHMAN: Do you advise breeding the sows after those cases?

DR. MACKLIN: I never had that come up, but one man who had a successful case had the sow bred accidentally within a week afterwards. It was a very remarkable case. I wouldn't advise taking those sows for breeding. One reason is that they have difficulty in delivery, and I would advise that those cases go to market.

DR. JUHL: I would like to ask if the number of pigs removed has any influence on the success of the operation.

DR. MACKLIN: As a rule, the patient has a better chance of recovery where there are fewer pigs left in the uterus, on account of the fact that it takes a shorter time to operate; but if the sow is operated upon early and the pigs are alive, you can remove quite a number of pigs and still the operation will be successful.

DR. ELLIOTT: Coming right down to hard tacks, I want to know what fee he charges.

DR. MACKLIN: A number of years ago, when I first started to operate, I charged \$5.

DR. H. H. SPARHAWK: I would like to ask if any practitioners who perform Cæsarean section are using atropin about the time the operation is completed, the object being that the blood is centralized, and using that with the idea of preventing surgical shock. The point I would like to bring out is that it was called to my attention by a physician in Detroit, who was originally a sheep man in Indiana. He said he had gained most of his experience along those lines in the sheep industry, and he had saved about 80 per cent of the cases that would ordinarily be mortal by using atropin.

The North Carolina Agricultural Extension Service is authority for the following statements as to the value of purebred sires in increasing production:

The milk productions of heifers out of ordinary cows and sired by Holstein, Jersey and Guernsey bulls increased over that of their dams by 64 per cent. The fat production increased by 52 per cent. The second generation increased in milk production over the original cows 130 per cent; in fat production, 109 per cent. Pigs from a purebred boar will average 25 per cent more mature weight on the same quantity of feed than pigs from a scrub boar.

CLINICAL AND CASE REPORTS

PNEUMOCOCCI AS THE CAUSE OF A SPORADIC CASE OF CROUPOUS PNEUMONIA IN A COW

By E. L. STUBBS

Pennsylvania Bureau of Animal Industry

ON March 16, 1920, organ sections from a cow (lung and intestine) were received at the laboratory of the Pennsylvania Bureau of Animal Industry, with a request that they be examined for *Bacillus bovisepiticus*. The history was as follows: This animal developed an acute attack of pneumonia and died in the course of a few days. Necropsy revealed hemorrhagic inflammation of the serous membranes and lobar pneumonia. The attending veterinarian believed it due to *B. bovisepiticus* and forwarded specimens to confirm his diagnosis, and, at the same time, ordered vaccine for the remainder of the herd.

A microscopic examination of the tissues received showed hemorrhagic inflammation of the serous coat of the intestines, hemorrhagic inflammation of the pleura, and croupous pneumonia. An emulsion of the lung tissue was plated on plain agar and injected subcutaneously into rabbits. The plates failed to reveal *B. bovisepiticus*. One rabbit died the third day after inoculation. Necropsy revealed hemorrhagic inflammation of the subcutaneous tissues at the site of injection, hemorrhagic tracheitis, acute splenitis, petechial hemorrhages over the large colon, and highly injected serous membranes. Microscopic examination of the heart blood showed it to be teeming with diplococci which, after proper staining, showed a large, distinct capsule. Pure cultures were obtained on blood agar and further studies proved the organisms to be pneumococci. The second rabbit died on the fifth day, showing lesions similar to the first, and the same organism was readily isolated from the heart blood.

Croupous pneumonia of cattle generally develops as a consequence of the localization of an infectious disease or as a complication in the course of a variety of diseases. Whether occurring as a primary or a secondary disease, it is caused by infection. The *Bacillus bovisepiticus* is credited as the infective agent in a great majority of cases, and as little mention is made in the literature of other organisms, particularly the pneumococci, as of any etiological importance, it was thought advisable to report this case.

RINDERPEST IN BELGIUM

In the "Bulletin du Service de la Police Sanitaire des Animaux Domestiques" of the Belgian Department of Agriculture, No. 14, July 16-31, 1920, appears the following:

NOTICE

Contagious epizootic typhus or rinderpest has just appeared in the country.

This affection is eminently contagious and deadly. The present epizootic causes a particularly grave situation, being of a nature to decimate rapidly the cattle herds of the nation.

It is therefore indispensable that each one give his active and earnest aid to the struggle undertaken for stamping out the epizootic and preventing the return of the scourge.

With this object in view the veterinary service must enforce a rigorous observance of the sanitary measures prescribed by the royal decrees of December 20, 1883, and August 3, 1920, and the ministerial decrees of December 22, 1883.

Disinfection must be the object of special attention of the veterinary service and must be strictly carried out. The registered veterinarians will notify their clients that as soon as the existence or suspicion of the disease is determined the proprietor of the infected premises must provide a large quantity of freshly slaked lime so that it may be immediately and abundantly utilized as a disinfectant.

Special attention must likewise be given to the movement of domestic animals and poultry, and especially of ruminants and swine, the movement of which for slaughter must be covered by a sanitary certificate. This certificate is individual and absolutely indispensable. For each certificate issued a stub in the prescribed form will be retained by the veterinarian.

The issuance of a certificate for a bovine animal which has not reached the age for slaughter (four teeth for females and two teeth for males) is strictly forbidden.

Articles 2 and 5 of the regulations of August 3, 1920, are susceptible of divergent interpretations. The provisions of these articles should be applied as follows: Within a radius of 1,000 meters of an infected place, all movement of ruminants, swine, dogs, cats and poultry is prohibited. Beyond this radius of 1,000 meters the movement of bovine animals for purposes of work is allowed, and ruminants intended for immediate slaughter, when covered by a sanitary certificate in the prescribed form, may be moved to public abattoirs, private slaughterhouses or public markets. Bovine animals, sheep and goats may likewise move a single time in order to go from the stable to the pasture, where they will remain after having arrived there. The free movement of these animals is forbidden by the provisions of paragraph 1 of article 2 of the royal

decree of August 3, 1920. They must therefore remain either at the stable or at the pasture.

The attention of the veterinary service is particularly called to the necessity of burying on the spot the carcasses of animals affected with bovine plague, as well as the offal of animals slaughtered as suspected of contamination, since the removal of these carcasses or their offal constitutes a grave danger of the dissemination of the virus and the propagation of the contagious disease.

LIVE STOCK BREEDS IN THE UNITED STATES

The U. S. Bureau of Crop Estimates took a rough census of the livestock of the country, classified according to breeds, a short time ago. The census brought out the following facts: Cattle, Shorthorns, 15,420,000, or 22.6 per cent; Herefords, 14,302,000, or 21 per cent; Holsteins, 11,069,000, or 16.2 per cent; Jerseys, 9,554,000, or 14 per cent; nondescripts, 7,044,000, or 10.3 per cent; with Angus, Red Polls, Polled Shorthorns, Guerneys, Galloways, Ayrshires, Brown Swiss, Devons, and Dutch Belted in gradually diminishing percentages.

Among the hogs, Duroc-Jerseys lead with 24,914,000, or 34 per cent; Poland Chinas with 20,308,000, or 27.9 per cent; Chester Whites, 7,788,000, or 10.7 per cent; Berkshires, 6,719,000, or 9.2 per cent; nondescript, 4,061,000, or 5.6 per cent; razorbacks, 3,061,000, or 4.2 per cent; with Hampshires, Tamworths, Yorkshires, and Cheshires in gradually diminishing numbers.

Among the sheep, Merinos lead with 12,364,000, or 25 per cent; Shropshires follow with 11,253,000, or 23.2 per cent; Rambouillets, 6,455,000, or 13.3 per cent; nondescripts, 3,941,000, or 8.1 per cent; Cotswolds, 3,504,000, or 7.2 per cent; Southdowns, 2,984,000, or 6.1 per cent; Hampshires, 2,968,000, or 6.1 per cent, with Oxforddowns, Dorsets, Cheviots in decreasing percentages.

While these figures are not exact, they tend to give a fair idea of the popularity of the different breeds and grades.—K. C. S. Ry. *Agricultural and Industrial Bulletin.*

The Outlook tells of a health campaign in Lee County, Mississippi, in which prizes were offered for health slogans contributed by school children. The first prize was won by this: "Chew your food; you have no gizzard." Fifteen hundred mile posts bearing this and other useful health precepts were erected by enterprising merchants throughout the county.

ABSTRACTS

THE BACTERIOLOGICAL CHARACTERISTICS OF TUBERCLE BACILLI FROM DIFFERENT KINDS OF HUMAN TUBERCULOSIS. A. Stanley Griffith.
Jour. Compar. Path. and Bact., vol 23 (1920), No. 2, pp. 129-152.

The author states that the main objects of the investigations were (1) to determine by the examination of unselected series of cases the relative proportions of the human and the bovine types of tubercle bacilli in different kinds of human tuberculosis; and (2) to ascertain the frequency of occurrence and the distribution in the human body of variant strains of tubercle bacilli.

It is noteworthy that attenuated strains of tubercle bacilli have been found only in what may be described as the external forms of tuberculosis, *i. e.*, in cervical gland tuberculosis, in a thigh abscess, and in the skin tuberculosis. Of the two forms of tuberculosis affecting the skin which have been examined, lupus has yielded a higher proportion of attenuated strains than scrofuloderma. Since lupus is the most superficial of the various kinds of tuberculosis which have yielded attenuated tubercle bacilli, there is evidently close relationship between attenuation of tubercle bacilli and nearness of the tuberculous lesion to the surface of the body.

The total number of cases of human tuberculosis now investigated in Great Britain by identical methods and reported on, is 1,068, as follows:

Age Periods	Number of Cases	Types of Infection						Per-centage of Bovine Infection
		Standard Types			Atypical			
		Human	Bovine	Mix-tures (Human and Bovine)	In Cultural Characteristics	In Virulence		
						Human	Bovine	
0 to 5 years	221	133	76	2	2	3	5	37.55
5 to 10 years	312	208	81	1	5	7	10	29.45
10 to 16 years	150	119	17	--	6	3	5	14.66
16 and upwards	384	342	20	2	8	10	2	6.25
Total	1068*	803*	194	5	21	23	22	20.7

*including one case the age of which was not stated.

CONTRIBUTION TO THE KNOWLEDGE OF BIRD POX, WITH SPECIAL REFERENCE TO ITS RELATIONSHIP TO BIRD DIPHTHERIA, STOMATITIS PUSTULOSA CONTAGIOSA EQI AND VACCINIA. I. Van Heelsbergen. *Centralbl. f. Bakt. I. Abt. Orig.*, vol. 84 (1920), No. 4, p. 288.

The author formulates the following conclusions:

1. The great majority of cases of hen diphtheria are caused by the bird pox virus.
2. It is quite possible that the micrococcus of Bordet & Fally is the cause of bird pox.
3. The existence of an independent bird diphtheria with a specific cause (e. g. the bacillus of Klebs-Loeffler) cannot yet be denied.
4. Bird pox virus is not only filterable through a Berkfeld candle, but the Chamberland B and F filters may also allow the virus to pass through.
5. The bird pox virus is apparently phylogenetically closely related to the virus of stomatitis pustulosa contagiosa of the horse.
6. If it is not yet established that the vaccine virus is identical with bird pox, there is a very close relationship between them.

In support of these assertions the following facts are cited:

- (a) Both viruses possess an affinity for the skin. (b) A local process causes a general immunity with both. (c) Both viruses agree with regard to their preservation in glycerine. (d) Both viruses are similar morphologically. (e) Both viruses possess the same susceptibility to rabbit gall. (f) One can produce pox in mammals with bird pox virus. (g) Pox in hens may be produced with vaccine virus. (h) A pustular stomatitis in horses may be produced with both bird pox virus and vaccine virus. (i) One can produce a local immunity against bird pox in hens with vaccine virus (j) Rabbit passage increases the virulence of bird pox for the calf, just as it does in the case of vaccine virus. (k) Pox in children may be produced with the virus of contagious pustular stomatitis of the horse. (l) The cell inclusions found in bird pox agree with those which are produced by vaccine virus. (m) With the virus of the pigeon, there can be produced in the hen pox eruptions which agree completely with those produced in this species of animal by the vaccine virus.

L. T. GILTNER.

AFRICAN ABORIGINAL THERAPY. P. A. E. Sheppard. *American Journal of Public Health* (1920), p. 227.

The following incident was observed by the author: On inspecting the possessions, including the cattle, of a worthy young chief of the Zulu tribe, the following remarkable feat was performed

while milking a savage cow that kicked over Kaffir after Kaffir in succession the moment they attempted to milk her. The young chief, however, walked boldly up and seizing the cow's hind foot with both hands, dragged it out behind her, holding it firmly in spite of her struggles, until he succeeded in resting her hoof on his shoulder, when the frantic cow became quiet, and stood still to be milked by him, giving no further trouble. What really happened, was in my judgment, a subluxation either in lumbo-sacral or sacro-iliac region, or both, and an impingement of nerves of sufficient pressure to prevent pain or induce numbness of temporary duration, so that the animal either did not feel the milking or the unpleasantness caused by milking was removed.

W. N. BERG.

INFECTIOUS ABORTION IN SWINE. M. Schlegel. *Zeitschr. f. Infektionskrank. d. Haust.*, vol. 19 (1918), p. 332.

In one district for some years abortion had occurred in sows as frequently as in cattle. The swine aborted most often between the twelfth and fifteenth weeks of pregnancy, they also aborted between the sixth and eighth weeks. The symptoms manifested themselves in diarrhea and suppressed appetite for two or three days; then there appeared edema of the udder similar to that occurring at normal birth. The sows remained lying down much of the time, and aborted after an illness of two or three days. Other sows aborted suddenly without previous symptoms. Usually after surviving the abortion, the sows again became lively and soon recovered. Later the swine bred again and farrowed normal litters. Other sows were sold for slaughter on account of coming in heat every three weeks and not conceiving. The anatomical findings in the fetuses consisted of a seroedematous infiltration of the subcutis in the region of the navel, chest and throat. In the abdominal and thoracic cavities, as well as in the pericardial sac, there was a considerable quantity of reddish cloudy fluid. The liver was swollen and icteric, the spleen and lymph glands enlarged, and the blood watery. In the liver of the fetuses the abortion bacillus could be demonstrated in quite large numbers. Thus the Bang bacillus is established as the cause of infectious abortion not only of cattle, but also of swine.

L. T. GILTNER.

ARMY VETERINARY SERVICE

APPOINTMENTS IN THE VETERINARY CORPS

Examinations for the appointment in the Regular Army of veterinarians who served during the World War were held throughout the United States and Overseas Forces, the last of July. There were eighty-nine vacancies in the Veterinary Corps, Regular Army, on July 1, to be filled by the appointment of emergency veterinary officers who successfully completed the examinations held in July.

The War Department announced that no officer would be appointed in the Regular Army in a grade higher than the grade he held during the World War. The Act of June 4 also placed the minimum age limit of thirty-six years on men to be majors in the Regular Army.

There were eighty-seven successful candidates for appointment in the Veterinary Corps; of these appointees two have to date declined their commissions.

There are now fifteen vacancies in the grade of second lieutenant in the Veterinary Corps.

Veterinary Officers Recently Appointed Under the Act of Congress, June 4th, 1920

NAME	RANK	COLLEGE GRADUATED FROM	STATION ASSIGNED
Behney, Jacob Edw.	Capt.	Geo. Wash. U., 1913 U. of P., 1914	U. S. D. B., Ft. Leavenworth, Kans.
Cheely, Edw. I.	Capt.	Wash. State C., 1910	R. D., Ft. Bliss, Tex.
Crawford, Nathan N.	Capt.	Ia. State Coll., 1909	R. D., Ft. Robinson, Nebr.
Derrick, Jesse D.	Capt.	U. of P., 1916	3rd Div., C. Pike, Ark.
Eakins, Horace S.	Capt.	Colo. Agri. Coll., 1911	1819 W. 39th St., Chicago, Ill.
Egan, Harold E.	Capt.	Ohio State U., 1911	Ft. Sam Houston, Tex.
Gladish, Isaac O.	Capt.	Ind. V. C., 1915	1st Div., Camp Dix, N. J.
Harsh, Forrest R.	Capt.	Ala. Poly. Inst., 1910	Camp Furlong, N. M.
Hodge, Joseph E.	Capt.	Geo. Wash. U., 1912	Camp Benning, Ga.
Howe, Harry H.	Capt.	U. of P., 1909	R. D., Camp Grant, Ill.
Kelser, Raymond A.	Capt.	Geo. Wash. U., 1914	5th Div., Camp Gordon, Ga.
Mahaffy, James R.	Capt.	U. of P., 1896	Camp Travis, Tex.
Moon, Joseph G.	Capt.	U. of P., 1916	Declined appointment
Perkins, Clell B.	Capt.	Ohio State U., 1912	R. D., Camp Travis, Tex.
Underwood, Jean R.	Capt.	Ia. State Coll., 1909	Camp Knox, Ky.
Whitney, Clifford C.	Capt.	Geo. Wash. U., 1914 U. of P., 1915	Army Medical School, Wash., D. C.
Austin, Francis M.	1st Lt.	Grand Rapids V. C., 1915	American Forces, Germany
Breeman, Howard N.	1st Lt.	Ohio State U., 1913	Camp Sherman, Ohio
Breen, Thomas A.	1st Lt.	McKillip V. C., 1908	R. D., Camp Dix, N. J.
Bridges, Burlin C.	1st Lt.	C. V. C., 1915	Camp S. D. Little, Ariz.
Brown, Lloyd J.	1st Lt.	K. C. V. C., 1910	6th Div., Camp Grant, Ill.
Ruffin, Kenneth E.	1st Lt.	Geo. Wash. U., 1916	Q. M. D., San Antonio, Tex.
Carroll, Thomas E.	1st Lt.	U. of Calif., 1899	Camp Bragg, N. C.
Cook, Chauncey E.	1st Lt.	Ohio State U., 1909	R. D., Front Royal, Va.
Cowherd, Charles M.	1st Lt.	K. C. V. C., 1912	Q. M. D., St. Louis, Mo.
Crosby, Joseph F.	1st Lt.	Cornell, 1915	Ft. Snelling, Minn.
Dildine, Seth C.	1st Lt.	Ohio State U., 1917	Q. M. D., Baltimore, Md.
Dixon, Oress H., Jr.	1st Lt.	Ia. State Coll., 1915	P. D., Manila, P. I.
Dodsworth, Wm. E.	1st Lt.	Colo. Agri. Coll., 1915	Mercedes, Tex.

NAME	RANK	COLLEGE GRADUATED FROM	STATION ASSIGNED
Gerety, Joseph P.	1st Lt.	U. of P., 1910	Ft. Clark, Tex.
Grover, Sawyer A.	1st Lt.	K. C. V. C., 1914 McKillop V. C., 1915	Ft. Oglethorpe, Ga.
Guilfoyle, Calvert T.	1st Lt.	U. of P., 1911	Ft. Jay, N. Y.
Hershberger, Frank C.	1st Lt.	K. C. V. C., 1913	Marfa, Tex.
Johnson, Homer	1st Lt.	C. V. C., 1912	Eagle Pass, Tex.
Kunnscke, Robert P.	1st Lt.	Ind. V. C., 1913	Camp Lewis, Wash.
Lovell, Raymond I.	1st Lt.	Ohio State U., 1914	8th Cav., Camp Ft. Bliss, Tex.
Loy, Martin D.	1st Lt.	C. V. C., 1911	Q. M. D., Washington, D. C.
McConeghy, John K.	1st Lt.	Penn. S. Coll., 1915 McKillop V. C., 1917	Ft. Keogh, Mont.
Miller, Charles L.	1st Lt.	K. C. V. C., 1911	Camp R. L. Michie, Tex.
Miner, John W.	1st Lt.	Ia. State Coll., 1917	American Forces, Germany
O'Grady, Albert J.	1st Lt.	McKillop V. C., 1913	2nd Div., Camp Travis, Tex.
Pickering, Clifford E.	1st Lt.	Wash. State Coll., 1909	16th Cav., Ft. Sam Houston, Tex.
Pollard, Irby R.	1st Lt.	Ala. Poly. Inst., 1915	Ft. Riley, Kansas
Ramsey, Mott	1st Lt.	McKillop V. C., 1916	Q. M. D., San Antonio, Tex.
Randall, Raymond	1st Lt.	U. S. C. of V. S., 1917	7th Div., Camp Funston, Kans.
Reynolds, Francois			
H. K.			
Riedel, Philip H.	1st Lt.	Geo. Wash. U., 1914	Dept. Lab., Ft. S. Houston, Tex.
Savage, Howard M.	1st Lt.	Ind. V. C., 1911	Q. M. D., Boston, Mass.
Schreck, Harold F.	1st Lt.	Geo. Wash. U., 1917	Z. T. O., Washington, D. C.
Seaver, George H.	1st Lt.	Ohio State U., 1917	5th Div., Camp Gordon, Ga.
Shinn, Fred W.	1st Lt.	K. C. V. C., 1914	R. D., Camp Funston, Kans.
Sierseveld, Max, Jr.	1st Lt.	Ia. State Coll., 1914	Q. M. D., Omaha, Nebr.
Smock, Stanley C.	1st Lt.	Cinn. V. C., 1909	Camp Eustis, Va.
Steinkolk, Frank B.	1st Lt.	K. C. V. C., 1917	Ft. Apache, Ariz.
Stewart, Ralph B.	1st Lt.	Cinn. V. C., 1917	Ft. Sill, Okla.
Stifler, John R.	1st Lt.	St. Jos. V. C., 1916	Ft. Leavenworth, Kans.
Waters, Fred C.	1st Lt.	U. S. C. of V. S., 1911	Declined appointment
Williams, Charles S.	1st Lt.	Ohio State U., 1912	Fitzsimons, G. H., Denver, Colo.
Williamson, Wallace L.	1st Lt.	Ohio State U., 1912	83rd F. A., Camp Knox, Ky.
Wolfe, William R.	1st Lt.	Ohio State U., 1915	Ft. D. A. Russell, Wyo.
Worthington, Josiah W.	1st Lt.	K. C. V. C., 1917	R. D., Camp Pike, Ark.
Barringer, J. Lew	2nd Lt.	K. S. A. C., 1917	Hawaiian Department, Hawaii
Beck, Oscar G.	2nd Lt.	Cornell, 1916	Q. M. D., New York City, N. Y.
Carpenter, Peter T.	2nd Lt.	C. V. C., 1911	Camp Meade, Md.
Clark, Samuel W.	2nd Lt.	C. V. C., 1915	R. D., Camp Funston, Kans.
Cox, Claude F.	2nd Lt.	C. V. C., 1912	Q. M. D., San Antonio, Tex.
Dornblaser, Joseph H.	2nd Lt.	C. V. C., 1913	O. M. D., Ft. Mason, Calif.
Fitzgerald, Gerald W.	2nd Lt.	McKillop V. C., 1917	Ft. Riley, Kans.
Friedline, Lloyd M.	2nd Lt.	K. S. A. C., 1916	R. D., Ft. Bliss, Tex.
Hudgins, Patrick H.	2nd Lt.	Ind. V. C., 1917	6th Div., Camp Grant, Ill.
		Ont. V. C., 1910	Ft. D. A. Russell, Wyo.
		Toronto U., 1910	
Hughes, Wm. O.	2nd Lt.	Ind. V. C., 1913	R. D., Camp Gordon, Ga.
Ingram, Lester W.	2nd Lt.	Ind. V. C., 1917	R. D., Camp Travis, Tex.
Jones, Gardner, B.	2nd Lt.	K. C. V. C., 1916	Q. M. D., Chicago, Ill.
Kielsmeier, Samuel G.	2nd Lt.	C. V. C., 1916	Marfa, Tex.
Long, Earl F.	2nd Lt.	Ohio State U., 1910	Camp Stanley, Tex.
Ludwigs, John R.	2nd Lt.	K. C. V. C., 1916	4th Div., Camp Lewis, Wash.
Martin, Floyd G.	2nd Lt.	C. V. C., 1915	3rd Div., Camp Pike, Ark.
Moore, Herbert K.	2nd Lt.	K. C. V. C., 1916	Aberdeen Proving Grounds, Md.
Noonan, James E.	2nd Lt.	U. of Toronto, 1911	A. S. B., Norfolk, Va.
		Ontario V. C., 1911	
Pringle, Walter R.	2nd Lt.	St. Jos. V. C., 1917	Q. M. D., San Antonio, Tex.
Rogers, Edwin K.	2nd Lt.	Wash. State Coll., 1916	R. D., Ft. Robinson, Nebr.
Schwalm, Oscar C.	2nd Lt.	Grand Rapids V. C., 1917	Camp Sam Fordyce, Tex.
Seymour, Raymond T.	2nd Lt.	K. C. V. C., 1915	2nd Div., Camp Travis, Tex.
Shannon, Russell S.	2nd Lt.	C. V. C., 1913	Hawaiian Dept., Hawaii
Skinner, Charles B.	2nd Lt.	Cornell, 1914	Raritan Arsenal, N. J.
Van Tuyl, Harry Edw.	2nd Lt.	K. C. V. C., 1917	Ft. Myer, Va.
Watson, Harry L.	2nd Lt.	Grand Rapids V. C., 1916	R. D., Camp Gordon, Ga.

APPOINTMENTS IN THE RESERVE CORPS

The law of June 4, 1920, limits appointments in the Reserve Corps to a grade not higher than that held by the person while in the military service. Another provision of that law authorizes the promotion, under such rules and regulations as the Secretary of War prescribed, of Reserve Officers after one year's service.

The board or committee appointed in compliance with the above-mentioned law to devise a plan of organization of the Reserve Corps is now in session in Washington. Among other things to be accomplished by this board will be the drawing up of regulations governing such promotions.

This information is of importance in view of the fact that there have been of late many declinations of commissions in the Reserve Corps on account of the inability of the applicant to receive a higher grade than that held during the war.

STALLION FIGURES

According to a compilation for 14 States having stallion registration laws, following is the relative proportion of purebred, grade, crossbred and mongrel stallions:

Purebred stallions.....	27,694
Grade stallions.....	12,734
Crossbred stallions.....	9
Nonstandardbred stallions.....	71
Mongrel stallions.....	2,915
Total.....	43,423

The States represented by these figures are California, Idaho, Iowa, Indiana, Kansas, Minnesota, Montana, New York, North Dakota, Oregon, Pennsylvania, South Dakota, Utah and Wisconsin.

Dr. C. B. Robinson, contract veterinarian of the District of Columbia, states in his recent annual report that the District government has in use 703 horses and mules, an increase of 22 over the preceding year. Nearly half are in the street cleaning department.

Topeka Daily Capital (August 22) notes that 300 head of cattle have died of anthrax in the recent epizootic in the vicinity of Collinsville and Claremont, Okla.

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of Fifty-seventh Annual Meeting, Columbus,
Ohio, August 23 to 27, 1920

(Continued from the October JOURNAL)

GENERAL SESSION

TUESDAY AFTERNOON, AUGUST 24, 1920

THE meeting convened at 2:30 p. m., President C. A. Cary presiding.

REPORT OF EXECUTIVE BOARD

THE PRESIDENT: The first thing in order is the report of the Executive Board.

(Secretary Mayo read the list of applications for membership, and it was voted, on motion, duly seconded, that the recommendations be received and approved, and that the Secretary, under suspension of the rules, be authorized to cast an affirmative ballot for all the names read.)

SECRETARY MAYO: The Executive Board recommends that the rules be suspended and that Horace B. Allen be elected to membership.

(It was voted, on motion of Dr. W. H. Hoskins, seconded by Dr. Kinsley, that the recommendation of the Executive Board be approved and Dr. Allen elected.)

SECRETARY MAYO: The Executive Board recommends also that Dr. Crespo, of Cuba, be elected under suspension of the rules.

(It was voted, on motion of Dr. Kinsley, seconded by Dr. Hoskins, that the recommendation of the Executive Board be approved and Dr. Crespo elected.)

SECRETARY MAYO: The Executive Board also recommends that the rules be suspended and that Dr. de Souza of Brazil be elected to active membership in the Association.

(It was voted, on motion of Dr. Kinsley, seconded by Dr. Hollingworth, that the rules be suspended and that Dr. de Souza be elected.)

SECRETARY MAYO: The following applications have been unfavorably reported by the Executive Board: John R. Scully, W. H. Lynch, and C. W. Anderson.

(It was voted, on motion of Dr. Kinsley, seconded by Dr. Glover, that the recommendation of the Executive Board be approved.)

ELECTION OF OFFICERS

THE PRESIDENT: According to the Constitution and By-Laws and the order of business, the election of officers comes up at this time. Let me say a few words about this before we begin to nominate, so that you will not be under any misunderstanding. The Constitution says: "Nominations shall be made from the floor, and nominating speeches shall not take up more than two minutes' time." Therefore I hope all of you who are interested will regulate yourselves accordingly, as to time especially.

First in order is the election of a President for next year. Nominations are now in order.

MAJOR GOULD: I know a man who needs no speech, Dr. David White of Ohio. (Applause.)

DR. MERILLAT: I want to second that nomination. I want to see a man of the proper size for President during this ensuing year, a man who is able to carry this Association through this year that is coming. I say this without any disparagement of the virtues or capabilities of those who may be nominated hereafter.

David White of Ohio is a pioneer of the veterinary profession. No one knows like Ohio men how he brought the turbulent State of Ohio to good order, from charlatanism to a State that makes every State in the Union proud of Ohio, by building up from this chaos the greatest organization in the State; how he went to the war, without any thought of what influence it might have on his position; went through the Army and made good. As an Army man I second his nomination, because in France, when the Veterinary Corps was in bad state through lack of organization, David White showed his bigness by setting things right in a few weeks and putting us on a plane that made the Veterinary Corps function in better condition.

Gentlemen, I speak to you strictly as a member of the American Veterinary Medical Association who wants to see the right support of David White of Ohio. (Applause.)

DR. ADAMS: Mr. President, I wish also to second the nomination of Dr. David S. White, and in seconding that nomination I do not have in mind the individual man, but really I am thinking of what I believe to be the welfare of this Association, and that is what I think we all are thinking of. This Association is a big institution, and the standing of every veterinarian in this country depends largely upon the stand taken by this institution.

I was very sorry, before I came into this room, to hear one note of discord spoken. It was well meant, but if we should follow out the line of argument that I heard we would soon be setting one faction up and another faction up, and working faction against faction. We would have practitioners lining up against school men and the Bureau of Animal Industry men. Let's keep those things out of our minds for all time.

When we think of a man let us not think of him in any particular sphere of work, but let us try to recognize the type, the educated man, who knows what advances veterinary medicine has made the world over, who is in a position to lead us to the front if we are behind; a man who knows the status of veterinary medicine in countries where it has had a hundred years' advance of us—Germany and France; a man who knows what they are doing there, and knows what we should be doing here.

We want a man of whom we can be proud when he comes up against the best educated physicians of this country, who will be recognized not only as an educated gentleman but as a scientist. That is the type we are after, and whenever we nominate such a type, if he is one of our men, let's get behind him, no matter what school or what section he comes from. David S. White, in my opinion—and I have known him thirty years—is the type, and therefore I take pleasure in seconding his nomination. (Prolonged applause.)

DR. JACOB: I think that I voice a most popular sentiment from the South when I second the nomination of Dr. David S. White. (Applause.)

DR. CONNAWAY: Missouri expects to help elect an Ohioan for President—of the United States (laughter and applause), and in conformity with this plan of things I think that every veterinarian in the State of Missouri would be pleased to have an Ohioan as the President of the American Veterinary Medical Association. (Applause.)

DR. DUNPHY: Mr. President, I take off my hat to no man in this Association in honor and respect of Dr. David White of Ohio, but there are times in our lives when we feel that merit and work in this Association or any Association should have its reward. I wish to present the name of a man who has been connected with this Association for over thirty years. His influence has helped in the veterinary profession not only from Florida to Michigan, not only from Maine to California, but over the entire American continent. He has been an instructor, a teacher, and he has been a practitioner all of his life.

The good State of Ohio has been honored this year as no State in the Union. There are three candidates from this State for President of the United States. It has also been honored with the meeting of the American Veterinary Medical Association, the largest institution of its kind in the world, and it looks to me that when they have been given the whole world, you might say, it isn't necessary for us to put a little red fence around it for them. I think a State that has been honored with those four things that I have mentioned—three men as candidates for President of the United States and the honor of entertaining the American Veterinary Medical Association—when a State that has had that much honor, that honor alone should live in men's memories for scores of years, and even be handed down to posterity until the crack of doom. I don't believe it is sportsmanlike for men to lick the earth. As an old sportsman,

when I was out shooting birds and I got what I thought was fair and right, I stopped and went home; and I don't believe it is sportsmanlike for Ohio to want any more than she has been honored.

I want to present the name of A. H. Baker, not of Chicago, not of Illinois, but Dr. A. H. Baker of America. (Applause.)

DR. SIGLER: I take pleasure in seconding the nomination of Dr. Baker.

DR. WELCH: Coming from his home State, knowing him intimately as I have for thirty years, as a man, as a teacher, and as a zealous worker, both in his home State association and in the American Veterinary Medical Association, during all of that time, I take pleasure in seconding the nomination of Dr. A. H. Baker. (Applause.)

DR. L. E. BROWN: I want to second the nomination of Dr. A. H. Baker for President. I think it is due him. He is in the prime of life, and he will be a little further along. He has a great many claims on this Association that I think should be honored. (Applause.)

THE PRESIDENT: Are there any further nominations? If not, a motion to close the nominations is in order.

(It was voted, on motion of Dr. W. E. Wight, of Pittsburgh, duly seconded, that the nominations be closed.)

THE PRESIDENT: We will vote by ballot, and only those who have been recently elected and those who have paid their dues for 1919 are entitled to vote. I will appoint Dr. Kinsley, Dr. Dunphy, Dr. Reichel, and Dr. Lambert as tellers.

(The vote was taken, and the tellers retired to count the ballots.)

THE PRESIDENT: While the tellers are out, we have five Vice-Presidents to elect. I want to call your attention to one feature we have overlooked. You can elect all the men from one district that you want to, but I have had a number of complaints about the fact that the separate districts were not represented. These complaints, coming from the rank and file, should be heard, notwithstanding the fact that the Constitution and By-Laws give you the opportunity to do otherwise. I want to give you an opportunity to elect one at a time. You can all vote on them. I think that is fair. I think the rank and file of the men in these districts have a right to ask you to do that. If you don't want to do that, it is your privilege. I am going to present it to you because it has been presented to me. You came up here and elected them all from these areas, and didn't give these districts a chance. You can do just as you like. I leave it to you.

DR. HILTON: Mr. President, I take great pleasure in nominating Dr. A. A. Etienne, of Montreal, Canada.

DR. J. B. HOLLINGSWORTH: I take much pleasure in seconding that nomination.

DR. DE VINE: I nominate A. O. Longley, of San Francisco, California. Dr. Longley is not here, but many of you know that he has

been working here for a quarter of a century. He has also done service in the war. Dr. Longley is one of the finest men, and those of you who know him, know him as one of the grandest men in the profession. Therefore I hope he may receive your support.

DR. COTTON: I want to second Dr. Longley's nomination.

DR. LAMBERT: In seconding the nomination of Dr. Longley I wish to say a word. It was my privilege in the Army to room with Dr. Longley. It will be recalled by you that Dr. Longley started the movement to add 400 members to the membership of the American Veterinary Medical Association. In other words, he started, single handed, a movement that increased our membership more than 10 per cent. A great many of the men here today are men that Dr. Longley started in. He is neither an old man nor a young man. I appeal to you to support Dr. Longley. (Applause.)

DR. McAUSLIN: I wish to present to this Association the name of a Vice-President not representative of any particular section. He represents the United States Army, and I offer for reelection the name of John N. Gould.

DR. L. T. REEFER: West Virginia has never been recognized in the American Veterinary Medical Association. I desire to place in nomination the name of J. J. Cranwell, of Clarksburg, West Virginia. (Applause.)

(The nomination of Dr. Cranwell was seconded.)

DR. T. E. ROBINSON: I place in nomination the name of Dr. T. A. Sigler, of Greencastle, Indiana.

DR. JOHN BLATTENBERG: I second Dr. Sigler's nomination.

DR. JOHN I. HANDLEY: I would like to place in nomination the name of Dr. Herbert Lothe, of Wisconsin.

DR. F. P. CAUGHMAN: I would like to place in nomination the name of a gentleman who is probably one of the oldest practitioners in America today. He has been a practitioner for twenty years and quite active in the affairs of the American Veterinary Medical Association. I place in nomination the name of Dr. Benjamin McInnes, Charleston, South Carolina.

DR. O. H. ELIASON: I wish to second the nomination of Dr. Lothe, of Wisconsin.

DR. W. H. HOSKINS: Mr. President, there is a man in our organization who has been of great service. He has made the world his debtor. I therefore place in nomination the name of Adolph Eichhorn for Vice-President.

DR. EICHHORN: I have served for two successive terms, and I think somebody else ought to take my place. I place in nomination Dr. T. A. Burnett, whose efforts for the success of this meeting have been great.

DR. BURNETT: I am not a young veterinarian, but I am a young member of the American Veterinary Medical Association. I think there are a good many older men among whom the honor should be distributed.

DR. GLOVER: Mr. President, I wish to nominate Dr. Charles G. Lamb, State Veterinarian of Colorado. (Applause.)

(It was voted, on motion duly seconded, that the nominations for Vice-President be closed.)

THE PRESIDENT: I will appoint Dr. Lambert, Dr. Day, Dr. Hoskins, Jr., and Dr. Simms as tellers.

The Secretary informs me that a motion has been required heretofore to determine the results of the election, and that motion has included this, that the one receiving the highest number of votes would be regarded as First Vice-President, the second highest Second Vice-President, and so on. A motion to that effect will be in order.

DR. J. PAYNE LOWE: In order to facilitate matters, I so move.

(The motion was seconded and carried.)

THE PRESIDENT: The tellers for President are now ready to report. The Secretary will read the results.

SECRETARY MAYO: Total number of votes cast, 448. Dr. White, 325; Dr. Baker, 123.

THE PRESIDENT: Dr. White having received the majority of votes cast, I hereby declare him elected President for the ensuing year.

(The vote was taken for Vice-President and the tellers retired to count the ballots.)

THE PRESIDENT: Nominations for Treasurer are now in order.

DR. S. F. MUSSELMAN: I wish to place in nomination for Treasurer the name of Dr. M. Jacob.

DR. BURNETT: I second that nomination.

(It was voted, on motion of Dr. Caughman, duly seconded, that the nominations for Treasurer be closed.)

DR. MCAUSLIN: I move the rules be suspended and the Secretary be instructed to cast one vote for Dr. Jacob as Treasurer.

(The motion was seconded and carried. The Secretary cast the ballot as instructed, and Dr. Jacob was declared elected Treasurer of the Association. (Prolonged applause.)

PLACE FOR NEXT MEETING

THE PRESIDENT: According to the motion yesterday, the selection of the next place of meeting was the next order of today. The organization or the house has the right to select the next meeting place or leave it to the Executive Board. We are now ready for that question.

SECRETARY MAYO: Mr. President, as Secretary, I have received an invitation from the Chamber of Commerce, or some official organization, of New York City. I have also received the following letter: (Dr. Mayo read an invitation from the Des Moines Convention Bureau.)

DR. GLOVER: Mr. President and gentlemen, out West there was a cowboy who went to a dance in a tipsy condition, and they threw him out. Soon he went back again and they threw him out again.

Finally he went back the third time, and then they threw him out the window. He sat there a while, rubbing his shins, and finally he looked up and said, "I know what's the matter with them fellers; they don't want me in there." (Laughter.) I have invited you to Colorado twice. If you turn me down the third time I shall conclude that you don't want to come to Colorado. (Laughter.)

I wish I had the eloquence to stir your souls like some of our noted orators, but unfortunately I can not. I am something like the young minister who had just graduated from a theological seminary and contemplated performing the marriage ceremony. He went over the ritual, always ending with this, "It is customary to kiss the bride." The day arrived, and he got through the ceremony all right. Finally, he said, "It is kisstomary to cuss the bride." (Laughter and applause.) Now if I get confused in my few words you will please pardon me, because I want to assure you that I am stirred in an unusual way. It is seldom that any audience affects my nerves, but this time I am nervous.

We want you in Colorado. I have in my pocket invitations from the Chamber of Commerce of the city of Colorado Springs and the Mayor of Colorado Springs, and the unanimous vote of the Colorado Veterinary Medical Association.

You have overlooked our district. You have gone over the mountains twice. You have been to New York City, Toronto on the north and New Orleans on the south. Why not come out to Colorado? That is the playground of the United States. Formerly it was a popular thing to go and see the Alps, to go across the water. Now the slogan is, "See America first."

I want you to come to Colorado Springs. Colorado Springs is right at the base of Pike's Peak. If any of you think it is hot out there, I want to tell you that two weeks ago we had a foot of snow on top of Pike's Peak. If you take a train to Denver and go over Moffat Pass, there you can reach out of the window and reach the snow banks. You can snowball, you can roll in the snow, you can eat snow, get all the snow you want. There are many side trips into the mountains. If you want to go fishing for speckled trout, there is the best kind of opportunity, and you never will want to fish for bass or sunfish out in the lake again. If you want to take a short trip above timberland, go to the top of Pike's Peak and back for lunch, or take an automobile round and round and round the mountain top, to the top of Pike's Peak. Then you can be back in time for lunch and the afternoon session.

One thing that will appeal to you is how much it won't cost. Mind you, there are special tourists' rates to Colorado next summer, so that the rates will be less next year than the ordinary passenger rates. Colorado Springs has six main railroad trunk lines. The purpose is to make the headquarters at the Antlers Hotel. Don't think for a moment you are going to be held up. Please get that notion out of your heads. I am here to tell you that the rates are

practically the same as in the Deshler. You can go to a cheaper place if you want to. If you want to pay more you can do so. You can pay eight or ten dollars and get all the style you want.

Colorado Springs is in the habit of entertaining. They have found it does not pay to overcharge tourists, because they want them to come back again. They will be fair with you. We have plenty of room. There is plenty of space in the hotel and elsewhere. There is nothing you can want out there that you can't get as well as in any other place in the United States. You are one mile nearer heaven out there, and that will do you no harm. (Laughter.)

Mr. President, I will leave it to you; is it not a fact, according to your observation, that whereas that country is from one to two miles nearer heaven, the people, being in close proximity to that future abode for the few, and hearing the clapping of angel wings and the heavenly chorus, have in a measure partaken of the angelic qualities of those inhabitants? (Laughter and applause.)

Come out there. It will do you good physically. It will do your soul good.

Mr. President, I would like to see this thing settled on the floor of the convention this afternoon, and not left to the Executive Board. Therefore, if it is in order, I would move you that if it is the sense of this meeting, we request the Executive Board to make arrangements for the next meeting in Colorado Springs, Colorado. (Seconded.)

DR. STANGE: Gentlemen, before the motion is put, I would like to say a few words in behalf of Des Moines, and before I get through I am going to tell you of the finest plan I ever heard of. I have here a letter from the Des Moines Chamber of Commerce.

(Dr. Stange read the letter, also a letter from the President of the Iowa State College.)

DR. STANGE: In addition, the Governor of the State has sent word that he would like very much to see the convention come to Iowa next year.

In addition to the great live-stock interests we have, we register in Iowa about 800 graduate veterinarians. I believe that is what we are interested in. I believe we are also interested in the great live-stock industry of this country, and I believe you will find if you come to Iowa that you are practically in the center of that great industry.

I know we would all enjoy a vacation to Colorado, and I am going to make the suggestion to you that you go to Des Moines and hold your meetings in the midst of the very things that we are most vitally interested in, and then we will all get on the train and go down to Colorado Springs.

So, Mr. President, I move an amendment to Dr. Glover's motion, that we meet in Des Moines and then all get on the train and go to Colorado Springs for a fine outing. (Applause.) (Seconded.)

DR. W. H. HOSKINS: Mr. President, I think I understood Dr. Stange to say that the Association had never met in Des Moines.

It did meet in Des Moines, and I will second Dr. Glover's motion that we go to "Pike's Peak or bust."

(The question was called for, a rising vote was taken, and the result was 96 for and 120 against Dr. Stange's amendment. So the amendment was lost.)

THE PRESIDENT: The question now comes on the original motion made by Dr. Glover that we go to Colorado Springs.

(It was voted, on motion of Dr. Glover, duly seconded, that the Executive Board arrange for the meeting next year in Colorado Springs, Colorado.)

NOTICE OF AMENDMENT TO BY-LAWS

THE PRESIDENT: The Secretary has some business on the desk.

SECRETARY MAYO: Notice is given by the Executive Board of an amendment to the Constitution and By-Laws. It is recommended that Section 1, Article 1, of the By-Laws be changed so far as the order of business is concerned, placing reports of officers ahead of election of officers, which is now number 6.

(It was voted, on motion, duly seconded, that the recommendation of the Executive Board take the usual course of lying over for a year before it comes up for adoption.)

PURCHASE OF PERMANENT HOME

DR. BENNETT: I move that the Executive Board, together with the President and the Secretary, be authorized to exercise their discretionary powers in the consideration of location and purchase of a permanent home for the Secretary, Editor and Business Manager, and for the storage of the records, books and archives of the Association. (Seconded.)

DR. W. H. HOSKINS: Won't that go over for one year?

THE PRESIDENT: This gives the committee power to take that up.

DR. W. H. HOSKINS: It means that the Board would spend a large sum of money. I don't think it would have the right to do that. I am not against that, but I think all the members should know the action before we vote on that.

THE PRESIDENT: The question is before you, and I see nothing in the Constitution and By-Laws prohibiting it.

DR. REICHEL: Is it understood that this carries the right to purchase?

THE PRESIDENT: Yes. They are the financial committee of the Association.

DR. W. H. HOSKINS: I move that that be laid over for one year. (Seconded by Dr. McAuslin.)

THE PRESIDENT: An amendment has been moved and seconded that this be laid over for one year.

DR. W. H. HOSKINS: My idea is that the members all ought to have notice of it. I move that we postpone it for one year and that

all members be given notice of this proposition. (Seconded by Dr. McAuslin.)

SECRETARY MAYO: I would like to ask for information. If this is published in the official JOURNAL of the Association, would that be satisfactory?

DR. W. H. HOSKINS: Yes, sir.

DR. COTTON: A point of information. Do I understand that this motion gives the Executive Committee power to purchase, or only to investigate and report to the Association?

THE PRESIDENT: It gives discretionary power to this Board to purchase or to investigate and report. They may purchase.

DR. MURPHEY: I don't see that there is any necessity for this to prevail. We have a democratic form of organization, in that we have representatives from different districts. They have been elected from different districts. If we didn't have confidence in them we would not have elected them. It seems to me it would be unfair with the arrangement of better business management to ask that the meeting not give the Executive Board power they ask to establish a permanent and satisfactory home and save the rent, and officially take care of the archives of the Association and the business of the Association. I see no reason for postponing this with the idea of bringing it back here and squabbling over it on the floor. This is a democratic organization and we have our representatives and we should trust them.

DR. MCAUSLIN: I would like to call Dr. Murphey's attention to the fact that this motion gives those people unlimited power, an unlimited amount of money to spend. Discretionary power doesn't mean anything when it comes to paying out hard cash. Postponing this matter for one year can't do any harm.

DR. JACOBS: Mr. President and gentlemen, I think this question of making a permanent home should be decided. As Treasurer of the Association I happen to know that it has been an expensive proposition to keep shifting the Association's property from one place to another. I think it ought to be permanently located. I look upon the Executive Board as men who have business ability, or they would not represent the Association. (Applause.)

DR. KOEN: I don't believe that we shall have another meeting when there will be a more representative attendance than there is here today, or when men will know better what they want to do than they do today. We have placed our confidence and our loyalty in the Executive Board, and I think it would be a reflection upon them to postpone action while a good and convenient place might be had. The sooner this question is decided the better it will be for the Association. I think we should vote down the amendment and give the committee the power and the authority we placed in their hands when we elected them. (Applause.)

DR. W. H. HOSKINS: You have had less than 500 of your members here today. You are going to vote, 500 of you, for 4,500,

without having given them the opportunity of investigating for themselves on the proposition, let alone the purchase. It is a fairly new proposition, unknown to seven-eighths of your membership, and it would not do any harm to let it lie over for one year. You may not be afraid to. It can come up at the next meeting.

DR. W. HERBERT LOWE: I have confidence in the committee, but we have done all these years without a home, and let that Executive Committee come back here and tell us what they think and let us vote on it then. We may be sorry if we get the wrong home.

DR. A. S. COOLEY: I wish to say that I have confidence in the Executive Committee upon this question, and believe this should come before this section.

DR. W. HERBERT LOWE: I have every confidence in the committee, and I am in favor of this Association having a permanent home; but I do think that we ought to know approximately what amount is anticipated to be spent for a home, and I don't think it is good business for us to vote and give this authorization without knowing approximately how much money they expect to spend for a home.

DR. CONNAWAY: I want to move a substitute for the original motion.

THE PRESIDENT: That would be in order after this amendment.

DR. CONNAWAY: Substitute that the Executive Committee be authorized to investigate the cost and the best location for a permanent home for this Association and report back to the Association at its next meeting.

THE PRESIDENT: That is practically equivalent to what the amendment will do.

DR. W. H. HOSKINS: I will accept the substitute.

(Dr. W. Herbert Lowe seconded Dr. Connaway's substitute.)

DR. CONNAWAY: The substitute is this: That we, as good business men, use our good sense during this coming year and investigate this matter thoroughly as to place and cost of establishing a permanent home for this work, and report back at our next meeting. (Applause.)

(The question was put to a standing vote and the result showed a total of 180 for and 52 against the substitute. Dr. Connaway's motion was carried.)

DR. STANGE: Inasmuch as I am retiring from the Executive Board after this meeting, I would like to say just a few words. I want to call your attention to this fact: You are going to ask for a survey, so to speak, during the next year. You are going to have a report at the next meeting. It will probably be acted upon. You are going to meet in Colorado Springs. Are you going to have a representative group from all over the United States to vote? Or are you going to have—as you have at most meetings—a certain area immediately around where you have the meeting, in the majority, and let them decide?

You people could very well and very easily locate the permanent home in the West if you so desired. I simply want to call your

attention to that fact. I want to say that on the Executive Board you have representatives from all districts, and my experience on the Executive Board has been that their ideas in all things are for the best of the Association.

I thought I ought to explain this to you, because I am not going to be on the Board, and I won't have anything to do with the investigation or anything of that kind; but you are taking action now for your survey, and then you are going to decide it in Colorado Springs. You ought to keep that in mind. You will vote for a permanent home while in Colorado Springs next year. Would you rather do that, or leave it to the Executive Board? For the benefit of the whole organization I wanted to make that explanation.

DR. R. C. MOORE: There are objections, undoubtedly, to all of these methods. It is very hard to arrive at any method. It seems to me that good business managers would demand that this Association know something about how much money is to be spent. The Board could obligate this Association to any sum, half a million dollars, if they want to, and I don't think that would be good business. I think we ought to get a good idea of what it is going to cost, and then get a maximum sum to be authorized and spent for this purpose.

DR. STANGE: If that is the desire of the Association, I suggest that this vote be taken by mail count.

DR. KINSLEY: As a member of the Executive Board, I will say this is a relatively new problem, and the Executive Board, I personally believe, would prefer time to think it over. In my judgment the best plan would be by a post-card vote after the Board has made its investigation. I believe it should be left in such a way that this does not need final action at the next meeting in Colorado Springs. I believe there ought to be a post-card vote from the entire Association before this home is selected. (Applause.)

THE PRESIDENT: Any other discussion on the original motion? If not, are you ready for the question as amended?

DR. KINSLEY: I should like to ask then, does the substitute require final action next year?

THE PRESIDENT: Not necessarily.

DR. STANGE: I move an amendment that the vote for final selection of a home be taken by mail ballot. Seconded by Dr. Kinsley.)

SECRETARY MAYO: Let me state to you briefly how this stands. As it is now, the Executive Board is to report at the next meeting of this Association in Colorado Springs, and that after that report, if there is a ballot taken, according to the proposed amendment of Dr. Stange, if that carries, then after the next meeting they will take a postal-card vote on the report of the Executive Board.

DR. MCAUSLIN: Mr. President, I would call the attention of the assembly to the fact that this does not call for definite action at Colorado Springs. The motion made says the Executive Committee

shall report, and it calls for no definite action at Colorado Springs. It has been so settled by this assemblage.

THE PRESIDENT: The amendment is in order, notwithstanding that, but doesn't qualify the substitute.

DR. MCAUSLIN: How so?

THE PRESIDENT: By stating a definite thing. I rule that the amendment is in order. Are you ready for the question?

DR. KINSLEY: I rise to a point of information. If the Board reports at Colorado Springs, unfavorably, it will not be necessary to have a post-card vote?

SECRETARY MAYO: Yes, it would. The purpose is to have the Executive Board report at Colorado Springs. If the Board decides to buy a place, it will be voted on. If they decide not to buy a place, that would be voted upon. This Committee is to investigate and report. They will report that they can get certain places, and certain locations, and so on. If the Association, according to the amendment proposed by Dr. Stange, wants to take the whole matter out of the Executive Board's hands and vote against the report of the Executive Board, they can do so. In other words, after the report of the Executive Board is made at the next meeting, every member of the Association will have an opportunity to vote on the report, either approving or disapproving, by postal card.

DR. MCAUSLIN: I want to call your attention to the fact that if we go to Colorado Springs and then turn around and go to Des Moines, then we will have the same situation, the local influence. Let's play fair.

DR. STANGE: That question, as I understand it, will not be decided at the meeting. That vote will be taken between the time you meet in Colorado Springs and the time of the next meeting, by postal card.

THE PRESIDENT: The question is on the amendment made by Dr. Stange.

(It was voted, on motion of Dr. Stange, duly seconded, that the vote on the selection of a permanent home be taken by mail ballot.)

THE PRESIDENT: Now the question is on the original motion, as amended, which now reads that the Executive Committee shall investigate this matter of a permanent home, and report, and when that report is made, there shall be taken, after the vote, or whatever action is taken at Colorado Springs, a mail vote on their action.

(The vote was taken on the original motion as amended, and the motion was carried.)

ELECTION OF VICE-PRESIDENTS

THE PRESIDENT: We will now call for the report of the tellers on the election of Vice-Presidents.

The Secretary read the report of the vote, which was as follows: Dr. Longley, 207; Dr. Etienne, 200; Dr. Gould, 167; Dr. Burnett, 160; Dr. Cranwell, 159. (Applause.)

THE PRESIDENT: You have heard the names and the number of votes received by each nominee. I now declare them elected Vice-Presidents in the order named, for the ensuing year.

TELEGRAM FROM SECRETARY OF AGRICULTURE

THE PRESIDENT: I have here a telegram from the Secretary of Agriculture at Washington: "Please extend to the members of your Association my hearty greetings and best wishes for a successful meeting at Columbus and express to them my regret that I can not arrange to be with them. This Department is deeply interested in the welfare of the veterinary profession and appreciates its importance in relation to agriculture and especially the live-stock industry of the country. If your next meeting is held in Iowa, I hope that I may have the pleasure of attending. (Signed) E. T. Meredith, Secretary." (Applause.)

SECRETARY MAYO: Mr. President, I think it would be very appropriate if this Association should send to Secretary Meredith a telegram of appreciation of the interest and support that he has given to the veterinary profession of America, not only as Secretary of Agriculture, but as a leader in the agricultural work of the country.

DR. W. HERBERT LOWE: Mr. President, I take great pleasure in seconding the motion made by our Secretary.

(It was voted that a telegram be sent to Secretary of Agriculture E. T. Meredith.)

Adjournment.

GENERAL SESSION

WEDNESDAY MORNING, AUGUST 25, 1920

The meeting convened at 10 a. m., President C. A. Cary presiding.

THE PRESIDENT: The first thing this morning will be announcements by the local committee about the banquet.

(Announcements by Dr. Lambert.)

REPORT OF EXECUTIVE BOARD

THE PRESIDENT: We will now go on with the report of the Executive Board.

SECRETARY MAYO: Here is a list of applications for membership which have been favorably recommended by the Executive Board.

(The list was read, and it was voted on motion of Dr. W. Herbert Lowe, duly seconded, that it be approved and the persons elected members of the Association.)

DR. MAYO: The following applications are unfavorably reported, but there is no reflection whatever upon the individual applicants: N. R. Yarborough, James R. Brown, C. W. Crawford, J. F. Kagey, W. B. Casilear, W. G. Saunders and James H. Bias.

(It was voted, on motion of Dr. Kinsley, duly seconded, that the recommendation of the Executive Board be approved.)

REPORTS OF COMMITTEES

THE PRESIDENT: The regular program for this morning is, first, reports of committees. The Committee on Intelligence and Education is not ready to report. The report of the Committee on Resolutions we will not call for unless they have some special report at this time.

(The report of the Auditing Committee was next called for, but the chairman was not present. The Committee on Necrology was not ready.)

THE PRESIDENT: We will hear from the Committee on Nomenclature, Dr. Murphey.

REPORT OF COMMITTEE ON NOMENCLATURE

DR. MURPHEY: The committee has stood pat during the past year on account of the fact that there was some doubt in our minds as to our status, for the reason that our recommendations were disapproved in part by the Executive Committee and so reported back in the three articles passed by the Association in regard to two points, namely, the adoption of the list of terms as submitted, and second, the publication of the list.

The 1920 report is what we asked particularly for the adoption of, and we would like to present it at this time.

A. In view of the fact that the American and British associations of anatomists will not complete their reports for several years, and that the B. N. A. terms will form the basis of their final report, we move that the committee be continued to prepare and submit a table of suggested English equivalents together with such additions and corrections as are necessary to conform to the lists of the American Association of Anatomists, and that the committee be directed to cooperate with the veterinary anatomists of other English-speaking countries in the preparation of said lists of anatomical terms.

B. We move the adoption of the Latin terms previously submitted.

H. S. MURPHEY,

F. W. CHAMBERLAIN.

THE PRESIDENT: We shall have to ask Dr. Murphey to explain to you what that means.

DR. MURPHEY: At the Chicago meeting several years ago the suggestion was made that we try to adopt a uniform set of anatomical terms. The principles on which that should be done were submitted and adopted at the Indianapolis meeting. Following that, the first list of terms was presented at the New York meeting. That list was received and published in the proceedings of that meeting, but not officially adopted; and then there were several years between this time. The second list was submitted last year, after having been first submitted to the teaching faculties for criticism and additions. That list was filed with the Secretary of the Association. We are asking for the adoption of that list. The Association accepted the Latin terms, and it deserves a good deal of credit, particularly Dr. Newsom of Colorado for bringing it to the attention of the Association.

The anatomists of the world will eventually work out a uniform set of terms for human and veterinary anatomy. It may be years before that is done, but in the meantime we should have a uniform set of terms that will be considered the language of anatomists among English-speaking peoples, and that is what the committee is asking.

There is a difference in opinion as to whether we should use Latin terms or English equivalents. I am not sure whether the committee is entirely satisfied in their own minds, but we thought it would be advisable to have a set of English equivalents made. However, we didn't think that would be advisable until the Latin terms were adopted. There will undoubtedly be some changes to conform with what will be an official nomenclature.

(It was voted, on motion of Dr. Murphey, seconded by Dr. W. Herbert Lowe, that the report of the Committee on Anatomical Nomenclature be adopted.)

THE PRESIDENT: The next committee is the Committee on Bovine Tuberculosis. (This committee was not ready.)

Then we will hear the report of the Committee on Abortion, Dr. Fitch.

REPORT OF COMMITTEE ON ABORTION

(Dr. Fitch read the printed report of the Committee on Abortion, as follows:)

A disease of cattle, variously known as contagious, infectious and epizootic abortion, and slinking and dropping of calves, is widely prevalent throughout the United States and Europe, and has been observed and studied in South America, Asia, Africa and Australia. In the United States the losses due to it have reached alarming proportions and threaten to increase in the future.

Your committee, therefore, submits the following summary of the present knowledge concerning this disease:

1. Though various causes for the occurrences of abortion in cattle exist, only one kind of infectious abortion disease of cattle has been proved to be both widespread and common. For this disease the name "bovine infectious abortion" is recommended.

2. Bovine infectious abortion is characterized as a rule by an interference with the development of the fetus, frequently resulting in its premature expulsion, either dead or alive, viable or unviable. There is also a frequent manifest inflammation of the fetal membranes and of the maternal cotyledons, together with frequent retention of the afterbirth. A cow may be the carrier and disseminator of the germs of the disease without showing symptoms of her dangerous condition.

3. In this disease complications are frequent and include more or less severe inflammation of either or both the superficial and deeper structures of various parts of the reproductive organs, and temporary and permanent sterility and interference with milk and flesh production are common phenomena.

4. The essential cause of bovine infectious abortion is *Bacterium abortus* (Bang).

5. The microorganisms most commonly found in connection with the sequelæ of bovine infectious abortion are the common pyogenic bacteria.

6. It has been proved that the *Bacterium abortus* (Bang) can enter the body via the digestive tube. That it may also enter through other channels (genital tract), etc., is not disputed but has not been definitely proved.

7. *Bacterium abortus* (Bang) possesses peculiar biological requirements which are found in the pregnant uterus and in the udder. The microbe localizes in these places and has been found in the lymph nodes of the lymphatic system draining the udder. In the udder it often persists indefinitely, while in the post-parturient uterus it has been isolated after 58 days, but usually can not be found after three weeks. It is usually found in the stomach and intestines and less commonly in other organs of the aborted fetus.

8. In the bull *Bacterium abortus* (Bang) has been found in the reproductive organs, seminal fluid as well as in urethral discharges.

9. *Bacterium abortus* (Bangs) produces in the pregnant cow an inflammation of the chorion and the fetal and maternal cotyledons, in the udder no gross, visible alterations, in the bull abscessation and other changes of the genital organs, and in the fetus no well-defined pathological alterations.

10. *Bacterium abortus* (Bang) leaves the affected animal with the dead fetus and fetal membranes and through the uterine discharges via the vagina and with the milk from the infected udder and with the discharges from the genital organs of the bull. The bacillus probably also occurs in the alvine discharges of viable fetuses from affected cattle.

11. *Bacterium abortus* (Bang) has been found to persist alive in the material in which it is discharged outside the bovine animal for many weeks.

12. The diagnosis of bovine infectious abortion is possible through a study of the history and condition of the herd, by means of the serum tests (agglutination and complement fixation) and bacteriological studies of infected material.

13. The attempt to control bovine infectious abortion should conform to the principles of sexual hygiene and general sanitation, making the efforts specific in so far as our knowledge of the etiology of the disease permits. Unimpeachable experimental work has not yet shown that biologicals are of positive value in the control or treatment of this disease.

14. To reduce the economic losses incident to and attendant upon bovine infectious abortion requires rational treatment such as the qualified veterinarian is competent to give.

In addition to the presentation of this statement of facts concerning bovine infectious abortion, your committee recommends that adequate funds be provided for further investigations of bovine infectious abortion and strongly urges *better coöperation* among the various research workers.

In order to make this recommendation effective we respectfully ask for the adoption of the following resolution:

Whereas, Bovine infectious abortion is an exceedingly and increasingly destructive animal plague and is responsible for serious economic loss,

And whereas, Additional knowledge for the control of this complex scourge is necessary and should be obtained at the earliest possible time,

Therefore be it Resolved, That the American Veterinary Medical Association strongly urges that larger appropriations for the investigation of bovine infectious abortion be made by Federal and State Governments and through such agencies as the National Research Council to make possible cooperative work by the institutions engaged in investigating this disease."

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

(It was voted, on motion of Dr. Fitch, seconded by Dr. W. Herbert Lowe, that the report of the Committee on Abortion be adopted. Dr. W. H. Hoskins then moved that the report of the Committee on Abortion be received and published. This motion was seconded and carried.)

DR. MCAUSLIN: Mr. President, in view of the very excellent shape of the report, I move a vote of thanks to the committee, and especially to Dr. Fitch.

DR. W. HERBERT LOWE: I take great pleasure in seconding that motion. (The motion was carried.)

THE PRESIDENT: I want to say, personally, that this, to my mind, is one of the best reports we have had on the subject, and in the best and most condensed form for us to understand.

We will now listen to the report of the Auditing Committee, Dr. Day.

REPORT OF AUDITING COMMITTEE

DR. L. E. DAY: Mr. Chairman, I wish to report that your committee has looked over the books of the Secretary and also those of the Treasurer, and we find that the reports are correct as printed and distributed.

THE PRESIDENT: What shall we do with the report?

(It was voted, on motion of Dr. W. Herbert Lowe, duly seconded, that the report of the Auditing Committee be adopted.)

REPORT OF INTERNATIONAL COMMITTEE ON BOVINE TUBERCULOSIS

THE PRESIDENT: We will go back, if there are no objections, to the report of the International Committee on Bovine Tuberculosis. Dr. Reynolds.

DR. REYNOLDS: Gentlemen of the Association, when I get through reading this very short report I am going to move its adoption and the acceptance of its recommendations, and that will mean, if you adopt that motion, that you will be committed to certain definite things. The present committee has undertaken to try to start something definite in the hope of accomplishing something definite, at least in the future.

(Dr. Reynolds read the report of the committee, as follows:)

The urgent problems with reference to tuberculosis seem now to lie in the direction of control work. In order to accomplish something definite, we have endeavored to start a line of constructive work on a series of problems which can be studied, and upon which definite recommendations can be made. We have always needed still more accurate methods of diagnosis. With the thermal alone we leave tuberculous cattle in the herd at times, and at times we condemn presumably nontuberculous cattle. The status of the intradermal and ophthalmic tests for official work is yet to be determined. Veterinary sanitarians need authoritative information. The public needs uniformity of method among States and the Federal Government. A large number of States and the Bureau of Animal Industry have officially and fully accepted the intradermal. Others refuse any except the thermal.

Recommendation No. 1.—We therefore recommend that the several tuberculin tests be made a special subject for continued study by the Committee on Bovine Tuberculosis. It has seemed apparently necessary first of all to establish a standard of reaction for the intradermal test before any official statement from the committee can be made concerning the relative accuracy or practical desirability, or concerning the question of its official recognition for Federal and State work.

For the first definite problem, therefore, we suggest the question as to what constitutes an intradermal reaction, and we recommend that the statement yet to be made be based upon a questionnaire sent to the entire membership of this Association, as well as upon a study of definite information that may be available in print. In this report a statement should be made as to what constitutes a reaction.

Questionnaire Concerning Intradermal Reaction

"1. In your experience, what constitutes an intradermal reaction to tuberculin?"

"2. What is the average period of time after injection when the reaction begins to assert itself?"

"3. What is the average number of hours after injection when the reaction reaches its most marked point?"

"4. What is the average duration of reaction?"

"5. Describe phenomena which in your observation constitute a reaction.

"Upon approximately how much work with this test are your answers based?"

In view of the urgency of such definite information, we recommend that the conclusion of the committee upon this point be submitted to the Executive Board at its mid-winter session, and if approved that the Executive Board be authorized to accept it and provide for immediate publication and distribution.

In the studies relative to the various modes of applying tuberculin, your committee suggests that special attention should be given to the toleration for tuberculin that seems to develop in the body generally and in the skin from previous injection of tuberculin, and, on the contrary, the seemingly increased sensitiveness to tuberculin which previous exposure of the animal to the agent in any way develops in the mucous membrane of the eye.

Recommendation No. 2.—We would call the attention of this Association to the importance and the need of collecting all possible data that may throw light on the recurrence of tuberculosis in clean herds, and recommend that this be made a work for future consideration by the Committee on Tuberculosis. This would, of course, include faults of tuberculin tests and errors on the part of operators as well as unrecognized methods of distribution of the virus.

Recommendation No. 3.—We would recommend that this Association memorialize the Bureau of Animal Industry and the American Meat Packers' Institute, calling attention to the importance of careful autopsy work for officially condemned cattle, and request provision for more time and careful autopsy of such cattle before reporting "no lesions." As compared with the total number of cattle passing over the killing floor, the number of no-lesion cases is comparatively small, and such request does not appear to your committee unreasonable, in view of its importance.

We recognize that with the knowledge now available the financial aspects of tuberculosis control are the most fundamental of all its problems, and would call attention to the very plain fact that before an amount of control work can be done that will actually reduce tuberculosis over the United States and Canada to an appreciable extent, we must have available a vastly increased fund, or we must develop less expensive methods, or we must do both. This involves several serious questions which your committee did not think wise to discuss at this time, *e. g.*, reduction of reimbursement expense, and possibly more economical disposal of reactors than by immediate slaughter.

Recommendation No. 4.—The committee begs to remind this Association of the suggestions made by the committee last year for the consideration of some system of tax on meats handled under Federal inspection, the revenue derived from this source to be expended in the suppression of food-destroying diseases of domestic animals.

Recommendation No. 5.—Your committee feels that it is necessary to call attention again to the necessity of careful tuberculin test work at the hands of experienced veterinarians, trained for this work. We therefore suggest that this Association urge upon the appropriate Congressional committees the appropriation of sufficient funds for the payment of reasonable salaries to such men, and we recommend that proper distribution be made as between reimbursement and overhead expense in the way of salaries, in order that the most competent help obtainable may be employed.

Recommendation No. 6.—Since the report of the International Commission on the Control of Bovine Tuberculosis was issued some years ago there have been many important developments which we feel should be put freely before the public by this Association. We therefore recommend that immediate provision be made for the publication and distribution of a revised edition of this report, which should give the essential facts concerning bovine tuberculosis in simple language.

Recommendation No. 7.—We recommend the preparation of a short popular article to be published by this Association defining the causes and conditions on which the persistence and spread of tuberculosis depends, together with the definition of such measures as seem desirable to overcome such spread of tubercle virus. Your committee has ways in mind by which a very large number of copies of this article could be distributed to the members of this Association, and throughout the United States, at no cost to the Association.

M. H. REYNOLDS, *Chairman*.
C. E. COTTON,
J. J. FERGUSON,
E. C. SCHROEDER.

(Applause.)

DR. REYNOLDS: I move the adoption of the report and the acceptance of its recommendations.

DR. W. HERBERT LOWE: We have before us a very comprehensive report. I feel that the committee has given this subject careful consideration, and therefore I take pleasure in seconding the motion as made by the chairman.

DR. KINSLEY: There were three or four different recommendations. It would appear to me that it would be better to take up each of those recommendations separately. Therefore I move an amendment to the motion to take up each recommendation separately.

DR. DE VINE: I think Dr. Kinsley's idea is splendid, but I think if we do that, we may resign ourselves to giving up this morning to that particular work.

THE PRESIDENT: I hardly think we have time to enter into that and carry it out, together with the program.

(It was voted, on motion of Dr. Reynolds, seconded by Dr. W. Herbert Lowe, that the report of the Committee on Bovine Tuberculosis be adopted.)

DR. HILTON: If I have permission, I would like to suggest, in regard to the Committee on Tuberculosis, that that report is a very important matter. It might be possible to have a discussion of that this evening at 5 o'clock.

THE PRESIDENT: If that is taken up by a special order, we can.

PRESENTATION OF PAPERS

THE PRESIDENT: We will omit further reports of committees and go on to the regular program. The first paper is "Veterinary Educa-

tion and Its Readjustments," by Dr. C. D. McGilvray, Toronto, Canada.

(Dr. McGilvray read his paper, which will be published in a later issue of the JOURNAL.)

SECRETARY MAYO: Mr. President, I move the discussion of this paper be postponed until the report of the Committee on Intelligence and Education is heard, and the whole subject be taken up at that time.

(The motion was seconded and carried.)

THE PRESIDENT: The next paper on the program is "The Relation of the Agricultural Press to the Veterinarian," by E. S. Bayard, Editor of the *National Stockman and Farmer*, Pittsburgh. (Applause.)

(Mr. Bayard's paper is published elsewhere in this issue.)

DR. KINSLEY: I am certain we have all appreciated Mr. Bayard's address, and I move that we extend a rising vote of thanks to him.

(The motion was seconded and carried, and the audience rose and applauded Mr. Bayard.)

THE PRESIDENT: The next paper on the program is "Sound Livestock Sanitary Laws; Their Value to the Farmer and Breeder," by Mr. H. H. Halliday, Commissioner of Animal Industry, Lansing, Michigan.

DR. DUNPHY: I have Mr. Halliday's paper. He, unfortunately, could not be here. It is a short paper, and I will read it, or have it read by title.

THE PRESIDENT: I suggest, owing to the shortage of time, that we have it read by title.

(Mr. Halliday's paper will be published in a later issue of the JOURNAL.)

THE PRESIDENT: The next paper is "The International Exchange of Livestock," by Mr. G. F. Finley, Sydney University, Australia.

(Mr. Finley read his paper, which will be published in a later issue of the JOURNAL.)

THE PRESIDENT: We will not open this paper for discussion on account of lack of time. If there is nothing special to come up on it, we will call for the report of the Committee on Intelligence and Education. This is an important report, and we would like to have everybody remain to hear it.

REPORT OF COMMITTEE ON INTELLIGENCE AND EDUCATION

(Dr. Cassius Way presented the following report:)

During the year one vacancy and two resignations from the committee necessitated the appointment of three new members. Due to these changes, the organization of the committee was delayed and the work of inspection of colleges was necessarily postponed until the latter part of the school year 1919-20, and it was necessary to delay a few inspections until after the sessions had closed.

During the past year the following veterinary colleges have discontinued:
Chicago Veterinary College, Chicago, Ill.
McKillip Veterinary College, Chicago, Ill.
Cincinnati Veterinary College, Cincinnati, Ohio.

Only the first of these three institutions was recognized by this Association last year.

During the past two years all veterinary colleges at present giving instruction in the United States and Canada have been visited by members of the committee. During the session of 1918-19 the following veterinary colleges were visited, and material for this report is taken from data obtained during these inspections, together with additional information received from the deans of these institutions during the present year:

Colorado State College, Division of Veterinary Medicine.

Kansas State Agricultural College, Division of Veterinary Medicine.

Michigan Agricultural College, Division of Veterinary Science.

Ontario Veterinary College, Toronto University.

University of Pennsylvania, School of Veterinary Medicine.

During the present year 1919-20, the following institutions have been visited by members of this committee:

Alabama Polytechnic Institute, College of Veterinary Medicine.

Georgia State College of Agriculture (Veterinary Degree Course).

Indiana Veterinary College.

Iowa State College, Division of Veterinary Medicine.

L'Ecole de Médecine Vétérinaire, Université de Montreal.

New York State Veterinary College, Cornell University.

New York State Veterinary College, New York University.

Ohio State University, College of Veterinary Medicine.

State College of Washington, College of Veterinary Science.

St. Joseph Veterinary College.

Texas Agricultural and Mechanical College, School of Veterinary Medicine.

Detailed information submitted to the committee relative to entrance requirements, curricula, faculties, methods of teaching, equipment, etc., has been carefully considered. With one exception, all of these institutions are complying with the regulations of this Association in reference to entrance requirements and length of curriculum. With practically no exception there are varying degrees of improvement that might be suggested.

Two colleges, L'Ecole de Médecine Vétérinaire (Université de Montreal) and Georgia State College of Agriculture (Veterinary Degree Course), requested initial inspections preparatory to seeking recognition by this Association as approved institutions. One college, the St. Joseph Veterinary College, requested inspection with a view to making application for reinstatement to the approved list of the Association.

1. L'Ecole de Médecine Vétérinaire, Université de Montreal. This institution, affiliated with the University of Montreal, is a French school, all instruction being in the French language. The school was founded as a private institution in 1886, and has graduated 268 veterinarians. Beginning with the session 1920-21 it will be under the direct control of the University of Montreal. The school is adequately housed in buildings provided by the University, and secures both Provincial and Government support, the actual amount depending upon the number of students in attendance. Since 1917 a four-year curriculum has been maintained, each year's school work being divided into two semesters of sixteen weeks each. The preliminary educational requirements are a high-school education or its equivalent. According to French custom, students often receive their preliminary education in private sectarian institutions, and those desiring to take up a higher education are required to take special examinations for entrance under the direction of a special board of governors. This examination is rigid, and, if satisfactorily passed, an entrance certificate is issued which corresponds to a high-school certificate. High scholarship standards are apparently maintained, the system of conducting examinations being conducive to thorough work on the part of the students.

Twenty-four students were in attendance during the past year. This comparatively small number is due to the effect of war conditions. No

senior class was graduated this year on account of the fact that the school adopted a four-year curriculum beginning with the session 1917-18.

The veterinary school occupies the entire first floor of a modern three-story building, the two upper floors being occupied by the Dental School of the University. Here are located the general offices, class rooms, laboratories, library, etc. A new two-story building provides hospital facilities for large and small animals, also a clinical amphitheater and anatomy laboratory. The general teaching facilities and methods employed seem good and the various instructors competent. One was impressed by the general cleanliness of the buildings. Clinical records, including medical and surgical clinics, operative surgery, etc., were on file and available for examination. The general appearance and impression created by the institution, attitude of faculty, etc., is such as to lead the committee to believe that the school is being conducted efficiently.

After conference with graduates of the institution and representatives of the Veterinary Service of the Dominion of Canada regarding certain specific points, this committee recommends that the work in meat and milk inspection be improved, and the time allotted for teaching these subjects be increased. This suggestion is prompted by the fact that in examinations conducted by the Civil Service Department of the Dominion a majority of the graduates of the institution seemed to be deficient in these subjects. The committee further recommends that the number of cases in medical and surgical clinics be increased, and also the increasing of the number of bovine cases in these clinics.

2. The Georgia State College of Agriculture (Veterinary Degree Course) was visited by a member of the committee. The number of students in attendance at this institution is small. The institution, however, in the opinion of the member of the committee making the inspection, is apparently doing fairly satisfactory work. In view of the fact that the first graduating class to receive a degree in veterinary medicine will not complete the course of instruction leading to this degree until 1921, the committee deems it advisable to withhold recognition of this college until the present senior class has been graduated and the institution actually has graduates eligible to A. V. M. A. membership. The committee advises and recommends additional and more modern accommodations for hospital purposes, and additional facilities for teaching anatomy separate from the hospital building; also that better equipment for the teaching of gross pathology be provided, including adequate postmortem facilities. Thorough discussion of these recommendations and future plans for the institution have been held with the dean. The secretary of this committee will communicate with the authorities of the institution, setting forth these recommendations.

3. The St. Joseph Veterinary College was dropped from the approved list at the Fifty-sixth Annual Meeting of the Association for failure to meet A. V. M. A. matriculation requirements effective at the beginning of the session of 1919-20. Upon investigation this committee found that of a total of 50 freshmen classified for the session 1919-20, only 5 could have matriculated on the basis of the A. V. M. A. regulations, the other 45 failing to meet the required entrance qualifications. This class, matriculating contrary to the A. V. M. A. regulations, constitutes practically one-third of the student body of this institution. Of the three upper classes, 23 students entered from other veterinary schools with apparently very lax examination of advanced credits. In view of these serious conditions, and in justice to institutions accredited by this Association which have met the entrance requirements, your committee does not feel justified in recommending the approval of this institution.

During the investigations of the various other colleges, made by the committee, many discrepancies in equipment, teaching facilities and methods were discovered in several institutions. In the majority of cases these discrepancies can be remedied within a reasonable time, provided the authorities and trustees of the institution have the funds available and see fit to

comply with the recommendations made by the committee. In some instances, regulations in reference to requirements as to the teaching staff as laid down by the A. V. M. A. and the Bureau of Animal Industry are not being fulfilled. In the main, the criticisms made by the committee involve—

(a) The teaching of certain basic subjects, such as animal husbandry, chemistry, etc.

(b) The lack of proper facilities for the teaching of anatomy and other fundamental major subjects.

(c) The lack of proper laboratory facilities for teaching gross pathology and the examination of clinical material for use in diagnosis work.

(d) Lack of systematic administration of clinics and keeping of uniform records which are valuable in teaching work, and as reference data for students.

(e) Lack of general facilities and equipment owned and controlled by the institution for the teaching of many of the major subjects of a properly organized veterinary curriculum.

These criticisms and suggestions as pertaining to each individual institution have been discussed with the dean, and in every case we are advised that satisfactory adjustment of undesirable features will be effected at the earliest possible time. The details of these criticisms and suggestions are on file with the committee and are available to any member of the Association desiring to review them.

Your committee fully realizes that certain of these institutions should not be unconditionally approved by this Association. However, due to delay in organization of the committee, inspection in some instances was not conducted during the college year; and in view of recommendations presented later in this report the committee deems it advisable to recommend for approval the list of colleges as hereafter specified.

The value of an educational institution is clearly determined in the quality of its faculty and the character of its teachings. These qualifications are in turn reflected by the ability and quality of its graduates. In the final analysis, no educational institution in this country is responsible in any way to any committee or any part of this Association. Unfortunately, too many institutions in the past have looked upon recognition by this Association and the Bureau of Animal Industry as the great goal of final attainment, and in meeting the limited requirements and superficial suggestions of these bodies, as outlined in the past, have felt that their obligations to their students, to the profession and to society have been fulfilled.

In investigating the veterinary schools recognized by this Association, your committee has been impressed by the great variety of educational methods and standards, as well as the very apparent differences in the quality of education being offered by the various institutions.

While preliminary educational requirements have been standardized and are now uniform in all recognized veterinary schools, and a minimum length of curriculum has been established which has placed veterinary education on a par with other lines of professional education as far as time requirements are concerned, there exist at present most remarkable differences in the general educational qualifications and methods of the various institutions. These differences include personnel and organization of school faculties, sequence and apportionment of time to the various subjects in the curriculum, administration and supervision of the educational work of the school, general teaching equipment and facilities, character of research work being done, and, probably most important of all, the product of the school, *i. e.*, the quality of its graduates as denoted by records made before State and National examining boards.

The present educational standards required of veterinary institutions by this Association, aside from matriculation requirements and length of curriculum, are the standards set by the Bureau of Animal Industry governing the entrance to the examination for veterinary inspector under civil

service regulations. It is the opinion of this committee that these standards do not adequately specify the standards of a modern school of veterinary medicine.

Since the A. V. M. A. is the recognized representative organization of the veterinary profession in this country, this Association should establish, as has been done by the American Medical Association in the case of medical schools, definite standards whereby the "essentials of an acceptable veterinary school" will be specified, and in addition formulate a definite schedule whereby the various veterinary schools may be graded and classified. An attempt by this Association to standardize and improve veterinary education as suggested will necessitate primarily a detailed study of the general veterinary educational situation, a careful survey of all institutions, a consideration of the present demands upon the profession for service, and the general responsibilities of the profession to the public as related to the training of the individuals entering the profession. The results will be a better organization of school faculties, more efficient teachers, improved teaching methods, better apportionment of time to various subjects in the curriculum, the teaching of certain subjects in a more logical sequence, improved teaching and clinical facilities, and ultimately better trained veterinarians. Again, any school falling below what may be termed "Class A" could be readily furnished with exact data as to why so classified, which information could be used by the dean of the particular institution as an aid in securing facilities that would place this school in "Class A." In fact, assistance along this line has been furnished this year by your committee upon solicitation by the deans of certain institutions.

After careful discussion in the committee and with many of the deans of the various veterinary colleges of the country, your committee respectfully requests a careful consideration at this time of this most important subject. Better veterinarians, better veterinary service, and better recognition of the profession by livestock owners and society is greatly desired. We must eventually face this problem just as the American Medical Association faced its problems some fifteen years ago. It is thoroughly believed by this committee that after the inauguration of a definite and specific program such criticisms as have emanated from various sources during the past year against our profession and our educational standards will, of necessity, not appear in the future.

From the records and data obtained by the committee, there are 14 schools recommended for approval and one institution apparently in line for approval next year. There are approximately 1,000 students in attendance at these institutions, all of which are located in North America. It is conservatively estimated that a greater number of graduates than are apparently forthcoming from these institutions are needed each year to replace practitioners who may retire from active work for various causes, and to supply the needs for veterinarians in the Bureau of Animal Industry, the United States Army and State and municipal service.

Clearly the supply of young veterinarians for the immediate future is inadequate. With the demand of livestock owners for better veterinary service comes the need for better veterinarians to be graduated from our institutions in the future. This demand necessitates veterinarians with not only a better preliminary training, but also a better scientific and technical education. In some States county veterinary advisers are being employed for consultation service by the large livestock owners and farmers, to work in conjunction with the Farm Bureau advisers. If these counsellors adhere strictly to the scope of work for which they are retained, without infringing on the rights and the field of the private practitioner, this may be a good omen and the field for work of this character is in evidence. In order that future veterinarians who may assume responsibilities of this nature may be thoroughly equipped and in every way on a par with agricultural college graduates, your committee recommends that careful consideration of higher educational standards be considered by this Association.

In view of the fact that it is clearly advisable at this time to bring before prospective students the advantages of the profession and the opportunity for service to the livestock industry, it is recommended that a high-class, ethical publicity campaign be inaugurated in order that young men who may be interested and influenced to take up the study of veterinary medicine may be reached. During the past year or two many large universities have found it necessary to appeal to their alumni for support, and campaigns for funds have been launched by some of our great institutions of learning. In some cases very high-class and ethical advertisements have presented the needs of these institutions through the columns of the daily press, magazines and journals of various kinds. In order to present this subject to prospective veterinary students your committee recommends that it be empowered to work out an educational publicity campaign, submit the same to the Executive Board, and inaugurate the same if deemed advisable by joint conference of these bodies. It is proposed to set before young men who may enter the profession, as well as the livestock owners of the country, the great service that is being rendered by the profession, the great possibilities for still better and more efficient service, and the high ideals and standards of the profession as pertain both to entrance requirements and to scientific and technical education.

Livestock owners, agricultural associations, farm bureau organizations and the general public should be thoroughly advised of the scope of the veterinary profession. With three-fifths of the agricultural products of the country being of livestock origin, the public is little aware of the great field of the profession. By the laity who know, the profession is no longer considered as pertaining mainly to "doctoring horses," but the great fields of food control, research in animal diseases, sanitation and public health work are recognized. This knowledge should be more universal.

It is thoroughly believed and suggested by the committee for consideration by this Association that some such method of publicity must prevail, in order to bring before young men with the proper training the advantages of service in the profession, so that the livestock industry may be safeguarded against a possible shortage of scientific men in this profession that will eventually lead to increased losses from disease among our domesticated animals, which losses are already too great.

Summary

1. This committee recommends the approval of the following veterinary colleges for the ensuing year:

Alabama Polytechnic Institute, College of Veterinary Medicine.

Colorado State College, Division of Veterinary Medicine.

Indiana Veterinary College.

Iowa State College, Division of Veterinary Medicine.

Kansas State Agricultural College, Division of Veterinary Medicine.

L'Ecole de Médecine Vétérinaire, Université de Montreal.

Michigan Agricultural College, Division of Veterinary Science.

New York State Veterinary College at Cornell University.

New York State Veterinary College at New York University.

Ohio State University, College of Veterinary Medicine.

Ontario Veterinary College, Toronto University.

State College of Washington, College of Veterinary Science.

Texas Agricultural and Mechanical College, School of Veterinary Medicine.

University of Pennsylvania, School of Veterinary Medicine.

2. This committee recommends that it be empowered to formulate a plan of educational publicity, and that the same be submitted to the Executive Board; that the combined bodies be empowered to inaugurate the educational publicity campaign previously outlined in this report, and that sufficient funds be provided to conduct properly such a campaign.

3. This committee recommends that it be empowered to draft and outline suitable requirements for an acceptable veterinary college and for the

proper grading of veterinary colleges into classes A, B and C; that this outline be submitted to the Executive Board, and that the two bodies be empowered to inaugurate the use of the same for the inspection of veterinary colleges during the coming year 1920-21.

4. In order that sufficient funds may be available for the work of the Committee on Intelligence and Education to carry out the inspection of veterinary colleges, it is respectfully requested that the Budget Committee, if it deems advisable, increase the appropriation for the work of this committee from \$500 to \$1,000 for the ensuing year.

Respectfully submitted,

CASSIUS WAY, *Chairman.*

(Term expires 1922.)

L. ENOS DAY,

(Term expires 1921.)

B. T. SIMMS,

(Term expires 1924.)

H. D. BERGMAN, *Secretary.*

(Term expires 1923.)

THE PRESIDENT: Gentlemen, you have heard the report of the committee and its recommendations.

DR. R. C. MOORE: Mr. President, I would like to recommend the adoption of the report with the exception of that part in reference to St. Joseph, which I would like to explain to this Association, which I have no time to do now. Therefore, I would like to have that portion postponed until such time when I can put before the Association the evidence which I have in my hands. (Seconded.)

DR. STANGE: I offer an amendment to the motion, to adopt the report of the committee as read. I believe that if the St. Joseph Veterinary College has anything to offer, they can offer it tomorrow, and by a motion their school can be included in the list, if necessary. (Seconded by Dr. Fitch.)

DR. R. C. MOORE: That will be satisfactory to me, and I will accept it without voting on the amendment, providing I can have the assurance that I will be given that privilege tomorrow.

THE PRESIDENT: It is understood that Dr. Moore will have the privilege tomorrow of presenting his statement.

(The motion to adopt the report of the Committee on Intelligence and Education was carried.)

DR. R. C. MOORE: Could I have any specified time when I can bring this matter up?

THE PRESIDENT: Bring that up tomorrow morning at the time of the committee reports.

(The Committee on Intelligence and Education also submitted, with its approval, the following:)

We, the undersigned, hereby propose for honorary membership in this Association Hon. E. T. Meredith, Hon. Alvin H. Sanders and Editor A. J. Glover.

As Secretary of Agriculture, Mr. Meredith has done much for the profession. The Bureau of Animal Industry veterinarians are truly grateful for his loyal support. As an executive he has been fair and just in all questions pertaining to the good of the service. As a livestock owner and breeder he has materially contributed to the advancement of the industry, and as an editor he has championed the cause of better agriculture.

Mr. Sanders, as editor of that great livestock publication, *The Breeders' Gazette*, has through his great influence enhanced the value of purebred livestock, and has by his writing helped to make possible the development of that great field in which the veterinarians of this country have such fine opportunity for service.

Mr. Glover, as editor of a most influential publication, devoted almost exclusively to dairying, *Hoard's Dairyman*, has been a potent factor for better things in that great field of agriculture. He has supported the veterinarian in his honest endeavor to eradicate disease. He is active in the work of the United States Livestock Sanitary Association. He has done much for the veterinary profession in its fight to stamp out tuberculosis and is a staunch advocate of higher and better things for our profession.

It would seem that it is an unusual privilege for us as a profession to recognize at this time the work of these three great servants of agriculture.

J. R. MOHLER,
V. A. MOORE,
CASSIUS WAY.

(On motion, duly seconded, Messrs. Meredith, Sanders and Glover were elected to honorary membership in the Association.)

Adjournment.

(Proceedings to be continued.)

Two petitions requesting new sections for the A. V. M. A. were presented to the Executive Board at the Columbus convention by those interested in small animal practice and in laboratory research work, respectively. The Executive Board decided wisely to create no additional sections for the present, but proposed to change the name of the Section on College Faculties and Examining Boards to the Section on Education and Research which will meet present requirements and permit those engaged in laboratory investigations to come together for the discussion of matters of common interest.

On learning of the Executive Board's decision, the Section on General Practice proceeded to elect for secretary a man who has always been deeply interested in small animal practice and it is planned to encourage those engaged in this line to present sufficient papers for at least one full session at the next convention.

Before adjournment the three sections of the A. V. M. A. elected the following officers for the ensuing year:

Section on General Practice: T. H. Ferguson, Lake Geneva, Wis., Chairman; W. E. Muldoon, Manhattan, Kans., Secretary.

Section on Sanitary Science and Police: H. D. Jakeman, Indianapolis, Ind., Chairman; B. T. Simms, Corvallis, Oreg.

Section on Education and Research, formerly Section on College Faculties and Examining Boards: F. W. Chamberlain, East Lansing, Mich., Chairman; L. W. Goss, Columbus, Ohio, Secretary.

OTHER MEETINGS

JOINT VETERINARY PICNIC

THE Tippecanoe and Wabash Valley Veterinary Associations held a joint picnic at Lake Cicott near Logansport, Indiana, July 29. Dinner, with chicken galore, was served by the Ladies' Aid in the basement of the little white church just across from the lake front. It was just like the days of real sport, with Skinny and Tubby and everything. Then to the lake proper. It is not the largest lake in America, but it was large enough to hold one of the biggest veterinarians.

Just at 2:16 p. m., Dr. Musselman, of Denver, Ind., mounted the "shoot the chute." When he let loose and slid 40 feet at the rate of 90 miles per into the water, the banks moaned; after several anxious seconds the Doctor rose to the surface and paddled to the shore. When the troubled waters became quiet, the majority of the party spent an enjoyable hour in bathing.

Next was the ball game between the two Associations. Babe Ruth would have looked on with envy at some of the batters. The game was well under way when a gong was sounded announcing that the automobile belonging to the pitcher of the losing side had been stolen. Talk about the speed of a fire truck, multiply it by two, and you will have a faint idea of that crowd sailing for their cars to chase the thief. Some fell by the wayside; others reached their cars only to be informed that a mistake had been made by the wife of the Doctor in attempting to identify their car. It was soon realized that it was all a hoax and that the Doctor had pre-arranged that scheme to be used in case he saw his team going down to defeat owing to his poor pitching. The final score stood 6 to 5 in favor of the Wabash Valley Association. J. L. KIXMILLER.

SOUTH DAKOTA VETERINARY MEDICAL ASSOCIATION

The summer meeting of the South Dakota Veterinary Medical Association was held at Lake Madison, South Dakota, on August 3 and 4. Fifty-two veterinarians were present and heard lectures on veterinary science by well-known authorities.

The session of the first day was opened by an address by the president. Dr. J. T. E. Dinwoodie of Aberdeen, South Dakota, gave the response to the president's address and explained the legislative

program for the coming year, pertaining to veterinarians. This was followed by a postmortem demonstration on a hog by Dr. G. S. Weaver and the case was diagnosed as hog cholera. Dr. H. A. Hartwich showed some interesting specimens of anthrax in cattle. A banquet was given in the evening of the first day and was a very pleasant affair. Dr. Weaver acted as the toastmaster and Dr. Boyd gave the main talk of the evening. After the banquet the evening session was called and Dr. W. L. Boyd of the University of Minnesota gave an interesting lecture on "Sterility and Infectious Abortion in Cattle." This was illustrated by lantern slides. The following forenoon Dr. Boyd gave the second lecture on "Abortion Disease of Cattle" and very vividly brought out the main points by showing specimens of pregnant and non-pregnant uteri. In the afternoon the business meeting was held and the session closed by everybody expressing his satisfaction of having a good time. The winter meeting will be held at Mitchell, South Dakota, during the live-stock show, in January.

The following officers were elected: Dr. G. S. Weaver, Brookings, president; Dr. James F. McFarlane, Plankinton, vice-president; Dr. Wm. F. Joseph, Iroquois, secretary-treasurer.

WM. F. JOSEPH, *Secretary*.

CONNECTICUT VETERINARY MEDICAL ASSOCIATION

THE summer meeting of the Connecticut Veterinary Medical Association was held at Savin Rock, New Haven, August 10. The following members and visitors were present:

Members—Drs. George E. Corwin, J. L. Devereaux, B. D. Radcliff, G. W. Loveland, W. J. Southey, R. S. Todd, F. W. Page, W. H. Pullen, Wallace F. Vail, George T. Crowley, E. L. Thornton, Earle F. Schofield, Harry E. Bates, G. Leroy Cheney, James J. Flaherty, J. E. Underhill, H. C. Balzer, Edwin Laitinen, J. R. Morin, Charles L. Colton, Thomas Bland, Harrison Whitney, J. S. Schofield, P. T. Keeley, V. M. Knapp, I. R. Vail.

Visitors—Dr. R. L. Smith, Hartford; Dr. M. C. Thompson, Sharon; Dr. Conway, New Haven; Dr. S. A. Selby, New York; Dr. E. I. Smith, Hartford; Dr. F. E. Blake, Springfield; Dr. Benjamin D. Pierce, Springfield, Mass.; Dr. W. Horace Hoskins, New York; Mr. J. M. Hunter, New Milford; Dr. H. J. Milks, Ithaca, N. Y.

The entire time of the meeting was taken up by the reading of the following papers:

Dr. W. Horace Hoskins, Dean, Veterinary Department, New York University, "Some of the Present Day Problems of Veterinary Medicine."

Dr. E. I. Smith, Inspector in Charge, Bureau of Animal Industry, "Relation of the Local Veterinarian to Accredited Herd Test."

Dr. Charles L. Colton, Deputy Commissioner on Domestic Animals, "Timely Topics of Interest to Every Member of the C. V. M. A."

The addresses were of a very high character, instructive and timely, thoroughly enjoyed by all the members and visitors present.

Mrs. W. Horace Hoskins, President of the Ladies' Auxiliary of the A. V. M. A., addressed the ladies on "The Object of the Auxiliary." The following members and visiting ladies were present:

Mrs. Charles L. Colton, Mrs. George E. Corwin, Mrs. V. M. Knapp, Mrs. F. E. Blake, Mrs. George T. Crowley, Mrs. Harrison Whitney, Mrs. Conway, Mrs. R. L. Smith, Mrs. Wallace F. Vail, Mrs. I. R. Vail, Mrs. F. W. Page, Mrs. G. Leroy Cheney, Miss Colton.

GEO. E. CORWIN, *Secretary*.

CONESTOGA VETERINARY CLUB

The Conestoga Veterinary Club held its regular monthly meeting at the Hotel Brunswick, Lancaster, Pa., October 14, 1920. The speaker of the evening was Col. C. J. Marshall of the Veterinary School, University of Pennsylvania; subject, "Pyosepticemia of Colts and Its Relation to Abortion in Mares." He spoke of the work done on this subject by Smith and Kilborne for the Federal Bureau of Animal Industry, Good in Kentucky, Schofield in Canada, Meyer, Hardenbergh and Boerner for the Pennsylvania Bureau of Animal Industry, and the work of several well-known European investigators, including McFadyean and Edwards, Magnusson, Panisset and several others. After reviewing the conditions in a few outbreaks of this disease with which he had been personally interested he gave an extract of the subject by Panisset which was published in the *Revue Générale de Médecine Vétérinaire* of March 15, 1920. This article coincides so fully with the experience and observation made in this country by Dr. Marshall and members of this club that it was felt that the article should be published for general distribution.

B. SCOTT FRITZ, *Secretary*.

COMMUNICATIONS

From the Secretary's Office

To the Editor:

On September 15 there was sent out from the Secretary's office about 1,000 return postal cards to members of the Association in District No. 5, asking for nominations for members of the Executive Board from this District.

District No. 5 comprises Alaska, Washington, Montana, North and South Dakota, Minnesota, Iowa, Nebraska, Wyoming, Idaho, Oregon, the Philippines and Hawaii.

As soon as the nominations are in a postal card vote will be taken. It will probably be the middle of February before the returns can be canvassed as it takes about sixty days, under favorable conditions, to get a letter to the Philippines and reply.

CONSTITUTION AND BY-LAWS

The Executive Board at its recent meeting in Columbus, authorized the Secretary to have copies of the Constitution and By-Laws of the A. V. M. A. printed and also a list of members.

This will be published in booklet form as soon as possible. The list of members will not be published this year in the Journal of the A. V. M. A.

A number of members of the Association are asking the Secretary with reference to Section Seven of the Code of Ethics prohibiting a member of the A. V. M. A. from contracting with any live-stock insurance company for the professional treatment of live stock. A notice to change this section of the Constitution and By-Laws was given at the New Orleans meeting and laid on the table for a year, as required. At the Columbus meeting Section Seven of the Code of Ethics was stricken out.

N. S. MAYO, *Secretary.*

Efficiency of Commercial Biologies

To the Editor:

Recently I received two publications: one on "The Immunizing Value of Commercial Vaccines and Bacterins against Hemorrhagic Septicemia"; the other on "The Value of Commercial Vaccine and Bacterins against Fowl Cholera," both by the same authors, L. Van Es and H. M. Martin, published by the Agricultural Experiment Station of the University of Nebraska as Research Bulletins 17 and

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studying these bulletins I was very much surprised to have entirely disregarded any work previously published on the same line. These publications have been of such a nature that no doubt many veterinarians will accept the conclusions of carefully conducted research work.

It is advisable to analyze the publications at this time and call attention to Bulletin 18 on "The Value of Vaccines and Bacterins against Fowl Cholera" in which the following conclusions are as follows:

"It is evident from the above that no reliance can be placed on the vaccines and bacterins against fowl cholera, which we are able to find on the market and subject to definite tests. We have no doubt as to the possibility of artificial immunity as an aid to the control of fowl cholera, but as yet we will have to get along with the more nonspecific means of prevention, even if those are far from a universal efficiency."

In the face of these conclusions I have before me a publication on "The Use of Bacterin in the Control of Fowl Cholera," by Dr. Winifred B. Mack and Dr. Edward Records, published by the Agricultural Experiment Station of the University of Nevada. The authors of this bulletin have both established a splendid record in research work on animal diseases and do not need any further introduction. Their experiments are recorded in an up-to-date, thorough manner, giving detailed data on every phase of the work. In the conclusions of the last-named publication we find the following paragraphs.

"The use of bacterins in infected flocks produced sufficient resistance to promptly check outbreaks of fowl cholera in fifteen out of sixteen lots of fowls in fourteen flocks, although one flock required three treatments. It failed in another flock in spite of three vaccinations.

"The results of field trials with bacterins as an agent for checking and controlling outbreaks of fowl cholera indicate that it is a practicable, satisfactory method.

"In fourteen out of sixteen lots of fowls treated one or two injections of bacterin satisfactorily controlled the outbreak, with little or no difference in the result. In one lot there was recurrence requiring three treatments. Complete failure resulted in but one of the sixteen lots treated.

"There was no apparent difference in the results whether homologous or heterologous strains of *Bact. avisepticum* were used in the preparation of bacterins. The use of stock bacterins containing several strains appears to be satisfactory, and is the logical method where a stock is to be carried for immediate use when needed.

"Finally, in the last analysis, the value of a protective method must be judged by clinical rather than by experimental results."

Here we are face to face with entirely contradictory results. Besides, as there are many other investigators in this country and abroad who arrived at similar results as Drs. Mack and Records, how should the veterinary profession judge the publication of Drs. Van Es and Martin? It seems if the work of Van Es and Martin would be carried out with any human or veterinary biological products in a manner as recorded by the authors, I dare say we would hardly have today a single biological product which could be considered dependable for the prevention or cure of diseases. Even the classical work of the great Pasteur, in regard to the immunization against anthrax, would be shattered. Just think what would have been the result of the wonderful experiments at Pouilly-le-Fort, demonstrated by Pasteur before a commission on the effectiveness of anthrax vaccination, if Pasteur had not given careful consideration to the infective dose of the virulent anthrax bacilli which were administered to the immunized animals.

Pearl River, N. Y.

A. EICHHORN.

International Veterinary Congress

TURIN, August 30, 1920.

DR. A. EICHHORN,

Pearl River, N. Y.

Dear Colleague:

I have read the letter of our eminent friends and colleagues, Dr. de Jong and Sir Stewart Stockman, relative to the International Congress of Veterinary Medicine planned by the U. S. A. I am in favor of such a move and as one of the older members of the International Commission am very anxious for arrangements for the next International Veterinary Congress in order that that wonderful veterinary organization should continue its activity in the study of diseases of animals and on all other branches pertaining to animal industry.

I would like, however, to advise you that next spring, 1921, the second International Congress of Comparative Pathology will be held at Rome and we hope that on that occasion all eminent members of the veterinary profession of the United States and likewise scientists interested in comparative pathology will be in attendance.

Therefore, it appears it would be of an advantage for your association to cooperate with us and to plan to hold the next Inter-

national Veterinary Congress in 1922 or 1923, which if held in your country I am sure will be a credit to the United States.

I take this opportunity in expressing to you my cordial greetings which you also please convey to all those who are interested in comparative pathology and veterinary medicine.

Affectionately yours,

E. PERRONCITO.

Acknowledgments from Honorary Members

September 20, 1920.

DEAR DR. MAYO:

Upon my return to the office today, your letter of August 30, informing me that I have been elected to honorary membership in the American Veterinary Medical Association, was brought to my attention. In my work here I have come in closer contact than ever before with the activities of the veterinary profession, many members of which are engaged in the Bureau of Animal Industry, and I fully realize its important relation to the live-stock industry of the country. I am grateful for the honor conferred upon me and I hope that you will express my appreciation to the Association.

With all good wishes, I am,

Sincerely, yours,

E. T. MEREDITH,

Secretary of Agriculture.

September 13, 1920.

DEAR DOCTOR:

This is to acknowledge receipt of your note advising me of my election as an honorary member of the American Veterinary Medical Association.

I assure you I appreciate the compliment, and through you thank the members of your organization kindly for this recognition.

Sincerely, yours,

ALVIN H. SANDERS,

Editor Breeders' Gazette.

September 3, 1920.

DEAR MR. MAYO:

Your letter of August 30 received. It was very thoughtful and kind of the members of the American Veterinary Medical Associa-

tion at their fifty-seventh annual meeting to elect me as honorary member of their organization.

I appreciate this recognition, although I do not know whether I deserve it. I have always done the best I knew how to support the veterinarians in their work and to do whatever I could to further this profession. I feel honored by the recognition that your Association has extended to me.

With warm personal regards, I am,

Yours truly,

A. J. GLOVER,

Editor Hoard's Dairyman.

Offers for A. V. M. A. Permanent Home

To the Editor:

The following notice is hereby given to the Veterinary Medical Associations of Iowa, Missouri, Illinois, Indiana and other States contiguous and near the geographical center of the United States, that at the meeting of the Executive Board of the A. V. M. A. a special offer will be presented to the Executive Board for the location of a permanent home for the Editor and Secretary of the A. V. M. A. Unless the States properly located make suitable donations in the way of buildings and place, there will be special offers made by other parts of the United States. All interested please take notice and get busy. These offers will be presented at the meeting of the Executive Board at Chicago some time during the meeting of the United States Live Stock Sanitary Association.

Yours truly,

C. A. CARY.

Breeders' Gazette says editorially of the opposition to tick eradication in the South: "Individual and organized hostility to the enforcement of the tick-eradication law is open or latent in a few regions of some of the Southern States; but the periodical shifting of the Federal quarantine line toward the southern boundary of the United States is a reassuring pledge that the days of the tick in this country are numbered. The Government's campaign to clean out the pest has been scientifically and economically sound. If all the facts and factors were known, however, we should probably be surprised at the rapidity with which the campaign has progressed toward completion."

NECROLOGY

DR. E. M. WIGGS, until recently the State Veterinarian of Texas, died August 10, at Mineral Wells, Texas, having been kicked in the abdomen by a horse earlier in the day.

Dr. Ernest Milligan Wiggs was born near Portland, Ind., September 28, 1878, graduated from the grammar school there and spent one term at the University at Wooster, Ohio. He came to Texas in 1907. He completed his freshman year at the Chicago Veterinary College and graduated from the Kansas City Veterinary College in 1913. He had practiced at the following Texas points: Electra, Wichita Falls, Tyler and Greenville.

Dr. Wiggs was a practitioner and surgeon of unusual ability. Little given to the limelight, many of his methods and the results of his personal research work have benefited the profession, although his name has not been associated with their success. He was a deep thinker, a student with a wide vision, a believer in the equal rights of all men based upon their own qualifications and uninfluenced by political or personal preferment.

Dr. Wiggs gave freely of his time and money that the veterinary situation in Texas might be improved. Driven by a nervous energy far beyond his physical strength, he labored for years and died just as the profession, in solid union and close amalgamation through a thriving State association, faced with renewed confidence the problems that confronted it.

At the amalgamation of the Texas Veterinary Medical Association and the State Veterinary Medical Association of Texas in 1915, Dr. Wiggs was elected to the office of Secretary-Treasurer, which office he held for two terms, refusing for business reasons to continue longer. That his counsels might still be available as an executive committeeman he was elected Second Vice-President. It was during his tenure of office that the profession in Texas bound up its wounds after years of conflict, and became consolidated in the present powerful State Association.

That the stock interests and veterinary interests might be brought into closer understanding, Dr. Wiggs, at the request of the State Association, relinquished his practice at Greenville to accept the position of State Veterinarian of Texas under Governor Hobby's administration. This office he filled creditably until July 1, 1920, at which time he resigned that he might give his undivided time

to the management of his dairy stock farm at Mineral Wells. Here the same restless energy worked him beyond his strength or he might have rallied and fought off the injury that resulted in his death.

The profession has lost a distinguished member and the world at large a humanitarian who meant much to it. Dr. Wiggs leaves a wife and two children.

N. F. WILLIAMS.

DR. PETER P. PETERSEN died at San Francisco, Calif., December 24, 1919, leaving a wife and two small children.

Dr. Petersen attended the University of California and was a graduate from the New York State Veterinary College at Cornell, 1915. In 1917 he joined the A. V. M. A. Dr. Petersen was associated for a time with the veterinary department of the University of California. He was an active and able veterinarian and was very highly thought of on the Pacific coast. He was a leader in his profession.

A MEMORIAL GIFT

Mrs. John F. Winchester, formerly of Lawrence, Mass., has presented the entire library of veterinary works of her late husband to the Alexander Liautard Library. Upwards of three hundred volumes, including a complete set of the *American Veterinary Review* beautifully and substantially bound, with a complete set of a very early edition of Percival's *Hippopathology* and many older editions of other veterinary publications now out of print, will be of utmost value to the students and research men in veterinary fields.

The Liautard Library of over three thousand volumes is now one of the most valuable veterinary libraries in the land. Greater facilities for consulting and using this library have been completed by New York University.

MISCELLANEOUS

THE TRAGEDY OF HAEMONCHUS

(Tune: *Who Killed Cock Robin?*)

[Sung at the Tenth Anniversary Dinner of the Helminthological Society of Washington, June 20, 1920. Verses by Dr. M. C. Hall; choruses by Capt. R. Daubney, M.R.C.V.S. Doctors Cobb, Hassall, Ransom, Schwartz, and Curtice were at the dinner.]

Who named *Haemonchus*?

I, said Doctor Cobb.

I did that little job,

I saw his onchus.

Cho.: The parasites and commensals
Said "Whoever will report us?"

When they heard of the transfer of *Strongylus contortus*.

Who indexed *Haemonchus*?

I, said Doctor Hassall.

After a fearful wrasse,

I catalogued *Haemonchus*.

Cho.: The parasites and commensals
Said "Whoever will report us?"

When they heard of the index of *Haemonchus contortus*.

Who killed *Haemonchus*?

I, said Doctor Ransom.

I did him up quite handsome,

I killed *Haemonchus*.

Cho.: The parasites and commensals
Said "Whoever will support us?"

When they heard of the death of *Haemonchus contortus*.

Who caught his blood?

I, said Doctor Schwartz.

I tested it in quarts

For amboceptors.

Who made his shroud?
I, said Doctor Curtice.
I know just where that shirt is,
I made his shroud.

Cho.

HART GOES TO UNIVERSITY OF PENNSYLVANIA

EXTENSION work among veterinarians and livestock owners in Pennsylvania is about to be inaugurated by the University of Pennsylvania. Dr. George H. Hart, for several years past with the Veterinary Division of the University of California, has been appointed to conduct the work and will take up the duties of his new position November 1.

Dr. Hart is a native of Pennsylvania and is a graduate of the School of Veterinary Medicine at the University of Pennsylvania, class of 1903. He was born and raised on a farm near Philadelphia and immediately after graduation practiced in and about that city. Entering the service of the United States Bureau of Animal Industry as a veterinary inspector, he was detailed to a position in the pathological laboratory, where he did much good work. He resigned this position to go into general practice at Los Angeles, California, where he also filled the position of city dairy inspector, in which office he made an enviable record. For the last three years he has been engaged in veterinary research and extension work for the University of California.

Dr. Hart is well qualified by thorough training and broad experience for his new position, in which he will be called on to discuss veterinary subjects with veterinarians and also to inform the livestock owners how the veterinarians can help them and how they can best cooperate with the veterinarians to obtain the best results in reducing the losses from disease. The veterinary extension work will bear the same relation to the practicing veterinarian as the agricultural extension work does to the farmer and livestock man, and in addition it will also take up with farmers and livestock men those problems which can best be presented by a veterinarian.

SALARIES OF FRENCH GOVERNMENT VETERINARIANS

THE French Government has fixed the following scale of salaries in its official veterinary services. We understand this to represent an increase over salaries previously paid. In normal times 5 francs are equal to about \$1.

For the personnel of veterinary schools: Inspector general (three grades), 16,000 to 20,000 francs; director-professors (three grades), 14,000 to 18,000 francs; professors (four grades), 12,000 to 15,000 francs; other members of the faculty, 6,000 to 11,000 francs; various minor employees, 3,800 to 7,000 francs.

For the personnel of laboratories for research in animal diseases: Director (two grades), 14,000 to 16,000 francs; heads of departments (six grades), 6,000 to 11,000 francs; laboratory assistants (eight grades), 3,800 to 5,200 francs.

For frontier veterinary inspectors who give their whole time to government work and are not permitted to engage in private practice: Chief inspectors (two grades), 12,000 to 13,000 francs; assistant chief and other inspectors (six grades), 6,000 to 11,000 francs.

Veterinarians at breeding establishments: Chief veterinarian, 8,000 francs; others (three grades), 4,500 to 6,500 francs.

RATIO OF SIRES AND DAMS

Developments in the "Better Sires—Better Stock" campaign have resulted in figures showing the relative number of males and females kept for breeding purposes. Following are the ratios based on more than 200,000 head of stock of all kinds listed with the United States Department of Agriculture: Cattle, 1 bull to 18.9 cows; horses, 1 stallion to 16.9 mares; swine, 1 boar to 11.5 sows; sheep, 1 ram to 37 ewes; goats, 1 buck to 26.6 does; poultry, 1 rooster to 23.3 hens. Other poultry, geese, ducks, turkeys, etc. (average), 1 male to 8.5 females.

These figures represent conditions on more than 2,000 farms in various parts of the country and are believed to be typical of other farms. They show the importance of placing stress on quality in sires, since in practically all cases a sire is the parent of a very much larger number of offspring than the average female animal.

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VICIOUS ANTIVIVISECTION MEASURE DEFEATED

VETERINARY practice in California was threatened at the general election in November by an initiative measure which, under the deceptive guise of humanitarianism, had for its ultimate object the prevention of all practical experimentation with animals—the means by which science has measured its greatest achievements in the preservation of both human and animal life. Fortunately this ridiculous measure, which struck at the very heart of our modern system of disease-control, was defeated by a decisive vote. The veterinarians of that State are to be congratulated on the success of their efforts in that direction.

California is a State in which a large proportion of the population resides in the cities and towns. Such persons, being as a rule unfamiliar with livestock matters, could not be expected to appreciate as readily as country people the absurdity of a law which would render illegal the surgical or medical treatment of any animals that are not physically injured, deformed or sick, and which would prohibit such common operations as castration, dehorning, the docking of lambs, mallein and tuberculin testing, and immunization

against infectious diseases. It is to the credit of the California voters that enough of them understood the true import of the measure to defeat it.

It is a truism to state that without animal experimentation it would be impossible to hold in check the destructive diseases that constantly menace the livestock industry. Indeed, had such legislation been enforced in the past we would have been completely in the dark with respect to many diseases that we now control. It is well known that animal experimentation has led to the discovery of the nature, cause, diagnosis and prevention of many of the infectious diseases, while the curse of other contagions will surely be lifted as a result of future work. The results of experiments with animals have enabled the United States to exclude from the country, or to control, such food-destroying diseases as rinderpest, foot-and-mouth disease, anthrax, Texas fever, hog cholera, surra, swine erysipelas, contagious pleuropneumonia of cattle, sheep scab, and the like. And without abundant livestock—the result of the control of animal diseases—it is questionable whether food enough for the present population of the world could be produced.

The prohibition of animal experimentation would not only prevent the acquisition of further knowledge of disease by scientific research, but would also prevent the manufacture of certain serums, vaccines and other biological products necessary in the diagnosis, prevention and treatment of various animal infections. Furthermore, it would make impossible the use of test animals in the diagnosis of disease, which in the case of certain affections is highly important, as we have no other positive means of identifying those diseases.

Because of the similarity between the higher animals and the human body, discoveries useful to stockmen and veterinarians are of service also to hygienists and physicians. Animal experimentation has resulted in such basic knowledge as that of the circulation of the blood; capillary circulation; the vasomotor mechanism; functions of the nervous system; the flow of chyle in the lacteals; the passage of chyle through the lymph ducts into the venous circulation; the nature of the digestive fluids and the chemical transformation of food through their action; functions of the liver, lungs, kidneys and other organs; the reaction of the cells to various kinds of stimuli; the significance of the endocrin glands; the nature of inflammation and other pathological processes, and numerous other discoveries in physiology, pathology and biochemistry.

Experiments with animals have contributed richly to the current knowledge of drugs and their uses and to the precise information we have of the therapeutic, physiologic and toxic actions of the innumerable substances from which our useful drugs have been selected. Without specific knowledge of how drugs act on the body as a whole, or on special parts of the body, and whether their action is immediate or cumulative, the death rate among persons and animals would be multiplied, and the greater losses among the latter would be a serious economic disadvantage.

Experiments with animals have likewise given information that prevents untold suffering of both persons and animals, by aiding in the preservation of health and hastening recovery from sickness. Persons who treat diseases among animals must be credited with relieving more pain in one day than animal experimentation causes in a number of years, and they do this almost exclusively through the knowledge which such experiments have supplied.

For these outstanding reasons it is very gratifying to learn that the voters of a great State have refused to adopt a measure whose enforcement would jeopardize the health of its people and render extremely hazardous if not ruin its livestock industry.

MOUNTED SERVICE CUP ENDURANCE TEST

On October 11 twenty-seven horses of cavalry type started on the annual endurance ride from Fort Ethan Allen, Vermont, to Camp Devens, Massachusetts, a distance of 300 miles. Each horse carried a weight of 245 pounds and was given five days to complete the race. The major part of the course was over sandy and mountainous roads, but all kinds of footing were encountered in the five days. Generally speaking, this was a severe test, which is plainly shown by the fact that only 10 horses finished. The remarkable speed made by a few of the contestants was an outstanding feature of this year's trial. In fact, such speed with 245 pounds weight can be attained by only a very few unusually good horses. While this weight adds to the severity of the test, it does not give as good a line on the type and blood most useful for cavalry conditions as would be the case if there had been a larger number of animals completing the test from which to draw conclusions.

The race has shown that grades compare favorably with pure bred in endurance, as five of the ten horses to finish were grades. The final result gave first place to a grade Thoroughbred; second, grade Arab; third, grade Thoroughbred; fourth, grade Arab; fifth,

purebred Arab; sixth, Morgan; seventh, Morgan; eighth, Thoroughbred; ninth, Arab, and tenth, grade Arab.

The service cup, for which, among other prizes, the horses contended, must be won three years in succession to be held permanently. Last year Mr. W. R. Brown's Ramla, a purebred Arab, won it, but this year the grade Thoroughbred winner was Mlle. Denise, belonging to Captain De F. W. Morton, U. S. A.

REPORT IT

The following editorial which appeared in a recent number of *The National Stockman and Farmer* is just as applicable to veterinarians as to the owners and handlers of livestock. This is especially true under present conditions when the large insurance fund, provided by the Congress during each of the last four years for combating any outbreaks of foot-and-mouth disease that might have occurred, has been discontinued.

"We are afraid that the millions of shoes in which our soldiers had tramped over Europe might bring back some stray germs of foot-and-mouth disease. Fortunately no outbreak occurred. Now tourists are returning from Europe, foreigners who went back home after the war are returning to this country, thousands of immigrants are coming in. In their clothing or baggage may be the germs, and they may come in contact with livestock. Every effort is being made to keep them out, but they are invisible and may get through the lines. One more precaution is necessary, a watch by every owner and handler of livestock. Report immediately to the State Veterinarians anything that looks like foot-and-mouth disease. It is infinitely better to have a thousand false alarms than to miss one genuine case, so report if there is any doubt about it. Taken in time millions of dollars may be saved; neglected a few days, our losses may run into millions. Let's take it in time."

PRACTITIONERS ARE INVITED

To send in reports of interesting cases which will be helpful to others for publication in the JOURNAL's department of Clinical and Case Reports. Give your professional associates the benefit of useful knowledge gained from unusual cases arising in your practice. Address the Editor of the JOURNAL, 1620 Hobart Street, Washington, D. C.

To live in the presence of great truths and eternal laws, to be led by permanent ideals—that is what keeps a man patient when the world ignores him, and calm and unspoiled when the world praises him.—*Balzac*.

SWINE DISEASES¹

By C. H. STANGE and CHARLES MURRAY, *Iowa State College, Ames, Iowa*

WE approach the subject "Swine Diseases" with some hesitancy because of the confusion of opinions expressed and the multiplicity of ideas entertained at present concerning this important factor in our control work, and because we have no satisfactory solution for this situation at the present time. We hope that some suggestions together with records of some experiments may be helpful. It is appreciated that we already have too many opinions, some of which are based upon the most superficial of experiments, others of which have no experimental backing or even a founding on scientific knowledge.

The past ten years have brought about important changes in the source from which most of the information offered the practicing veterinarian comes. The biological houses have been prosperous, while Federal and State governments have been hesitating with reference to funds, with the natural result that some of our leading educational and research men have drifted into commercial lines. These men or the concerns employing them can not be criticized. It is a reasonable and logical result. It seems, however, that an organization such as the American Veterinary Medical Association should be able to do much to assist, encourage and stimulate scientific research along veterinary lines. We suggest that the support and assistance of the National Research Council be sought and that diseases of swine be suggested as one of the projects.

Throughout the Corn Belt there is no more important or pressing problem among those concerning animal health than that of swine diseases. The confusion which exists at present is equal in extent to the importance of the problem. We are suffering at present from a lack of reliable information to give the practitioner. There are too many things we do not know and there is much guessing. Based on clinical observations and what substantial research work has revealed, we should recognize the following infectious diseases of swine as of greatest significance to our animal industry:

HOG CHOLERA

This is the most important and common disease of swine. It is accepted as being the one resulting from an infection with the filterable virus, concerning which there is no question at the present

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

time, so far as its etiological significance is concerned. The controversy is concerning the exact nature of this agent, but nothing tangible has been published for confirmation. When hog cholera is uncomplicated the lesions are usually of the purely hemorrhagic nature, and these may be present in very small numbers in mucous and serous membranes and in some of the parenchymatous organs as kidney, heart and lungs. We have according to this no pectoral or intestinal form of hog cholera. This is by far the most contagious disease we have among swine, and its mortality is higher than any other of which we know.

In making a differential diagnosis we know of no rule that will apply to all cases. No known diagnostic formula has stood the test and we must yet rely upon the judgment of the veterinarian after he has considered carefully the history, environment, symptoms and lesions. Many more errors have been made in the past two years throughout the Corn Belt by looking for some indefinite, uncommon or even new condition, sometimes in cases where quite common and practically characteristic lesions of cholera were present, than by calling some other disease hog cholera. Many hogs have been lost as a result of this error. Fortunately, cholera can probably be more satisfactorily controlled than most of the other diseases, because there may be developed an immunity more pronounced than for any other disease. It may be permissible to repeat the statement we have made on a previous occasion, that the first and most important fact that should be determined in all cases of swine diseases is *whether hog cholera is present*, and we should be very certain that the virus is not present before the owner is advised that hogs are not suffering from cholera and serum will do no good.

DIPHTHERITIC OR NECROTIC ENTERITIS

Necrobacillosis, Salmonellosis, Pig Typhus, etc.

This condition may apparently be caused by one or more of a number of organisms. Ulcerative enteritis is frequently associated with other diseases or debilitating conditions and was long considered as the intestinal form of hog cholera. The symptoms and lesions are so well known that to enumerate them here would be poor use of your time. In connection with the etiology, however, we wish to remark that in 1918 members of the research staff (Murray and Benbrook) observed ciliated protozoa in considerable numbers located usually at the junction of the necrotic area and

the living cells of the colon of affected hogs. These were identified as *Balantidium coli*. *Balantidium coli* are protozoa described by Malmsten in 1857. They have been found in Asia, Europe and America and on a number of islands, and are regarded as a cause, either primary or aggravating, of colitis in man. The *Balantidium coli* is frequently present in the rectum of pigs (Leuckart), but the encysted stages serve only for transmission. It has been observed that this caused little or no disturbance in pigs, and the latter are regarded as the source of infection for man. More recent work done by Brumpt, in which he infected young pigs by using *Balantidium coli* from infected monkeys, suggests that this parasite may have pathogenic and harmful species and consequently some significance in the cause of enteritis in pigs.

HEMORRHAGIC SEPTICEMIA (*Swine Plague*)

This disease in our opinion has been given undue and unjustifiable prominence during the past few years. We believe that hemorrhagic septicemia in swine as a primary disease occurs very rarely. As a complication the presence of the bipolar organism is a rule rather than an exception. Associated with the hog cholera virus it frequently produces pneumonia, which was formerly referred to as swine plague, and later usually as the pectoral form of hog cholera. During the past few years enteritis and hemorrhagic septicemia have been grouped together with most other diseases of swine not hog cholera, as mixed infection, and we will now consider some of this rather indefinite group of ailments. Bacteriological examination made on 134 animals after death in a series of experiments conducted by one investigator (Pfeiler) gave

TABLE 1.—Results of Pfeiler's Experiments

Principal lesion	Kind of Organism Found									
	<i>Bacillus suispestifer</i> group	<i>B. Coli</i>	Streptococcus	<i>B. pyogenus suis</i>	Staphylococcus	<i>B. pyocyaneus</i>	Bipolar bacillus		Diplococci	Not classified
Enteritis	28	24	1	.....	4	5	3	4	2	.....
Pneumonia	1	1	.....	.....	.....	.....	4	1	.....	1
Pectoral and intestinal Hemorrhages	14	12	.....	.....	1	5	16	2	.....	4
	.....	4	2	1	2	2	1	2	.....	1

the following interesting results as near as can be determined from the tables submitted:

The figures in the table indicate the number of times the organism was found. In a few cases (10-12) more than one organism was isolated. Some workers have found the *Bacillus necrophorus* and claim to have reproduced enteritis by feeding cultures to pigs. The same claim has been made by others in regard to organisms mentioned in the table, especially the *Bacillus suispestifer* group. Evidently the *Balantidium coli* and many of the above organisms stand in much the same relationship to enteritis of pigs.

Both the pneumonias and enteritis of swine have been quite commonly called mixed infection and very generously treated with "mixed-infection bacterins." One of the Iowa veterinarians (F. H. P. Edwards) gathered data in regard to the application of bacterins from thirteen different concerns producing them, and the replies are summarized in Table 2. These replies indicate a great variation in opinions as regards the nature of the diseases for which bacterins are indicated as well as the quantity and time of administration. It is difficult to see how they can all be right.

BRONCHO-PNEUMONIA (*So-called Flu*)

This condition, occurring in the swine-raising States during 1918-19 as a widespread infection, caused a heavy monetary loss, not so much through the death of swine as through the loss in flesh during the progress of the disease and the subsequent setback during convalescence. The mortality was low, probably less than 1 per cent. Variouslly diagnosed in different localities and by different workers as mixed infection, swine plague and hemorrhagic septicemia, much confusion among veterinarians in their lines of treatment resulted. Through work carried on during the fall and winter of 1919 and 1920 we have been forced to the conclusion that the bipolar organism, which had been most generally credited as the etiologic factor, plays little if any part in the causation of the disease and represents a secondary invader when it is present. In stained smears from the blood, spleen and lungs we have found quite uniformly occurring a very small non-motile, Gram-negative coccus, which when injected intravenously in fairly large dosage has reproduced the disease in swine as a highly acute septicemia. Injected in extremely small dosage, a subacute type of the disease, resembling in all respects the disease observed in the field in natural outbreaks, has been produced, and after running a typical course recovery has usually occurred.

TABLE 2.—Summary of Replies from Thirteen Manufacturers of Bacterins

COMPANY NO.	MENTION THE DISEASES OF SWINE YOU WOULD SUGGEST THEY BE USED IN.	WHAT DOSES; WOULD YOU REPEAT THE DOSE; IF SO, WHEN?	WHAT RESULTS ARE YOU GETTING IN THE FIELD WITH YOUR MIXED BACTERINS SWINE?
1	Hemorrhagic septicaemia and enteritis.	Medium, with hog-cholera serum and virus.	Some good; others no value.
2	Hemorrhagic septicaemia and complications.	2 c.c., not with hog-cholera serum.	Very satisfactory.
3	Necrotic enteritis, swine plague, paratyphoid infections and garbage poisoning.	2 c.c.	Generally good.
4	Pathologist will return in spring.		
5	Doctor in charge sick.		
6	Thumps, pneumonia, enteritis and complicated cases of hemorrhagic septicaemia (where <i>B. suis-septicus</i> is complicated with other organisms).	Variable; large in acute conditions.	Extremely optimistic. Nearly equal to serum.
7	Eliminates accurate diagnosis.	Use specific bacterin.	
8	Pneumonia, enteritis, infectious rhinitis, polyarthrititis.	2 c.c. (100 billion).	Very good.
9		2 c.c. (80 billion).	Highly satisfactory.
10	Diseases cannot be differentiated.	2 c.c. (20 billion).	Uniformly satisfactory.
11	<i>B. suis-septicus</i> , <i>B. suis-pestifer</i> , <i>B. pyocyaneus</i> , <i>B. paratyphosus</i> , <i>B. coli</i> infection.	4 to 8 c.c. (50 billion to 100 billion).	40 to 100 per cent.
12	Necrotic conditions in intestines and lungs.	40 billion.	Contradictory.
13	Enteritis (necrotic) or lung and intestinal complications.	2 c.c.	Good results (enteric conditions).

The course of the disease in outbreaks and the symptoms are so familiar to all that recounting them at this time is deemed unnecessary. The most common lesions observed are the broncho-pneumonia and the congested superficial lymph glands. Pigs artificially

injected generally show a bluish discoloration of the skin of the belly; passive congestion of the digestive organs, with marked gastritis; congestion of the mucosa of the respiratory organs and a reddish-yellow, frothy fluid filling the bronchioles; petechiæ on both mucous and serous surfaces of the heart; swollen, juicy, congested lymph glands; congested kidneys with occasional petechiæ, and reddened urinary bladder.

Pigs recovered from both natural and artificial infection have shown very irregular susceptibility to subsequent infection, some showing a complete immunity, others succumbing to large doses of the coccus administered intravenously. Immune bodies (agglutinins) have been demonstrated in the blood of sick and recovered pigs only in low dilution, while in pigs given repeated injections of sub-lethal doses the agglutinins have been found present in dilutions as high as 1 to 320.

Other animals than swine, including rabbits, guinea pigs, the donkey, but not the domestic fowls, have shown a marked susceptibility to infection when the organism is injected intravenously, dying usually within 24 to 72 hours and presenting the same clinical picture as pigs suffering from a natural infection, and showing on autopsy quite the same pathological changes as swine dying in the field.

Further work on this disease is recognized as necessary and is contemplated for the coming year. Unqualified claim as to the organism observed being the cause of the disease in natural outbreaks is not held by us, but its so frequent occurrence in the organs of sick animals, and its production of a disease so closely resembling the one occurring in the field, suggest the possibility of the same and the importance of further study, and we present the matter to other workers for corroboration or disproof.

DISCUSSION

CHAIRMAN BEMIS: Are there any questions or discussion?

DR. MCAUSLIN: Dr. Fitch expressed a consensus of opinion in his report this morning on the infectious diseases of cattle. I wonder if it would be possible for a Committee on Swine Diseases to be appointed to give us their findings as we had on the abortion disease this morning. Certainly Dr. Stange has brought up a number of things that are absolutely contradictory on the face of things, and if a committee were appointed possibly they could get together. Certainly Dr. Stange has pointed out absolutely and irrefutably that the majority of investigators are working in the dark. I will put that in the form of a motion, that such a committee be appointed, to report back to the Association.

(Seconded by Dr. John Lowe.)

DR. JOHN LOWE: I think this means a summary of what we know at the present time, so that we have some point to start from.

DR. FITCH: While I am perfectly in favor and in sympathy with the motion, I have just come from the meeting of the Section on Sanitary Science, and they are there discussing problems of swine diseases. It is perfectly reasonable that they may appoint a committee for the same thing. It seems to me this is a subject that should be brought before the Association in general session.

CHAIRMAN BEMIS: I think that is a good suggestion and really a matter for the entire Association. There is a phase of this subject which concerns the practitioner in particular and another phase which affects others. That is the reason we have swine diseases discussed in both sections at the same time. That indicates, just as Dr. Fitch has said, that this is a subject that should be rounded up for the entire Association.

DR. MCAUSLIN: I would like to call Dr. Fitch's attention to the fact that we didn't ask for conjunction with any other section, so that we would get a lucid view of the matter; and it can be brought before the entire session, or our committee could confer with the committee of the other section. Simply because one section takes it up is no criterion why we should not take up the matter and work in conjunction. Dr. Stange's paper certainly shows that there is a great barrenness of investigation and results.

(The vote was taken on Dr. McAuslin's motion that a committee be appointed to investigate swine diseases and report back to the Association, and the motion was lost.)

DR. BELL: I would like to make a motion to extend a vote of thanks to Dr. Stange for his paper, with the request that he report back developments next year.

(The motion was seconded by Dr. McAuslin and carried.)

Iowa Homestead says of the Bureau of Animal Industry's runt inquiry: "The number of runty pigs, calves, and other animals produced annually is a factor of considerable economic importance to the farmer and the country as a whole. We hope that the bureau will some day be able to supply breeders with information on this subject. It is certainly worth investigating."

Farmer and Stockman says editorially: "Some livestock owners have not yet joined in the nation-wide campaign against tuberculosis. They fail to see that the loss of an animal slaughtered now is small as compared with the losses this animal will eventually cause by infecting other animals. There is no good reason to doubt the reliability of the tuberculin test. It is 99 per cent efficient when made by a competent veterinarian."

VETERINARY TRAINING FOR GENERAL PRACTICE¹

By HERBERT LOTHE

Waukesha, Wis.

THE ultimate end of veterinary study is the prevention and relief of disease among animals, and it is this end that justifies the study of veterinary science. The ultimate end is not the creation of a field for the exploitation of the individuals who may pursue its study, but for the good of the public as a whole, of which the veterinarian is a part. From this statement it should not be understood that the ultimate end is one of philanthropy, for the practice of veterinary science is a business conducted for profit, the same as any other legitimate commercial enterprise. Because the practitioner sells his services makes his position no less justifiable or economically secure. The very fact that the practitioner has been able to exist and prosper more or less is evidence that he satisfies a want in industrial economy. How well he satisfies this want depends upon how thoroughly he is able to meet the needs of the community he serves. The better he serves his community the more he prospers financially. His ability to serve depends in a great measure upon his knowledge of what veterinary science can and can not do, and upon his judgment and diplomacy in presenting his ideas.

A successful practice, then, does not depend alone upon knowledge of veterinary science, but upon other factors as well. If I were to enumerate, in the order of their importance, the requisites for a successful veterinary practice I would place them something like this: (1) Location; (2) personality of the practitioner; (3) knowledge of veterinary medicine. I do not wish to be understood as believing that knowledge is of little value or that a successful practice can be built up without it, for such an idea is far from my thoughts. I simply want to bring out the fact that there are other prerequisites. A man with a fair knowledge of veterinary science and a good personality in a good location will do more veterinary work than a man with the best veterinary knowledge and a poor personality located in a community where veterinary work is not so plentiful or necessary. Give this same man with the best veterinary knowledge a good personality, and place him in the same location where veterinary services are in demand,

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

and he will do the community more good and prosper more than the man with a fair knowledge of his science. I simply want to bring out that knowledge of veterinary science is just one prerequisite for successful practice. Other things being equal, the more knowledge the better the practitioner.

Locations can not be influenced to any great extent and are largely a matter of selection. Personality is an abstract something inherent in the individual and can not be influenced to any great degree by training. Knowledge of veterinary medicine is entirely a matter of training, depending to a greater or less degree upon individual ability to learn. The qualification, then, that can be shaped is knowledge of veterinary science.

There are at least three factors the character of which have determined the young veterinarian's knowledge when he receives his coveted "sheepskin" on graduation day. They are (1) the physical plant or equipment of the college; (2) the teachers; (3) the course of study.

It is not the intention in this short paper, nor is it the writer's province, to discuss these factors in detail; they are largely problems of pedagogics and require solution by those pedagogically inclined and experienced. However, pedagogics is a means to an end and not an end, the end in this particular instance being to turn out a product that will best serve a practical purpose, namely, a practicing veterinarian. The practitioner is best familiar with the problems he has to meet and may well suggest to the teacher what they are and possible means of meeting them. It is with this thought that this short paper has been written.

COLLEGE EQUIPMENT

The question of college equipment will only be touched upon briefly. It has been pretty conclusively proven, by the closing of most privately operated veterinary colleges, that medical training according to modern approved methods can not be carried on at a profit. The cost of equipment is too great. It is sufficient to state that for best results equipment must be adequate and of the best.

TEACHERS

A great deal depends upon the class of teachers. These may be divided into two classes—those that teach pre-clinical branches, and those that teach clinical branches. Under pre-clinical branches will be included such subjects as chemistry, biology, pharmacology, pathology, anatomy and physiology, while the clinical branches

include the subjects of medicine, surgery and obstetrics with their various subdivisions. Pre-clinical teachers might well be specialists in their particular branches. Clinical teachers should by all means be men of broad training and experience in the practice of the profession as related to their special branch. By this it is not meant that they should devote the major part of their time to practice and teach as a side issue. If a veterinarian is to do justice to teaching he can not devote the major part of his time to making emergency veterinary calls. He should, however, "keep his hand in" by treating clinical cases. In no way can the writer see how a teacher can become familiar with the problems met in practice except by meeting them in actual practice.

THE COURSE OF STUDY

The course of study may be divided into pre-college, college and post-college. It is not the intention to discuss these in detail, but in a very general way. The details are a matter of pedagogics.

Pre-College Training

The pre-college training is of vast importance. To take up properly the study of veterinary medicine the student must have a certain amount of preliminary training. The four-year high-school requirement of the American Veterinary Medical Association is none too high. The case of the poor boy with deficient preliminary training has been used as an argument for low entrance requirements, but when closely scrutinized this argument is found to be a justification of the poor school rather than the poor boy.

A teacher in a veterinary college once made a remark to the writer something like this: "Before we had our high-school entrance requirement we got many students of mature years with considerable worldly experience and judgment who knew what they came to college for and made good in college and after graduation. Our entrance requirement now keeps many of these men out, and in their place we get high-school graduates lacking in mature judgment and without any definite idea of what they need to learn or expect to do when they graduate."

I have often thought of that remark, made by a man of wide experience in teaching veterinary students and for whose judgment I have the profoundest respect. The thought has now come to my mind that possibly our requirements were not quite high enough. Possibly the added requirement of college training in English,

chemistry, biology and physics would help eliminate this immaturity and indefiniteness of purpose by adding years to the age of the student. Surely it would tend to turn out a better finished product. But the time is probably not ripe for such a requirement. The time will come when our best veterinary colleges will require some college training for entrance.

College Training

Veterinary college training may be divided into pre-clinical and clinical. The pre-clinical training is a preparation for the clinical study of medicine, surgery and obstetrics, and consists in the study of such branches as anatomy, physiology, pharmacology, pathology, etc. The better training the student has in these fundamental branches the better practitioner he will make. The science of veterinary medicine is nothing more than the application of known facts of chemistry, biology, physiology, pathology, etc., to the treatment and prevention of disease in animals. Veterinary medicine is no longer a system of memorizing symptoms with their antidotes, but a science based upon known facts. A practitioner can not have too much knowledge of the basic sciences.

We often hear the remark that these things are all right for the "scientific" veterinarian, but the practitioner needs something more practical. The terms "scientific" veterinarian and "laboratory" veterinarian have somehow become synonymous in the minds of many, in contradistinction to "practitioner." This raises the question as to which is of higher scientific value, laboratory findings or clinical observations. We are "apt to call pathology real, or pure, or more or less accurate science, as against presumably unreal, or impure, or more or less inaccurate clinical data." The "scientific character of a procedure depends not upon where or by what means facts are procured, but altogether on the degree of caution and thoroughness with which observations are made, inferences drawn and results heeded." Laboratory investigations and practice are "one in spirit, method and object." One can be as scientific as the other, and both classes of veterinarians need a good knowledge of the basic sciences. Both are or should be scientific.

The character of the college clinical training is what determines to a great degree whether the prospective practitioner enters practice gracefully or awkwardly. While it is recognized that college begins rather than ends a practitioner's training, still the character of his

clinical training will in a great measure determine the first impression he makes upon his clientele.

The object of our clinical training should be to *learn and learn how*. The "learn how" is where most of our graduates are deficient when entering practice. It is a sad sight to observe the impression a veterinary practitioner makes upon a good horseman by beginning an examination of a horse for soundness by starting at the caudal end of the animal. The writer had this experience, and it was very humiliating later to have a stable "flunky" demonstrate the method of examination and approach of a horse recognized by horsemen as standard. A client judges a veterinarian largely in terms of what he himself knows, and if the veterinarian bungles these common things the client is very apt to think his knowledge of scientific things is bad.

There are so many seemingly insignificant things as compared to the general principles of veterinary medicine, which mean so much to the young practitioner, that are not given the attention they should be given in colleges. These things are nothing more nor less than technique and should be taught religiously, not to the exclusion or at the expense of other more scientific subjects, but in addition to them. Everyone admires good technique, whether it is in a pianist, a ball player or a veterinarian. Students should be drilled in these practical things until they become second nature and a matter of habit. Such things as animal restraint, bandaging, methods of clinical examination, post-mortem examination, etc., might well come under this class. The idea is not to carry these things to extreme at the expense of the more fundamental principles so as to make an artisan of the student, but enough time should be given to these practical things to familiarize the student thoroughly with them.

We often hear that this or that school is a good theoretical institution while another is a practical school paying less attention to the theoretical part of veterinary science, the idea being that the latter institution is the one for the prospective practitioner. There is no logical reason why theoretical training and practical training should be incompatible. The idea is not to teach less theory and more practical things, but to teach more of both. Our agricultural clients are beginning to demand a more finished product than formerly. The dentist when he leaves college is able to do a good job of filling a tooth, and the veterinarian should be just as able

to do the technical part of his job as to make a diagnosis. The subject of animal husbandry is one that should not be neglected. A stockman is apt to think that if a veterinarian does not know a well animal he is not apt to know a sick one. The breeder of dairy cattle, for instance, has a higher regard for the professional ability of a veterinarian who knows breed type and what are good butter-fat records than for the practitioner who is ignorant of these things.

The college has another mission to fulfill in the teaching of the more scientific branches of the science; the "learn" of the science is as important as the "learn how." Successful clinical training depends upon clinics. It is not mere numbers of cases but variety that determines the effectiveness of the clinical teaching. A large surgical clinic can not compensate for lack of medical or obstetrical material. It is in the clinic that the student correlates his preliminary training with practice. The greater variety of clinical cases a student has seen and studied at college the better he is equipped to give good service to his clients.

Post-College Training

Our brother, the physician, spends some time following graduation as an interne in a hospital. He realizes the value of more clinical training than can be gotten from his regular college courses. So, too, the veterinary practitioner should avail himself of an opportunity to perfect himself following graduation. There are few well-equipped veterinary hospitals, so the only recourse the recent graduate has is to affiliate himself with some good practitioner with experience. Not only is this of value in developing technique and in observation of clinical cases, but it gives the young graduate a bird's-eye view of practice as a whole, showing the relationship of the scientific to the commercial.

If there is any one thought that the writer has tried to bring out in this short and rather incomplete paper it is that the better trained a veterinarian is both practically and scientifically, the better practitioner he makes.

DISCUSSION

CHAIRMAN HILTY: Gentlemen, this is a very valuable paper, and there should be some discussion of it. Is there anyone who will open the discussion?

DR. CHRISMAN: There is one point in this paper that strikes me forcibly as being one of the keynotes to the success of the practitioner, and that is

the man who has a well-grounded knowledge of animal husbandry before he studies veterinary medicine. It has seemed to me that I should know first of all the animal in health in order to give the animal my intelligent service, from an analytical standpoint. I believe that the veterinarian should thoroughly know the animal from every standpoint, the history, the care and needs, and how to make an efficient inspection, and so on, before he can make a practical, scientific and successful veterinarian.

I remember not a great while ago talking to a splendid man who didn't quite know the needs of his animals, what the animal should be, or what the animal should have; and when it was sick he sent for a veterinarian, who diagnosed the case; it was the intestines, and he said that he should give the animal every six hours a dose of cottonseed meal—six pounds of cottonseed meal twice a day. Now, no one would have any respect for any veterinarian who had no more knowledge than that.

If a veterinarian does not know animals in health, he does not know what the animal requires—hasn't a sufficient knowledge of what we term animal husbandry; doesn't know the general habit of animals. We should know the animal from a commercial standpoint, the size and the conformation. We find that the livestock men like to know and discuss with the veterinarian these different points.

I remember when I first started practicing, for illustration, I hadn't had much experience with Thoroughbred horses. I was raised in a draft-horse section, and my knowledge was from the draft-horse view, and I knew very little about Thoroughbred horses. I was called to look at a Thoroughbred, and I went there with fear and trembling to make the examination. The gentleman said, "I think you don't know Thoroughbred horses very well," and I said "No, I haven't had much experience with them," and the gentleman didn't seem to be very much impressed with me. He said, "I used to raise horses myself; I was a race-horse man, and I tested the conformation of a race horse." I had in mind that the horse that was standing there was ready to go into the race, and when he asked me to pick out the horse, I picked that one, and I fell down. He said "That one is not ready; it is in preparation." If that man had been the Board of State Examiners they would have flunked me right there. I didn't know what I should have known.

That is just an illustration. I went back home and studied conformation of the race horse. I think a great many make this mistake, and I think we ought to know better. We should have a more thorough course in animal husbandry in veterinary colleges and applied veterinary courses, and a thorough knowledge of good English, and a good academic course.

CHAIRMAN HILTY: Is there any one else? These are all the papers that we have before us.

Here is a letter referred by Dr. Mayo to this section, written by some man who wants to change his location from one State to another. Does anyone know about this subject of reciprocity?

DR. FOGLE: That has been before the Ohio association, the medical profession, and I don't know but the time is ripe to have this apply to veterinarians.

DR. HOSKINS: That matter has been discussed until it is threadbare. There is only one solution, and that is that the American Veterinary Association modify its veterinary methods. That is a part that should come under the auspices of the United States Civil Service Commission. The A. V. M. A. may be represented by the Bureau of Animal Industry, or by the veterinary faculty of the schools, to conduct through the Civil Service Commission a matter of this kind, and give to these men and women a certificate showing that they passed that examination, and then have the State laws modified to accept that in lieu of the State board examination. That would give plenty of reciprocity between the States, and I have always truly felt that would accomplish what is needed. We have always utterly failed in accomplishing this reciprocity, though it has been taken up time and again.

Research Specialist Wanted in Uruguay

The Experimental Station for the study of animal diseases of the Sociedad Rural, Department of Durazno, Uruguay, is desirous of securing the services of a specialist for research work on splenic fever, especially from the viewpoint of immunizing stock and eradicating the disease from that country. It is necessary for the applicant to be familiar with disease-carrying ticks and piroplasmiasis, and to have conducted experiments and published original works on the subject. In addition, he must have had sufficient practical work to give him complete mastery of the subject. While the Experimental Station is not an official institution, it is closely connected with the Government offices which have supervision over similar lines of work. The salary is not stated, but they want a first-class man and are willing to pay accordingly.

They Want to Know

An important function of the Bureau of Animal Industry is to give information and advice to stock raisers. Some requests, however, are hard to answer satisfactorily. This one, for instance:

"Please give me a receipt that will fatten a poor mule or horse, something that will make it look fat or puffed so that they will do to trade on. If you will send me this receipt I will pay for it."

The best the Bureau could do was to advise plenty of feed and good care, and no charge was made for this "receipt."

More worthy of attention was the following from a farmer in the Southwest:

"Have you any thing on hydrofobi in cattle there has bin several died here they get mad and fite any thing in site and slobberd at mouth. Can one cow anokelet an other."

ORGANIZATION FOR COMPULSORY DIPPING FOR THE ERADICATION OF MANGE

By A. E. CAMERON

Medicine Hat, Alberta, Canada

MANGE of cattle has existed in western Canada for some years and has caused a considerable amount of trouble in the south-western part of Saskatchewan and the southern portion of Alberta. This territory was put under quarantine, no cattle being allowed to leave this defined area without inspection by a veterinarian of the Health of Animals Branch if for immediate slaughter, while if for any other purpose the cattle were required to be treated with the dipping solution authorized by the Department of Agriculture, under the supervision of an inspector. Besides the general quarantine, infected herds with their contacts were held under quarantine until treated and reported as free from contagious disease.

These restrictions were very irksome, and many meetings of stock associations and shippers were held to devise means whereby they might be removed. At one of those gatherings the stockmen were informed by the Deputy Minister of Agriculture that if they would give their assistance and coöperation for compulsory dipping, and the dipping were carried out to the satisfaction of the Department of Agriculture, the general quarantine would be removed and any mange which might subsequently be detected would be dealt with by the quarantine and treatment of infected herds and their contacts. This was readily agreed to by the stockmen, and the order in council was made, which was necessary for the legal enforcement of the dipping.

The territory held under the blanket quarantine, known as the mange area, has been reduced from time to time as portions were found to be free from mange. After a careful inspection of the different herds of cattle, during the end of 1919 and the beginning of 1920, the mange area was again reduced, leaving a small section of Saskatchewan and a larger part of Alberta to be organized when the compulsory dipping order came in force. There are many difficulties in the eradication of mange from an extensive territory with range cattle at large. It was, however, believed this had become possible, as the herds of cattle on the open range are now comparatively few, most range cattle being in large fenced leases.

Accordingly, the Veterinary Director General issued instructions to proceed at once with the necessary organization to carry the compulsory dipping into effect. The quarantined area is administered by the Chief Inspector for Alberta, acting under the Veterinary Director General. It is divided into districts, the executive work of which is carried out by veterinary inspectors. Each of these districts is subdivided and range riders are employed who each cover a subdistrict, reporting mange or suspected mange to the veterinary inspector under whose instructions they act. Reports from veterinary inspectors are forwarded to the Veterinary Director General through the office of the Chief Inspector for Alberta. It was essential to have men who could get in touch with the individual stock owners in one or more townships, according to the settlement of the country. For this purpose veterinary inspectors selected reputable owners who were willing to assist in this way and act as committeemen for their localities. Decentralization is carried out as much as possible, each veterinary inspector being responsible for his district. He can consult the Chief Inspector for Alberta on any matter, while the latter refers the larger issues to the Veterinary Director General.

It may be assumed that any measure of compulsion must have the coöperation of the people concerned, and to gain this was the most important step. Ignorance of the disease is one reason why there is difficulty in getting active coöperation; many believing that mange is just in the country and always will be. To overcome these ideas a capable lecturer, a veterinarian of the Health of Animals Branch, went in succession to each inspector's district. The veterinary inspector arranged the meetings at which these lectures were given, and they were advertised locally. The lectures had as their primary object the enlightenment of stock owners on the cause of mange, its treatment and the possibility of its eradication. The habits of the acari were described and mounted specimens were shown under the microscope. The reasons for the two dippings were given, and it was pointed out that the only treatment recognized by the Department of Agriculture is dipping in the calcium sulphide solution. This has been found safe and efficient, while the cost is comparatively low.

This dipping solution is made in the proportion of 10 pounds of lime and 24 pounds of sulphur to 100 gallons of water. The lime and sulphur are mixed into a paste and boiled in a smaller

quantity of water for not less than two hours and finally diluted to the above-mentioned proportions. The solution is used at a temperature of 105° to 115° F. and must have a specific gravity of 1023. The tester used is similar to a urinometer. The cattle are immersed in this solution twice, the second dipping being not less than 10 and not more than 15 days after the first treatment. The second dipping insures the destruction of parasites which may be hatched from eggs which escaped at the first dipping, before they reach maturity.

For the benefit of committeemen and in order that they could transmit the information to cattlemen in their locality, circular letters were sent to them periodically. These letters were written in as interesting a manner as possible, giving a general idea of the disease, its treatment, and the advantages to the stockmen if the restrictions were removed. Instructions were given for the disinfection of stables, corrals, etc., between the first and second dippings.

Having shown that the eradication of mange was possible if all cattle were properly treated and reinfection prevented by the disinfection of buildings, etc., it was brought home to each one that he was personally interested in seeing that no cattle were missed, whether purebred, dairy, range or farmers' cattle, and that calves must in every case be brought to the vat for treatment.

There were already many vats in the mange area, but the building of many more was undertaken in order that no stock owner, especially farmers with one or two cows, should have to bring their cattle more than about 10 miles to be treated. The building of these extra vats was assisted by the Department of Agriculture, a grant being given when the vats were built according to the plan of the Department. The vat, which could be of either the swimming or the cage type, had to be in working order, approved and reported on by the veterinary inspector, before the grant was paid. At these Government-assisted vats the charge was fixed in the agreement signed so that not more than 40 cents a head could be charged for the two dippings.

Advantage was taken of the meetings at which the lectures were given to organize the district, and where this had not already been done committeemen were appointed. Arrangements for the building of the vats necessary were also made, and where one man would not undertake the building of a vat, it was found possible in nearly

every case to have several form themselves into an association for the purpose.

For each vat a superintendent was appointed. He was instructed in his duties of supervising the preparation of the solution and seeing that every animal was properly dipped. Range riders saw that the large herds were gathered clean, and where any owner had not brought his cattle to the vat he was hurried up, or, if necessary, the cattle were brought in by the range rider himself or by someone hired for the occasion. In the latter case the owner was required to pay the expense.

The date set for the commencement, after consultation with representative stockmen, was June 24, this being a time when few cows would be left in calf, the winter coat would be entirely shed, and, as experience has shown, mange is in a more or less dormant state, possibly on account of the fine, oily condition of the hair and skin. Less infection showing at this time of year, the dipping would, presumably, be more effective, with fewer parasites to destroy and less scale to protect them.

Lists were prepared of the stock owners in each district, with the number of their cattle and the vat at which they proposed to dip their animals. These lists, made by the range riders with the assistance of committeemen, were at the vat concerned, so that the cattle could be checked as they were dipped.

Articles dealing with compulsory dipping were prepared by officers of the Health of Animals Branch and published in the newspapers circulating in the mange area. The last action was the posting of large notices in public places notifying stock owners of the compulsory dipping order with its requirements. With this chain of officials, lectures, circulars, newspaper articles and posters it would appear impossible for anyone owning cattle in the mange area to plead ignorance of the regulations.

In every community, however, there are irreconcilables who, on general principles, are "agin' the Government." In order that such people should not interfere with the effective dipping of all cattle a fine of \$500 was made possible. A heavy fine was necessary, as, for example, if a large stock owner chose to move his cattle out of the mange area without a license, his profits if the market were favorable might easily reimburse him for any small fine he might have to pay.

The shipment of cattle for any purpose after the 24th of June

until the dipping was completed was prohibited unless the cattle were accompanied by a certificate that they had been twice dipped. The railway companies were notified of this, as of all other regulations.

Dipping was carried out as arranged, with only a few delays owing to unforeseen circumstances, such as boilers leaking and accidents to vats. There was little trouble in getting the cattle to the vats, although some owners had to be hurried up. Veterinary inspectors made a daily visit to each vat in their district and saw that everything was progressing satisfactorily. Range riders assisted in their subdistricts, while vat superintendents remained constantly at the vat to supervise the actual dipping. The time left to make the necessary arrangements was short, and that the compulsory dipping has been satisfactorily carried out reflects credit on all concerned.

Although it would probably be too much to hope for, in such a large territory, that mange would be eradicated with the one compulsory double dipping, it is not unreasonable to expect that any fresh outbreak could be kept within easy control by the quarantine and treatment of infected and in-contact herds.

Dr. C. E. Edgett, V. S., D. S. O., late Director of the Canadian Veterinary Forces in London, England, and a member of the British Columbia Veterinary Association, is a candidate for member of Parliament in the Yale, B. C., constituency, to fill the vacancy caused by the resignation of the Hon. Martin Birrell.

He has the support of the Soldier-Farmer Party and also the Liberals have decided not to enter a candidate against him.

According to Ohio newspapers, our colleague, A. S. Cooley, of Cleveland, was elected as Representative to the State Legislature with the highest vote of any of the fourteen selected. In addition, he polled the seventh highest number of all votes cast, being led only by President-Elect Harding, County Commissioner Kohler, Senator-Elect Willis and three State officials.

The *National Stockman and Farmer* states that a stud of Suffolk horses was recently dispersed in England after having been bred by the same family on the same farm for 150 years.

THE CONTROL OF ANTHRAX IN THE CANAL ZONE ¹

By W. J. TAYLOR, *Cristobal, Canal Zone*

I WAS away on business when I got the request of our Secretary to present this topic, and I did not have time enough to prepare a paper, so I will make a few extemporaneous remarks concerning anthrax in the Canal Zone.

We are surrounded by certain limitations which do not exist with practitioners and research workers in the States, in that we are not able to prepare statistics that would become public property.

The Canal Zone consists of a strip of land five miles east to west from the center of the canal between the two oceans. In 1918 the idea was conceived that as a matter of precaution it might be well to turn over the land available for cattle pasture. Up to that time the Panama Canal with its working forces had been drawing on the States for its beef supply, and it was found that in Colombia there was no outlet for the beef, the animals being slaughtered for their hides. The Canal Zone authorities entered into a contract with Colombian authorities to import cattle into the Zone. Very soon anthrax broke out, and I was asked to go to the Canal to control it. As far as I can say, it is no greater factor than in the United States; but we have had certain conditions to deal with entirely different from those under which most practitioners and sanitarians have to work. At the present time we have 18,000 head of cattle owned by the Government on the Canal Zone.

A short time after America entered the war arrangements were made for supplying a certain amount of beef for army consumption. The daily consumption of the cattle by the Canal employees does not exceed 50 head a day, but to meet the new demand it was necessary to increase the killing to 200 or 250 a day.

The anthrax in the tropics corresponds very closely to the change of seasons, the wet and the dry seasons. The dry season is the anthrax season. This comes on the first of December and lasts until the first of May or June.

Certain recommendations that I made against the importation of cattle from Colombia could not be carried out, as it was necessary to import these cattle to furnish the beef. In the fall of 1918 I was in Colombia choosing the kind of cattle to be shipped to the Zone. To avoid anthrax in the Zone we vaccinated something like 18,000

¹ Presented at the Fifty-seven Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

head of animals, with not very good results. Those animals were kept thirty days before shipment, and even then after arriving on the Isthmus anthrax developed. We used a serum.

The point I wish to bring out is that we found very little evidence of anthrax causing the death of animals—not to a sufficient extent to cause any alarm. The people of Colombia are not so up-to-date and they do not recognize the importance of destroying all evidence of the carcass by burning it, so the disease is on the increase in that country.

Putting those cattle on the Zone after vaccination seems to lower their vitality sufficiently to allow them to develop the disease, and in that way a large area of the pastures of Panama have become infected. That is what we are up against. We have lost animals on the ships, but the losses are mainly from 48 hours to several days after landing. It seems they were infected in the country from which they came. I think that is a very important factor, because it opens up a line of thought which men dealing with the disease in this country have not met with. There is very good evidence to show that a few hours on shipboard or perhaps other conditions that will slightly devitalize an animal will cause development of anthrax.

I wrote Dr. Hoskins that if I said anything it would not be along the line of control of anthrax in the Canal Zone, because you might think I had something new to present. I want to make a statement of our conditions down there and ask you for suggestions.

During the next year it is not our plan to import animals during the dry season except for immediate slaughter. I might explain by saying that most of the cattle are young stock brought from Colombia and placed over various parts of the pasture area that has been developed, and so far as I know the loss among 12,000 to 17,000 young animals could be counted on the fingers of one hand. The young animals do not show themselves carriers of infection, but as soon as the dry season sets in we have to be very careful about fat animals, for in a few days after landing anthrax will develop in those cases.

The question arises, Is there some method by which vaccination may be carried on prior to shipment to prevent the development of this disease? During the coming season it is our purpose to kill all animals soon after landing. Our system of inspecting meats is carried out antemortem and postmortem. A smear is taken from

every spleen, and in that way we are sure we will catch everything in the way of anthrax coming over the killing floor.

All the fat cattle imported on the Zone during the dry season have some time during the year developed anthrax, while the young cattle have not. Perhaps the vaccine which we used was not potent for that particular strain or that particular stock. The fact that they later died shows that there was something lacking.

I think Dr. Eichhorn has a more interesting paper, and I am turning the further discussion of this subject over to him.

"On the representation of citizens and officials of Pittsburg County (Okla.), made personally to Governor Robertson, that the anthrax epidemic prevalent in that county for several weeks threatened to spread over other territory, the Governor issued a deficiency certificate for \$19,000 to be used by the State in helping to fight the disease in that and adjacent counties. Several hundred head of livestock have been lost."—*Wichita Daily Stockman*.

Eugene Ferron, V. M. D., of Philadelphia, Pa., formerly assistant to the manager and veterinarian for the Cauca Valley Agricultural Co. of Palmira, Colombia, South America, is now veterinarian for the Asociacion de Agricultores del Ecuador, with headquarters at Guayaquil, Ecuador, S. A. Dr. Ferron left for Guayaquil last April after his discharge from the U. S. Army on his return from overseas, where he served in the Veterinary Corps, A. E. F., with the rank of captain.

Drs. Eduardo P. Stirling and Pedro Sesane, Uruguayan veterinarians, are spending several months in this country on an official mission from their Government. They are particularly interested in studying methods for the prevention of livestock diseases and the enforcement of meat inspection regulations, as well as in visiting the leading veterinary colleges.

Dr. Burton R. Rogers gave his stereopticon lecture on "Tuberculosis" before a large number of delegates at the convention of the Institute of American Meat Packers recently held in Atlantic City. Dr. R. F. Eagle, as Vice-Chairman, arranged for the lecture and presided at the meeting.

THE DISSEMINATION OF ANTHRAX INFECTION THROUGH INDUSTRIAL SOURCES¹

By A. EICHHORN, *Pearl River, New York*, and A. L. EDMUNDS,
Franklin, New Hampshire

THE handling of anthrax hides in tanneries has been recognized as a source of danger to the employees coming in contact with them, and the statistical data available prove that a large proportion of the anthrax cases in human beings develop among the tannery workers and among laborers employed in loading and unloading hides. Thus, from 1900 to 1911 in Germany the number of cases among tannery employees varied from 20 to 50 annually.

The necessity of large importations of foreign hides to the United States from China and India especially, due to the shortage of native hides during the war period, resulted in a pronounced increase of anthrax infections in human beings and also in the occurrence of anthrax infections in animals kept in districts where tanneries were obliged to resort to the importation of hides.

The fact that the danger from native hides may be considered negligible may be explained in that on the North American Continent, as well as in most of the European countries, sanitary measures employed for the control of anthrax infections prevent in most instances the skinning of anthrax carcasses, thereby eliminating danger from such sources. Such is not the case in the Asiatic countries, and the experimental work conducted in this country as well as in Europe with hides from those sources has conclusively established the fact that the occurrence of anthrax in imported hides is very common. In two instances the senior writer had occasion to demonstrate this fact in connection with his investigations on the occurrence of anthrax infections in tanneries handling imported hides.

Veterinary sanitarians are primarily interested in the dissemination of anthrax from the tanneries through the drainage water, inasmuch as it is a practice to establish tanneries in localities where the drainage water from the tanneries may be readily emptied into smaller or larger streams. Such practice naturally results in the pollution of the streams into which the drainage water from the tannery flows, and if such polluted streams are accessible to cattle, or, on the other hand, if the topography of the land around the

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

stream is such that it is subject to inundation, the infection is disseminated upon the adjacent land. In this manner permanently infected anthrax districts have been established in the United States and Canada primarily as a result of the fact that some tanneries which previously handled only native hides have in the past few years resorted to importation of hides.

The control exercised by the Federal authorities on the importation of hides is not at the present time effective in eliminating anthrax infection. The requirement of certification at the point of shipment, before a United States consular officer, that the hides constituting the shipment are not from animals affected with anthrax, does not afford a sufficient guarantee for the elimination of the infection. Likewise the dipping at such points without proper supervision could not be made effective. In view of these conditions the control of the infection from such sources becomes a problem of the health and sanitary authorities in this country. Up-to-date tannery owners were required to satisfy only the board of health authorities as far as safeguarding the health of the employees is concerned; whereas the livestock authorities are entirely disregarded on the problems which arise from the handling of anthrax-infected hides in tanneries.

Repeated dissemination of anthrax infections from tanneries and thereby the creation of anthrax localities points out the necessity of inaugurating a proper and effective control for such establishments, and therefore the livestock sanitary laws in States where tanneries exist should include such measures which will place tanneries under their supervision, giving the livestock authorities such powers as will safeguard the livestock and agricultural interests in such communities against the possibility of infection.

It is true that we have many instances in which tanneries handling infected hides are not responsible for causing outbreaks of anthrax in animals, but it has been established that in such instances the failure to communicate the disease from those sources is due to the tannery being so located that there are no pastures in the surrounding localities of the polluted streams, or to the fact that the drainage water empties into a large stream in which it immediately becomes very much diluted, or that the drainage water passes into a stream having an extremely slow flow whereby the maximum of the solid material settles to the bottom, or that cattle have no access to the streams in which the tannery drainage flows, or finally in case the tanneries do not handle hides from districts in which anthrax pre-

vails. In all these enumerated instances the danger of the dissemination of the disease, while not always entirely eliminated, is reduced to a minimum by the natural environments. On the other hand, in other instances under more favorable conditions the anthrax infection is disseminated from the tanneries, infecting the adjacent locality, thereby causing periodical outbreaks of the disease.

It must be recognized that hides from anthrax carcasses harbor a tremendous number of spores, and in view of the fact that the viability of these spores extends over many years, the sterilization of the hides and the drainage water constitutes a rather difficult problem. Contamination of the hides with ordinary pathogenic germs, especially those which are not spore-bearing, can be eliminated much more readily than the resistant anthrax spores. Investigators who have conducted experimental work along this line have long realized the difficulties confronting them in safely eliminating anthrax infections from hides, and while methods have been developed by which this may be safely accomplished, they involved a procedure which the tanneries are not willing to adopt, inasmuch as they claim that the value of the leather suffers as a result of the application of these methods. In the face of experimental work, however, it is evident that their contention is not well founded.

The Seymour-Jones method and the Schattenfroh method have, according to many investigators, both proven effective; and according to the investigations of Tilley, of the Bureau of Animal Industry, the sterilization of the hides by these methods may be successfully accomplished without any injury to the hides. By both of the methods mentioned the destruction of the infection is accomplished by chemical means, the hides being subject to disinfection during the soaking process. The methods are described in detail in the original articles of these investigators or in the publication by F. W. Tilley on "A Bacteriological Study of Methods for the Disinfection of Hides Infected with Anthrax Spores." By subjecting the hides to any of these processes the anthrax infection can be eliminated, or at least controlled; that is, if some of the spores should survive the process of disinfection they would become attenuated to such an extent that they would no longer possess disease-producing qualities. The disinfecting of the hides through chemical action therefore can be accomplished in tanneries provided this is satisfactorily carried out. This has been further established in the control of the infection in the Whitefield, New Hampshire, district, which will be described later.

The possibility of the elimination of the infection by physical methods has also been employed in many of the investigations. The fact that in the various processes employed in the tanneries preparatory to the tanning of the hides, especially in the soaking and fleshing, the largest proportion of the infection is eliminated, and that in these processes a great amount of infection passes into the drainage water, suggested the possibility that the infection might be eliminated from the drainage water by suitable procedures. The chlorinization of the water has given the best results, but would represent such a costly method that from a practical point of view it must be left out of consideration. On the other hand, since the great proportion of the infection is carried into the drainage water by solid particles, especially the fleshings, the installation of devices whereby the solid material may be removed would naturally tend to reduce the pollution of the water to a minimum.

With this in view many tanneries, both in the United States and especially in Europe, either voluntarily or through authoritative compulsion installed sedimentation tanks and also various kinds of screens for the purpose of eliminating the solid material from the drainage water. In some instances revolving screens have also been installed for the exclusion of the solid material. Likewise in connection with the sedimentation tanks the water flowing out of them is directed into filter beds, which not only accomplishes the final elimination of the solid material contained therein but would also tend to retain most of the microorganisms from the drainage water. Several of the tanneries in Pennsylvania are equipped with sedimentation tanks of this kind, and unquestionably if they are properly cared for and the filter beds are also kept in good condition the pollution of the streams from the tanneries may be successfully prevented.

It is of paramount importance that where any of these systems or a combination of these systems is established the greatest care must be exercised to supervise their proper operation. It is essential that a series of sedimentation tanks must be provided, the number depending on the amount of water used in the tannery. There should be only one outlet from the tannery for all the water used, which should be permitted to flow into the sedimentation tanks. From the last tank the water should be directed into well-constructed filter beds, and these also must be cleansed from time to time of any refuse which may impair their proper functioning.

In some instances the senior writer had occasion to observe the unsatisfactory functioning of the sedimentation tanks from inattention, and he succeeded in demonstrating without the slightest difficulty anthrax organisms in the slimy material collected along the canal carrying the water from the tannery into the river. In this particular instance, however, on inquiry it was found that no attention whatever was paid to the sedimentation tanks, which, of course, under such conditions could not perform the function for which they were intended.

The fact that by far the largest amount of anthrax infection from hides is contained in the solid particles, and that they may be eliminated by devices, would tend to minimize the danger of the infection if nothing else but such means are used to guard against the pollution of the streams by tanneries; at least the infection would hardly exceed proportions whereby it would be capable of infecting animals which are being periodically vaccinated against anthrax. However, in such instances it would be essential to vaccinate all the stock exposed to such polluted water or pastured upon land inundated by the water; whereas in the absence of such precautions even the ordinary vaccination would not entirely prevent losses, as the animals would be subject from time to time to such extraordinarily heavy exposure that the immunity conferred upon them would not be sufficient to protect them against the infection.

The junior writer had the opportunity in his experimental work along this line to prove this point. From personal observations and also from authentic statements of owners of the land along a polluted river in the Whitefield, New Hampshire, district it was found that after the recession of the water following an inundation, pieces of hides, tremendous quantities of fleshings, etc., were found upon the land several miles from the tannery. Such polluted soil no doubt in some cases contains anthrax spores in such quantities that at times the ordinary vaccination is ineffective to prevent the development of the disease.

It may be readily seen, therefore, that in order to safeguard the livestock in such localities it is essential that the methods adopted for prevention must be carried out painstakingly and that any neglect or disregard may be followed by serious results. Once the infection is established on the land, even if proper precautionary measures are taken toward eliminating the infection, the animals must be vaccinated for many years to come in order to prevent any losses from the disease. Such land must naturally be considered as per-

manently infected, and only by persistent vaccination and thereby preventing all reinfections will it be possible to make such land safe.

Continued inattention toward the prevention of constant infection of the land from tanneries would not only result in a persistent infection, but also would tend to increase the infected area, as the infection may be carried from such sources to adjoining territories, continuously enlarging its extent. This was also observed in the Whitefield, New Hampshire, district in 1919, when the disease spread from the meadow lands upon the farms along the hillsides, in some instances several miles distant from the meadow land. It is not necessary to dwell upon the many channels whereby the infection may be spread from localities to more distant points, if we now only consider the established facts that flies, birds, dogs, etc., may disseminate the infection from one place to the other.

From the numerous instances in which anthrax has been disseminated by tanneries it is of the utmost importance that the livestock sanitary authorities should be empowered to require such precautions from the owners of tanneries as will prevent the dissemination of anthrax. Only by so doing will it be possible to safeguard the livestock from any danger emanating from polluted tannery drainage. If such power had been given to the livestock sanitary authorities many outbreaks could have been prevented in the United States and the livestock owners would have been spared great losses and a permanent danger which prevails in such districts.

CONTAMINATION OF LAND BY TANNERY DRAINAGE IN NEW HAMPSHIRE

New Hampshire, as far as can be ascertained, was free from anthrax until 1915. In June of that year several reports of deaths of cattle were received from the towns of Whitefield and Dalton by the Commissioner of Agriculture. The investigations revealed anthrax infection, and after removing the cattle from the infected pastures no further cases appeared until the winter. At that time several animals died from the disease, which was definitely diagnosed as anthrax. It was further established that the deaths resulted from feeding of hay cut from the meadow lands bordering the Johns River. The Chief of the Bureau of Animal Industry of Washington, D. C., was informed of the occurrence of anthrax in that district, and a bacteriologist from the Pathological Division was assigned to proceed to New Hampshire to assist in the investigations for the purpose of preventing the spread and losses from the disease.

Specimens of hay cut from the infected meadow land have definitely proven a contamination of the pasture with anthrax infection.

It was further established that the occurrence of the disease was due to the contamination of the Johns River with drainage water from the tannery located in the town of Whitefield. This tannery up to 1915 principally used native hides for tanning purposes. Due to the shortage of hides at that time, importations were resorted to, which came from various parts of the world, many of the shipments originating in China. In the course of the investigations by the State Department of Agriculture, the presence of anthrax infection was found in the water in which the hides were soaked. Consequently the infection must have persisted in different parts of the tanneries in which the hides were handled, such as in the hide room, soaks, fleshings, etc. All the drainage water from the tannery empties into the Johns River, which is located about 50 yards from the tannery soaks. From that point the Johns River is somewhat winding in its course and empties at a distance of about 6 miles from the tannery into the Connecticut River. The flow at some points is slow, at others more rapid, and the river is bordered on both of its banks by rich meadow lands. The meadow lands again adjoin farms, most of which are located on slightly sloping and rolling hillsides. The Johns River overflows the meadow lands in the spring and also during the season of torrential rain-storms.

As soon as the presence of the infection was established, the hay originating from the meadow land was ordered burned under official supervision. The animals in that locality were vaccinated by the veterinarians in the State service. The premises where the disease occurred were thoroughly cleaned and disinfected. Instructions were issued by the authorities on the disposition of carcasses which died from anthrax, and such sanitary measures were inaugurated as would prevent the spread of the disease.

In order to prevent the continuous recontamination of the land, and also on account of the possibility of spreading the infection from the Johns River into the Connecticut River and thence upon the land bordering the latter river, it was deemed advisable to require that the hides in the tannery be soaked in a suitable disinfectant. The tannery officials agreed upon such a procedure, and soaking of the hides in a bichloride of mercury solution was decided upon. Pasturing of animals on meadow lands was prohibited.

In order to establish whether vaccinated animals might be safely placed upon the pastured land, especially since reinfection of this

land was guarded against by the soaking of the hides in the bichloride of mercury solution in 1917, the Department decided to carry on experiments to determine whether the animals might be safely pastured upon the land and also whether the hay after being cut and placed in the barns for winter use could be fed to the animals.

The following precautions were taken before undertaking the experiments:

1. It was required that the tannery at Whitefield soak the hides in bichloride of mercury solution of 1 to 1,000 for 24 hours, which is known to destroy or at least attenuate greatly the anthrax spores in infected hides.

2. The meadow lands along the Johns River were burned, covering a territory varying in width from a few rods to half a mile and in length from three to four miles. Some of this land was burned over twice, while all of it was burned over once. This precaution was taken in order to destroy the anthrax spores present on the surface.

3. Thorough cleaning and disinfection of all premises where cases of anthrax were known to exist, and the proper disposition of all carcasses which died of anthrax.

4. Vaccination of all cattle in the entire area.

The vaccination of 1917 consisted in the administration of either the simultaneous treatment or the double vaccination with No. 1 and No. 2 vaccines. All the animals were held in the barn for about 10 days, after which they were turned on the infected land.

In this experimental work coöperation of the land owners with the Department was solicited and an agreement was entered into which resulted in the vaccination of about 20 animals. A few days after the placing of the animals upon the pasture one animal died, and the farmers, without consulting the veterinarian in charge, removed the other animals from the meadows, which automatically terminated this experiment.

In the spring of 1918 it was decided to try the experiment again but in a somewhat different manner. The farmers agreed to furnish the cattle for this work, the Department of Agriculture taking full charge of them, and no animal was to be removed from the meadows during the term of the experiment except by order of the Department. To insure the farmers against financial loss it was agreed that any animals dying, either as a result of vaccination or from direct infection, should be paid for by the Department from the

funds appropriated for this purpose, the full appraised value of such animals being allowed.

Instead of placing the cattle on small inclosed plots, as was done in the first experiment, they were now given free range over most of the quarantined area. On some farms the cattle did not necessarily drink the contaminated water from the river, as there were brooks coming from the highlands to which they had access. It was noted, however, that they did occasionally drink from the river. This river water has been found to carry heavy solutions of anti-septics used by the tannery company in the process of tanning hides. Not only that, but many thousands of hides imported from China, and known to be infected with anthrax, had been washed or soaked in water which was allowed to run into the river from the soaking vats.

It has been stated that in the experiment of 1917 one animal died, which clearly proved that the process of vaccination used did not in all cases protect the cattle from this disease. In 1918 a different procedure was therefore carried out. Forty-four animals were used in this experiment, each of them being ear-tagged and records made of estimated weight, age, previous history and appraised value.

The process of immunization was then begun. Each animal first received 10 c.c. of serum and 1 c.c. of vaccine No. 1. Ten days later they were given a dose of vaccine No. 2, and again ten days later a special vaccine somewhat stronger than the No. 2 was administered. The animals were retained in the barns for ten days after the last vaccination, when they were turned on the meadows.

During the latter part of the summer a registered bull was added to the experimental herd. He was vaccinated by the procedure described above, and after remaining on the infected meadows for several weeks showed no ill effects from the exposure.

The Department, wishing to carry the experiment still farther, gave its consent to the cutting of some of the hay for barn feeding. About 40 tons of this hay was placed in special barns and was to be fed under special permit to animals that were pastured on infected areas. No further vaccination was deemed necessary. Twenty other animals which had not been on the meadows, but which were vaccinated as described above, were also used in this feeding experiment. No bad results followed the feeding of the hay.

These experiments having proven that animals could be successfully vaccinated against the existing infection, some farmers informed the Commissioner of Agriculture that they wished to pasture

the animals upon the meadows; others desired to cut the hay and feed it to vaccinated animals. The animals were vaccinated and some of them after complete vaccination were placed upon the infected land. In about four weeks' time anthrax was reported to have occurred in two of the animals on pasture, with typical manifestations of the disease.

In the face of the favorable results and the control of the disease in 1917 and 1918, losses from anthrax came as a surprise, and investigations were immediately undertaken to establish whether the soaking of the hides in the bichloride of mercury solution was consistently carried out. These investigations revealed that the instructions were entirely disregarded; that the bichloride, if such had been used, was not used in a sufficient strength to insure the destruction or even an attenuation of the spores. This fact would explain the recurrence of the disease among the animals.

It must be considered remarkable that the vaccination of the animals, even with the special vaccine, was not sufficient to prevent the disease. This may be explained by the fact that the tannery imports practically all of its hides and the infection must have been very heavy. Thus the animals drinking the water from the contaminated stream took in such a large amount of spores that the immunity produced by the vaccination was not sufficient to prevent the disease. As a matter of fact observations by the authors conducted along the river have shown that tremendous amounts of fleshings and other solid materials were carried down the stream, which could be observed even at a distance of four miles from the tannery. These conditions show the extraordinarily heavy exposure to which the animals were subjected.

From the infection in the meadows the disease spread to the adjacent farms on the hillside, carried by flies and possibly by other means. In all a total of 6 cattle and 12 horses died. A large proportion of the affected animals recovered after the liberal use of anti-anthrax serum. The failure of conscientiously carrying out the dipping of the hides as agreed upon no doubt was responsible for the 1919 outbreak, and the observations in the past three years warrant the conclusion that, unless precautions are taken by the owners of the tannery as outlined by the State authorities, the meadow lands along the Johns River could not be safely utilized for pasturing or for hay production.

In view of the fact that the dipping requirements on the hides can be controlled effectively only by strict supervision, the installation of revolving screens and settling tanks would afford the best

solution for controlling the infection. At least the ordinary form of vaccination in such cases would prevent losses and thereby the spread of the disease. It is contemplated to equip the plants with such means as will effectively take care of the solid material emitted from the tannery, and it is thought that by persistent vaccination the disease may be effectively controlled and the extension of the anthrax district prevented.

CONCLUSIONS

1. The drainage water from tanneries handling foreign hides constitutes a source of danger for polluting streams with anthrax infection. In at least two instances in the past five years new anthrax districts have been created by such tanneries in the United States and Canada.

2. Either Federal or State authorities should be empowered to compel tannery owners to adopt such means as will prevent the contamination of streams with anthrax infection. The soaking of the hides by either the Seymour-Jones or Schattenfroh methods will effectively control the anthrax infection in hides. These methods, however, are only effective if consistently carried out.

3. If the soaking in disinfectants is not practiced, the elimination of the solid matters from the drainage water should be insisted upon. This may be accomplished by the installation of revolving screens and settling tanks.

4. The effective operation of the screen and settling tanks should be periodically controlled.

5. Where no precautions are taken to guard against continuous pollution of the drainage water, and where animals have access to the stream in which such drainage water flows, they should be vaccinated not only in the routine manner but should also be periodically revaccinated in order to confer upon them the maximum of immunity.

6. Even if the necessary precautions are taken by the tanneries, the animals which have access to the land previously known to have been infected by tanneries should be regularly vaccinated. In case of the development of anthrax in such districts, the outbreaks should be controlled by the usual approved sanitary measures.

The writers desire to express their hearty appreciation to Andrew L. Felker, Commissioner of Agriculture, and Dr. Charles Duncan, Secretary of the State Board of Health of New Hampshire, for their valuable assistance offered in connection with these investigations.

THE DIAGNOSIS AND TREATMENT OF CERTAIN SKIN DISEASES OF SMALL ANIMALS¹

By H. J. MILKS, *Ithaca, New York*

THE diagnosis and treatment of the diseases of the skin constitute a considerable part of the work of the veterinarian who deals with small animals. The treatment varies so greatly that a slipshod diagnosis is not sufficient. The numerous forms of skin trouble have led to a great number of separate diseases and in many cases to a number of synonymous names for different conditions. There are several classifications which may be followed, but this paper will be limited to a few of the more important nonparasitic diseases and the different forms of mange.

ACNE OR FURUNCULOSIS

Acne is an inflammation of the sebaceous glands and hair follicles, frequently progressing to pus formation, and characterized by pin-point to bean-sized nodules appearing on an otherwise healthy skin. Furunculosis, although given as a synonym by many authorities, is reserved by Hutyra and Marek for another disease with larger foci, more intense pain and greater destruction of tissue.

The disease occurs most frequently on the bridge of the nose or on the face. The inflammatory foci are first nodules which after a time become filled with pus. Sometimes several coalesce and form a large slough. It is always a troublesome disease to cure, as new foci will form by the time the earlier ones are healed, and thus we have a succession of pustules.

Diagnosis.—This is made entirely by the location and appearance of the nodules and pustules. Whether a distinction is drawn between acne and furunculosis depends upon the extent of the lesion, as stated above; but usually a single classification is sufficient.

Treatment.—While the treatment of the individual pustules has not given serious trouble in the few cases we have had, the difficulty has been to prevent a new crop. The usual surgical procedures, such as opening and cleaning, have sufficed for those present, but seemed to have no influence on the formation of subsequent pustules. Our only permanent successes have been obtained by the use of autogenous bacterins, which have given us uniformly good, prompt results.

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

SEBORRHEA (DANDRUFF)

Seborrhea is described in two forms, according as whether the secretion is oily (*oleosa*) or dry (*sicca*). The dry form is said to occur mostly behind the ears and on the neck, shoulders and tail, but may involve other parts of the body, while the oily form develops on those parts thickly covered with hair. In dry seborrhea there is an excessive amount of bran-like yellowish or grayish scales together with a greasy mass, often dark in color on account of the presence of dirt, which surrounds the hair follicle. The hairs are matted into tufts by the excretion, which seems to work up along them, and become loosened so that they are readily removed by rubbing. The skin is normal beneath the hair and dirt. In the oily form the skin is covered by an oily substance, which, drying, readily appears as yellowish-gray crusts.

Diagnosis.—Seborrhea may be distinguished from eczema because in eczema the skin is altered; from mange by the slight itching, by the fact that sarcoptic and follicular mange commonly involve certain parts of the body first, and finally by an absence of parasites.

Treatment.—Treatment may be divided into general and local. Under the head of general may be included tonics, as iron and arsenic. Any digestive disorder should be corrected. The local treatment consists in removing the crusts and scales, followed by the application of astringents and stimulants with the idea of influencing the glandular secretion. Resorcin, salicylic acid and sulphur are the most important and may be used in ointment or solution. For reasons of cleanliness lotions are to be preferred. Resorcin is usually given first place in the remedies for seborrhea, although in one case upon which almost everything had been used over a period of several months, and after failure with resorcin, we succeeded by having the dog washed with a mild potash soap followed by daily applications of salicylic acid 1 part, glycerin 3 parts and alcohol 60 parts. This particular animal improved rapidly. The hair stopped falling after the third application, and six treatments followed by another bath effected a cure that was permanent for at least several months.

ECZEMA

Eczema is a noncontagious inflammation of the skin, characterized primarily by exudation, erythema, vesicles and pustules leading to scales and crusts and accompanied by burning and itching. Its causes are chiefly due to mechanical, thermal, chemical or bacterial

influences, some of the more frequent being parasites, soiling the body with excreta, pus from wounds, etc., especially in long-haired dogs. While it is often impossible to connect any internal disease with eczema, certain digestive disturbances are often accompanied with it, and it is not rare in debilitated or badly nourished animals or in cases of rickets, diabetes, etc. No animals or class of animals are free.

Various methods have been advanced for classifying this common disease: According to its stage, eczema erythematosa; location, eczema capitis; condition, moist or dry; extent, circumscribed or diffuse; and to its chronicity, acute or chronic. For our purpose it seems well to follow the classification of Hutyra and Marek, who describe acute diffuse eczema of the long-haired parts and circumscribed eczema occurring on different parts of the body.

Acute diffuse eczema is often seen back of the ears, on the neck and shoulders and back of the thighs. It begins as small circumscribed spots that spread rapidly until large areas are involved. When seen early the eruption takes the form of roundish, sharply circumscribed, shiny orange-yellow or red spots surrounded by papules and vesicles within an outer darker red ring, but in the later stages may consist of a raw surface with broken-off or matted hair covered with a yellowish or grayish exudate. On the newer part of the lesion, that is, toward the periphery, one will find the hair broken off and the skin cracked and covered with serum or pus. The lesion is very sensitive and itchy and is consequently altered by the animal licking it. Acute diffuse eczema occurs less frequently on the thin-haired parts, yet we have frequently seen it on the side of the face.

Circumscribed eczema shows little inclination to spread and occurs on parts of the body more liable to mechanical injury, dirt, fleas, etc. It may take an acute course but more often follows a chronic course. On the scrotum we have seen it most often as an acute disease. Circumscribed eczema often occurs on the back, especially in old, fat animals. The hair becomes thin or is broken off, and the skin is unevenly thickened or thrown into folds and may be moist, although in most cases it is scaly. Itching is intense and persistent. When localized on the tip of the tail an ulcer may result. One of the most important forms of circumscribed eczema is that of the external auditory canal, commonly called non-parasitic otorrhea.

Diagnosis.—Eczema is easily diagnosed when typically manifested by its location, rapid spread, the presence of nodules and pustules and moist condition of the skin. Kaposi recommends in doubtful cases to rub the suspected places with dilute caustic potash solution, when small moist dots or vesicles appear if the condition is eczema. The differential diagnosis from mange will be given later.

Treatment.—The treatment of eczema may be divided into general and local. There are no specifics.

General treatment: A great deal of attention has been given to the diet, and yet except in very few cases I have been unable to couple eczema with the diet. In human medicine highly nitrogenous foods are usually omitted, but in canine patients a lack of meat appears frequently to be the cause of the trouble. All spiced food, sugar, etc., should probably be prohibited. Each case of course must be decided on its merits. Correctives to the digestive tract are frequently useful. Among these are laxatives, intestinal antiseptics, etc. Free catharsis, preferably with a saline, is valuable in acute conditions. Diuretics may be of some service. Arsenic is frequently prescribed, but is not indicated in acute eczema or when the inflammation is high. In any case it is generally believed that arsenic is contraindicated unless the condition of the animal is such as to require arsenic if there were no eczema. Thyroid extract in small doses has been found useful in certain eczemas of the young and aged in human medicine and may be of service in veterinary practice.

Local treatment: This is probably of most importance in treating the disease. The choice of the remedy depends upon the condition of the inflammation. In acute cases all stimulation should be avoided and something soothing used. Water should be avoided as much as is compatible with cleanliness in acute and subacute eczema, but may be made less irritant by the addition of boric acid, bran, starch or borax. Soap is useful in subacute and chronic eczema, but should not be used in the acute form. Tar is indicated in the chronic forms of the disease, the rule being that the more chronic is the eczema the more is tar indicated. Crusts should be softened with oil rather than with soap and water, and in extreme cases may be softened with warm starch or linseed poultices. Salves and pastes should be loosened in the same manner. It is often necessary to take some measure to prevent the dog licking the medicine off or injuring the lesion.

The treatment of a few different types of eczema will be given in detail.

Erythematous eczema.—Jacob recommends washing with diluted Goulard's extract (liquor plumbi subacetatis dilutus) or liquor aluminum acetate (Burrows's solution), 2 to 4 per cent, or with vinegar, three or four times daily. Linimentum calcis (carron oil) rubbed into the part three or four times daily, followed by the application of some drying powder such as starch, lycopodium, boric acid or kaolin, often works well.

As a rule lotions are borne better than ointments. They should consist of some agent in suspension, such as zinc oxide or other bland powder. Black lotion (lotio nigra) either alone or combined with equal parts of lime water is useful. If the skin is covered with scales zinc oxide ointment often does well.

Moist eczema.—Since there is no sharp line of demarcation between the different kinds of moist eczema, their treatment must be discussed as a whole. The main object of the treatment is to dry up the lesion and stop its spreading. All eczemas heal under a scab, and therefore the first thing to do is to facilitate the formation of a scab. Ointments do not do well because they will not adhere to the moist surface.

First clean up with boric acid solution, bran or starch water. Cut the hair from the lesion and for a short distance around it. Powders which dry up the secretions or agents which coagulate them may then be used. Among the former are the hygroscopic powders mentioned previously, and of the latter, astringents, either vegetable or mineral. We have used solutions more than powders. Salicylic and tannic acids in alcohol or 5 to 10 per cent silver nitrate work well. They are to be applied two or three times daily until a scab forms and the lesion stops spreading. Then the scab is softened and removed with a soothing ointment. As a rule the above-described treatment will be successful in from 5 to 10 days, the average being about a week. Numerous other agents may be used with similar action with equally good results.

Chronic eczema.—In chronic eczema stimulating remedies are indicated, to promote absorption of the infiltrate. Some preparations of tar, as oil of tar, cade or rusci, are of this class and may be used interchangeably, as they differ little if any in action. One of the above-mentioned agents may be incorporated with sulphur in ointments, lotions or paints, according to the preference of the practitioner.

Eczema of the ear.—The treatment for this type corresponds very closely to that for other types of moist eczema. The ear should be cleaned either with dry cotton on an applicator or by the use of water or hydrogen peroxide, and thoroughly dried. Mild cases do extremely well with daily dry cleaning followed by the instillation of one of the drying or soothing agents, such as boric acid, xeroform, thymol iodide, calomel, etc.

Serious diseased conditions with considerable ulceration require more vigorous treatment, such as the use of antiseptics and astringents, the same as in acute diffuse moist eczema. Indolent ulcers or exuberant granulations may be actively cauterized with silver nitrate stick or stronger solutions than those mentioned previously. This is painful and should be preceded by a local anesthetic; indeed it will be found advantageous in many cases to use these agents whenever the ear is painful, as it relieves the pain and consequently lessens the irritation from shaking the head. If shaking can not be controlled otherwise, a bandage or cap should be applied to prevent injury to the ears. Shaking, however, is not so severe in catarrhal otorrhea as in the parasitic form because it is much more painful.

PARASITIC DISEASES

Under the head of parasitic diseases I will include only sarcoptic mange, otodectic mange and follicular mange.

Sarcoptic Mange

In the dog the eruption most often begins upon the head, base of the ear, bridge of the nose, orbital rims and other thin-skinned parts such as the front of the chest and abdomen, and finally spreads over the whole animal. In the early stages the lesions consist of small papules which may change to vesicles or pustules. The diseased areas may be covered with profuse desquamation at first, later by a yellowish-gray scab. The hair falls out. Violent itching, which is increased by warmth, accompanies the eruption, and consequently the dog may change the character of the lesion by biting and scratching. There is a mouse-like odor when large areas are diseased. Animals frequently die from cachexia.

Sarcoptic mange in the cat usually begins on the ears and is confined to the immediate vicinity on the head, although the feet are sometimes involved and in one instance the tail was covered with crusts. It begins much like the corresponding mange in dogs, but appears to become scabby earlier. The skin soon becomes

wrinkled and covered with gray scabs. In bad cases the eyelids may be involved.

In the ferret the disease usually begins on the head and feet, although the lesions on the feet (foot rot) are often first noticed by the owner. Crusts form on the extremities, at the base of the nails and on the feet. Upon removal they leave a raw area. The nails grow extremely long and curved. A careful examination will show the entire body scabby.

Diagnosis.—Sarcoptic mange in the dog may be differentiated from follicular mange by its intense itching, easy transfer from one animal to another, greater accumulation of scurf, preference of the disease for the ears, lower chest, belly, elbows and inner thighs, and finally a microscopic examination will reveal the follicular mite.

From eczema it is distinguished by its contagiousness, by the itching, which is out of all proportion to the lesion, and by the fact that eczema responds more readily to treatment. The demonstration of the parasite is at times so difficult that, according to Friedberger and Frohner, any skin eruption accompanied by intense itching and other symptoms of the disease must be regarded as mange, although no parasite can be found. The lesions of the disease in ferrets and cats are so characteristic that no confusion seems likely to occur, and furthermore, the mites are easily demonstrated.

Treatment—Dogs.—The whole body must be treated to insure success. Long-haired animals should be clipped. The crusts may be removed with green soap and rubbing. As a rule remedies are best applied to one-third of the body daily, left on four or five days, then washed off, and the treatment started again the following day. Many remedies are useful: tar, cade, sulphur, or usually a combination of tar and sulphur in oil or fat. Cresol, lysol, balsam of Peru, etc., are also valuable. Washing or scrubbing in lime-sulphur solution or solution of liver of sulphur are often effective. Probably more depends upon the thoroughness of the application than of the parasiticide used.

Cats.—Clip the hair on the head and posterior to any lesion on the neck. Then apply any nonirritant parasiticide. Alkaline sulphur ointment, N. F., does nicely. Balsam of Peru is also excellent, although it is said to cause cerebral symptoms occasionally.

Ferrets.—Remove the crusts on feet and body. Cut and clean crusts from the nails. Many of the combinations of tar, sulphur and fat are effective.

Ear Mange (Parasitic Otorrhea)

The chief symptoms which lead one to suspect parasitic otorrhea are violent shaking of head, rubbing the ears on the ground or convenient object, whining and howling. The itching increases in the presence of warmth. Epileptic convulsions are not rare in cats, but we have not seen them in dogs. In some cases the mites cause itching only and do not in themselves cause any inflammation, the skin of the ear being sound in spite of a heavy infestation. If the ear be examined closely in these cases, a number of tiny white specks may sometimes be seen moving about. This is especially so in cats. Long neglected cases, however, usually end in baldness of the flaps of the ear, scratches or abrasions, and finally all the symptoms of catarrhal otorrhea. Many of those chronic sores on the ear flap accompanied by violent shaking of the head are due to parasitic otorrhea, although the inside of the ear appears in fair condition.

Diagnosis.—The disease may be distinguished from canker by the violent shaking of the head, dark brown discharge, being itchy instead of tender, and the presence of the mites, which may often be seen with the unaided eye or hand lens.

Treatment.—This is aimed directly at the parasites. Most of the parasiticides may be used. Jacob recommends 2 to 5 per cent solution of lysol in liquid petrolatum instilled in the ear for several days, after which they are to be cleaned. Glass advises 1 part of nitrate of mercury to 8 of almond oil. We have had fair success with 1 part of this ointment to 3 of lard, but the treatment must be persisted in for a considerable time in order to effect a cure. Caution should be used in applying sulphur and tar preparations, as they are occasionally too irritant. If the ear flap is injured it will probably be necessary to apply a cap or bandage in order to heal it.

Cats.—Parasitic otorrhea is a common disease of cats. It is easily diagnosed, as the parasites are more numerous and larger. The treatment is the same as that for dogs.

Rabbits.—The most prominent symptoms are severe itching, hanging of the ear, and the presence of yellowish-brown crusts or scabs that may completely fill the ear. This is probably the easiest mange to diagnose, as the mites are very numerous and large enough to be readily seen with the unaided eye. The treatment is the same as that given for other animals.

Follicular Mange (Acariasis)

Follicular mange is characterized by absence of itching, falling of the hair, with desquamation or pustule formation, and thickening of the skin caused by the *Demodex folliculorum*. It is generally classed as communicable, although Jacob claims it is not and puts stress on the proper condition of nutrition. It is certainly not easily transmitted, and on the contrary many cases are seen in which there has been no known contact. Some entire litters of puppies become infested at an early age, while the mother, so far as can be determined, remains entirely sound. The larger number of cases occur in short-haired dogs.

Two forms are commonly described, the pustular and the squamous. The pustular may follow the squamous or be present from the start. When encountered there is little chance of missing a diagnosis. We see the firm nodules followed by pustules, usually beginning on the thin-haired parts and then spreading to other parts. The contents of the pustules are either a blood-stained pus or a thick, yellowish mass in which it is easy to distinguish the parasites. The skin of the affected part assumes a copper red color.

Squamous form.—This, as the name implies, is a squamous eczema. It usually remains for some time with little tendency to spread. Favorite seats are the orbits, spreading to the face, elbows, under side of neck, or even isolated small spots on different parts of the body, from which the hair falls. The skin is at first a copper red color and covered with fine scales, but after a time becomes lead gray. In other cases there is simply a baldness with such a perfect skin as to indicate only a light form of squamous eczema. The disease in these cases may be localized on the under side of the neck and only be suggestive of rubbing with the collar and wearing of the hair, or may be upon the side of the face, on or around the eyes, or in spots on different parts of the body. They show no signs of inflammation or change in color of the skin, do not itch, and in fact manifest themselves only by a loss of hair; and yet if a microscopic examination of the scrapings be made numerous parasites will be found.

Diagnosis.—The pustular type of the disease is so characteristic as to be easily diagnosed. The copper red color, thickened skin, pustules bluish red in color and containing a thick bloody pus make diagnosis easy. In doubtful cases the contents of a pustule examined under the low power will quickly check the diagnosis.

The squamous form is not so easily diagnosed. Some suspicion may be gained by the loss of hair with slight or no itching, but a positive conclusion can be reached only after a microscopic examination, as some of the atypical types which are often diagnosed as squamous eczema can be differentiated in no other way. Furthermore the prognosis of follicular mange is so dubious that one should always incriminate the acarus mite in suspicious cases until its absence can be determined.

Treatment.—The treatment is most unsatisfactory, as might be surmised from the long list of remedies which have been used and recommended at one time and another. Jacob appears to give proper food and hygienic conditions more prominence in the treatment than drugs, but we have not been successful in carrying out his line of treatment. Many cases recover after a time, and many do not, and even for a recovery considerable time is required.

For the squamous type tincture of iodine often does well. It should be rubbed fairly well into the skin daily until desquamation is profuse, then omitted for a few days. Nitrate of mercury ointment 1 part to lard 3 parts also will succeed in some cases. Our plan is to apply to one-third of the body daily until covered, then rub each day for three or four days, wash with soap, and repeat.

The other agents recommended for the treatment of sarcoptic mange in the dog may be adopted. Bacterins were advised at one time for the treatment of follicular mange, but have not given the success in our hands that would warrant their use, perhaps because each case upon which we used them was positively diagnosed as mange.

DISCUSSION

CHAIRMAN BEMIS: Are there any questions you would like to ask Dr. Milks on skin diseases?

DR. BOYD: I believe the Doctor said something about prognosis, but I don't believe he touched upon the prognosis in cats, and mange in cats.

DR. MILKS: Unless you have a very badly affected case, the prognosis ought to be good.

DR. FERGUSON: In those moist cases of eczema where the dog scratches a whole lot and where they are very hard to control, have you ever tried formaldehyde?

DR. MILKS: No.

DR. FERGUSON: I have had some good results in those cases, where it was impossible to keep the dog from scratching, where they would scratch the side of the face until it was like beefsteak. I could strap the ears and face up and the next day the wound would be suppurating. Take a case like that and wash it with soap and water and wash it with a solution of

3 or 4 per cent of formaldehyde and it will stop the itching. One application will not. It may be two or three days, but it will dry up the parts and stop the itching, and if you follow that up with a little sulphur ointment those cases will do remarkably well. Those are about the meanest cases in the dog that I have to treat, because the most trouble is to take care of them, and this way of handling them has been very satisfactory to me.

This is the way I got on to that treatment: One of my boys has that same trouble, that eczematous condition of the flexure of his knee, especially in the summer time when he goes in swimming, and we have tried different remedies, and were unable to control it until we tried several applications of the formaldehyde solution, and that has controlled it very nicely.

DR. MILLER: I would like to say one word in regard to follicular mange. When it comes to shaking the thing right down to the bottom, I don't believe that there is a drug in the Pharmacopeia that will cure follicular mange. I believe those things are evolved out. For instance, take Bruner's remarkable table of the tenacity of the life of these parasites. I think he estimated they would live for 85 minutes in oil. You know you can't treat a dog for 85 minutes.

The young parasites are animals with three legs. The fourth is only developed at a last stage. When you treat those things over a series of weeks—that is what it means to treat them successfully—you will find that several things take place. You will find the contour of the parasites changing. Instead of having long bodies, they will become more stumpy. You will find them more pigmentary; a yellow pigmentary condition of the bodies precedes their demise, or they have all been put out and you search in vain. When you treat those with balsam, it is most difficult to locate the young parasites. I believe you can take that table of Bruner's as an index of what they will stand, in the laboratory, from the fact that you cannot find young parasites. Long before that, you will have ceased to find young parasites with three limbs. I think I am safe in saying that those things are evolved out and not cured.

DR. BRUNER: I would like to ask the Doctor what results he has obtained with the use of bacterins.

DR. MILKS: I have had several cases of vesicular mange. That is where it was absolutely from the parasite. We never had any luck at all.

DR. ANTHONY: I would like to ask the Doctor when a mange case is cured and leaves the hospital and goes back to its home what he does and what procedure he uses to keep the dog from returning to him infected in a few weeks with mange.

DR. MILKS: We haven't any special proceeding. You would have to burn up a man's home to get it disinfected. The best we can do is to do the same as when they came to us first. We can't disinfect the man's home.

DR. MERILLAT: I think the experience of Professor Henry during the war has shown that the carrying of parasites is not very successful, that they do not live off the body of animals more than fifteen days. That is a basis upon which to work in disinfecting homes. We concluded that in the Army. If we went into places that had just been evacuated, they

were the infected places, whereas if we went into barracks that had been abandoned for a long while, our animals never contracted mange, proving that the extraneous life of the parasite was most precarious.

DR. FLYNN: I think I find that my greatest trouble is with reinfection; the animal going home becomes reinfected. I always advise the owner to be careful where he houses the animal. Those parasites are in the rugs, floors, and in the kennel, and I always tell the owner to provide an absolutely clean place and to disinfect his place and send the rugs to the cleaner. I think the thing is easily controlled if proper measures are used.

DR. MILKS: I find in a case like follicular mange you are obliged to use such good treatment that you don't get a case of reinfection for a number of years, because that dog lives through a good brisk exposure.

DR. MERILLAT: The dog is usually so thoroughly impregnated with parasiticide that the parasites will seek another dog rather than that one. We have very few cases of reinfection, so few that we don't need to consider them at all.

Dr. J. H. Oyler, No. 110 South 13th Street, Harrisburg, Pa., who has been conducting a general practice of veterinary medicine in Harrisburg for the past 35 years, finds that on account of his failing health he can no longer do justice to his patrons, and announces his practice and equipment for sale. His successor should be a general practitioner especially well trained in the treatment and surgery of small animals and can be assured of Dr. Oyler's help in establishing himself.

Dr. A. A. Leibold, who has been holding the position of Director of Laboratories with the Eagle Serum Company, is now associated with the Zell-Straub Laboratories, in Chicago.

"The accredited-herd plan, by which owners of tuberculosis-free herds receive State and Federal recognition, has met the approbation of breeders of cattle all over the United States."—*Iowa Homestead*.

Twenty-five dairy cows driven across the Maryland-York county line in violation of the interstate cattle law were quarantined and inspected by agents of the Bureau of Animal Industry of the Pennsylvania Department of Agriculture, and 36 per cent of the cows were found to be so badly diseased that they were condemned for fertilizer. The State line is being closely watched by State officials in coöperation with the Federal Department of Agriculture.—*Pennsylvania Grange*.

THE DIAGNOSIS, THERAPEUTICS AND PROPHE- LAXIS OF CHICKEN-POX (CONTAGIOUS EPITHELIOMA) OF FOWLS¹

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THE relationship between the various pathological conditions of the head of domesticated fowls has been the subject of much controversy. These conditions are variously designated as chicken-pox, contagious epithelioma, avian diphtheria, canker, colds, contagious catarrh, swelled head, roup, etc. Ward and Gallagher (1) in their recently published work, "Diseases of Domesticated Birds," express the opinion that all of these conditions are due to the same etiological factor, namely, "the filterable virus of chicken-pox or contagious epithelioma." The results of extensive study of these diseases at the California Agricultural Experiment Station, however, have led us to the conclusion that, as they occur in California, there is a distinct difference between some of them.

CLASSIFICATION OF DISEASES INVOLVING THE SKIN OR MUCOUS MEMBRANE OF THE HEAD

In order that there may be no misunderstanding of the nomenclature of lesions or diseases used in this discussion, I will give briefly our conception of them.

Chicken-pox or contagious epithelioma is a readily transmissible disease manifested by the formation of small wart-like epithelial tumors on the comb, wattles, or skin of the head. The sole etiological factor of this disease is accepted to be the filterable virus of contagious epithelioma.

Canker or avian diphtheria is manifested by the formation of masses of adherent, cheesy exudate on the mucous membrane of the mouth or eyes. These diphtheritic lesions should not be regarded as evidence of a specific infectious disease, since factors other than the filterable virus of contagious epithelioma are known sometimes to produce them.

Colds, catarrh and roup are manifested by a viscid discharge from one or both nostrils, which has a tendency to collect in the nasal sinuses, where it undergoes rapid transformation into a cheesy mass,

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causing marked swelling of the face beneath the eyes. Such lesions, as in the case of canker, are believed to be due to a variety of causes.

There is abundant evidence, both clinical and experimental, to indicate that chicken-pox and the most common form of canker are etiologically identical. Diphtheritic lesions in the mouth or eyes can be produced by intravenous or subcutaneous inoculation with a suspension of finely ground chicken-pox virus derived from scabs removed from the tumors on the skin of diseased birds, or by applying the virus to a scarified surface on the comb. In like manner typical chicken-pox lesions may be produced by inoculation of the comb with material from mucous membrane lesions. A vaccine prepared from desiccated chicken-pox scabs affords protection against canker as well as chicken-pox. In outbreaks of chicken-pox the number of affected fowls with canker of the mouth or eyes only may be as high as 60 per cent.

However, as above stated, not all cases of canker can be regarded as due to chicken-pox virus. We recognize at least three distinct forms, which for convenience we classify as *chicken-pox canker*, *mechanical canker*, and *malignant canker*.

Mechanical canker is produced by injury to the mucous membrane. It commonly occurs in the cleft in the hard palate and in the inner corner of the eye as a result of a particle of litter or a kernel of grain becoming lodged there. Removal of the cause results in prompt recovery.

Malignant canker is so classified on account of its nature. It commonly occurs on the base of the tongue or the side of the larynx, penetrates deeply into the tissue, does not respond to any treatment so far attempted, is accompanied by general symptoms such as depression, loss of appetite, and rapid emaciation, and practically always terminates fatally. However, since it is of rather rare occurrence and has shown no tendency to spread from diseased to healthy fowls in the same flock, it is not as yet of much economic importance. Since chicken-pox is the subject to be discussed, when the term "canker" is used hereafter in this paper it will refer only to "chicken-pox canker."

We have found little to indicate that there is any relationship between chicken-pox and roup, but instead, considerable evidence that they are not, as a rule, in any way related. A nasal discharge is so infrequently associated with canker, especially in the early stages, that it would seem there is little ground for considering this

an indication of chicken-pox or canker when it does occur. Even in very severe advanced stages of canker the nasal passages are not necessarily involved. On the other hand, it is extremely rare to find canker of the eyes or mouth accompanying roup. Even though the sinuses may be so distended as to cause the eyes to become closed, as a rule no cheesy material is formed in them. It has been frequently observed that birds that have had chicken-pox are not rendered immune to roup, and that birds that have had roup are not immunized against chicken-pox. It is very probable that there are always a few cases of roup present in all large flocks, no matter how well they may be housed and cared for, but we have yet to observe an epidemic of roup in any flock in California that was given proper care. Chicken-pox and canker are just as liable to attack a well-cared-for flock as one poorly cared for. Therefore we do not consider roup to be related to chicken-pox, to be a specific infectious disease, nor a menace to successful poultry raising.

A Malnutritional Disease Resembling Roup.—There have occurred during the past two years epizootics of a disease involving the mucous membrane of the mouth, pharynx, eyes, and the nasal passages which closely simulates roup, but which has been found to be entirely distinct. In the mouth and pharynx we find pustule-like caseous patches 1 to 2 mm. in diameter. On pressure we find that the caseous material penetrates quite deeply into the mucosa. These may be so numerous as to give the mucosa, especially of the pharynx, the appearance of being covered with caseous false membrane. These pustules are often found in the mucosa of the esophagus as far as the proventriculus. We also frequently find the cleft in the hard palate and the glottis filled with caseous exudate. In the eyes we find first a thin, viscid discharge which may glue the eyelids together, then the formation of a tightly adherent, white, membranous film over the membrana nictitans, and finally the collection in the conjunctival sacs of white, cheesy exudate. There is usually a clear, viscid discharge from one or both nostrils which later may become turbid and flocculent and be followed by swelling of the infraorbital sinus. On postmortem examination of dead birds we usually find the kidneys severely involved. They are usually very pale and marked with a network of very fine white lines which are urate-filled tubules. We also frequently find a deposit of white material, probably urates, on the liver, heart and other organs.

The results of our study of this disease have led to the belief that, although it frequently affects large numbers in the same flock, it is

not of an infectious nature, but rather due to some nutritional disturbance. This belief was arrived at after failure to transmit the disease from diseased to healthy birds or to find any species of bacteria which appeared to be a causative factor, and success in controlling and reproducing the disease by certain methods of feeding. This disease is always mistaken for roup by poultrymen, and it is very possible that many so-called "outbreaks of roup" have in reality been this nutritional disease.

THERAPEUTICS OF CHICKEN-POX

In the treatment of chicken-pox and canker we have found that the administration of chicken-pox vaccine is a valuable adjunct to other remedial measures. The scabs from the pox tumors and the caseous exudate from the mouth or eyes are removed with forceps. Tincture of iodine is then applied with a medicine dropper. This treatment is repeated at 2 or 3 day intervals as long as necessary. Except in very severe cases not more than two or three treatments are necessary. In addition, two or more 1 or 2 mil doses of chicken-pox vaccine at 3 to 5 day intervals are given.

In experiments to determine the curative value of chicken-pox vaccine 536 diseased fowls were used. They were divided into two lots of 268 each. In order that there might be a nearly equal number of fowls in each lot with lesions of the same type and degree of severity, the location and severity of the lesions were the basis upon which the selection of the birds for each lot was made. Each bird in one lot was given two 1-mil doses of vaccine, in addition to local treatment of the lesions, while the birds in the other lot received local treatment of the lesions only. The percentage of mortality of fowls in the lot receiving vaccine was 19.6 and of those in the lot not vaccinated 38.9. The average number of days required for recovery of the fowls vaccinated was 10.8; of those not vaccinated, 13.7. From these results it would appear that the use of vaccine is of considerable value in the treatment of chicken-pox and canker.

PREVENTION BY VACCINATION

It is for prevention rather than cure, however, that chicken-pox vaccine is designed and chiefly used. The first vaccine experiments in California were made in 1914. The results obtained were so satisfactory that the vaccine was recommended for use to commercial poultrymen. It was only natural that at first many poultrymen were skeptical of the value of vaccination. Continued good results, how-

ever, soon dispelled this skepticism, and at present in California the use of chicken-pox vaccine by poultrymen is as general as the use of blackleg and anthrax vaccine by cattle raisers in infected districts. During the fiscal year ending June 30, 1920, the California Agricultural Experiment Station furnished vaccine for over 300,000 birds.

Propagation of the Virus

The method used in preparing vaccine is a development of that used by Manteufel (2) in 1909 and Hadley and Beach (3) in 1912-13. Scabs removed from chicken-pox lesions are the source of virus used in preparing vaccine. The virus is propagated by inoculating the combs of healthy cockerels with a suspension, in sterile water, of dried ground scabs. Only scabs from the comb are used, any lesions developing upon the mucous membranes being discarded.

The inoculation is made by moistening one side of the comb with the suspension of ground scabs, then vigorously scarifying the entire surface with a large, dull hypodermic needle or other instrument, and then moistening the scarified surface with the suspension of scabs. This process is repeated on the other side of the comb. Care is taken that none of the virus comes in contact with the mucous membrane of the eye. Lesions appear in five to seven days and develop sufficiently to permit the removal of scabs in two to three weeks. A second growth of scabs can be removed seven to ten days later. The percentage of mortality of the inoculated birds ranges from 50 to 100 per cent, the greatest loss usually occurring soon after the first growth of scabs is removed.

After removal the scabs are thoroughly dried and reduced to a fine powder by grinding in a small coffee mill and then in a ball mill for 24 to 48 hours. This powdered virus, if perfectly dry, will keep for months, and may be stored in sterile bottles until needed in preparing vaccine. High potency of the virus is maintained by keeping fowls constantly inoculated and using for inoculation purposes fresh dried scabs from severe cases, and by occasionally procuring new strains of virus from naturally infected birds.

Method of Preparing the Vaccine

One gram of the powdered desiccated virus to 100 mils of physiological salt solution is the proportion used in making vaccine. This proportion was adopted after making numerous trials with varying amounts of virus. Aseptic precautions are observed. The virus is

first weighed out and placed in a sterile mortar with a sufficient amount of sterile salt solution to make a paste, and is ground for at least five minutes or until the mixture acquires a smooth, cream-like consistency. Four or five mils of sterile salt solution to each gram of virus is required for this purpose. To this mixture is then added sufficient sterile salt solution to bring the volume up to 80 mils. It is then poured into a sterile flask or bottle, placed in a water bath and heated at a constant temperature of 55° C. for an hour. It is then filtered through sterile cheese-cloth into a sterile flask or bottle, and to it is added 20 mils of sterile salt solution containing 1 per cent of tricresol, which mixture is poured through the filter so as to wash out as much of the pulverized material as possible. After cooling in running water or ice water until the temperature is below 7° C. the vaccine is ready for transfer to the ultimate containers, which are sterile bottles of amber or other dark glass.

The vaccine may retain its potency for more than a month after preparation, and on the other hand it may become less effective within two weeks. Therefore vaccine should be used as soon after preparation as possible.

Efforts to Standardize the Vaccine

Our experiments have shown that the immunizing value of vaccine varies directly as the virulence of the virus contained therein. Since there is a variance in the virulence of different lots of virus, there is necessarily a variance between different lots of vaccine. Thus far all attempts to devise a method of standardizing the virus in vaccine have proved unsuccessful. These have included the complement-fixation test, inoculation of fowls with vaccine by scarification of the comb, and the intracutaneous injection of vaccine. The complement-fixation test proved to be entirely inapplicable. Vaccine capable of producing marked lesions on fowls inoculated by scarification of the comb produced a higher degree of immunity in fowls vaccinated than vaccine capable of producing only mild lesions. At present, however, it is not possible to determine by observing the lesions produced on fowls inoculated with vaccine the degree of immunity it may be expected to produce in fowls vaccinated. The intracutaneous injection of vaccine gave no determinative reaction.

Efforts to Improve the Vaccine

Various attempts were also made to increase the efficiency of the vaccine by improving the method of preparation. The use of

glycerine in the preparation of vaccine did not produce a more satisfactory product. Vaccine prepared in the usual manner, but not heated, proved to be an efficient immunizing agent, but it also produced disease in more than 50 per cent of fowls vaccinated. For this reason such vaccine can not be used. A shake extract of powdered virus was found to be an efficient immunizing agent when fresh, but it did not retain this property sufficiently long to make such a lengthy method of preparation practicable. Powdered virus made in the form of "pills" and given subcutaneously conferred no immunity. The intracutaneous injection in the wattle of 1/10-mil⁶ doses of regular or shake-extract vaccine proved to be a very efficient means of immunization. However, the development of lesions at the injection point and elsewhere about the head, and areas of induration at the injection point in the wattle, make this method both dangerous and objectionable.

Method of Administration

The vaccine is administered subcutaneously. The dose is 1 mil for each bird. The most convenient place for administration is beneath the skin of the breast under the right thigh, the skin at that point being comparatively free from feathers. Special precautions must be taken that the vaccine is injected *subcutaneously*, not *intramuscularly*. The bird may be held either by the operator or by an assistant.

When the operator holds the bird the left wing is held back, the fowl is laid on its left side, and the right wing and leg and feathers are held back with the last three fingers of the left hand. The exposed skin is then cleansed with a piece of cotton saturated with disinfectant solution (2 per cent solution of compound solution of cresol), and picked up with the thumb and forefinger of the left hand. Then with the right hand the syringe needle is inserted *just beneath the skin* and the proper dose injected. With a little practice one man with an assistant to catch the birds can vaccinate from 100 to 150 per hour.

When an assistant holds the bird, both wings are grasped with the left hand and both legs with the right hand. The bird is then laid on its left side with the breast toward the operator. The operator, standing a little to the rear of the bird, cleanses the skin at the point of injection, picks it up with the thumb and forefinger of the left hand, and with the right hand inserts the syringe needle *just beneath the skin* and injects the vaccine. By this method a man

with two assistants to catch and hold the birds can vaccinate from 200 to 300 per hour.

A syringe of 6 to 12 mils capacity is well suited for this work. The needle should be 16 to 18 gauge and from $1\frac{1}{2}$ to 2 inches over all in length. A screw needle is preferable.

One treatment is usually sufficient in healthy or slightly infected flocks. In badly infected flocks a second treatment for all birds is advised. In very severe outbreaks the injections should be continued at intervals of 5 to 7 days until the disease ceases to spread.

THE PROTECTIVE VALUE OF CHICKEN-POX VACCINE

We have found that partial or nearly complete protection against severe artificial infection with chicken-pox virus may develop in 2 to 6 weeks after vaccination. Some lots of vaccine afford nearly complete protection against severe artificial infection 30 days after vaccination, while with other lots the protection is less marked, and with still other lots very slight. The amount of protection afforded was measured in all cases by comparing any lesions on vaccinated birds produced by the inoculation with those produced on an equal number of non-vaccinated control birds inoculated with the same virus. This variation in the protection afforded by different lots of vaccine is explained by the previously mentioned variation in virulence of different lots of virus.

It would seem very probable, however, that the resistance to artificial infection produced by the vaccine is sufficient to protect against natural infection, which could not be as severe as the artificial infection. A series of experiments were conducted in which an aggregate of 1,298 birds were used, 272 of which were naturally infected with chicken-pox. Nine hundred healthy fowls were vaccinated and 126 healthy fowls were not vaccinated. None of the diseased fowls were removed from the flocks after vaccination, thus affording every opportunity for the then healthy fowls to become infected. It was positively known that none of the healthy fowls had been previously infected with chicken-pox. All the fowls were leg-banded and therefore an accurate record of the condition of each fowl could be kept. Frequent examination of each fowl showed the following: Of the vaccinated healthy fowls 11 per cent subsequently became diseased, while of the non-vaccinated healthy fowls 86 per cent subsequently became diseased. Such results seem to us exceedingly good evidence of the protective value of chicken-pox vaccine against natural infection.

The results of experiments to determine the length of the immunity have indicated that it may vary from 9 months to more than 2 years. Field observations show, however, that the immunity may last no longer than 2 or 3 months. On account of the uncertainty in regard to the longevity of the immunity produced, it is recommended that flocks be vaccinated only to prevent the spread of infection already present, and not for the purpose of immunizing them against subsequent infection.

CONCLUSIONS

In concluding this discussion it is desired to emphasize the following points:

1. As they exist in California, there does not appear to be any etiological relationship between chicken-pox and those pathological conditions of the nasal passages commonly designated as colds, roup, or swelled head.

2. Many so-called outbreaks of roup may in reality be a disease manifested by symptoms very similar to roup but due to nutritional factors.

3. There appears to be ample evidence that chicken-pox and those pathological conditions of the mucous membranes of the mouth and eyes commonly designated as canker or avian diphtheria are etiologicaly identical.

4. Vaccine prepared from desiccated chicken-pox virus, while not conferring, in the majority of cases, complete protection against severe artificial infection, does confer a considerable degree of resistance. This is shown by the mildness of lesions produced by inoculating vaccinated birds with virus as compared with those produced on non-vaccinated control birds.

5. Chicken-pox vaccine has proved to have considerable curative value when used on diseased birds.

6. Chicken-pox vaccine has proved a very effective means of promptly checking outbreaks of chicken-pox and canker. The use of this product has become very general among poultrymen of California.

7. The length of immunity produced by chicken-pox vaccine may vary from two months to more than two years. For this reason the vaccine is recommended only to check the spread of the disease in flocks already infected.

8. The efficiency of chicken-pox vaccine is dependent upon the degree of virulence of the virus contained in it. Since there is con-

siderable variation in the virulence of different lots of virus and there is at present no method of standardizing the virulence of virus, there is necessarily considerable variation in different lots of vaccine.

9. It is realized that the present method of preparing chicken-pox vaccine is very imperfect. Thus far, however, all efforts to devise a better method have proved failures.

REFERENCES

1. Ward and Gallagher. Diseases of Domesticated Birds. The Macmillan Co., 1920.
2. Manteufel. Arb. d. Kaiserl. Gesundh., XXXIII (1910), 305.
3. Hadley and Beach. Proc. Am. Vet. Med. Assn., 1913, p. 704.

DISCUSSION

DR. REICHEL: Has an opportunity been afforded to study the relationship between chicken-pox and human chicken-pox?

DR. HADLEY: I had intended to open the discussion on this paper, as there is interest in this subject. We were interested seven years ago in immunizing against the disease among fowls. In our earlier work we had no standardized method as Dr. Beach has outlined. One reason is that we did not work at the problem as he has. One reason is that chicken-pox has become less prevalent. In California, where conditions seem to be suited to raising larger flocks than in this part of the country, it is gratifying to know that the University of California succeeded in enlisting Dr. Beach's gifts in this work, and the Veterinary Association should feel complimented in having such a discussion.

No one who does not know the disease knows how difficult it is to prepare immunizing products. Chickens are quite different from animals like horses, cattle, sheep and hogs. This makes the problem more difficult than with the animals just mentioned.

One point I would like to urge upon the members of this organization who have chicken diseases to deal with. Although this vaccine is not available from commercial firms, I am sure in most States where veterinary laboratories are maintained by the State, the State will be very glad to prepare the vaccine.

Another point interests me, and that is that Dr. Beach has differentiated from roup on the one hand and chicken-pox and those diseases which have lesions very similar to roup which will not respond to the same treatment.

CHAIRMAN DAY: Dr. Beach may answer Dr. Reichel's question.

DR. BEACH: In our attempt to go over the literature on the subject, we find that a tremendous amount of study of the nature of this virus and its relationship to similar diseases in other animals has been gone into, and so far it is found that no other animal and not even some birds are susceptible to this.

CHAIRMAN DAY: We have a written discussion on this paper sent here by Dr. Archibald R. Ward, and the Secretary has looked it over. Shall we have it read or just printed in the proceedings?

(A motion prevailed that Dr. Ward's discussion be read by title and printed.)

DR. WARD: The discussion of the valuable paper by Dr. Beach is undertaken with satisfaction, for I have an intense personal interest in the subject. I feel also that his opportunities and experience in the study of this perplexing group of exudative diseases of the fowl's head, together with his scientific attitude, entitle him to high rank as an authority on the subject.

I am further glad to discuss the subject in order to correct a misapprehension on the part of Dr. Beach regarding views expressed by Dr. Gallagher and myself in our book on "Diseases of Domesticated Birds." I alone, however, am responsible for the subject matter in the book relating to avian diphtheria and bird pox. The paper just read contains a reference to our views as follows:

"These conditions are variously designated as chicken-pox, contagious epithelioma, avian diphtheria, canker, colds, contagious catarrh, swelled head, roup, etc. Ward and Gallagher in their recently published work express the opinion that all of these conditions are due to the same etiological factor, namely, the filterable virus of chicken pox or contagious epithelioma."

On critical scrutiny of the chapter on Avian Diphtheria and Bird Pox, I am unable to locate such a statement. In the opening paragraph of the chapter a somewhat similar list of pathological conditions was given, and was referred to as presenting a complicated subject for discussion, without, however, referring to etiology.

Elsewhere I took occasion to question the validity of differentiating into separate disease entities such conditions as simple catarrh, common colds, contagious catarrh, influenza and coryza, inclining to the view that the conditions mentioned are indistinguishable from early cases of avian diphtheria due to pox virus. It was pointed out that insufficient etiological evidence is available to justify recognizing such conditions as specific infectious diseases. If it is indisputably true that pox virus seldom or never causes a fluid exudate in nostrils or conjunctival sacs, the view given regarding this symptom is inaccurate.

In an attempt to put in the book only that which appeared to be known in contradistinction to that which is as yet uncertain we discussed only two diseases, namely, avian diphtheria and bird pox caused by pox virus and the condition designated simple catarrh or cold manifested by a watery or viscid discharge.

The literature of the subject available and my personal observations did not permit me to go further in introducing well-defined diseases recognizable by etiological agent, nor did this standard justify including simple catarrh. However, this conservative attitude in including diseases was not intended to justify the conclusion that I believe that research had gone far enough to conclude that pox virus is the cause of all exudative conditions on the mucosa of the fowl's head. Quite the contrary view was held. I introduced several paragraphs to present views concerning the importance of hemorrhagic septicemic organisms, and observed that—

"Whether there are other specific infectious diseases of fowls characterized by diphtheritic lesions not due to pox virus remains to be deter-

mined by further investigation. The idea has been advanced that diphtheritic lesions of the mucosa of the head of the fowl may result from invasion by various bacteria."

Dr. Beach has given a keen analysis of the clinical differentiation of these conditions, and it is the best that has yet appeared. In recognition of conditions confidently believed not to be due to pox virus he has made a great advance, and it is believed that his further studies will completely elucidate the etiological problem. In view of the occasional failures of chicken-pox vaccine to protect, great caution should be taken in assuming that a diphtheritic exudate on a bird supposedly immune to pox is really due to another agent. I should like to see a piece of work done on the pathological histology of diphtheritic exudates made in connection with the study of etiology. Much of the work on these exudates has been done by bacteriologists ignoring the influence of pox virus and by men working with pox virus while ignoring possible etiological agents among the bacteria or other organisms. Dr. Beach is not subject to these limitations.

I note with satisfaction the progress of the elucidation of this problem. Some fifteen years ago I made, I believe, the first observation that virus from some diphtheritic lesions may cause a pox lesion on inoculation, and reported the same before a meeting of this Association. The first experiment performed revealed other cases which did not reproduce pox on inoculation, which may be interpreted as indicating a variety of etiological agents in diphtheritic lesions.

Dr. Beach's tests of the therapeutic and prophylactic value of chicken-pox vaccine are to be commended as models of the correct procedure to be followed in passing judgment on the value of a biological product. Only when equal numbers of individuals are treated and untreated, and left to natural exposure, can a safe judgment be passed on the value of a product.

We are indebted to Dr. Beach and to Dr. Haring for the steady prosecution of this important work, yielding such valuable results for the benefit of the poultry industry.

Dr. S. E. Bennett, of the Executive Board of the A. V. M. A., made a hasty visit to Washington early in November en route for the South, where he will make a study of the stockyard conditions in that section.

Dean W. Horace Hoskins, of the New York State Veterinary College of New York University, was appointed a member of the Veterinary Council of the Board of Regents at their annual convocation, on October 7 and 8.

G. Arthur Bell, for many years Senior Animal Husbandman in the Bureau of Animal Industry, has recently resigned his position to accept a place in the War Department at \$5,000 per annum to assist in the work of breeding horses for the cavalry which that Department is inaugurating.

CLINICAL AND CASE REPORTS

HYDRANGEA POISONING

By E. A. BRUCE, *Agassiz, British Columbia*

PAMMEL states that hydrocyanic acid occurs in the well-known ornamental plant *Hydrangea hortensia*. The root of the wild hydrangea (seven barks), *H. arborescens*, of the United States of America, has diuretic properties and is said to have been much used by the Cherokees and early settlers in calculous complaints (Alice Henkel). The root of *H. arborescens* contains about 1 per cent of a glucoside, hydrangin, also a volatile oil, resin and starch. It probably also contains a saponin. A glucoside, parahdrangin, is also present in the root of the arborescent hydrangea (*H. paniculata grandiflora*), a variety extensively cultivated (Kraemer). No references to poisoning by hydrangea appear in the literature.

I am indebted to A. J. Damman, D. V. S., of Vancouver, B. C., for information regarding cases of poisoning in a horse and a cow. Confirmation of the toxic action of hydrangea was obtained when an extract was fed to guinea-pigs.

DR. DAMMAN'S CASE

On July 28, 1919, was called to see an animal belonging to a Chinese peddler in the city of Vancouver, B. C. About 4 p. m. found a black horse, 9 years of age, weight about 1,475 pounds, standing with his head down and with his tail twisted to one side. The animal was pawing with the front feet and showing a profuse diarrhea. Except when the tail was raised to let out a stream of liquid feces it was held in close to the body, but the point of the tail was twisted to one side all the time. The abdominal muscles were drawn very tightly. At times the animal would attempt to lie down, but would only bend its legs and then straighten up. At such times it would squeal and jump up stiff-legged like a goat on all four feet. Temperature 103, respiration 45, pulse 105. A peculiar stare of the eyes was also noted.

Upon inquiry the Chinaman stated that the horse had eaten and drunk as usual at noon, but that about 11 o'clock that morning it had eaten a woman's potted plant. Dr. Damman then accompanied the Chinaman to the woman's house, where a hydrangea (subsequently identified as *H. hortensia* var. *otaska*) was found to have been eaten. Upon returning the horse was found in the same posi-

tion, but was now passing blood and mucus with its liquid feces. At 6.30 p. m. the following drench was given: Oil of turpentine 3 ounces, tincture of ginger $1\frac{1}{2}$ ounces, tincture of capsicum 3 drams, raw linseed oil to make 29 ounces.

The animal was seen at 9.30 p. m. The abdominal muscles had relaxed, the staring gaze had gone, and the animal seemed to suffer less pain. At 9.30 the following morning the horse was much improved; temperature 100.4, respiration 20, pulse 45. The case was discharged at 6 p. m. that evening, the horse having drunk some water and eaten a carrot and some hay.

The hydrangea implicated in this case was about $2\frac{1}{2}$ feet high and 30 inches across. Dr. Damman estimated the weight at 15 pounds and the amount eaten at 6 to 8 pounds. All the leaves and blooms had been eaten, but very little of the stems. Personally I should judge the weights given as being 50 per cent too high.

In October Dr. Damman informed me that he had recently had an inquiry over the telephone about a cow that had eaten hydrangea. The owner said she had signs of colic and was very short of breath. As this cow was some distance away, treatment was prescribed over the telephone. The following day the owner telephoned that she was much better but had diarrhea. No further information is available regarding this case.

EXPERIMENT

About $3\frac{1}{2}$ ounces of *Hydrangea hortensia* var. *otaska*, consisting of two large flowering heads, ten leaves and a few inches of stem, were macerated in cold alcohol for several days. The alcohol was then allowed to evaporate, about one teaspoonful of a sticky brownish extract resulting.

October 21 at 3 p. m. two guinea-pigs were given the extract by means of a small wooden spatula; had great difficulty in getting them to swallow it, each animal getting only about one-quarter of a teaspoonful. One pig was much larger than the other. Fed as usual after dosing. October 22, 11.30 a. m., the smaller guinea-pig shows diarrhea; keeps humped up in a corner of cage, shivers. Larger pig also quiet and humped up. Both animals have hair standing on end as if cold. Diarrhea of smaller animal well marked.

Killed smaller guinea-pig at 4 p. m. Stomach half full of food, greenish on side next to stomach wall. Pyloric end of stomach very much inflamed. Intestines full of a thin, yellowish, gaseous fluid, and show inflammation, but to a less extent than the stomach.

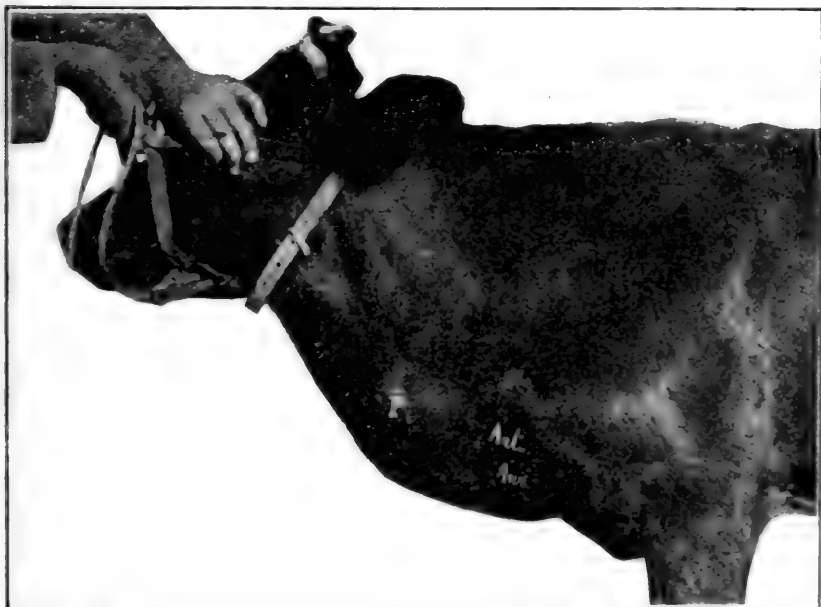
October 23, larger guinea-pig still humped up and quiet. No diarrhea. Killed. Some congestion around the pyloric end of stomach and duodenum. Intestines contain some gaseous fluid, but to a less extent than did the smaller animal. Probably did not get as large a dose as the other, besides being a bigger animal.

CONCLUSION

The peculiar symptoms seen in a horse a few hours after eating the aerial parts of hydrangea, and the reported case in a cow, together with the well-marked irritation of the alimentary tract of guinea-pigs after ingesting small doses of green extract, point to hydrangea as a plant possessing strong toxic properties.

TWO CASES OF CERVICAL ECTOPIA OF THE HEART IN BOVINES

In *La Prensa Médica Argentina* of August 20, 1920, Drs. B. A. Houssay, professor of physiology of the Faculty of Medicine of Buenos Aires, and L. Giusti, professor of physiology in the Veterinary Faculty of Buenos Aires, report an interesting anatomical and physiological study of two cases of ectopia of the



Ectopia of the Heart. P, point of the heart; Art, pulmonary artery; Aur, auricle

heart, one in a grade Shorthorn heifer, 17 months old, and the other a black native heifer, two years old. Tracings were made of the cardiac and arterial pulsations, and it was found that the functioning of these abnormally located hearts was very similar to those in normal positions. One of the cases is shown in the accompanying illustration.

N. S. M.

An editorial in *Hoard's Dairyman* says: "The past year or two the Wisconsin Experiment Station has been treating sawdust chemically and making it a nourishing cattle feed. No doubt certain sections of the country could use this feed, if it could be purchased at reasonable prices. It should be remembered that sawdust untreated is worthless. The result in feeding sawdust in combination with high protein feed at the Wisconsin station has been satisfactory, but it is rather early to say whether it will ever become a feed generally used in the United States."

Rumor has it that Denmark will endeavor to make this country her main butter market, rather than Great Britain, as in the past. * * * Denmark needs coal from this country and the "butter money" will come handy in settling the bill.—*National Stockman and Farmer*.

The Swedish Government has withdrawn all licenses for the importation of meat from Denmark owing to the fact that cases of foot-and-mouth disease have been discovered at various places in Denmark, according to the American consul at Copenhagen.

Foot-and-Mouth Disease in England

In reply to a question by Captain Coote, in the British Parliament, it was stated that the number of animals slaughtered during the months of April, May and June, 1920, in connection with the outbreaks of foot-and-mouth disease, was: Cattle, 772; sheep, 5,265; pigs, 271; goats, 2.

Goat Rules Road in Switzerland

The goat is held in high esteem in Switzerland and is carefully protected by legal regulations. If a boy plagues a goat he can be fined and sent to jail. If a person meets a goat on a path and drives him aside he can be arrested. If a railroad train driver sees a goat on a track the train must halt until the animal can be coaxed to remove himself.

ABSTRACTS

COEXISTENCE OF UDDER TUBERCULOSIS IN GENERALIZED CASES IN SWISS CATTLE. G. Flückiger. Schweizer Archiv. f. Tierheilk., May, 1920, p. 204.

During a five-year period from 1915 to 1919, out of a total of 14,362 cows slaughtered in the municipal abattoir in Bern, 357 animals were found affected with generalized tuberculosis. Of the latter 111, or 31.09 per cent, showed udder tuberculosis. The percentage of udder infection of all the cows slaughtered was 0.77. This is about 3 times higher than Ostertag reports for udder tuberculosis in Germany (0.1 to 0.3 per cent of all cows slaughtered).

L. T. GILTNER.

CONTROL OF FOWL CHOLERA BY VACCINATION. E. Grimm and W. Pfeiler. Berl. Tierärztl. Wochn., Vol. 35, Apr. 24, 1919, p. 139.

In an outbreak of fowl cholera, 25 hens, 4 ducks and 2 geese succumbed to the disease within the first six days. Autopsy and bacteriologic findings verified the clinical diagnosis of cholera.

A test of the efficacy of serum and vaccine treatment for cholera was made on this flock as follows: Thirty-two healthy fowls, 2 sick fowls, 2 geese and 3 turkeys were given separate injections of serum and vaccine subcutaneously in the region of the breast. Ten other fowls in the same lot were used as controls. Separation of the healthy from the sick birds was purposely omitted; the manure was also not removed from the house, and no disinfection was undertaken.

The 10 control fowls all contracted the disease, showing well-marked diarrhea and other characteristic symptoms of cholera. After 9 days they were sacrificed on account of the severity of the disease which developed. Of the 2 sick fowls which were vaccinated 1 died and the other recovered. All of the healthy vaccinated birds remained well.

L. T. GILTNER.

DIAGNOSIS OF JOHNE'S DISEASE IN CATTLE BY TESTING WITH AVIAN TUBERCULIN. T. Krautstrunk. Zeitschr. f. Infekth., etc., der Haustiere, Feb., 1920, Vol. 20, No. 4, p. 267.

From the data gathered from a considerable amount of experimental work the author draws the following conclusions:

Avian tuberculin is a valuable aid for the early diagnosis of Johne's disease.

In advanced cases the reaction may not occur; in other cases the failures are not greater than with the tuberculin test applied for the diagnosis of tuberculosis.

For controlling the disease, the entire herd is tested at least once a year and all animals which show a positive or doubtful reaction are separated.

Visibly sick animals are separated at once and slaughtered.

Natural infection results through consuming feed and water badly soiled with the feces of an affected animal.

L. T. GILTNER.

TREATMENT OF TETANUS IN THE HORSE. H. Vontobel. Schweizer Archiv. f. Tierheilk., Oct., 1919, p. 341-343.

Vontobel gives the following summary of a case of tetanus treated by him:

Symptoms: trismus, moderate degree of stiffness of neck, throat and back. No visible wound.

Therapy: 1. For the first two evenings hot sublimate foot baths, followed by warm bandaging. 2. Injections of 125 c.c. serum divided into three doses administered over a period of three days. 3. Beginning with the second day on each evening, 25 c.c. of 10 per cent magnesium sulphate solution was injected subcutaneously on each side of the neck. 4. Each evening a clyster of 20 c.c. of 30 per cent hydrogen peroxide in 4 to 5 liters of warm water was given. 5. Suitable diet.

During the first days the symptoms became more marked, but did not assume a serious character. From about the ninth day there were striking signs of improvement with a lessening of the spasm of the sphincter muscle of the anus. The patient made favorable progress daily, being able to move about freely, pick up hay from the floor, etc. However, the horse had become so weak that after lying down it could raise itself only with considerable help and in spite of such assistance could not remain standing. Accompanying this there was no return of the symptoms of tetanus. The patient was transported to a cantonal hospital, where it was put in slings and soon made a complete recovery.

L. T. GILTNER.

REVIEW

THE TOPOGRAPHICAL ANATOMY OF THE LIMBS OF THE HORSE. By O. Charnock Bradley, M. D., D. Sc., M. R. C. V. S., Principal, Royal (Dick) Veterinary College, Edinburgh, and Lecturer on Comparative Anatomy, University of Edinburgh. One volume of 166 pages, with 115 illustrations. William Wood & Company, New York. Price, \$5.00.

This book, which comprises one hundred sixty-six pages, discusses, as its title accurately indicates, the relationship of the structure of the limbs of the horse and confines itself exclusively to the parts mentioned. Although prepared seemingly for the use of students who are equipped with some knowledge of systematic anatomy, it should also prove helpful as a reference volume for those who are engaged in surgical work pertaining to the limbs. Directions for exposing regions for study are followed by a discussion of the muscles, arteries, veins and nerves that the carrying out of the procedure outlined brings into view.

The work is profusely illustrated, thereby enabling the student to form a relatively clear conception of the anatomical structures and to identify them as the dissection proceeds. An interesting method of conveying to the student's mind the osseous areas of attachment of muscles and ligaments is through the use of colored plates. They are prepared so as to permit areas of origin of muscles to be distinguished from surfaces of insertion. Illustrations of cross sections are so numerous as to render no little assistance in the mastery of the subject.

The limited amount of space which is frequently devoted to the discussion of the individual structures suggests that the work is not intended to supply the needs met by the more voluminous treatises on the subject, but rather to impart knowledge pertaining to the relationship of the anatomical parts, and how they may be studied in an orderly manner. The work should be highly successful in accomplishing these ends.

J. M. B.

"The better-sire campaign, which has for its purpose the ultimate elimination of the scrub sire and is making very satisfactory progress in that direction, is another and a very important factor in increasing the demand for registered stock. The potentialities in that field are almost unlimited."—*Farmer and Stockman.*

ARMY VETERINARY SERVICE

CHICAGO GROUP HOLDS PLEASANT OUTING

The army veterinarians detailed to Chicago for training in food inspection under Major George Lytle held a picnic in Lincoln Park, Chicago, on the afternoon of October 14. An exciting game of indoor baseball was pulled off under military regulations, which severely handicapped the civilians taking part. The following army veterinarians and the wives and children of the married officers were present:

Colonel Turner, Majors Lytle, Pick, Peters and McKinnon, Captains Eakins and Leininger, Lieutenants Wight, Nye, Curley, Juzek and Clark. Drs. Lacroix, Campbell and Mayo were guests.

After an armistice had been declared in the ball game, Drs. Campbell, Mayo and Lacroix were compelled to leave. The army moved to see the animals (in cages) fed and negligently failed to leave an armed guard at their supply base. This was raided. Drs. Lacroix and Mayo being, like Cæsar's wife, above suspicion, a board of strategy was appointed to apprehend the culprit. He will be tried before a court-martial. A firing squad has been detailed. This will be the tragic end of what was otherwise a delightful occasion.

Major E. B. Ackerman, who has been recently associated with Dr. J. F. DeVine at the Goshen Biological Laboratories, announces his reentering the field of veterinary practice in Brooklyn, N. Y.

Major Robert J. Foster, who has been on detail at the Surgeon General's office in Washington for the past few years, has been ordered to Coblenz, Germany, where he will serve as Chief Veterinarian with the American Forces in Germany.

Dr. E. M. Ranck, formerly State Veterinarian of Mississippi, but now with the War Plans Division of the U. S. Army, is at present convalescing from an eye trouble at the Walter Reed Hospital, D. C. Dr. Ranck, as first vice-president of the U. S. Live-stock Sanitary Association, will preside at the forthcoming meeting, owing to the death of President S. F. Musselman.

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of Fifty-seventh Annual Meeting, Columbus,
Ohio, August 23 to 27, 1920

(Continued from the November JOURNAL)

GENERAL SESSION

THURSDAY MORNING, AUGUST 26, 1920

The meeting convened at 10 a. m., President C. A. Cary presiding.

REPORT OF EXECUTIVE BOARD

THE PRESIDENT: The first thing this morning will be the report of the Executive Board.

DR. STANGE: Gentlemen, no doubt all of you understand that according to the amendment adopted this week the Executive Board is required to recommend a Secretary for the Association and a Business Manager and an Editor for the JOURNAL. Your Board has been considering this matter as much and as carefully as possible during this meeting, but we believe that in order to come to the best conclusion it would be better to consider all of the available men before taking any definite action. We decided, therefore, to recommend to you that we leave the present arrangement much as it is until the sub-committee which is being appointed in the Executive Board to consider the entire matter during the next year can report back to the Association. We recommend, therefore, in compliance with the idea I have set forth, that Dr. N. S. Mayo be elected Secretary for the Association (applause), at a salary of \$2,000 a year. I move that this recommendation be adopted.

(It was voted, on motion of Dr. Stanage, seconded by Dr. W. Herbert Lowe, that the recommendation of the Executive Board that Dr. Mayo be elected Secretary be adopted.)

DR. STANGE: The Executive Board further recommends that Dr. John R. Mohler be elected as Editor and Business Manager of the JOURNAL during the next year at a salary of \$1,500 a year for each position.

(It was voted, on motion of Dr. W. Herbert Lowe, duly seconded, that the recommendation of the Executive Board be adopted, and Dr. Mohler was declared elected Editor and Business Manager of the JOURNAL.)

(Secretary Mayo read the list of applications for membership which were favorably recommended by the Executive Board. It was voted, on motion of Dr. W. Herbert Lowe, duly seconded, that

the Secretary be instructed to cast the ballot for these applications. It was pointed out by Dr. W. E. Langford that one man, D. M. Phillips of West Virginia, on the list read, had not passed the State board examination of West Virginia.)

THE PRESIDENT: The motion as made will include all except the name objected to. The Secretary will read the name of the man referred to.

SECRETARY MAYO: David M. Phillips, Huntington, W. Va., graduate of the Cincinnati Veterinary College, 1916, vouched for by C. R. Neiddy and P. E. Quinn.

THE PRESIDENT: The gentleman will please state to the audience his objections to this man.

DR. LANGFORD: The objections that I have are these: If he is a member of the A. V. M. A., and recognized as such, why not pass the State board in his own State and be registered as a graduate veterinarian and not be on the non-graduate list? He objects to taking the examination of the State board. He has been given an opportunity at every meeting since 1916, and all graduates are expected to take the board, whether of West Virginia or any other State. They all have done that excepting this man, and he is no better than the rest. There are many States today that are refusing to allow graduates of recognized schools of learning to register in their State. Why? They find they are not competent and efficient men to discharge their duties as veterinarians in the State, although they are graduates of recognized schools of learning. We feel that this man should come before the board. It is only just and proper. I move that his name be rejected.

DR. NEIDDY: I signed that application and know the situation in West Virginia as Dr. Langford states, but Dr. Phillips said he had passed the Ohio State board. That is the reason I signed the application. Understand, I knew he held no graduate license in the State of West Virginia, but Dr. Phillips stated to me here yesterday that he had passed the Ohio State board.

(It was voted, on motion of Dr. Kinsley, seconded by Dr. W. H. Hoskins, that the name of Dr. Phillips be laid on the table for further investigation.)

THE PRESIDENT: Is there any further report to come from the Executive Board?

SECRETARY MAYO: The Executive Board recommends a reconsideration of the election of R. V. Cannon and Dr. Slade. The names presented and passed were Dr. R. V. Cannon, Springvalley, Ohio, a graduate of Ohio State University in 1915, vouched for by Drs. L. Anderson and F. A. Lambert; and J. G. Slade, of Cleveland, graduate of Ohio State University, 1919, vouched for by Drs. Fortune and N. C. Powell. These men are colored men. At the time they were recommended this fact was not known.

THE PRESIDENT: Gentlemen, you have heard the statements. What shall we do with the request for reconsideration of these men?

DR. GANNETT: I would like to ask if the Constitution would exclude colored men.

THE PRESIDENT: We never have elected one until this time.

DR. W. C. FAIR (Cleveland): I happen to be on the State Board of Veterinary Examiners here in Ohio, and I assure you that these men passed a very creditable examination, and I don't know whether we ought to draw the color line or not. They come up to the requirements, and we feel as though we gave them a thorough examination and graded them as carefully as we thought best. I just want to give you that little information so that you will not feel that they slipped by in any way.

SECRETARY MAYO: I think it is but fair to state to you that in the report yesterday among those unfavorably recommended by the Executive Board was a colored man, graduate of Ohio State University, and no question at all was raised as to his qualifications as a veterinarian.

DR. GLOVER: I move you that we declare these men members of the Association. (Seconded by Dr. Hollingsworth.)

DR. P. A. FISH (Ithaca, N. Y.): It seems to me that we are not holding true to the idea of refusing a man on the ground of his color. The Government recognizes these men in their appointments in the Bureau, and if they can qualify in that respect it seems to me that they should be allowed to come in this. The mere shade of their external appearance, it seems to me is a very insignificant factor influencing their veterinary qualifications in public service.

DR. L. P. BEECHY (Columbus, Ohio): I am quite sure that the veterinary profession follows this idea of merit. I don't think that it will dishonor itself in the least by taking these men in as members of the Association. If we are going to draw the color line in the Association, we ought to draw the color line in the application at the colleges, and I consider it a mistake if we discourage these men. One man, particularly, in this community is well-liked by the farmers, and I think it is a mistake to exclude him because he happens to be colored. (Applause.)

DR. W. H. HOSKINS: For twenty years we have drawn the color line in this Association. I consider that there have been rejected on that ground several good veterinarians who have done good work in their respective States. States can not draw such lines; associations have this privilege. The only danger that this Association has had from this question came when you incorporated so that any man can sue you for any amount he wants to. The amount depends upon how much he has suffered at your hands. Now, you have rejected colored men for twenty years along this line, but today you take another stand on this problem.

DR. CHARLES J. BECKER (Birmingham, Alabama): I would like to ask Dr. Glover if he would include the name of the other colored man who was rejected the other day.

THE PRESIDENT: That couldn't be.

(It was voted, on a rising vote, on motion of Dr. Glover, seconded by Dr. Hollingsworth, that these colored men, Dr. Cannon and Dr. Slade, be elected to membership in the Association. Eighty-three voted for the motion and 48 against it.) (Applause.)

THE PRESIDENT: Is there any further report from the Executive Board?

SECRETARY MAYO: The Executive Board recommends that the notice given last year to change section 7, article 19, of the By-Laws be recommended for adoption. This notice is as follows:

"To the Members of the A. V. M. A.: Notice is hereby given that at the next meeting of the Association we shall propose the elimination of section 7 of the By-Laws of the Association, and that section 9 of article 19 be changed to read section 7."

This deals with the Code of Ethics of the Association, and this notice proposes to strike out this section:

"It shall be deemed a violation of the Code of Ethics for any member of this Association to contract with or through the officers of any livestock insurance company for the professional treatment of the members' stock so insured, but this rule shall not prevent any member from becoming an examiner of risks and acting in the capacity of an expert for the same."

DR. KOEN: I move that the recommendation of the Executive Board be adopted. (Seconded.)

The livestock insurance business is assuming large proportions these days, and it is one of vital importance to every practitioner and to our Association. If this section stands as read no practitioner can perform professional services for a livestock insurance company to protect the risks that it has taken without jeopardizing his standing in this Association. It is in the interest of the practitioner, to whom, of a right, this work belongs, that he may render professional services in a professional way for a livestock company, the same as for an individual. For that reason I have moved the adoption of the recommendation of the committee.

DR. W. H. HOSKINS: This matter has been discussed pro and con for the last two days, in connection with this convention. There is nothing in that section of the Code of Ethics that prevents any veterinarian from rendering legitimate professional services to any livestock insurance company. There is nothing in that section of the Code of Ethics that prevents him from answering the call of any livestock insurance company when any of its risks are imperiled. There is nothing in there to prevent livestock insurance companies from employing veterinarians on salary or otherwise and sending them out to report any illness of their risks. It simply does one thing, and that ought to be held without any question: that livestock insurance companies can not offer veterinary services by adding the cost to the insurance and taking possession of all of the animals that they have insured, and taking this business away from the local veterinarians and hiring it out to some one veterinarian in the district or visiting a State, and employing veterinarians on salary to look after all their insured risks in a certain section of the State.

It does prevent them from doing just this thing. That is all it does prevent them from doing. It does not prevent them from employing veterinarians to go out and look over their risks and advise what should be done; but look out if you wipe this away.

You will find a pretty much increased cost in the service of veterinarians, and it will destroy the opportunity of the average veterinarian in his community; it will hurt the business of his clients for whom he is insured. (Applause.)

SECRETARY MAYO: You will pardon me for speaking on this, but the Secretary's office is a sort of a clearing house for a great many things. I am not taking a stand one way or another. I have received a number of letters from veterinarians who say that according to this they can not go out and treat animals for an insurance company; that just as soon as they go, either on a telephone or any other call, they enter into a contract with that insurance company to treat those animals, and they say that in that locality a man who is not a member of the A. V. M. A. gets the work to do among those who are conscientious and trying to live up strictly to the code of ethics of this Association, and they hold that it is just as ethical and just as legitimate for a qualified veterinarian to enter into a contract with an insurance company as it is with a mining company or anything else. I am simply stating their case.

THE PRESIDENT: Any further discussion on this subject?

DR. STANGE: I would like to say a few words on this question, because there is a great deal of insurance carried by Iowa farmers. These insurance companies pick out, or attempt to pick out, the best veterinarians in the communities in which they have livestock insured. I have had also, as Dr. Mayo has had, letters from a great many of our veterinarians, saying that they were members of our Association and they noticed by the Code of Ethics that strictly they can't accept this work, and they want to know if it is going to be a disadvantage to the veterinarian who stands best and highest in the community to belong to this Association. I don't believe there is anything unfair about a veterinarian arranging with a company to take care of the animals that they have insured in his community. Suppose vaccinations for hog cholera are called for. Those hogs are insured, and if a disease appears in that herd or that community, the insurance company reserves the right to go in and vaccinate those hogs. Instead of employing field men and sending them over the State to take the business away from the veterinarians, most companies like to employ the local veterinarian. Now, the question is: Are you going to make it impossible for our good veterinarians to do that kind of work? If you are, you are going to keep them out of the Association. Or, are you going to throw that work into the hands of the poorer veterinarians? That is the question that is up before us. This question has developed to a considerable extent in the last four or five years. I believe if we can consistently do it, we ought to make membership in this Association of advantage rather than disadvantage to a veterinarian. (Applause.)

DR. W. H. HOSKINS: I would like to say something about the origin of this. The origin of this Code of Ethics is incident to the livestock insurance being entered into in Pennsylvania. They employed veterinarians in just the capacity that Dr. Stange speaks of.

I was in an advisory position. If an animal was reported sick, I could go and see it and see that the owner of the animal employed or called the veterinarian. I could go into consultation with him, if he was willing to have me, without any violation of the Code of Ethics. Later on that insurance company thought they could increase their business by furnishing free veterinary service and increasing the premium cost, and they did so. They divided the City of Philadelphia into four districts. Horses insured for \$300 paid 1 per cent; \$200, \$2 a year. They pooled that money and then divided it among the four veterinarians in the four districts in Philadelphia. At that time no veterinarian would take a contract for treating horses for less than \$8 a head.

What was the result? Instead of lifting up the profession, it degraded it. These men had sometimes fifty calls on their lists, unattended to, for days at a time, because they couldn't render that service at any such cost, and the final outcome was the breaking up of the insurance companies just as I pointed out. I resigned from my connection with them when they adopted that plan, and this Code of Ethics doesn't conflict with rendering that kind of service. They can go and adopt any treatment and take care of the stock without any violation. It is merely a question of judicial interpretation, and I hope the suggestion made will have some influence. I will be ready to defend any veterinarian who might need defending for what might be called violating the Code of Ethics.

(Dr. R. C. Moore called for a rereading of the section referred to.)

SECRETARY MAYO: I would say that I have consulted an attorney on that matter and he says this is absolutely clear and right.

(Secretary Mayo reread the section.)

DR. KOEN: In discussing this matter Dr. Hoskins said he was the author of this section and understood what it means. If it means what he has said to you this morning, I think he is the only man in the audience who can understand it that way, for it surely doesn't say it. Conditions are different now from what they were ten years ago when Dr. Hoskins was connected with that insurance company. The people in Iowa and Illinois are confronted with new conditions, and the opinion is this, if they accept service and render professional service for the insurance companies, they violate the Code of Ethics. If this is eliminated and any insurance company enters into a contract with veterinarians that is detrimental to the best interests of the profession, those veterinarians entering into that contract can be dealt with by this Association. Unless this is eliminated, you are either going to prevent the local practitioner out there in the Central Western States from rendering professional service when called upon, or you are going to make him jeopardize his membership. I am in favor of upholding local practitioners and benefiting many by this Association rather than handicapping many. (Applause.)

DR. R. C. MOORE: We have an old, reliable member of this Association in that capacity with an insurance company, and it is

his business to examine risks or have it done, and to take general management of the veterinary side of the business of that company. He does not treat animals, but when he finds it necessary to vaccinate, he calls the local veterinarian and he goes along and encourages the fellow all he can and does all he can to build up the profession. He is a conscientious man.

I am not prepared to say how I construe that section. Dr. Hoskins seems to understand it clearly. Dr. Koen seems to understand it differently. It seems to me we ought to be able to draw a section that is easily understood. If this isn't, we should have one that is.

This man of whom I speak, who is a member of the Association, told me last winter that he had studied very, very carefully what he ought to do, whether he ought to withdraw from the Association or whether he ought to withdraw from the insurance company. He is absolutely conscientious and wants to do the right thing. It seems to me if we are going to do the right thing we ought to have a section that could be understood easily, and there would be no doubt about the consequences.

(The question was called for. A rising vote was taken, which resulted 81 for and 26 against. The recommendation of the Executive Board that section 7 of article 19 of the By-Laws be eliminated was therefore adopted.)

ST. JOSEPH VETERINARY COLLEGE

THE PRESIDENT: According to agreement yesterday, we are to give Dr. Moore a chance to present his case about his college. We will now give Dr. Moore of St. Joseph Veterinary College the opportunity.

DR. R. C. MOORE: The Committee on Intelligence and Education reported unfavorably on an application that the St. Joseph Veterinary College had made for being considered an accredited veterinary college of this Association. I want to say in the beginning that I am not criticizing the Association when I make the remarks I am going to make.

I want to correct what I believe is an error, for one thing, that was in the application. I believe the report showed an application for reinstatement. Reinstatement might put this college back in the same place it was prior to the New Orleans session. The request I made was in writing and handed in. I have a copy of it here. "We hereby make application for recognition in your Association as an accredited school, and respectfully refer you to the evidence of our fitness now in the hands of your Committee on Intelligence and Education."

The reason I wanted to make that clear to you was that we are not asking you to put us back. The reason I make this distinction is this: The class that matriculated last year apparently is not in accordance with the rules of this Association. It was a question, "What would be the responsibility of this Association in that class?" Precedent has been set in this Association several times regarding

similar conditions with colleges. Most of you remember that we went from three to four year course, but there were several of our best institutions that did not move up the time to the four-year course as this Association required. I think, if I am not mistaken, the institution presided over by your President is one. The Veterinary Department of the great University of Ohio was another; New York another; Toronto another. They could not do so at once, but promised to move up to it as rapidly as they could, and they were not rejected. That is a point I feel was a precedent set for the things I want to bring to your attention this morning.

If you will refer to the committee's report, there were two objections raised to the St. Joseph Veterinary College being added to the accredited list. One of those was a laxness in giving advanced standing to students. The committee raised one question with me when they examined the credentials of the students in our college, and one was so far advanced in attendance—that was the case of a gentleman from Iowa State College—that nothing could be done. I had two students last year who had finished, as I supposed, one year's work in the Iowa State College. One of them sent in his credentials a little while before the school opened. I examined them carefully and found them correct. The day of opening of school he appeared and brought with him a neighbor boy who, he claimed, was a classmate of his in school. He had his credentials, and in looking over them casually, I believed they were all right. I matriculated him in the sophomore class. When the committee came to examine those papers this spring, one of the members from the Iowa State College detected the error in that admission and called my attention to it and told me that this man had been rejected on account of low scholarship, and when I referred to it I at first was unable to see that he was correct. Dr. Day, who was also a member of that committee, said, "I would have taken that as a clear certificate that he was eligible to admission here." He thought it was right, as I said, but when we came to examine it carefully we found it was not. This was the day after the junior and freshman classes had been dismissed, two days after our examination. I wrote this man and told him the facts and told him that he must get clearance from the Iowa State College before he could come into our institution. We all make errors, and I believe that when we correct them promptly it is about all we can do.

We have these questions coming up day after day from various sources. I had one come up the other day from the Polytechnic College of Alabama. A man wrote me that he had had two years' work in that institution and asked for admission to our school. I wrote him that he could be admitted to the junior class if his credentials showed he had completed that work. He sent me the credentials and the grades apparently were low, but I could not find a single word showing what the passing grade was. I was unable to state whether they were all right or not. The heading of the papers stated that he had been admitted conditionally on 12

high-school credits, with the understanding that he would make up the other 2, making 14, before he could finish up the work. I compared the work in those two sheets and I found his general average in the second year compared favorably with his first year's work, so I was at a loss to know how the credit was conducted. The registrar had said in a footnote on this certificate that this man had been asked to withdraw on account of his low college work. I couldn't understand definitely whether that meant in reference to the matriculation there, or whether it meant the low grades in those papers. I took it from the papers that he had been passed from the sophomore year on a certain per cent he had made from his classes. Being in doubt, I wrote Dr. Cary and asked for particulars. He wrote me that the man had not been objected to because of his entrance requirements, but because of the low grades he had made on his two years' work. I immediately wrote the man that he could not enter our school. We have those things coming up and have difficulty in knowing just what to do with them. We don't want to do an injustice to the individual nor to the profession nor the rules of government.

When these questions come up in connection with the B. A. I., I always feel that I have a safe background, because I immediately refer them to the Bureau, giving the Bureau all the evidence I have in the case, and when I get their criticism or their report, I feel I am perfectly safe in following their recommendations.

I have not had any backing in the American Veterinary Medical Association. The committee has not been organized until this year. I was on that committee and I know whereof I speak. There was no head on the committee, and we could not get into shape to do very good work. Under those conditions there was nobody in the A. V. M. A. to whom I could refer those reports. I did refer them to President V. A. Moore, and he was unable to say what the Association would do. I believe you would help these schools wonderfully if you would empower the chairman of your committee to pass upon these things. His ruling should stand, and we would not be in doubt. It is not the desire of my school to violate the rules of this Association, notwithstanding the fact that the reports would indicate the contrary.

The second objection that was raised was the admission of students last year, under the two years of high school requirements. I would like to review that matter a little with this Association. If you refer to the minutes of the Philadelphia meeting and look at the report of the Committee on Intelligence and Education, you will find that the committee met in Chicago, I think in May, 1918; and inasmuch as our school had been receiving various requests and rulings from the Surgeon-General's office, we were in doubt as to what we were required to do. We didn't have any definite data that would say to the students, "You can be, or can not be, admitted."

Considering that matter, Dr. Dunphy, Dr. Kiernan and myself, three members of the Association, decided it would be advisable

to send a subcommittee to Washington and try to get an understanding from the Surgeon-General, the B. A. I. and the A. V. M. A. as to just what we could depend upon that year and next. It was war-time and young men over the country could not enter schools as they desired. We felt it was only fair to get some fixed and fair understanding on this Association, so Dr. Dunphy and Dr. Kiernan were selected as a committee. Dr. Dunphy was nearest to Washington, and they were selected to go down and get a ruling on this. Dr. Dunphy wrote me afterwards—and I believe he will verify this—that they had sessions with Dr. Mohler and representatives of the Surgeon-General's office, and they had finally agreed on requiring two years of high school for admission in 1918-19, three years in 1919-20, and four years in 1920-21. I have a copy of that agreement in my desk, and Dr. Dunphy is here to verify it, and it is verified if you will refer to the proceedings of the Philadelphia meeting. I have the copy in my hand.

On the strength of that, we wrote a number of our applicants who were being taken into the Army by the draft, and who wanted to know if they could get in later without a high-school education. I informed them of the rules. We had informed all our applicants that we required three years of high school for last year's training.

During the Philadelphia meeting, after the adoption of this report from the Committee on Intelligence and Education, we disposed of the matter. The resolution made before at Kansas City was exactly in accord with this. It required three years of high-school training for last year and four years for this year. We had no objections to that resolution coming along. We believed the thing to do was to work to meet that condition, meet it honestly and fairly.

When the report of that meeting came out in January, that was the first intimation that I had that there had been any changes. I was out of the convention room working, signing up the report of the Committee on Intelligence and Education, when that amendment was passed, and I had no knowledge of it until I received the report of that meeting.

The B. A. I., working with the Civil Service Commission, thought it advisable to hold to the two-years high-school requirement, and Dr. Mohler told me that he thought it was only fair to the schools and fair to the young men who had been taken by the draft to let them come in last year on the old basis. I believe a good many more in this audience believed it was the only patriotic thing to do. It was only fair, because we had shut them off from completing their work then.

Taking into consideration the way in which the amendment was passed, we did not know that this Association required a high-school standard last year. Last year's meeting was not held at the official time, but in November, two months after school had opened and two months after these students were in. I sent in my catalog last year and made a clear statement of the facts to the meeting in New Orleans. After stating the conditions, we said that we would

follow the requirements of the B. A. I. last year, and admitted students on two years of high-school training when properly certified to by their State or school officers, where they had finished the work. We further stated—and I put that in capital letters—that this year, beginning with 1920-21, we would require four years of high-school training for admission. We believed we were doing the fair thing and all we could do under the promises we had made. I explained that to Dr. Bergman when he inspected our school this year, or last year, before we were complying with all the requirements, and he made notation of it and said he didn't believe it would be required.

The resolution of Dr. Klein, as offered at Kansas City, really is two amendments. The first was in reference to the time that the school must teach, 32 weeks of not less than 17 credit hours a week. I said we exceeded that last year by a long way. We gave 32 weeks of actual teaching time. In place of 43 hours as required by the B. A. I., we put in over 30 hours of actual teaching time in the laboratories, not scheduled, but actual teaching time.

The second paragraph reads: "Beginning with the college year of 1918-19, matriculation shall be not less than one year of high-school training or school work or equivalent studies taken in other preparatory schools; beginning with 1919-20, the requirements to be not less than two years of high school, etc.; 1920-21, not less than four years of high-school work or its equivalent."

That was laid over. I offered these as amendments to the By-Laws. I am going over to the action of the Philadelphia meeting. I want to call your attention to one thing there, and then I am through. When this matter was brought up in the Philadelphia meeting, here is what took place:

"THE PRESIDENT: Now, the Secretary has a further report from the Executive Committee.

"ACTING SECRETARY DAY: The Executive Board recommends the following with reference to the Klein resolution, the resolution that was laid over last year. They recommend that the amendment to section 4 of article 2 of the By-Laws should read as follows: 'Except as provided in section 3, only such veterinarians,' etc."

It calls for 32 weeks of training, which we give, absolutely, not only by chart, but by actual class hours. Dr. Hoskins moved the adoption of this change in the By-Laws, and it was adopted unanimously.

The next section follows.

"ACTING SECRETARY DAY: The Executive Board then moved to amend section 5, article 2: 'Beginning with the collegiate year of 1919-20, the matriculation requirements shall be not less than four years of high-school work or equivalent studies, taken in other preparatory schools; provided,' etc., which it is not necessary to read.

This was voted on immediately and passed. Our Constitution and By-Laws provide that any motion to change a By-Law must

be read at one meeting and laid over until the next meeting. Here is a motion by the Executive Board read and adopted and called a part of our Constitution at one meeting without any chance of the people knowing what kind of a change was made, and I have had advice from a number of men who are supposed to understand these things more clearly than I do, and it is a universal opinion, as far as I know, that this is an unconstitutional amendment. If it is, then you have no standard for high-school training in this Association, more than the two years adopted by the Detroit meeting. I believe, then, that we did not transgress the constitutional rights of the members of this Association.

I thank you for your attention. (Applause.)

THE PRESIDENT: On account of the limited time, I shall ask those who discuss this matter to confine themselves to five minutes.

DR. R. C. MOORE: This is a vital question with this institution, and I want to call your attention to the fact that we have been members of this Association for years. If we are cast out here, it means a great financial loss to us that is almost irreparable. I ask for discussion.

THE PRESIDENT: Is there any further discussion on this matter?

DR. W. H. HOSKINS: Mr. Chairman, we have been traveling a very rapid pace in this Association in the last five to ten years; so rapid has been the pace that almost every veterinary school in the United States or in America is confronted with the smallest entry of the student body and we have today in the aggregate the smallest student body in the history of veterinary medicine.

It is a beautiful sight to see a man like R. C. Moore coming in here, pleading for leniency and pleading for more time, because he is one of a group of men who, for the last twenty or thirty years, have invested every dollar of their own money and all that they might command in the carrying on of some of the best private veterinary schools that ever existed in the history of veterinary medicine in any country. More than 2,000 men went out of the school in Kansas City. The school was maintained by a group of four or five men who had all that they possessed in the world invested in that school. Like conditions obtain in several other schools in the country. Dr. Moore has up to the present time met every advance of this Association, and it would seem to me that some degree of leniency might be shown.

Yesterday the secretary of the Committee on Intelligence and Education made the statement, which was a very forceful one indeed, that this Association had no power over any veterinary school in the land, and that was true; and there are not three States in the Union that have a standard beyond that given by the school at St. Joseph. Time after time in the history of this Association we have extended leniency to schools, and they have always met what we demanded, and I am in favor of granting to Dr. Moore's school leniency at this time, for, as I said before, he can go out and run his school without this Association and the graduates of that school

can go into 90 per cent of all the States in the Union without any question. It is a great tribute to this Association that he comes here under these circumstances and pleads for a reprieve of a short period. (Applause.)

DR. BAKER: Being out of school work at this time, for various reasons, which you probably all understand, the writing on the wall has been noticed and we have succumbed to it. There are two private schools now still struggling against the inevitable. I rather admire the remarks of Dr. Hoskins, especially that word "leniency," but I would be inclined to amend that word a little by saying "leniency based upon fair play." Dr. Moore has presented admirably the conditions of his school, and it appears to me now, as an impartial judge, that it would be unfair to the St. Joseph school to deny them admission and not let them come in as an accredited school. As Dr. Hoskins just said, many other schools failed to comply immediately with the requirements of this Association, but they did after a while, after leniency was given them, and they made it up in time to get recognized, and have been operating according to the rules of the Association ever since.

Nothing will be gained by this Association by eliminating the St. Joseph school from the accredited list. We won't violate or reduce our standard of ethics by admitting them. He has come up to the scratch. Four years, required this year in the Constitution and By-Laws, does not come in until this fall. All of this previous four-year business was a little ahead of time, a little premature; and bear in mind, as another strong asset that he is in possession of today, he is in good standing with the United States Government. (Applause.)

DR. R. C. MOORE: I failed to say that our requirements this year are four years of high school, a certificate of having completed four years of high-school work in an accredited four-year school.

DR. P. A. FISH (Ithaca, N. Y.): It seems to me that the issue here is rather a concise one. These matters were referred to quite completely at the New Orleans meeting. As I understand it, the requirements of this Association were known in advance and the private schools had an opportunity to comply with them. Most of the schools complied with them, but Dr. Moore of St. Joseph did not. Those schools that did, suffered financial loss because they did comply. It seems to me it is most unfair to penalize these schools that did comply and favor the one that did not.

DR. G. G. FABER (Mitchell, South Dakota): I don't see why there should be any line drawn as to educational requirements where students get their education, as long as they have it. I don't see why you should say a man should have a high-school education, or two years high school, but I say this: Have an examination board and examine these men and bring them up to a certain standard. If I remember correctly, I have heard it said that in Germany the veterinarian is up in a class with the M. D.'s. I think if you will go to their records—I am not stating this to be a positive fact—you will find that Germany does not say that a man shall be a graduate

of any school; if he can pass the required examination, he can go out and practice.

I myself was denied the privilege of a high-school education. I entered a private veterinary college for the simple reason that I could not enter a State school. I heard the dean of this school make the remark that graduates from high school came in, flushed big for a week or two, and after that they were back struggling in the drifts with the rest of us. I want to put it up to you daddies of boys in high schools, how long would they stay there if it wasn't for their athletics and you fellows back of them with a good, fat pocketbook? When I was 21 years of age I could not do an example in long division. I was in business for myself. Since that time I have put in five years of school. Had I been denied the privilege to enter a veterinary college, I would still be out in the class with the a veterinary blacksmith. That was my profession—or trade, rather. I entered a school, took some preparatory work for two years, got a certificate from the dean of my school, and was admitted on a level with the graduates of high school. I think if you will go to the records you will find that the majority of men without a high-school education have made equally as good, if not better, records accordingly than men admitted with a high-school education. I happened to be with them, sat right beside them, elbow to elbow, and I know when it came to good old examination time they were right along with the rest. (Applause.)

THE PRESIDENT: Any further discussion on this subject?

DR. R. C. MOORE: Mr. Chairman, I move you that this application be granted. I make a motion to the effect that this school be added to the accredited list of the A. V. M. A. (Seconded by Dr. Koen.)

THE PRESIDENT: The motion is open for discussion.

DR. WAY: As chairman of the Committee on Intelligence and Education that presented the report yesterday, I wish to make a few statements in reference to our work this year and in substantiation of our report. I want to say—and I have discussed this with Dr. Moore and other members of the St. Joseph organization—that there is absolutely no personality concerned in this discussion so far as the committee is concerned. I think the dean of the institution understands that. The committee individually think as much of Dean Moore as we can of any other member of our Association of whom we know and with whom we are acquainted as we are with him.

The committee visited the St. Joseph school and went into the facilities and requirements, educational qualifications of the students, etc. It seems to me there is very little difference between a request for reinstatement that was made by this school and a request for recognition at this time. However, if it is a question of recognition, entrance requirements as laid down by the A. V. M. A. and as put into effect by that institution last year, the requirements of this Association are clearly violated.

In reference to the statement made by the Dean, as regards advanced credits, I think that his own statement this morning is clear evidence of the statement made by the committee yesterday that these students were admitted apparently under very lax consideration of advanced credits. If a student brought a card from another institution virtually stating in red ink on that card "Dropped for scholarship," it would seem that the authorities of the institution might interpret that statement. However, the one member of the committee who made the inspection of the school this year, as he has been referred to as having examined these credentials, will discuss that point in a moment.

The committee wishes to read again a few statements in reference to conditions as they were found at this institution. There were some things that were not presented yesterday because in our opinion the reasons as stated were sufficient, inasmuch as the requirements approved by the Association this last year were clearly violated.

I don't want to go into a detailed discussion of the various steps of this matter that have led up to the four-year requirement. It has passed through a series of years at the meetings of this Association; but suffice it to say that at Philadelphia the Committee on Intelligence and Education did recommend that the requirements be graded from year to year. However, the Executive Board felt that the requirements for 1919-20 should be a four-year high-school course and they so specified in the recommendations of that committee, presented the same to the Association, and they were passed by the Association. It is not a question of By-Laws; it is a question of a definite action of the Executive Board, presented to the Association and adopted.

In reference to the inspection of this institution, I want to read just a paragraph or two from the report of the members of the committee who visited the institution.

"A total of 154 students were in attendance, divided into classes as per exact questionnaire and original copies furnished, showing the original classes of the four classes for 1919-20 and which constitute a part of this report. Regarding the freshman class, of a total of 50 students, only 5 could have matriculated on the basis of the A. V. M. A. matriculation requirements effective 1919-20. The remaining 45 were matriculated on the two-year basis and contrary to A. V. M. A. regulations. Of the three upper classes, 23 students entered from other veterinary schools with apparently very lax examination of advanced credits."

Regarding the general educational facilities, equipment, teaching methods, etc., as chairman of the committee I desire to read from the report of the members of the committee who made the inspection.

"The college building is a two-story brick structure, 100 by 140 feet, which accommodates the educational facilities, including the hospital which is operated as a sort of private institution by certain of the men connected with the school. Two laboratories are provided, one equipped as a chemistry laboratory and the other takes

care of all other laboratory work offered with the exception of dissection. Apparently, therefore, this one laboratory is considered sufficient for instruction in the following subjects: Histology, embryology, zoölogy, physiology, botany, bacteriology, pathology, laboratory diagnosis, parasitology, for 165 students. Needless to say, adequate laboratory facilities and equipment are lacking. It could not be expected that one laboratory, somewhat meagerly equipped, would suffice for giving students of all classes very thorough training in laboratory technique, or much of an opportunity for laboratory study and observation in connection with the various major subjects.

"The dissection-room methods and demonstration material in use did not impress the writer as being conducive to thorough work in the subject of anatomy.

"No library facilities or reference books are provided, as far as I could learn, nor was either a working or permanent pathological museum in evidence.

"While a roomy clinical amphitheater for observation of clinical cases is provided, the clinical facilities are lacking, on the whole, for handling a wide variety of clinical material, including post-mortem facilities and where the students may actually come in contact with and assume the general care of the cases."

Considerable stress is laid upon the availability of stockyards for observation of clinical cases, and the opportunity to visit outside cases by accompanying a practitioner connected with the school in routine practice. This practice may be similar to the custom employed at some other institutions of farming out their students, so to speak, with practitioners of various degrees of ability and questionable teaching qualifications. This is a practice known to this committee, and, as stated in our report yesterday, should not be countenanced by this Association.

"While undoubtedly of value, these do not, however, meet with the requirements whereby, through regular schedules and hospital and ambulatory clinic facilities, students may assume individual responsibility in the care and treatment of cases assigned them, submitting detailed written reports as to the condition of the cases under their observation or the results of postmortem examinations. Several students did not speak favorably of opportunity provided for detailed clinical study.

"The general appearance and impression created by the institution can scarcely be said to be such as would tend to instill in the students true appreciation of the scope of the profession into which they are entering, or to instill the spirit to go deeply into the sciences and practices of the profession. What might be termed an educational atmosphere seemed to be lacking."

This, gentlemen, is the detailed report of the members of the committee who made the inspection, and was on file at the time of the New Orleans meeting, and is part of the record of the committee. These records, of course, are accessible to any member of the Association for review.

Reference has been made to the small entrance of veterinary students to veterinary colleges, due to the rapid strides that have been made during the past two years. The strides have been so rapid that students are not able to keep pace with the A. V. M. A. Personally—and I think I can speak for the rest of the committee—we question whether or not this is the reason for the low entrance requirements. The great industrial field these days offers remuneration for young men far in excess of what they may see in prospect in entering the veterinary profession. I know many veterinarians say, "I wouldn't have a boy of mine enter the profession, and I tell every boy that asks me to forget it." Is that the attitude, or is it shortage of students due to the rapid pace that we have set? I believe it is due to industrial conditions and to the high remuneration that can be obtained in the industrial field.

The statement was made by one of the members on the floor today in reference to education in Germany. First, we are not following Germany (applause), and second, it is a general and accepted fact that if the veterinary profession is to assume a position in society with the other learned professions, we must maintain higher and better entrance requirements and educational standards and better and higher technical educational standards. (Applause.)

The question of fair play has been submitted. There is no question of fair play in this discussion. The play has been perfectly fair, open and above board, and it is a question of principle.

I thank you for your attention. I trust you will support your committee, and we pledge you, if the committee continues, to do everything we can do to help, to assist and to formulate better things for the veterinary profession of North America. (Enthusiastic applause.)

DR. R. C. MOORE: May I reply to one or two points?

Speaking about fair play, I think there are possibly two sides to the fair-play proposition. I believe that every member of the committee will agree with me that it has always been the rule that when the schools have not measured up to the standard, they have been notified of their deficiencies and given the opportunity to correct them. I asked the committee that made the inspection—I was lying sick in my bed at the time—if they found defects to let me know in time to change our catalog last year and make the improvements. I asked again at the New Orleans meeting for the same thing. I asked the committee when they examined the school to let me know if there was anything wrong. This morning is the first hint I have had that defects were found. Now, is that fair play? Is that the play that has been accorded the colleges of this Association heretofore? Is that fair play, or is that discrimination against this institution? I credited the committee with being fair before, but I believe they have been unfair from the statements made now.

DR. CRAIG: Mr. Chairman and gentlemen of the Association, I don't want to take up your time, because I feel you are tiring of this discussion, but I want to bring out certain facts that are history.

The private colleges of the United States held a meeting in Chicago in 1919. At that meeting there were present representatives from the four private veterinary colleges then running—Chicago, Mc-Killip, St. Joseph and Indiana. The question at that time before that body was whether or not we would accept the recommendations of the Bureau of Animal Industry. Clearly the requirements of this Association were a four-year course in an accredited high school, or 14 units, so certified. The question was whether we would ignore the regulations of this body and take up and maintain the regulations of the B. A. I. A vote was taken on that, and the colleges voted to maintain the requirements of the B. A. I. The Indiana College voted to maintain the requirements and accept the requirements of this body. We did that. (Applause.) We maintained our requirements last year, which we knew we would do at a large financial loss—and we did it at a loss—but, gentlemen, we are clear.

Is it fair to us—if you are talking of fair play—to put on the accredited list any institution which has openly and with knowledge of the fact disregarded your requirements? (Applause.) It was all right for a young man twenty years ago to say he couldn't get out and get a high-school education. Today there are high schools on every crossroad, and if a man hasn't the ambition, the courage and the character to get a high-school education, he has no business in this profession or any other profession. (Applause.)

I want to say to you right now, Where are you going? Is this Association going backward or is it going forward? That is the question for you to decide. Are you going to open the doors and take in the rag and bobtail of Tin-can Alley, or are you going to stand up in your communities as men and citizens of the greatest country that ever existed? What are you going to do? It is up to you. We have complied with your regulations, and we intend to comply with them because we believe they are right. (Prolonged applause.)

DR. R. C. MOORE: I have been virtually accused of misrepresentation regarding that meeting of the private colleges in Chicago. I was chairman of that committee and presided over that meeting. It has been stated here that three colleges voted for maintaining the standards of the A. V. M. A. I haven't the records of that meeting with me, but I believe I can procure them. Roll was called, and as I remember, the motion was made by Dr. Quitman that we follow the requirements of the B. A. I. Dr. Baker is here; he knows what was done at that meeting. Dr. Craig wrote me three weeks after the meeting that his board had decided to follow the requirements of the B. A. I.

DR. CRAIG: The A. V. M. A. I was only there representing the college as an individual, and I had to bring the matter before the Board of Trustees. I will say that the Board of Trustees decided to coincide with my vote.

DR. MOORE: Mr. Craig made the statement that three colleges voted for the following recommendations of the A. V. M. A.

(Cries of "No" from the audience.)

DR. MOORE: Then I misunderstood him. Then the statement is wrong.

DR. DAY: I feel that it is necessary for me to make a statement, since my name was brought out so clearly by Dr. Moore in his first statement in connection with this one individual who came from Ames. Dr. Moore said that I made the remark that I would have taken him. I do not remember exactly what remark I did make. I don't remember the conversation. Dr. Moore is a gentleman I have known for the past 25 years, and I have every confidence in him. We are both more or less given to joking, as most people are, but have very high regard and respect for each other. I do remember very well that it was written in bold red ink across the card of this student, "Dropped on account of scholarship." I do remember that very well. I believe that I can call Dr. Moore's attention to one individual we found who was supposed to have had two years high school. He had had only one and one-half years of high school, as his certificate showed.

Much has been said about fair play. I am for fair play. Something has been said of some of the findings and some of the shortcomings at each of these institutions. I am here to say that in every institution that I had anything to do with examining we found some points to be criticized, and I do not believe there is an institution in this country that hasn't something which can be criticized. I think constructive criticism is the thing, and that is what is going to bring our profession to what it should be. However, I must say that in some of these institutions the shortcomings were so flagrant that it was necessary to make some remarks about them.

You have heard the report of the chairman of this committee. It is not necessary to go over that report, but I do hope that you will consider this matter very seriously. This is a serious question. We are in a state of evolution and we should always be in a state of evolution. We will never get anywhere unless we are. Let us go upward instead of downward. I thank you very much, and trust you will support the recommendations of your committee. (Applause.)

(The question was put on the motion of Dr. Moore to adopt St. Joseph as an accredited school, and the result was as follows: For adoption, 9; against, 125.)

DR. KOEN: I move that the Committee on Intelligence and Education be instructed, with power to act, that after the sessions of the St. Joseph school have begun for the next term an investigation be made of that school, and if it be found that the requirements of this Association have been met and are being met, the school be then placed upon the accredited list. (Seconded by Dr. Kinsley.)

THE PRESIDENT: The motion has been made and seconded. Is there any discussion?

DR. KOEN: I think this is of too vital importance to be passed over as we have done. The Committee on Intelligence and Education is to be commended for the most excellent and comprehensive

report it has made. A better report has never been presented to this Association. The committee holds a most difficult position in making these investigations. I believe that every member of this Association has faith in that committee. We want to uphold it. It has found shortcomings in this school that this Association can not tolerate, but we are all human. It is only fair, if we have made mistakes, that we be given a chance to rectify them.

You recall the Bible story of David, who sinned grievously, but when he repented he was forgiven. There was another story of a woman who was caught in the act of adultery, and the mob came to stone her. The Master said, "Let him that is without sin among you cast the first stone." After a moment all had fled, and He asked, "Woman, where are thy accusers?" They were gone, and He said, "Neither do I accuse thee. Go thy way and sin no more."

That is fair play. There is a principle of education involved in this matter, but there is also a principle of life, of justice, involved here, and that is the reason I want to appeal to you this morning.

Dr. Moore made a mistake in trying to uphold the boys that went forth into war. In 1917 hell broke loose on this continent and things were not normal. The mistakes that were made by Dr. Moore largely revolved around the circumstances growing around the war. The boys that would have matriculated under conditions which exist now could not, but Dr. Moore made a promise that he would accept them, believing that he had the authority to do it. The Government of this country believed it was right. There was many a young man promised the job when he came back home, having answered the call of war, who found when he returned that the job had been taken by someone else. Was it fair play? Do we not hear about it on every hand? Was it just? When the boys came back, after they had answered the call of their country and had served as best they could, Dr. Moore made good his promise, and in doing it violated the rules and regulations of this Association and should be condemned. This is his only offense in a large measure. Are we going to condemn him?

Sixteen years ago I sat in his classes. Then he was fighting as vigorously as any man could fight for the veterinary profession, and he had fought long years before the members of this committee had entered this profession. Last year when this action was taken I met him in the lobby of the hotel, and he said, "John, they have nearly killed me." He is going down now to the evening of his life, heart-broken, unless his efforts for the veterinary profession and for the school to which he has given his life are appreciated. He is going away with a broken heart, and I say to you, there isn't a man in the veterinary profession who has contributed more, and whose standing in the profession is greater than "Daddy" Moore. I say to you that "Daddy" Moore is not guilty of trying to run a quack institution. He has done too much. I am one of the students of that school.

I want you to give to "Daddy" Moore the chance that he is asking for. I want you to give him that chance that every man should have

to make good, and that is the reason for making this motion. I have confidence in this committee. I believe that if upon another investigation they find he is making good, and that he goes his way to sin no more, to violate our regulations no more, he will be given this chance and that his school will be placed back on the accredited list. I thank you. (Applause.)

SECRETARY MAYO: I shall object very strenuously, and shall use every legitimate means at my command, if an effort is made to have a school placed on the accredited list until a report has been made from a committee of this Association. I know whereof I speak, and I know that Dr. Moore and the members of the faculty of the St. Joseph Veterinary College have known all the time just what the requirements of the American Veterinary Medical Association have been. There is no question about it at all. I sincerely hope that the school will meet those requirements and be placed on the accredited list, but I sincerely hope it will not be placed upon that list until this committee, in whom we all have confidence, recommend that to this Association. (Applause.)

DR. FISH: I move an amendment to the motion, that the Committee on Intelligence and Education visit the St. Joseph College in the usual course during the year.

DR. BELL: I would wish to offer an amendment to Dr. Koen's motion, that the committee give Dr. Moore, dean of the school, an itemized list of his shortcomings, so he will be able to correct them.

THE PRESIDENT: That should be a separate motion.

DR. MOORE: In view of the conditions that exist, I doubt whether it is necessary to pass any of these motions. When I look back at the action of the committee in criticizing, here before this Association, things that they claim they have found, without giving us due notice and an opportunity to correct them, I feel that there isn't any use for us to expect anything from the hands of this committee. The intention is to cut off the head of this institution, to down us. That is plainly stamped throughout the whole proceedings.

I have been a member of this Association for a good many years. I don't believe there is anybody who has worked harder than I have, but today I have been almost thrown from this Association. I was a member of the Committee on Intelligence and Education for two years. I visited a good many schools of this country, and I want to say to you that the conditions at St. Joseph will compare favorably with three-fourths of the institutions of this country. I know whereof I speak; I am not speaking as one outside. I am here to say what I know from actual investigation.

DR. MCGILVRAY: I have refrained from taking part in this discussion here this morning because it is a very delicate matter to deal with. However, coming from what we might term another country which has endeavored to comply with the requirements of the A. V. M. A. and the Bureau, I take a step for fairness. I have never had the pleasure of making the acquaintance of Dr. Moore of St. Joseph College. I came here with an open mind about it, but

still leaning toward Dr. Moore; in fact, I believe, intending to vote in favor of the St. Joseph Veterinary College being retained on the accredited list. However, on hearing this discussion, I began to waver and my mind wasn't made up.

When Dr. Koen stated what Dr. Moore was doing for the returned boys, I just thought of what I had to do. I was besieged there by the soldiers in Canada to take into the school a large number of men and give them educational training. I took the stand that they could only get in there if they met the requirements. I took that stand. We got none of them. I have in my possession letters from the Vocational Training Board at Boston, Massachusetts, in which they refused repeatedly to take men into that school unless they complied with the requirements. They have sent some of those men to the preparatory school in Boston. If that school is recognized by the Bureau of Animal Industry of the United States, we will accept them.

I have given the committee my word that I will live up to their requirements as far as permitted by the State and University. I am going to do it. I am going to support Dr. Moore. I don't see any harm in examining again, but the thing is this: We have to abide by the requirements, and I, for one, stand for that. If our school can't meet the requirements, we will have to take the same road as the St. Joseph School. If we can't meet the requirements, there is nothing to do but go our own way.

(The vote was taken, and the motion to make another investigation of the St. Joseph school was lost.)

DR. MOORE: Mr. Chairman, I remarked a while ago that I had been a member a good many years. I have performed every duty that I have been called upon to perform. I have run schools and done work for this Association and other institutions of this country. I have, I believe, as many friends among the veterinarians as any other man in the United States. I am proud of the friends. I have paid my dues for this Association for this year. I can leave it with clean hands and a clear conscience. I will hand my resignation in before I leave.

COMMITTEE ON ABORTION

DR. EICHHORN: We heard the splendid report of the Committee on Abortion. There have been no funds provided for such a committee during the ensuing year. I believe that the Association should decide on continuing such a committee, and I move that an appropriation of not less than \$500 be made and that the committee be continued. (Seconded by Dr. Hollingsworth.)

SECRETARY MAYO: This will have to go to the Executive Board.

DR. STANGE: I believe that the Constitution and By-Laws provide that the Budget Committee will make up recommendations regarding expenditure.

(Dr. Eichhorn's motion was adopted.)

Adjournment.

FRIDAY MORNING, AUGUST 27, 1920

The meeting convened at 9:40 a. m., President C. A. Cary presiding.

REPORT OF BUDGET COMMITTEE

THE PRESIDENT: The Secretary will read the report of the Budget Committee for the ensuing year.

SECRETARY MAYO: You understand that the different committees desire funds for their work, and each committee thinks its work is the most important work of the Association, which is proper. I don't think we would want a committee that didn't think it was doing an exceedingly important work; but it is the function of the Budget Committee to consider the situation as a whole, from as unbiased a point of view as possible, and they report as follows:

They recommend a contingent fund for the President of \$500. It is understood, and is a part of this report, that it be this sum or as much thereof as is necessary. This sum is the same as for last year.

Intelligence and Education.....	\$1,000
Legislation	1,500
Salmon Memorial Fund.....	50
Committee on Abortion.....	500
Treasurer	300
Committee on Pharmacopœia.....	250
Committee on Anatomical Nomenclature.....	50
Purchase of ten shares of stock in the Horse Association of America.....	50

The running expenses of the Association are to be paid, as at present, through the Secretary's office.

(It was voted, on motion of Dr. Turner, duly seconded, that the report of the Budget Committee be adopted.)

METHOD OF HANDLING COMMITTEE FUNDS

DR. STANGE: I would like to make one announcement on behalf of the Executive Board. The Board has requested and directed the officers of this organization to keep all of the funds in the hands of the Treasurer until they are expended, and that funds in the hands of committees existing at the present time, of whatever nature they may be, be turned over to the Treasurer.

We took this action for the following reasons: On a number of occasions money has been voted for committees and a check for the entire amount simply turned over to the committee. We feel that it is a more businesslike way to handle the matter if the committee is allowed to go ahead and spend up to the amount appropriated, but the funds remain in the treasury until they are expended. We believe the funds that are out in the hands of the committees at the present time, as to some of which we have no detailed reports, ought to be turned back to the Treasurer and remain there until they are expended. We have that officer under bond. If the funds are

deposited in the name of the chairman of the committee and if anything should happen to him the Association is out and there is no means of getting those funds back. We believe that as a business proposition these funds ought to be in the hands of the Treasurer until they are expended.

DR. TURNER: I would like to ask the Executive Board what their idea is relative to the manner in which funds are to be expended. As a member of one committee, I have been somewhat embarrassed at times to know just how this expenditure should be made; whether or not expenditures should be made and bills rendered to the Secretary from time to time; whether that was at the disposition of the committee, or whether they wished one bill brought in at the end of the year and presented for the amount. You can see, especially in the Legislative Committee, we have been somewhat embarrassed at times, and we have never been just acquainted with the disposition or feeling of the Board relative to the expenditures of this committee.

THE PRESIDENT: The Secretary can inform you as to the method adopted by the different committees.

SECRETARY MAYO: It is very important that all expenditures be billed and sent to the Secretary's office just as soon as possible, for this reason: If a sum of \$500 or \$1,000 is voted to a committee, we keep a check on that amount as it is vouched for, and we notify the committee that we have only so much left. If you wait until the end of the year we have no means of knowing, and neither has the chairman, unless it is handled through the chairman of the committee, and the chairmen don't look after that always as they should. We must know if they are going to overdraw their apportionment or not. Just as soon as a proper bill is sent to the Secretary's office, a voucher is drawn immediately and forwarded through the President to the Treasurer for payment.

DR. W. H. HOSKINS: Ought not all bills that are presented to the members of the committee to go first to the chairman for approval?

THE PRESIDENT: That is the custom.

DR. W. H. HOSKINS: I have used all the money of the Legislative Committee. Bills have come to me, been approved by me and sent to the Secretary for his approval.

SECRETARY MAYO: We would like to get all bills as soon as possible.

DR. STANGE: If necessary, I will make a motion that that action be approved.

(It was voted, on motion of Dr. Stange, seconded by Dr. W. Herbert Lowe, that bills be sent to the chairmen of committees for approval and then sent to the Secretary's office as soon as possible.)

RECONSIDERATION OF ACTION ON APPLICATIONS FOR MEMBERSHIP

DR. A. R. ANDERSON (Johnstown, Pa.): May I make a motion to reconsider the action taken on the two applicants from Ohio who were rejected?

(It was voted, on motion of Dr. Anderson, duly seconded, that the action taken on the applications for membership of J. C. Slade and R. V. Cannon be reconsidered.)

DR. LAMBERT: As Resident State Secretary from Ohio, I move that these applicants be referred to the Executive Board for such disposition as they desire to make.

(Seconded by Dr. W. H. Hoskins and carried.)

DR. HILTON: As a member of that Executive Board I wish to ask if it is not a fact that the Executive Board can act only in accordance with the Constitution of this Association, and as far as that Constitution is concerned we are obliged to accept any colored gentleman; so if you refer it back to the Executive Board they have no option.

THE PRESIDENT: The Board can handle this question. Under the conditions you speak of, that would not come up before the house, but will be taken up before the Board.

REPORT OF COMMITTEE ON COÖPERATION OF VETERINARY ASSOCIATIONS

THE PRESIDENT: The next thing in order is some reports which we have held over. We will hear from Dr. Welch's committee.

(Dr. Welch presented the report of the Committee on Coöperation of Veterinary Associations, as follows:)

At the last meeting of the A. V. M. A., at the suggestion of our Executive Board, there was appointed what was designated as "a committee to devise a plan looking toward a closer connection or affiliation between the A. V. M. A. and the different State and Provincial veterinary associations."

Your committee has given this subject serious consideration. It has likewise secured the ideas and opinions of many members of long experience in A. V. M. A. affairs.

In the very nature of events, the objects of all veterinary organizations are identical. They should coöperate and work in harmony. Therefore, in our opinion, there should be established an intimate affiliation between the A. V. M. A. and all State and Provincial veterinary organizations.

Your committee believes that this desired affiliation can be maintained more easily and effectively through the medium of the already existing Section of Veterinary Colleges and Examining Boards than through the creation of a new section. If the report of your committee is accepted, we would recommend a change in the By-Laws so that the title of said section shall read, "Section on Veterinary Colleges, Examining Boards and State and Provincial Associations."

Your committee would recommend that there be no change either in the manner of appointment or in the specified duties of the Resident State Secretaries, but it is urged that Resident State Secretaries exhibit a more active interest in the performance of their duties, especially in the matter of visiting the various veterinary organizations within their States or Provinces for the purpose of stimulating interest in the A. V. M. A., emphasizing its importance to the profession and increasing its membership.

We would further recommend that the veterinary organization of each State and Province, as recognized by the Executive Board of the A. V. M. A., be requested to select and designate an accredited member of its body to represent it at each annual meeting of the A. V. M. A. for the purpose of bringing to the attention of the A. V. M. A., through the Section of Veterinary Colleges, Examining Boards and State and Provin-

cial Associations, all matters of interest and importance to the veterinary profession of the State.

We believe that we are not yet ready for such a radical change as must ensue should we adopt the existing plan of the American Medical Association in its relation to subordinate State associations, but that the recognition of an accredited delegate from each State and Provincial association at our meetings, and the reception of our Resident State Secretaries as our representatives by the different State and Provincial associations at their meetings, constitute a feasible working plan whereby we may cooperate fully along all lines and be mutually helpful to one another.

W. H. WELCH,
U. G. HOUCK,
W. H. DALRYMPLE.

(It was voted, on motion of Dr. W. Herbert Lowe, duly seconded, that the report of the Committee on Cooperation, as read by Dr. Welch, be adopted.)

SECRETARY MAYO: Is there anything there that will come to the Executive Board?

DR. WELCH: The changing of the name of the Section on Veterinary Colleges and Examining Boards, adding thereto "State and Provincial Associations."

THE PRESIDENT: Just prepare an amendment and introduce it.

DR. STANGE: I have an amendment on that particular paragraph which I want to hand in a little later.

REPORT OF COMMITTEE ON NECROLOGY

THE PRESIDENT: The next committee is the Committee on Necrology, Dr. Connaway.

(Dr. Connaway read the report of the Committee on Necrology. It was voted, on motion of Dr. W. Herbert Lowe, seconded by Dr. Hollingsworth, that the report be adopted.)

REPORT OF COMMITTEE ON INTERNATIONAL VETERINARY CONFERENCE.

THE PRESIDENT: The next committee is the Committee on International Veterinary Conference, Dr. Eichhorn.

(Dr. Eichhorn read the report of the Committee on International Veterinary Conference, as follows:)

In order that your committee might extend the invitation to hold the next International Veterinary Congress in the United States through the proper channels, it deemed it necessary to ascertain the existing situation with reference to the status of the Permanent Committee. Besides, in view of the fact that the last International Veterinary Congress in London was abruptly terminated by the advent of the war, a communication was also sent to Sir Stewart Stockman, Secretary General of the last International Congress, in order to learn what the attitude of the profession in Great Britain is with regard to the next Congress. Dr. DeJong, the Permanent Secretary of the last International Congress, was also communicated with, informing him of the appointment of this committee at the New Orleans meeting and extending to the Permanent Committee the invitation to hold the next International Congress in the United States of America. In his reply he informed your committee that it would be necessary to reorganize the Permanent Committee before any steps could be taken, and that such steps for a reorganization are now under way; and at the same time he also expressed the opinion that it will hardly be possible to have another International Congress for at least three to four

years. Furthermore, he also stated that it might be advisable to have the next Congress in London on account of the abrupt termination of the last Congress there.

Sir Stewart Stockman, Secretary General of the last International Veterinary Congress, has also expressed himself on the inadvisability of holding the next Congress for at least three or four years.

While there was no inclination on the part of any of those who have been approached to refuse the invitation extended by our Association, nevertheless there seems to be the feeling that the next Congress should be held at London. Your committee therefore advised both the Secretary of the Permanent Committee and the Secretary General of the last Congress that we will be glad to abide by any decision and give full support to the next Congress without regard to the location which might be selected.

In the July number of the JOURNAL of our Association your Editor published an editorial on the International Veterinary Congress which, in part, is a translation of an editorial which appeared in the *Revue Générale de Médecine Vétérinaire*. Your committee deems it advisable to refer to this editorial, inasmuch as it involves the future relationship of the veterinarians of the allied countries with those of the countries with which they have been at war. In this editorial attention has been called to conferences of the Allied and Associated Academies, at which conferences it was decided that new associations should be established by the allied nations with the eventual concurrence of the neutrals, and that from these associations the Central Empires should be excluded. In this editorial it is also stated that we must abide by such a plan, and that if the American Veterinary Medical Association has been ignorant of this irrevocable decision, its initiative is not explained.

Your committee believes that an execution of the plans of the Allied and Associated Academies is not in accord with the American spirit of democracy, and furthermore, that such action would tend to a prolongation of estranged relations with the veterinarians of the former Central Empires. Your committee also believes that with peace reestablished it would be ill advised to discriminate against the scientists of certain countries and particularly so against members of our profession. The veterinary profession of this country is fully aware of the many valuable contributions made by investigators of animal diseases from the former Central Empires and the assistance they have rendered in the promotion of veterinary science. We have in mind such men as Ostertag, Schutz, Friedberger, Frohner, Hutyra, Marek, and many others, whom we have always considered ardent and faithful workers of our profession, devoting their lives to the advancement of veterinary science.

Your committee therefore recommends that the veterinary profession of America should not join at this time any scientific organization which would absolutely discriminate against members of the Central Empires. Such a step should be carefully considered and decided upon only after the most earnest deliberations. Furthermore, your committee suggests that the Association should foster the resumption of the pleasant relations which existed among the veterinarians of the different nations before the war and use its influence for the reestablishment of a pleasant professional harmony.

Your committee also recommends the continuance of this or a newly appointed committee for the purpose, if called upon, of assisting in the reorganization of a Permanent Committee and also to act for the Association on any matter pertaining to the next International Veterinary Congress. Furthermore, it is recommended that, should the Permanent Committee decide upon a meeting place outside of America, this committee should serve as the American Committee for the promotion of the next

J. R. MOHLER, *Chairman*.

A. EICHHORN, *Secretary*.

C. A. CARY.

DAVID S. WHITE.

L. A. MERRILLAT.

(It was voted, on motion of Dr. Eichhorn, seconded by Dr. W. Herbert Lowe, that the report of the committee be adopted and the committee be continued.)

REPORT OF THE COMMITTEE ON SALMON MEMORIAL FUND

THE PRESIDENT: The next report is the report of the Committee on Salmon Memorial Fund, by Dr. Hoskins.

(Dr. Hoskins read the report of the Committee on Salmon Memorial Fund, as follows:)

During the past year this committee met with the irreparable loss of its chairman, Dr. John Frost Winchester. Dr. Winchester was a life-long friend of the late Dr. D. E. Salmon and was associated with him in the early development of the great veterinary sanitary control measures he so successfully promoted. President Cary, subsequent to the death of Dr. Winchester, appointed Dr. L. H. Howard, of Boston, to fill the vacancy on the committee. By vote of the members of the committee Dr. Samuel Brenton was chosen as chairman to fill the vacancy caused by Dr. Winchester's death.

Three additional \$25 subscriptions were added during the year, from Drs. A. M. Farrington, J. S. Anderson and Robert S. MacKellar, making a total of 44.

The Maine Veterinary Medical Association subscribed and appropriated \$50, which, with a previous subscription of \$10, brought their contribution to \$60. This, with other subscriptions, makes a total for Maine of \$65.

New York State continues to lead all other States with a total of \$676.07, having added \$29 in subscriptions the past year.

At the solicitation of Dr. J. S. Anderson, of Omaha, one of the members of the committee, and the assurance of President Campbell, of the Missouri Valley Veterinary Medical Association, that a direct appeal to the members from the various States making up that body would win their support, I journeyed to Omaha in July and was accorded a most cordial hearing and hearty cooperation by the officers and members of that Association. Nebraska, which had not been on our list as a contributor, added \$123.50 and promises to make it \$300. Kansas added her first subscriptions, amounting to \$40, and promises to treble this amount at her next State meeting. Missouri added to her former subscriptions and pledged her quota in the near future. Colorado and Illinois pledged to increase their subscriptions. The invitations from President Campbell and Dr. Anderson of our committee give assurance of more than \$500 to the fund in the near future, as the membership of all these Missouri Valley States is now being canvassed by representatives of these States selected at the Omaha meeting.

The amount on deposit to the credit of the fund now reaches \$3,956.40 and in addition a \$500 United States Government bond. The additional pledged subscriptions, in part contingent, bring the total to approximately \$5,500. During the year interest on the deposit and on the United States bond has added \$94.26 to the fund.

Two States, New York and Iowa, and the District of Columbia have exceeded their quotas with respectively \$676.07, \$470.61 and \$614.86. It should be noted that the latter sum was gathered from Bureau veterinarians over the country and not alone from Bureau veterinarians in the District of Columbia.

The list attached hereto gives the subscriptions from the several States as nearly correct as possible, save those contributions made through the B. A. I., which are not credited to the States. The list of associations contributing from their treasuries is herewith attached, also a list of those contributing \$25 or more.

Members of the committee in attendance at this meeting will be glad to

receive additional contributions from any members who have not had an opportunity of making the same.

State Contributions Since Last Report

Nebraska	\$123.50
Maine	50.00
Kansas	40.00
New York.....	29.00
Missouri	22.00
Oklahoma	11.00
South Carolina.....	1.00
Illinois	1.00
Iowa	1.00
Indiana	1.00
Ohio	1.00
	<hr/>
	\$280.50

Association Contributions to Salmon Memorial Fund

New Jersey State Veterinary Medical Association.....	\$100.00
Virginia Veterinary Medical Association.....	50.00
Wisconsin Veterinary Medical Association.....	100.00
Massachusetts Veterinary Medical Association.....	100.00
Central New York Veterinary Medical Association.....	25.00
Michigan State Veterinary Medical Association.....	100.00
Connecticut Veterinary Medical Association.....	50.00
Keystone Veterinary Medical Association.....	25.00
Western New York Veterinary Medical Association.....	25.00
Lake Erie Veterinary Medical Association.....	25.00
Ohio State Veterinary Medical Association.....	100.00
Illinois State Veterinary Medical Association.....	50.00
Indiana State Veterinary Medical Association.....	100.00
Manitoba Veterinary Medical Association.....	50.00
Hudson Valley Veterinary Medical Association.....	10.00
Maine Veterinary Medical Association.....	60.00
New York County Veterinary Medical Association.....	25.00

State Contributions to Salmon Memorial Fund

New York.....	\$676.07
District of Columbia.....	614.86
Iowa	470.61
Minnesota	236.00
Ohio	221.00
Pennsylvania	212.00
Massachusetts	205.00
Michigan	194.00
New Jersey.....	165.00
Indiana	139.00
Illinois	132.00
Nebraska	123.50
Wisconsin	106.00
Canada	75.25
Missouri	74.00
Connecticut	73.00
Maine	65.00
Virginia	59.00
Tennessee	51.00
Kansas	40.00
Montana	33.00
California	27.00
Louisiana	25.00

Mississippi	20.00
Army Veterinarians.....	17.00
Colorado	16.00
Oklahoma	11.00
South Carolina.....	6.00
North Dakota.....	2.00
Georgia	1.00
Texas	1.00

W. HORACE HOSKINS, *Chairman.*

(It was voted, on motion of Dr. W. G. Langford, duly seconded, that the report of the Committee on Salmon Memorial Fund be adopted.)

SUB-COMMITTEE; AMENDMENT TO BY-LAWS; RELIEF COMMITTEE

DR. STANGE: I want to announce that the sub-committee of the Executive Board for considering the offices of Secretary, Editor and Business Manager is Dr. Munce, chairman, Dr. Hilton and Dr. Bennett.

I also want to give notice of a proposed amendment to the Constitution and By-Laws. I move that article 12, section 1, of the By-Laws be amended by substituting "Education and Research" for "Veterinary Colleges and Examining Boards" in paragraph C of the above section. That will lie over.

I would like to move that the Secretary and the President act as a relief committee during the next year. It has been found rather difficult to get reports from persons that actually need assistance and relief, and we thought that the officers were probably in closer touch with what the members were doing and were in better position to find out who needed assistance, so I move that they act as a relief committee during the next year.

(It was voted, on motion of Dr. Stange, seconded by Dr. Hollingsworth, that the President and the Secretary act as a relief committee during the next year.

PLACE OF NEXT MEETING

DR. STANGE: One more motion, Mr. Chairman. A number of persons have spoken to members of the Executive Board and others, I think, and there seems to be a feeling that a change may be desired in the location of the next meeting place. Therefore I want to make a motion that the Executive Board be authorized to change the place of the next meeting to some other city in Colorado, provided it is agreeable to and recommended by the veterinarians of that State and approved by the Executive Board. I simply make that so as to give the veterinarians of Colorado and the Executive Board an opportunity to make a change if they all think it is desirable. It doesn't change the State at all, but gives them a chance to change the city if desired.

(The motion was seconded by Dr. W. Herbert Lowe and carried.)

MESSAGE TO DR. GRANGE

DR. CONNAWAY: I would like to call attention to the fact that Dr. Grange is very ill and probably will not live long, and I believe it would be appropriate for our Secretary to express the sympathy of this Association in a nice letter or telegram.

THE PRESIDENT: Unless there is some objection, the President will instruct the Secretary to do that.

INTERNATIONAL COMMITTEE ON BOVINE TUBERCULOSIS

DR. REYNOLDS: There seems to be some question as to the status of the International Committee on Bovine Tuberculosis. Some members of the present committee have had the impression that it was in some way a sort of continuing committee. I took occasion to ask Secretary Mayo the other day, and he expressed the opinion that it was not the idea of continuing the committee. If that is correct, the work of the committee would be terminated automatically. This Association has already instructed a future committee to do certain things. When you adopted the report the other day you projected certain lines of work in the future to be done by this Association through future committees. That committee will be terminated automatically unless we do something. In view of the problems now before us and others in sight, it seems to me quite desirable that this Association should continue a committee of some kind on tuberculosis.

There is another point that I presume might be brought up, although probably nothing can be done about it. There really should be a small fund available for this committee, if needed, though it wasn't needed at this meeting and may never be needed. This committee ought to meet a day or two before the Association, if possible, or at least have a meeting other than during this Association meeting. That might involve some additional expense for a member of the committee who might have to pay his personal expenses to such meetings. It happened that in the present meeting nothing of that kind would have been needed, but really something of that kind should be provided for future business. The amount of money would be very small, probably \$100 or \$200, but I presume nothing could be done now according to the way we handle our finances.

It is embarrassing for the chairman to take this up, but I am of the opinion that the work should not be dropped automatically, and I move that the present committee be continued, that there should be continued an International Committee on Bovine Tuberculosis.

(The motion was seconded by Dr. W. Herbert Lowe and carried.)

PRESENTATION OF PAPERS

THE PRESIDENT: Now we will go to the papers. The first paper that comes up this morning is "The Production and Inspection of Biological Products for Veterinary Use," by Dr. D. I. Skidmore, of Washington, D. C.

(Dr. Skidmore read his paper, which will be published in a later issue of the JOURNAL.)

REPORT OF COMMITTEE ON RESOLUTIONS

THE PRESIDENT: We will go on to the report of the Resolutions Committee. Dr. White is chairman.

DR. WHITE: The Committee on Resolutions respectfully submits the following report:

Registration Fee for Conventions

Whereas, The Association has grown to such proportion as to make its entertainment when in convention a financial burden difficult to carry, especially for the less populated portions of the country and the members of the profession of the State in which the conventions are held:

Resolved, That a registration or entertainment fee of \$1 be charged each member attending a convention, the money so collected to be made available to the local Committee on Arrangements.

Emblematic Pin or Badge

Whereas, It is customary to furnish the members in attendance at the annual meetings of this Association with a pin or badge;

And whereas, The cost of providing such pins or badges reaches a considerable sum which is hardly justified unless a more suitable and uniform emblem is adopted:

Resolved, That a special committee of three be appointed to consider this matter with a view to the adoption of a pin or badge of a uniform or emblematic design for use at all future meetings.

Correspondence Schools

Whereas, The veterinary examining boards in the various States frequently receive applications from men representing themselves to be graduates of a veterinary correspondence school at London, Ontario, and these persons present as their credentials a certificate or so-called diploma of the Veterinary Science Association and the Detroit Veterinary Dental College signed by Messrs. Hodgins and Haskett;

And whereas, Persons possessing these certificates or diplomas have never attended college, but merely receive a book and a certificate in payment of a certain fee, and in addition a certificate of health for livestock:

Resolved, That this Association bring this matter to the notice of the proper authorities in Canada and the United States, in order that the persons, associations or colleges granting these certificates or diplomas be stopped from issuing them to residents of the United States.

Municipal Meat Inspection at Private Slaughterhouses

Whereas, Dr. William Thompson, of Canada, has presented a valuable contribution relating to the danger of tuberculosis being transmitted to human beings through the consumption of meats from cattle and hogs killed at private slaughterhouses under insanitary conditions and without proper supervision or adequate inspection:

Resolved That this Association place itself on record as being of the opinion that the time has arrived when all municipalities should enact and enforce such measures as may be necessary to safeguard the public health against the consumption of unwholesome meats and meat products, and that this protection can best be afforded by suitable legislation requiring the supervision of all private slaughterhouses and the inspection of all animals slaughtered therein by competent veterinary inspectors.

Unfair Classification of Government Veterinarians

Whereas The Congressional Reclassification Committee through error was manifestly unjust in regard to veterinarians of the United States De-

partment of Agriculture, having isolated them from all other employes doing scientific and technical work, in placing them in a lower grade than the above-mentioned workers;

And whereas, The qualifications to become veterinarians under United States civil-service requirements are of as high standard as those for the appointment to any other scientific and technical appointment in the Government service;

And whereas, The services rendered to the livestock industry of the Nation, and to society at large, in the control and eradication of contagious, infectious or communicable diseases, and the guaranty to the public of a wholesome meat supply, are of as great importance as the services rendered by any other group of scientific Federal employes:

Th refore be it resolved, That the American Veterinary Medical Association protest against the discrimination made against the Bureau of Animal Industry veterinarians;

And be it further resolved, That the Legislative Committee of the American Veterinary Medical Association be instructed to take vigorous action in endeavoring to have the above-described error corrected by Congress;

And be it further resolved, That copies of this resolution be sent to the Honorable E. T. Meredith, Secretary of Agriculture; to Dr. J. R. Mohler, Chief of the Bureau, and to each member of the Committee on Reform in Civil Service, House of Representatives, and to the Appropriations Committee of the United States Senate.

Death of Gen. William C. Gorgas

Whereas, Through the death of Major-General William C. Gorgas, late Surgeon General of the United States Army, the world has lost one of its ablest sanitarians, through whom the Panama Canal Zone was made habitable and the Canal made possible as the result of his skill in combating such scourges as yellow fever and malaria;

And whereas, Dr. Gorgas was an honorary member of this Association, and in him the veterinary profession had always a loyal supporter and wise counselor, through whose influence and guidance the establishment of the Veterinary Corps of the Army was made possible:

Resolved, That this Association record its deepest regret at the irreparable loss sustained and its fullest appreciation of the many evidences manifested by the late William C. Gorgas in the welfare and advancement of the Veterinary Corps of the Medical Department of the United States Army.

Commercial Biological Products

Whereas, The commercialization of biological products has given rise to a variety of products being placed on the market purporting to be specific for the cure and prevention of disease, the real value of which is unknown in many instances;

And whereas, In order to protect the livestock industry and the owners of livestock from being victimized by unreliable concerns:

Resolved, That this Association request the Bureau of Animal Industry of the United States Department of Agriculture that in the future it refuse to allow commercial biological concerns who hold Federal licenses to manufacture and distribute any products until they are satisfied, either by thorough investigation or experimentation, that such products are of material value as immunizing or therapeutic agents.

Thanks for Hospitality

Whereas, The local Committee on Arrangements, the veterinarians of the State of Ohio and the management of the Deshler Hotel have extended this Association at its annual meeting at Columbus every possible assistance for the comfort of the members:

R solved, That the Association extend its fullest appreciation and thanks for the kindnesses received at their hands and the splendid success of the Fifty-seventh Annual Meeting of the Association.

Horse Association of America

Resolved, That the American Veterinary Medical Association indorses fully the organization and efforts of the Horse Association of America, located at Chicago; that the American Veterinary Medical Association become a member of the Horse Association and subscribe for ten shares of stock at \$5 a share; that the members of the American Veterinary Medical Association be urged to join the Horse Association and to solicit members, if possible, from their friends and clientele who are further in favor of the horse and mule industry; and that the incoming President be authorized to appoint a member of our Association as official representative of our Association.

DAVID S. WHITE, *Chairman*.
 WM. HERBERT LOWE,
 C. D. MCGILVRAY,
 A. S. COOLEY,
 CHAS. E. COTTON.

(It was voted, on motion of Dr. W. H. Hoskins, seconded by Dr. Hollingsworth, that the report of the Committee on Resolutions be adopted.)

STUDENTS FROM FORMERLY ACCREDITED SCHOOLS

DR. STANGE: My attention has been called to one thing that ought to be taken care of, I think, before we adjourn. I would like to make this motion: That the Committee on Intelligence and Education be authorized to give special consideration to students who entered schools accredited by this Association at the time of their entrance, with a view of permitting these students to complete their education.

My idea is that these students entered accredited schools in good faith, but some of these schools are not accredited by this Association now, and we ought to make it possible for such students to complete their education. Some of the accredited schools are raising the question as to whether they can accept students from schools that are not accredited at present. A school that is accredited with this Association can't accept students from non-accredited schools and give them credit for their work. That throws those students out, and they can't complete their education in an accredited college unless we give them permission to do so.

DR. SIMMS: A point of information: That gives the committee power to act in regard to these students?

DR. STANGE: That gives this committee authority to make arrangements to have these students complete their education.

(The motion was seconded and carried.)

VOTE OF THANKS

DR. STANGE: I wish to make one more motion, Mr. Chairman: That this Association extend a vote of thanks to the veterinarians of Ohio, to the Chamber of Commerce of Columbus and any other interests in this State who were associated in making this convention a success.

(The motion was seconded by Dr. Hollingsworth and carried.)

INSTALLATION OF NEW PRESIDENT

THE PRESIDENT: Unless there is something further, this brings us to the close of our meeting. I will ask Dr. Stange to escort the newly elected President to the chair for installation.

(Dr. Stange brought Dr. White to the chair. Applause.)

THE PRESIDENT: It affords me great pleasure to extend to the newly elected President, who is most worthy of this office, the only credentials of the office that were ever extended to me. It is the famous gavel of "Honolulu Bill." I want to assure the newly elected President that the profession will give him as hearty and more hearty support than they gave me. (Applause.)

DR. WHITE: Mr. Ex-President and Gentlemen, the hour is late and we are very hungry, so I am not going to make a speech. I simply will say this: that in accepting this token of office, the gavel, I fully realize the responsibilities that go with it; and in thanking you for the honor bestowed upon me, which I assume to be the highest honor that a veterinarian can attain in North America, I do so with a spirit of service and only in that spirit. I thank you. (Applause.)

Adjournment.

NOTES FROM THE SECRETARY

In accordance with the action of the American Veterinary Medical Association at Columbus, the Secretary was instructed to notify Dr. T. E. White, of Sedalia, Missouri, that his dues to the A. V. M. A. were remitted and membership card was sent him.

The Secretary has received a letter from Dr. White in which he states that he is unable to express his gratitude to the Association for their kind interest in him. He wishes to thank the Association from the depth of his heart.

Dr. White has been very ill for several years and this, in connection with his advanced age, makes it impossible for him to do any work.

N. S. MAYO.

To All Members of the A. V. M. A.:

At the last meeting of the A. V. M. A., the Association decided to place the administration of the veterinary relief fund in charge of the President and Secretary of the Association. After consultation, it is planned to have the Resident State Secretaries look after cases of need among the members of the A. V. M. A. and their families in their respective States and Provinces, but it is important that each and every member report immediately to the President or Secretary any cases where A. V. M. A. members or their

families are in need of assistance, so that prompt attention can be given.

N. S. MAYO.

The following have been nominated by postal card nominations for members of the Executive Board from District No. 5: C. E. Cotton, W. S. Crewe, C. P. Fitch, W. P. Spencer, C. H. Stange.

Postal card ballots are being sent out to all members in the 5th District for the final vote.

A meeting of the Executive Board of the A. V. M. A. has been called by President Hilton to be held at LaSalle Hotel, Chicago, Sunday evening, November 28, 1920. At this meeting it is probable that the exact time and date for the next A. V. M. A. meeting will be determined.

N. S. MAYO.

Your Journal Stops Unless Dues Are Paid

According to the Constitution and By-Laws of the A. V. M. A., members who have not paid their dues within four months must be dropped from the JOURNAL mailing list. If you have not paid your 1920 dues your JOURNAL will stop January 1, 1920.

Don't forget this. It will mean a great saving of time of the Secretary as well as the Editor and money for the Association if those who have not paid will do so promptly. Send your check now to the Secretary.

Dr. A. H. Baker has donated to the A. V. M. A. 13 bound volumes of the proceedings of the Association.

The many friends of Dr. R. A. Archibald, member of the Executive Board from the 6th District, will rejoice to learn that he is gradually recovering his health and expects to attend the next A. V. M. A. meeting in Colorado.

The Colorado Veterinary Medical Association has appointed the following committee to make arrangements for the A. V. M. A. meeting in Colorado next year:

Drs. G. H. Glover, Chairman; Charles G. Lamb, A. G. Fisk, A. N. Carroll and I. E. Newson.

The personnel of this committee is sufficient to take care of all A. V. M. A. members so that the arrangements for the next meeting will be splendidly carried out in every way.

OTHER MEETINGS

MONTANA VETERINARY MEDICAL ASSOCIATION

The twelfth annual meeting of the Montana Veterinary Medical Association was held in Butte, July 29 and 30. The meetings were presided over by Dr. F. B. Remer, of Stanford, president of the association.

At the morning session on July 29 the routine business for the year was transacted. Addresses of welcome were delivered by Mayor Stodden, of Butte, and Lieutenant Governor W. W. McDowell, to which Dr. N. T. Gunn, of Butte, responded.

At the afternoon and evening meetings the following papers were presented: "The Livestock Sanitary Board Laboratory," Hadleigh Marsh, Helena; "The Veterinary Corps in the A. E. F.," Major M. E. Knowles, Helena; "Bovine Contagious Abortion and Sterility," G. F. Jungerman, Hiawatha, Kansas; "Veterinary Biological Laboratories and Supply Houses from the Practitioner's Viewpoint," V. W. Knowles, Ronan; "Veterinary Biological Laboratories and Supply Houses from the Distributor's Standpoint," J. S. Barbee, Kansas City, Mo.

Dr. Knowles's talk on the Veterinary Corps and Dr. Jungerman's paper on contagious abortion produced some very active and valuable discussion.

Officers were elected at the evening meeting, Dr. M. E. Knowles, of Helena, being unanimously chosen for president. Dr. A. D. Knowles asked to be relieved of the duties of secretary and treasurer, and Dr. N. T. Gunn was elected to the position.

The second day of the meeting was devoted to clinical work at the plant of the Hansen Packing Company, the morning being devoted to tuberculosis. Dr. Welch, of Bozeman, discussed the "Temperature Range of Normal Cattle," in its relation to the application of the subcutaneous tuberculin test. Dr. Gunn, in coöperation with Dr. Evans, B. A. I. Veterinarian at the Hansen plant, gave a demonstration of the intradermal tuberculin test, following the reading of the test with post-mortem examination of the reactors.

In the afternoon Dr. Jungerman gave a very instructive clinic on the treatment of sterile cows.

Socially, as well as professionally, the meeting was very successful. Mr. Hansen, of the Hansen Packing Co., entertained the

men at luncheon at his home. The ladies were entertained by Mrs. Hansen at her home and by Mrs. Gunn and Mrs. A. C. Jones at the Country Club. The meeting was concluded with dancing at the Columbia Gardens, as guests of Mr. and Mrs. Hansen.

N. T. GUNN, *Secretary*.

BRITISH COLUMBIA VETERINARY ASSOCIATION

The annual meeting of the British Columbia Veterinary Association was held in New Westminster on September 28.

There was an exceptionally fine attendance and great interest shown in furthering the interests of the profession.

The amendments to the Contagious Diseases Animals Act that we succeeded, with the help of the Dairymen's Association, in getting passed at the last session of the Legislature, in connection with the control and sale of tuberculin to prevent plugging, were discussed, and it was found that the amendments were not passed in accordance with our resolution, proper recognition not being given to the veterinary profession, and by the wording of the Act it appears to have legalized the injection of tuberculin by the layman.

These points were discussed and a committee was appointed to again take up the matter with the dairymen, and have these amendments altered.

The matter of meat inspection was then discussed, especially the practice of the Provincial Government in forbidding its veterinary inspectors to hold post-mortems of the cattle that have reacted to their test, and permitting these carcasses to be sold to the public without inspection.

The Association went on record that this was a menace to public health and intends to give this matter full publicity this fall. However, the Association feels that its efforts at publicity are slowly bearing fruit, as evidenced by the requests of the consumers for inspected meat and the signs appearing in the shops and advertisements in the newspapers that the meat sold is Government inspected. As a result of our meeting with the Rotary Club in Victoria last fall we can note that a meat inspector has been appointed for that city.

A letter was then read from one of the members in regard to the Canadian Army Veterinary Services, pointing out that four

Assistant Directors of Veterinary Service had been appointed, who were all qualified veterinary surgeons, but that no Director had yet been appointed. The Association is in receipt of a letter from the Quartermaster-General, dated February 5, in which he states that it is intended to appoint a Director of Veterinary Service who shall be a qualified veterinary surgeon. This letter was read, and it was moved and carried that this Association write the Militia Council reminding them of this letter.

A new scale of fees was worked out and copies will be sent to all members for their guidance.

A letter was read from Dr. Cozier, Secretary of the Washington State Association, inviting this Association to joint meeting in Seattle, together with the Association of Washington, Oregon, Idaho, some time in 1921. The members present thought this was a very good idea, and we hope to go.

The election of officers then took place, which resulted as follows: President, Dr. T. H. Jagger; Vice-President, Dr. T. Brookes; Secretary-Treasurer, Dr. Kenneth Chester; Council, Dr. M. Sparrow, Dr. T. E. Sleeth, Dr. A. J. Damman, and Dr. George Howell.

The following Board of Examiners was also appointed, which by our Act must consist of either Dominion or Provincial Inspectors: Chairman, Dr. Kenneth Chester, Health of Animals Branch; Dr. M. Sparrow and Dr. T. Brookes, Provincial Veterinary Inspectors.

After the business meeting the Association was the official guest of the Provincial Exhibition Association and in the evening a most enjoyable banquet was held, our past President, the Hon. Dr. S. F. Tolmie, Dominion Minister of Agriculture, acting as toastmaster, and as invited guests there were prominent dairymen and stock-breeders, officials of the exhibition, members of Parliament and other public men and women, making a total of 57. Speeches were made by veterinarians and replied to by various persons, one of the best being by a lady, the President of the Local Council of Women, acknowledging the benefit to the public of the veterinary profession in the matter of public health, and many went away with a much better understanding and appreciation of veterinarians and the profession in general.

The meeting and banquet were fully reported in the newspapers and this brought to an end one of our most successful annual meetings.

KENNETH CHESTER, *Secretary.*

UNIVERSITY OF PENNSYLVANIA VETERINARY ALUMNI GATHERING

On Tuesday evening, August 24, during the annual meeting of the American Veterinary Medical Association at Columbus, Ohio, forty-three alumni of the University of Pennsylvania got together at the Hotel Chittenden and had dinner.

President Tingley called a special meeting and asked Dr. John W. Adams to preside. Dr. Adams gave a short address and then called on each alumnus in turn. Various subjects were discussed and many jokes and short stories were told. Things of interest pertaining to the school were discussed more or less in detail by Drs. John R. Mohler, S. H. Gilliland, J. H. McNeil, Chas. Cotton, and several others. Dean Klein spoke of the relationship of the faculty, alumni and students, and impressed upon the memory of those present that Alumni Day or the day that alumni should gather at the school is always the Saturday before Commencement Day, which is always the third Wednesday in June. The presiding officer knew something of interest pertaining to almost every alumnus present and suitable jokes were intermingled with the more or less serious parts of the evening. Before adjournment Dr. Adams discussed some of the larger problems of the University in comparison with those of other large schools and universities.

Most of the classes from 1888 until 1917 were represented at this gathering. Every person showed an enthusiastic university spirit and went away in good humor. Those present were: L. N. Reefer, James C. McNeil, John P. Turner, Thomas J. Kean, John W. Adams, Chas. E. Cotton, H. W. Turner, C. J. Marshall, A. G. G. Richardson, U. G. Houck, Chas. W. Boyd, John R. Mohler, L. A. Klein, Jose Hershheim, John H. McNeil, Norris L. Townsend, M. Jacob, S. H. Gilliland, T. E. Munce, G. A. Dick, Chas. W. Springer, C. S. Rockwell, John Reichel, S. E. Bruner, R. M. Staley, H. W. Jakeman, W. G. White, H. Preston Hoskins, J. F. Kane, Cheston M. Hoskins, F. Porter Caughman, M. F. Barnes, Fred Boerner, Jr., Ross A. Greenwood, H. B. Mitchell, Ira Mitterling, E. K. Tingley, Edward A. Benbrook, James M. Herron, Thomas W. Munce, C. B. Shore.

Dr. V. A. Moore, Dean and Director of the Veterinary College at Cornell University, who is an honorary alumnus of Pennsylvania, was also present and gave an interesting talk on veterinary education.

M. F. BARNES, *Secretary*.

EASTERN IOWA VETERINARY ASSOCIATION

The annual meeting of the Eastern Iowa Veterinary Association was held at Iowa City October 6 and 7.

The officers elected for the coming year are: Dr. L. B. Graham, Cedar Rapids, President; Dr. F. L. Roach, Preston, Vice-President; Dr. Jerry Wolfe, Grand Mound, Secretary-Treasurer; Dr. Henry Hell, New Liberty; Dr. J. S. Potter, Iowa City; Dr. F. J. Crow, Iowa City; members of the Executive Board.

The meeting for 1921 will be held at Cedar Rapids.

L. B. GRAHAM, *Secretary.*

TUBERCULOSIS ERADICATION CONFERENCE

The second zone conference on tuberculosis was held in the Leonard Pearson Hall, at the University of Pennsylvania, on October 11-13, and was composed of representative breeders, State and Federal employees engaged in coöperative tuberculosis eradication work in the States of New York, New Jersey, Delaware, Pennsylvania, Maryland, Virginia, West Virginia, North Carolina, and the District of Columbia.

From the fall of the gavel Monday evening, October 11, to the closing remarks made by the chairman, Dr. John R. Mohler, Chief, Bureau of Animal Industry, the conference was bubbling over with interest. It was apparent from the outset that those in attendance came to contribute to the fund of information on the subject of tuberculosis eradication and to take away with them all the information that could be secured.

In the opening address the chairman pointed out the peculiar fitness of calling such a gathering together in the Leonard Pearson Hall and the splendid work done by that indefatigable leader in outlining plans for the future campaign in the extermination of the disease from this country. He laid emphasis upon the fact that this work is succeeding because it is being conducted on a coöperative basis, the livestock owners forming the foundation upon which the coöperative structure is built. It was manifest throughout the conference that the livestock owners feel the responsibility that they have assumed in the conduct of the tuberculosis eradication campaign and it is their purpose to fulfill every obligation they owe to the great industry they represent. The spirit of coöperation shown by the State representatives in their various discussions made it evident that all the forces at work in this campaign are

putting forth every effort to make it a success and are relegating personal differences of opinion that are considered irrelative to the great work in hand.

In an address of welcome Dr. L. A. Klein, Dean, Veterinary Department, University of Pennsylvania, referred to the pioneer tuberculosis work of Leonard Pearson and gave many valuable suggestions and words of encouragement for the continuation of the work which is now well under way.

Hon. Wesley Webb, Secretary, State Board of Agriculture, State of Delaware, spoke very encouragingly of the interest shown by the livestock owners of that State and predicted the eradication of tuberculosis from the Commonwealth of Delaware within the next few years.

Dr. J. H. McNeil, Chief, Bureau of Animal Industry, State of New Jersey, outlined the program for the work in that State and also presented an excellent paper, "The Value of the Ophthalmic Test in Badly Infected Herds." This paper was prepared in cooperation with Dr. R. J. Fortney, of the New Jersey force, and was read by the latter.

Dr. William Moore, State Veterinarian of North Carolina, told of the work which is being carried on in that State and predicted the continuation of a vigorous campaign until the disease was suppressed in the Tarheel State.

Dr. R. C. Reed, representing the State of Maryland, outlined the program of work being carried on and laid emphasis upon the fact of the eradication of the disease from circumscribed areas. In that State the work is being conducted on an intensive basis in Harford County, the livestock owners of that county having subscribed funds for the employment of a veterinarian to cooperate with the State and Federal departments.

Dr. T. E. Munce, Chief, Bureau of Animal Industry, Harrisburg, Pennsylvania, read an excellent paper containing many recommendations for strengthening the accredited herd plan.

Commissioner J. H. Stewart of West Virginia, and Dr. J. G. Wills, State Veterinarian of New York, made many suggestions of a constructive nature which will aid materially in the perfection of plans for the work.

Dr. Marion Dorset, Chief, Biochemic Division, Bureau of Animal Industry, gave a historical sketch of the discovery of tuberculin and the methods employed in its manufacture by the Bureau of Animal Industry soon after its discovery by Dr. Koch, which

method is still in operation by the Bureau. Dr. Dorset's discourse was discussed by Dr. Fred Boerner, in charge of the laboratory, Bureau of Animal Industry, State of Pennsylvania.

A very valuable contribution on "Experimental Work on Tuberculosis and Tuberculin" was given by Dr. E. C. Schroeder, Superintendent, Experiment Station, Bethesda, Maryland.

An excellent paper, supplemented by extemporaneous remarks, was presented by Dr. J. F. DeVine. The subject of his discussion was "How the Coöperative Tuberculosis Eradication Campaign Affects and Appears to the Practitioner." This interesting paper was discussed by other practicing veterinarians who were in attendance at the conference.

Other papers were contributed by Drs. H. W. Turner and S. E. Bruner, representatives of the Bureau of Animal Industry, Harrisburg, Pennsylvania.

Mr. D. W. McLaury, Director, Bureau of Animal Industry, Albany, New York, outlined the program of the campaign in that State and indicated that the livestock owners of the State of New York were determined to carry the campaign of eradicating tuberculosis to a final success. He anticipates that it will be a hard battle and take many years. He further stated that the time would come when no owner could sell breeding cattle unless his herd was under supervision and every effort was being made to exterminate tuberculosis.

Practically one entire afternoon was devoted to a discussion of the tuberculosis campaign from the standpoint of breeders of purebred cattle, during which the following well-known breeders took an active part: J. R. Danks, Delaware; H. V. Noyes, New York; Joseph A. Turner, Virginia; Paul O. Reymann, West Virginia; George C. Stevenson and H. Philips, of Pennsylvania.

One of the features of the conference was experimental testing done on 24 canner cows. As usual, the results of the subcutaneous test to this class of animals were not entirely satisfactory. In experimental work done with this type of animals covering a period of more than ten years, it has been found that only a certain proportion of tuberculous animals respond to the subcutaneous test. The results with the intradermic and ophthalmic methods of testing were much more satisfactory. These animals were slaughtered during the conference and the results of the post-mortem examinations were received with great interest.

The conference was attended by more than two hundred interested persons. The Leonard Pearson Hall was filled at every session. It is proposed to hold similar zone conferences from time to time in other parts of the country. So far they have proved profitable because they bring uniformity of purpose in the territory in which they have been held.

J. A. KIERNAN, *Acting Secretary.*

PHILADELPHIA VETERINARY CLUB

The Veterinary Club of Philadelphia held its regular meeting on Tuesday evening, September 27, at Leonard Pearson Hall, University of Pennsylvania.

We were honored by having with us Dr. W. Reid Blair, Veterinarian and Pathologist, New York Zoological Park, who gave an illustrated talk on animal intelligence.

The members of the Society for the Prevention of Cruelty to Animals were invited, and also the wives of the veterinarians.

There was a very large attendance, and the meeting was extremely interesting.

C. S. ROCKWELL, *Secretary.*

LIVESTOCK CONSERVATION

A conference of livestock producers, dealers, shippers, stockyard companies, commission men, railroads and meat packers was held at Chicago on November 5. This conference had for its object the reduction of livestock losses in shipping and marketing. This organization has been in existence for approximately a year, and splendid results have been obtained, as shown by the statistics presented at the meeting.

It is the object of the conference to get coöperation among all those who have to do with the handling of livestock. This is not only an economic problem, but also a humane one.

A splendid booklet on how to reduce livestock losses in shipping and handling has been issued. Every veterinary practitioner ought to have this so as to be able to advise his clients. It is free, and can be obtained of the Institute of American Meat Packers, 22 W. Monroe Street, Chicago, Illinois.

MINNESOTA STATE VETERINARY MEDICAL ASSOCIATION

The next meeting of the Minnesota State Veterinary Medical Association will be held in Minneapolis and at University Farm, January 13 and 14, 1921. The meetings in Minneapolis will be held at Hotel Radisson. The program is already under way. Dr. David S. White, Dean of the Veterinary College at Ohio State University, Columbus, Ohio, and President of the American Veterinary Medical Association, will be present and deliver an address. Dr. D. H. Udall, Professor of Medicine, Veterinary College, Cornell University, Ithaca, N. Y., will give a paper on "Diagnosis and Treatment of Some of the More Important Diseases of the Digestive Tract of Cattle." Dr. T. H. Ferguson of Lake Geneva, Wisconsin, will have a paper on "Diseases of the Udder." Dr. A. Eichhorn, Director, Veterinary Department, Lederle Antitoxin Laboratories, Pearl River, N. Y., will speak on "Anthrax with Special Relation to Prophylactic Measures." Dr. A. F. Schalk, Veterinary College, Fargo, North Dakota, will also have a paper, the subject of which has not yet been selected. A number of other papers will also be presented. The afternoon of the second day will be devoted to a discussion and clinic at University Farm on abortion and sterility. The completed program will be printed later.

C. P. FITCH, *Secretary.*

CALIFORNIA PRACTITIONERS' SHORT COURSE

The Division of Veterinary Science of the University of California, in coöperation with the California State Veterinary Medical Association, is arranging the program for a short course for the veterinary practitioners of the State. The course will be held at the University Farm at Davis, beginning January 3, 1921, and will continue throughout the week.

Dr. Marion Dorset, Chief of the Biochemic Division of the Bureau of Animal Industry, and Dr. A. T. Kinsley, of Kansas City, will be the principal speakers. Other prominent practitioners and investigators will aid in making the course a success. Special emphasis will be placed upon the diseases of swine, but other timely subjects of interest to the progressive practitioner will also be discussed. Courses of this nature were held at the University Farm in the years of 1916, 1917 and 1919, at which there was an attendance of about seventy-five each year.

COMMUNICATIONS

International Congress on Foot-and-Mouth Disease

Buenos Aires, September 15, 1920.

THE ARGENTINE AMBASSADOR,
Washington, D. C.

Mr. Ambassador—I have the pleasure of communicating to you that at the first session of the International Congress of Foot-and-Mouth Disease, the Assembly, taking note of Art. 16 of the Regulations, resolved, on the motion of Dr. P. Bergés, to designate Dr. John R. Mohler as Honorary President of the Congress, because of the success of his work in the extirpation of foot-and-mouth disease in the United States, and also because of the importance of the work that has been accomplished and is being accomplished by the Bureau of Animal Industry in the struggle against the contagious diseases of cattle, as well as the advance of all industries derived from cattle through these studies.

Praying that you will kindly communicate this resolution of honor and justice to the gentleman interested, I am pleased to salute you with my high consideration.

R. J. CARCANO, *President*.

Messages of Thanks

Alfort, October 12, 1920.

My dear and very honored Colleague—I have the honor to acknowledge the receipt of your very amiable letter of September 15, enclosing a check for \$500.00.

Our committee requests me to express to you its most cordial gratitude. It knows and can appreciate the fraternal generosity of our American colleagues toward the French and Belgian veterinarians who were victims of the war. This new testimonial of affection that the American Veterinary Medical Association has given to our work can only strengthen the ties of cordial appreciation that bind us to the United States, and to our colleagues in that noble country.

In December the activities of our committee will be concluded. Its accounts will be liquidated and a general report will inform all our supporters of the work that we have accomplished. It will be a duty and a pleasure to communicate this report to you.

Will you, my dear and very honored colleague, accept with all our thanks for your benevolent assistance, the expression of my most cordial devoted sentiments.

H. VALLEE.

Brigadier-General Frey, Director General of the French Army Veterinary Service, Commander of the Legion of Honor, writes as follows:

I am much flattered by the high esteem shown by the American Veterinary Medical Association in electing me an honorary member. I beg you to transmit to President D. S. White, to the members of the society and colleagues my most sincere thanks and the assurance of my most distinguished consideration.

I am happy to learn of the success of the Columbus meeting, and I shall follow with interest the work of the Association.

Tuberculosis-Free Accredited Herds

List No. 3 of herds officially accredited as free from tuberculosis, giving results to June 30, 1920, has been issued by the Bureau of Animal Industry. It shows that there have been established as fully accredited 3,370 herds containing 82,986 cattle (48,471 purebred and 34,515 grade), and that 16,599 herds containing 257,577 cattle have been tested once without reactors. The number of accredited herds almost trebled within a year. Minnesota has the largest number, and next come Virginia, Wisconsin and Pennsylvania.

In the work of tuberculosis eradication during the last fiscal year the Federal and State veterinarians applied the tuberculin test to 695,364 cattle, of which 28,616, or slightly more than 4 per cent, reacted.

Large Production of Veterinary Biologics

In the supervision by the Bureau of Animal Industry of the commercial manufacture of veterinary biological products during the last fiscal year 93 firms were licensed to prepare 177 products of 69 general classes. Fifty-eight of the licensed establishments produced only anti-hog-cholera serum and hog-cholera virus. The output of the latter products reached very large proportions. The net production, after deducting the quantities destroyed as unfit for use, was as follows: Anti-hog-cholera serum, 520,016.641 c.c.; simultaneous virus, 21,736,139 c.c.; hyperimmunizing virus, 113,878,741 c.c.

NECROLOGY

DR. SIDNEY F. MUSSELMAN.—The readers of the *JOURNAL* will receive with surprise and deep regret the sad news of the sudden death on October 25, of Dr. Sidney F. Musselman, State Veterinarian of Kentucky. He is survived by a wife and son, his mother and a sister. His death was the result of an attack of apoplexy while riding in a street car in Louisville, and came as a complete surprise, as he seemed to be enjoying the best of health.

Dr. Musselman was born at Cynthiana, Kentucky, December 7, 1872, in the house which he has always occupied as a home. After graduating from the Ontario Veterinary College in the class of 1894, he immediately took up the practice of veterinary medicine at his home town and continued there until the outbreak of the Spanish-American war, when he responded to the call for volunteers. After the war was over, he continued in the service of his country for twelve years in Cuba and the Philippines. On his return to civilian life he married Miss Ida Remington and resumed his practice at Cynthiana. His magnetism, genial and cordial manners, and his ability won for him many friends and he achieved an enviable reputation as a practitioner in his profession.

He was a member of the Baptist church since he was fifteen years old. In addition to his church affiliations, he was a Royal Arch Mason and a member of the Elks' Lodge at Cynthiana. For five years past he has filled with credit the position of State Veterinarian. The State of Kentucky has lost a most competent, faithful and conscientious official, and a gentleman who was respected and admired by all who had the pleasure of knowing him. He had the interests of his State deeply at heart and the livestock industry of Kentucky has grown and prospered under his able administration as State Veterinarian.

His usefulness as a veterinarian and livestock sanitary officer was not confined to one State. The activity and good judgment he displayed on matters affecting the improvement of livestock and the control of animal diseases were recognized by his fellow-workers in other States in a way to reflect favorably on our national livestock industry. He was known by State and national officials as an efficient, unselfish coöperator, willing to give and take, always keeping in mind the best interests of the livestock industry of both the

State and the Nation. His election to the Presidency of the U. S. Live Stock Sanitary Association at its last meeting was an expression of the esteem in which he was held by the livestock sanitary authorities of forty-eight States, the National Government and Canada. He was a man of stainless character, of wide experience and of high ideals, a prince among men.

Those of us who knew him best valued his friendship most. The JOURNAL joins his many friends from all parts of the country in extending to his bereaved family its deepest sympathy.

Dr. W. W. Kenneday, of Fulton, N. Y., dropped dead on July 4 while loading his gun at a trap shoot that was held at Long Branch, N. Y.

Dr. Kenneday was a graduate of the Ontario Veterinary College in 1890, and joined the A. V. M. A. in 1911.

Dr. Oliver B. Shipman, of Olaa, Hawaii, died on May 11, 1920.

Dr. Shipman was a graduate of the San Francisco Veterinary College in 1904. He joined the American Veterinary Medical Association in 1913.

Members and visitors to the recent meeting of the A. V. M. A. at Columbus will hear with regret of the death of Mr. Hugo Schlessinger from heart failure following an operation for appendicitis. Mr. Schlessinger will be remembered as the gentleman who delivered the pleasing address of welcome at the opening of the session. He was a man of high attainments, a successful Prosecuting Attorney of Franklin County and the nominee of his party for Judge of the Common Pleas Court.

ANOTHER RICH GIFT TO THE LIAUTARD LIBRARY

Mrs. H. D. Gill and family have presented to the Liautard Library some 350 volumes of the late Professor Gill's library.

Several sets of subscription medical works are among this addition, and many valuable works of reference are thus added to the library.

This library is now being carefully catalogued and cross-indexed by Miss Pollock, of Philadelphia, whose twelve years' experience in this field will make it possible to afford ready information to the readers of the JOURNAL from any book that may be desired for consultation or reference.

MISCELLANEOUS

OPPORTUNITIES IN LATIN AMERICA

The following request is a sample of others which have been sent me:

"I have been out of college two years and am doing fairly well, but I would like to go to South America. What are the chances for a graduate veterinarian there? D. E. B."

I suspect that the "call of the tropics" has come to you as it came to many of us in our younger days and I hope if you have the opportunity you will visit some Latin-American countries and see for yourself. Stay long enough to let the novelty of a new and interesting country wear off before you burn any bridges behind you and be sure to have money enough to get back home.

I have never visited southern South America, my experience being confined to the American tropics.

I do not think the opportunities in the American tropics are good for a North American veterinarian who does not speak Spanish, unless he can secure a position with some company or governmental employment.

Livestock conditions in the American tropics are primitive, and the stockmen and farmers as a rule are not in the habit of employing a veterinarian. The few native veterinarians are engaged in city practice.

Another serious drawback to locating in foreign countries is the difficulty in getting legally registered. The amount of red tape involved is amazing to an inexperienced person. You do not state whether you are married and have a family. If you have, you had better put the tropics bug in a cyanide bottle and leave it there unless you are so situated financially that you can afford the trip there and back.

If you have an opportunity to go with a reliable company or can get a government position be sure that you have a contract in writing that is clearly understood.

The advantages of going to a Latin-American country are considerable. These countries are rich in natural resources and there is a charm about them that appeals to many. There is a beautiful language to acquire and the people are delightfully courteous, but you will long for some home cooking that doesn't smell of garlic

and on "steamer days" you will look anxiously for letters from a few faithful friends who still remember you. The isolation from one's own people is the greatest drawback. If you are "foot loose" and want some interesting experiences in a wonderful region, take a chance if you have one. I spent five of the most interesting years of my life in the American tropics and I like them, but I like my own country best.

If you want to get an excellent idea of western South America, read "Vagabonding Down the Andes," by Franck. For delightful fiction dealing with Latin-America, "Captain Macklin" and "Soldiers of Fortune," by R. H. Davis, are fine. N. S. MAYO.

STUDY OF FOOT-AND-MOUTH DISEASE IN URUGUAY

The commission recently named for studying foot-and-mouth disease in Uruguay has recommended that a prize of 50,000 pesos (\$51,700) be awarded to the person succeeding, by a practical method applicable to herds, in immunizing animals from this disease for a period of six months, or to the person discovering the specific and morphologic cause of foot-and-mouth disease.

The commission points out that, although the amount of the proposed award may seem excessively large, it is in reality insignificant when compared with the economical results to the nation which would result from such a discovery.

MEAT INSPECTION FIGURES

The output of meat under United States Government inspection during the fiscal year ending June 30, 1920, was second only to the high mark of the preceding year. There were slaughtered under Federal inspection 65,332,477 animals, consisting of 9,709,819 adult cattle, 4,227,558 calves, 38,981,914 swine, 12,334,827 sheep, 77,270 goats and 1,089 horses. Of these, 228,148 animals or carcasses and 748,136 parts were condemned, besides which 18,201,648 pounds of meat and meat food products were condemned on reinspection. Tuberculosis was the cause of condemnation of 103,664 carcasses and 590,727 parts. The inspection was conducted at 897 establishments in 262 cities and towns. It is estimated that the Federal inspection covers about 65 per cent of the meat produced in the United States.

PROTECTING THE HORSE'S FEED

Federal and State officers are trying to break up the common trade practice of adulterating stock feed. In a recently reported prosecution under the food and drugs act a large Chicago grain company was fined \$1,050 and costs for adulterating and misbranding 28 carloads of oats. The oats were adulterated with more than 10 per cent of so-called feed barley, which is the grain remaining after the elimination of the sound, heavy grain, and contains, in addition to barley seeds, material amounts of weed seeds, screenings and chaff.

The shipment into interstate or foreign commerce of oats to which any other grains or substances have been added constitutes a violation of the Federal food and drugs act. A mixture of oats and barley or of other grains may be sold provided it is so labeled as to indicate clearly its composition, but the sale as oats of such a mixture is prohibited.

BARIUM A GOOD RAT POISON

A study of barium carbonate as a rat poison, made by the United States Department of Agriculture, indicates that a 20 per cent mixture with food makes a satisfactory bait. With this percentage a rat ordinarily needs to eat only one-third or three-eighths of a meal of average size to get a fatal dose. It was found that with this dose many of the rats poisoned died within 24 hours, though an occasional rat was found which survived an even larger amount, thus indicating that 100 per cent mortality is not to be expected in any case.

A summary of results of experiments conducted by various persons with a view of determining the deadliness of barium to different animals shows the fallacy of the assumption that barium is poisonous only to rats. It is pointed out that the fatal dose of barium per pound tends to decrease relatively as the size of the animal increases, and that a bait calculated to be fatal to rats may be assumed to be more or less dangerous to small domestic animals also.

Professor William Herbert Lowe, of the New York State Veterinary College, New York University, was elected chairman of the Committee on Meat Inspection of the Section on Food and Drugs of the American Public Health Association at its recent meeting at San Francisco, California.

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ANOTHER YEAR

NINETEEN hundred and twenty has been a year of transition from the flood tide of artificial war prosperity to the ebb of inevitable readjustment. As one writer has put it, the country has passed through a prolonged spree of reckless extravagance and is now at the castor-oil stage. The dose is unpleasant, but it will do the patient good.

Agriculture, with which veterinary science is economically in close relation, is suffering from large production at high cost and low selling value. It is unfortunate that the change from scarcity to plenty of food and clothing, bringing relief to the consumer, has been accompanied with loss to the producer. Economic law, however, may be expected to restore a proper balance during the coming year.

For the New Year the JOURNAL extends to its readers its best wishes for a generous measure of prosperity and professional success, with the happiness and satisfaction that come from useful service properly rewarded. It wishes also that they may have a part in forming and in attaining the higher aims and ideals of the profession.

BALANCE

SANITY, it seems, is a relative term, for none of us are perfectly sane—no, not one. When we speak of a person as having “good common sense” we inadvertently refer to his state of balance, but this quality may pertain to only one thing while he is manifestly “clear off his balance” on other things.

We must admit that all-around well-balanced persons are few and far between. Courage, zeal and balance, but the greatest of these is balance. The order of the eternal universe is founded on balance. Up and down, out and in, sunshine and shadow, centripetal and centrifugal forces, the ebb and flow of the tides, yea, the very planets in their courses are hung on the balanced wheel of gravitation. The mighty men of history whose lives have “lived after them” have been conspicuous for the quality of balance. The world takes a passing interest in brilliance, but it pays a lasting tribute to poise. Think of many people you know, and is your estimate of them in close harmony with your intuitive sense of balance? The man with the “level head” is sure to enjoy our confidence and command our respect. Not too much reserve, nor too much verbosity; not too much love of self, nor too much love of others; not too much materialism, nor too much spiritualism; not too much individualism, nor too much socialism; not too serious, nor too much given to levity; not wedded to established precedent, rule or regulation, nor too much of an iconoclast. The truth is most liable to be found in close juxtaposition to a point midway between the extremes. Balance is synonymous with equipoise; an even adjustment of forces, perfect sanity. May we keep our balance.

G. E. G.

WHAT ARE VITAMINES?

IN recent years it has become known that certain compounds, to which the name “vitamines” has been given, which are found in minute quantities in some foods, are necessary to the health and growth of man and animals. Scientific research has revealed much regarding the function of these substances in body maintenance and building and as to the parts of the foods in which they occur, but much yet remains in obscurity. It has been definitely proved that vitamins are absolutely essential in the food in order to maintain the weight of the body and produce growth, that lack of them in the diet causes the so-called deficiency diseases, and that exceed-

ingly small quantities suffice to meet the needs of the body. They are present in such minute proportions in the food, however, that chemists have not yet been able to isolate them from the many other compounds found in foods, hence we know very little of their actual character. In other words, they are much better known for what they do than for what they are.

These vital compounds have been classified into three different types, depending upon their functions in promoting well-being and growth.

The first type is known as water-soluble vitamins, and these are necessary in order to obtain growth from food. Lack of these causes beri-beri, which manifests itself by disease of the nervous system and by other symptoms. These vitamins are found in seeds, in green plants, in certain bulbs and fleshy roots and fruits, and in milk and eggs, as well as in certain organs in the animal body. The seeds referred to include beans, nuts and the various cereal grains. When cereals are very highly milled in order to obtain a very fine white flour, a large part of the vitamins may be removed. Vitamins are also lost when rice is polished in order to remove the outer layers, which contain most of the vitamins. It is for this reason that a diet consisting mainly of polished rice may cause beri-beri, while unpolished rice does not cause this disease.

The second type is known as fat-soluble vitamins, and these are found in butter, eggs, milk, and in certain animal organs such as the heart, kidneys and liver, and to some extent in other fats as well as in green vegetables. They also exist in smaller quantities in certain seeds. When fat-soluble vitamins are absent from the diet, animals and man are subject to a disease of the eyes which appears to be related to xerophthalmia and which, if prolonged, may produce blindness.

The third type is known as antiscorbutic vitamins; that is, those which prevent scurvy, which manifests itself by disease of the bones as well as in other ways. These vitamins are found in oranges, grapefruit, lemons and other citrus fruits, and in green vegetables, such as tomatoes, spinach and lettuce, and in eggs and raw milk. The drying of vegetables frequently destroys the activity of the antiscorbutic vitamins.

The best source of vitamins is in the leafy parts of vegetables, and this is one of the reasons why spinach, lettuce, and cabbage are valuable foods.

VETERINARY DRUG CONTROL IN FRANCE

A DECREE of the Ministry of Agriculture of France regulates the dispensing of certain classes of drugs for veterinary use, with a view to placing the treatment of animals in the hands of skilled and scientific men and preventing quackery and indiscriminate dosing with powerful and dangerous drugs. By this decree the right to keep, prescribe and deliver toxic substances is limited, and it is forbidden for a druggist to sell, for the treatment of animals, certain poisonous substances (preparations of arsenic, aconite, atropin, cantharides, chloroform, cocain, digitalis, ergot, morphin, opium, nicotin, savin, strychnin, etc.) without a prescription from an authorized veterinarian. Where a druggist and a veterinarian both reside in a town or village, only the druggist may keep and dispense the drugs, which the veterinarian must order. It is only in well-indicated cases that the veterinarian is permitted to keep such drugs on hand to be administered by himself. When certain of these poisonous substances are sold they must bear a firmly adherent label with the name and address of the authorized veterinarian, the name of the substance as given in the official list, the prescription number, a plain indication that it is a veterinary preparation, and the word "poison."

IMPROVEMENT IN STOCK BREEDING

THE "Better Sires—Better Stock" movement, carried on by the Government in coöperation with other agencies with the object of improving the average quality and general usefulness of livestock in the United States, has completed its first year of activity. During the year 2,756 persons enrolled, with a total of 131,482 animals and in addition 170,030 head of poultry.

According to a summary of results, there is a very small proportion of inferior female stock in herds and flocks headed by purebred sires. Only 2.7 per cent of the females are scrubs, and with poultry the figures are still lower, 2.2 per cent. Taken as a whole, the majority of female animals bred to purebred sires are grades. But approximately two-thirds of the sows are purebred, and two-thirds of all the poultry listed is of standard breeding.

Prominent among the persons enrolled are President Wilson with his flock of sheep and Secretary of Agriculture Meredith with his herd of dairy cattle. Forty-six States are coöperating with the Department of Agriculture in the campaign.

ON TO DENVER

AT the recent convention in Columbus, the question of naming the next place of meeting was carried to the floor of the convention, Colorado Springs, Colo., being selected. However, before adjournment on the last day, a motion was carried authorizing the Executive Board to change the place of the next meeting to some other city in Colorado if it were considered advisable, provided it was recommended and approved by the veterinarians of that State. Dr. Charles G. Lamb, acting as spokesman for the Colorado veterinarians, appeared before the Chicago meeting of the Executive Board and suggested that the 1921 convention be held in Denver on September 5-9, inclusive. This recommendation, after careful consideration, was finally adopted by the Executive Board, and it is now none too early to start your plans to take your vacation next September among the beautiful Rockies. You should also interest your fellow practitioners to assist in making a large attendance at Denver assured.

CODE FOR INTRADERMIC TUBERCULIN TESTS

THE following code for reporting cattle tested by the intradermic tuberculin test was unanimously adopted by the United States Live Stock Sanitary Association:

I. If one observation only is made, it shall be at the seventy-second hour after injection. If two observations are made, they shall be at the forty-eighth and ninety-sixth hours, respectively, after the injection. Under special conditions, more frequent observations over a more extended period of time are advisable.

II. An intradermic test shall be reported in accordance with the following code:

A. Animals showing no reaction shall be recorded at each observation as N—(Negative).

B. Reactors shall be recorded as follows:

a. For circumscribed swellings, pea size (diameter 3/16 inch) shall be used as a basic standard. Larger swellings shall be recorded as P-2, P-3, P-4, P-5, etc., in accordance with the findings, being two, three, four or five times the size of a pea.

b. For diffused swellings, "Thick 2-X" shall be used as the basic standard and signifies a diffuse swelling in which the injected caudal fold is twice as thick as the normal fold. Larger swellings shall be recorded as Thick 3-X, Thick 4-X, etc., in accordance with the findings.

VETERINARY EDUCATION AND ITS READJUSTMENT¹

By C. D. MCGILVRAY

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IN attempting to deal with a topic such as veterinary education and its readjustment one is confronted with the handicap of touching a seemingly fully elaborated academic subject. Aside, however, from the purely academic phases which it presents, there are other aspects that require to be anticipated, if not immediately faced. Personally, I should prefer to come to you with a cheery message that all is well. But, after all, it is only the false prophet, and those of visionary faith, who proclaim "Peace, peace, when there is no peace." Without the guidance of the broad vision which sees the finished whole the skill of the individual is oft in vain.

In looking over the reports of attendance at the different veterinary colleges one is forcibly struck by the paucity of students, and more especially when compared with the enrolment in other sciences. From nearly all other branches of science the reports indicate a greatly increased attendance. From the faculties of medicine, dentistry, pharmacy, law, applied science and agriculture similar reports are in evidence that the student enrolment is satisfactory and in many cases double that of any previous year. The only apparent counterpart to veterinary science in declining attendance is found in faculties of divinity. Seemingly the attractions of the ministry and the veterinary profession are somewhat similar in the esteem of the young man charting his future career. For the time being we are at least in honorable company.

Be that as it may, the problem confronts us of how to attract sufficient recruits to maintain our numerical strength. Let it be clearly understood that, rightly or wrongly, the future success and prestige of veterinary science may be largely influenced by the desire of qualified pupils to attend accredited colleges, and, ultimately, the welfare of the profession, by the numerical strength of its membership being maintained. Let us assume that we are approaching the parting of the ways. A little frank retrospect may assist us in charting our future course.

During the past year the total enrolment at accredited veterinary colleges was less than one-half that of one of the so-called veterinary correspondence schools and veterinary correspondence dentist

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

diploma mills. This concern claims to have a yearly enrolment of over 2,300 pupils outside of Canada, and a gross revenue of \$40,000 from this source. Unless such concerns are prevented from further creating and exporting their illegitimate products for veterinary practice the profession will continue to be wrongly estimated. The personnel of the profession must be maintained by graduates from accredited colleges.

Heretofore the prevailing plea has been that spacious and well-appointed colleges with close university affiliations and full matriculation were required to exemplify the dignity and status of the medical profession, and there seemed no good reason for not expecting the same for the veterinary profession; likewise, that veterinary science and medical science should be more closely interlocked with each other and thus be made equally attractive. The teaching staffs of veterinary colleges should be strengthened by an infusion of medical men. We have progressed in these directions without having attained the desired preëminence or any noticeable attention of a munificent nature through such channels. In fact we have reason to feel at times discouraged at the approachment made between medical and veterinary science being so unfruitful in many respects. Personally I am inclined to think that a readjustment toward agriculture will be more hopeful of results. The transition which is taking place in our professional activities throws us more closely to rural problems.

The insistent demand for practitioners from agricultural communities must be heeded and provided for. The shortage of graduate veterinarians for Federal and State or Provincial appointments will become more embarrassing. A careful census of the probable complement of graduates required to meet present and future needs should be undertaken and strenuous efforts made to induce a sufficient number of suitable candidates to attend veterinary colleges. The reason or reasons for the reduction of candidates for the profession should be carefully reviewed.

Apparently the increased length of the course from three to four years, together with the advanced entrance requirements, has had some effect. Personally I am an advocate in favor of both, but consider that some adjustments may be advisable for a time without impairing the principles involved. Selective candidacy for the veterinary profession was probably too long delayed for the good of all concerned, and more especially for those now entrusted with the responsibility of obtaining sufficient recruits of the desired type

to study for the profession. The standard of qualification and type of candidate which predominated so largely for the profession during the past has prevailed as a barrier to some extent, preventing the desired matriculants from now entering in reasonable proportion to the other sciences. The baneful effects of low standards may not be immediately dispelled or easily overcome. If good standards are maintained the better elements are attracted, as every young man entering a profession acts as a force to attract or repel others.

Generally speaking, the only visible source of supply for candidates able unconditionally to meet university entrance requirements is from the annual matriculation classes of high schools and collegiate institutes. Those comprising the matriculation classes have, as a rule, been matriculating for the express purpose of enabling them to qualify for admission to university classes. Many of these matriculants are not over 18 years of age, and have originated from urban centers without any opportunity of acquiring a knowledge of agriculture or livestock experience. As a result their inclinations may tend to divert the majority of them to other faculties than veterinary science. Efforts must be made to attract a larger proportion of matriculants to veterinary science as a suitable profession offering equal opportunities to the other learned professions.

In order to tap the direct source of supply in Canada a suitable poster and bulletin describing the opportunities and advantages of the profession was sent to all of the high schools and collegiate institutes in the Dominion, extending from the Atlantic to the Pacific. A total of 950 schools were thus canvassed. In addition a vigorous advertising campaign was conducted from January to August in 19 high-class papers and agricultural journals. The sum of \$900 was expended for advertisements, and suitable articles furnished to the press were published gratis by them. Many inquiries were received, and to meet them 2,500 copies of the College Calendar and Bulletin were printed for distribution.

The type of applicant is unquestionably superior to previous years, as indicated by penmanship and composition of their letters. As yet it is difficult to determine definitely the number able to furnish university matriculation certificates or likely to pass unconditionally the equivalent qualifying examination. A considerable number possess two or more years' high-school or collegiate education and show evidence of having received a sound education in essential subjects as a basis for pursuing further academic studies. Candidates of this class are generally over 21 years of age and have

commercial and agricultural experience, and many have been on military service overseas. They have reached the age at which they are unlikely to return to a high school or collegiate institute to complete their matriculation. Unless the colleges can so adjust the entrance requirements to permit a reasonable allowance of conditional candidacy to applicants over 21 years of age possessing two or more years' high-school education the number of new matriculants for the incoming session may be extremely limited.

It is worthy of notice that one of the leading State colleges has provided for the acceptance of candidates over 21 years of age as special students on the presentation of satisfactory reasons and provided that if any such student afterwards becomes a candidate for a degree he shall take the omitted entrance examination one year before the degree is conferred, or undertake excess work in other approved subjects. If my interpretation of this provision is correct, it means that candidates over 21 years of age possessing less than a complete high-school or collegiate education will be accepted and given the opportunity of improving their education and matriculating during the first three years of their course. This adjustment may be equitable and wise and should be carefully considered as to its adoption tentatively to augment the attendance through conditional candidacy. At the same time the number so admitted should be limited only to insure a sufficient complement in the entering class as may be justified by necessity.

After all, the possession of a certificate of four years' high-school attendance may not always abstractly afford a safe criterion as to one's capabilities or preparation for veterinary science studies and professional adaptability. The candidate who has received his preliminary education in Great Britain by completing the prescribed public-school standards and passing the required examinations, and then acquires two to three years' additional education in a high school, grammar school or an academy in Great Britain, is usually as well prepared academically as the candidate with four years' high-school education acquired in many parts of the United States and Canada. Likewise, many candidates between the ages of 18 and 25 years, possessing at least two years' high-school education, supplemented by commercial training and livestock experience, often prove to be satisfactory material for veterinary science studies and professional usefulness. The enabling of such candidates to obtain matriculation should be carefully approached. In this connection

a pre-veterinary year might furnish a satisfactory means for such a purpose and to maintain a good standard of qualification and type of candidate.

By arranging a suitable course of studies some good candidates with partial matriculation might be prepared and accepted through a selective and properly safeguarded draft at the completion of the year's course. Any readjustment of veterinary education must anticipate either an expansion or contraction of the profession. If a satisfactory complement of acceptable candidates are not attracted to veterinary science studies at accredited colleges, and a sufficient number of accredited graduates regularly provided to meet the needs, we may be confronted with professional decline through reduced personnel and numerical insignificance.

ONTARIO VETERINARY COLLEGE—SESSION 1919-1920

Standard of Qualification of the First-Year Class

A total of 98 applications were received for admission to the first-year class. Of this number 33 were accepted.

Twenty-three entered by furnishing a high-school certificate. Seven of these had full university matriculation certificates; 5 had certificates of partial matriculation, having successfully completed three years in a high school or collegiate institute; 11 presented certificates for at least two years' high-school education. Ten were accepted by successfully passing the qualifying entrance examination based on the equivalent of two years' high-school education. The remaining 65 applicants were refused admission either as a result of failing to pass the entrance examination or their inability to take the examination.

ONTARIO VETERINARY COLLEGE—SESSION 1919-1920

Attendance from the Different Provinces and States

	<i>1st Year Class</i>	<i>2d Year Class</i>	<i>3d Year Class</i>	<i>Graduating Class</i>	<i>Total</i>
Ontario	10	7	4	11	32
Manitoba	7	3	None	None	10
Saskatchewan	4	None	4	1	9
Alberta	1	1	None	1	3
British Columbia.....	1	1	None	None	2
Quebec	2	None	None	None	2
Nova Scotia.....	2	None	None	1	3
New Brunswick.....	None	None	None	None	None
Prince Edward Island	None	None	None	None	None
Newfoundland	1	None	None	None	1
Bermuda	1	None	None	None	1
British West Indies...	None	3	1	None	4

Pennsylvania	1	None	1	None	2
New York	None	1	None	None	1
North Dakota	None	2	None	None	2
Ohio	None	1	None	None	1
Wisconsin	None	1	None	None	1
Illinois	1	None	None	None	1
Vermont	1	None	None	None	1
Maine	1	None	None	None	1
Michigan	None	None	None	1	1
Totals.....	33	20	10	15	78

NATIONAL RESEARCH COUNCIL

A SITE for the new building in Washington which is to serve as a home for the National Academy of Sciences and the National Research Council has recently been obtained. It comprises the entire block bounded by B and C Streets and Twenty-first and Twenty-second Streets, Northwest, and faces the Lincoln Memorial in Potomac Park. The Academy and Council have been enabled to secure this admirable site, costing about \$200,000 through the generosity of their friends and supporters. Funds for the erection of the building have been provided by the Carnegie Corporation of New York.

Dr. Gregorio San Agustin, instructor in Animal Husbandry in the University of the Philippines, after spending several years in the United States as a University Fellow, has sailed for Manila, in order to take up his work once more with the University. Dr. San Agustin is a member of the A. V. M. A.

Professor H. Vallée, an honorary member of the A. V. M. A., has resigned as Director of the Alfort Veterinary School for reasons of indifferent health, and has been appointed Director of the Research Laboratory of the French Sanitary Service. Professor Cadiot has assumed the Directorship of the Alfort Veterinary School.

Professor Ch. Porcher, Professor of Chemistry at the Lyons Veterinary School, recently delivered a course of twelve lectures before the School of Infant Welfare of the Faculty of Medicine of Paris. It is, indeed, encouraging to learn that a veterinarian is considered a sufficient master of the intricate subject of chemistry to warrant being invited to deliver a series of lectures to medical men in a Medical Faculty.

THE PRESENCE OF MICRO-PARTICLES IN THE BLOOD AND OTHER BODY FLUIDS¹

By S. H. GAGE and P. A. FISH

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ALL organic foodstuffs are broken down, in the process of digestion, into simpler constituents or construction units in order to be of service to the body tissues. Proteins are converted into amino-acids, carbohydrates into monosaccharids, and fats into fatty acids and glycerin. None of the foodstuffs can be utilized in their original form; all must be dissociated by the digestive processes, and such portions of them as may be required are reconstructed into new or replacement tissue of the host. The animal body is continuously rebuilt and kept in repair by substances which have originated outside of itself. Dissociation and reconstruction changes can be demonstrated more or less clearly by means of chemical tests, and these have furnished the data upon which our knowledge is principally based. The introduction of the dark-field microscope has, however, made it possible to furnish visible evidence which may supplement, confirm and perhaps enlarge our information concerning certain of the body fluids and the changes that occur in them.

The presence of the minute particles in the blood, usually referred to as molecular base, elementary granules, blood dust, etc., and supposed by many to represent the débris or broken-down portions of the blood elements, can now definitely be shown to be related to the fatty portion of the diet. A purely protein diet or a purely carbohydrate diet contributes nothing to their presence in man, but a purely fat diet, or a mixed diet containing fat, causes a very marked increase in these particles under normal conditions. This method has therefore a very distinct value in confirming or checking up other methods concerned with the study of fat in the blood and lymph of the body.

The protein and carbohydrate construction units are absorbed from the intestine into the blood of the portal system and must pass through the liver before they can reach the tissues. Fat, or at least a large portion of it, holds the unique distinction of passing first to the general circulation and later in part to the liver. It has the further distinction of appearing in the blood, not in the form of its

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

constituents as is the case with protein and carbohydrates, but as reconverted fat which has been rebuilt from its constituents before it has had opportunity to enter the blood. The liver thus acts as a censor to protein and carbohydrate material, while some of the fat apparently escapes this censorship.

It is quite generally accepted that the fat of the food gets into the blood after it has undergone saponification in the intestine and is absorbed by the epithelium in water-soluble form as soaps and glycerin. These constituents are at once resynthesized into fat again

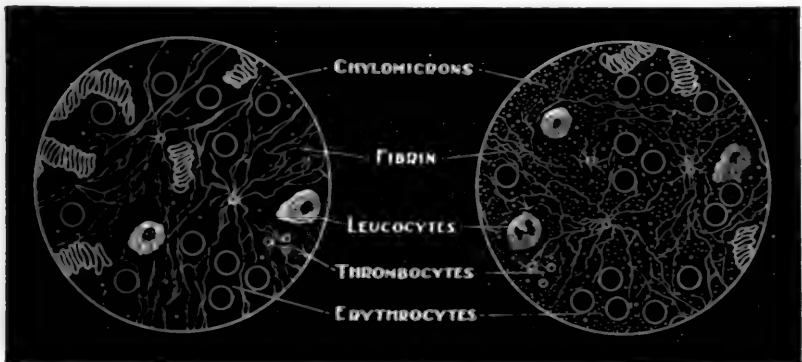


Fig. 1.—The diagram at the left shows the scarcity of the particles in the blood after a period of fasting. The diagram at the right shows the blood loaded with particles after the ingestion of fat

by the intestinal cells and passed into the lymph vessels of the intestine as the "molecular base of chyle," and thence through the thoracic duct to the general blood circulation. About 60 per cent of the food fat has been determined in the chyle in this way. The remaining smaller quantity is assumed to be absorbed directly into the blood of the intestinal capillaries. This assumption has received support from the work of Munk and Friedenthal (*Zentr. Physiol.*, 1901, Vol. 15, p. 297), who found that the fat in the blood increased after the thoracic duct had been ligated; also by the observation of d'Errico (*Arch. Fisiol.*, 1907, Vol. 4, p. 513) that the fat content of the portal vein was higher than that of the jugular vein during fat absorption, and by the work of Hamburger (*Arch. Anat. u. Physiol., Physiol. Abt.*, 1900, 554), who found that the absorption of soaps from an isolated loop of intestine took place after all visible lymph vessels had been ligated. R. Ehrström (*Finska Läk Handlingar.*

1917, Vol. 59, pp. 1259-1273, ref. *Physiol. Abstr.*, 1917-18, Vol. 2, p. 675), states that fat transport in the body is carried out partly by the plasma, partly by the corpuscles of the blood. In the plasma the greater part is in solution, and only a small amount is undissolved as the so-called hemokonia. The blood fat is a fairly constant figure.

Since all of the fat ingested with the food has not been accounted for in the thoracic duct route to the blood, the inference, with the supporting evidence previously mentioned, is that the remainder of the food fat enters the portal blood and submits to the censorship of the liver. Ligation of the thoracic duct or of the intestinal lymph vessels is an abnormal condition and would indicate that under compulsion there is a forced absorption of the fat into the portal system which under normal conditions would directly enter the general circulation. D'Errico's observation that, during fat absorption, the fat content of the portal vein was higher than that of the jugular vein would indicate that the greater percentage of fat was absorbed through the portal route, unless it can be demonstrated that some of the fat, turned into the general circulation by the thoracic duct, is lost in the circuit of the body before the jugular vein is reached, or that all of the fat does not appear in the blood in a fine state of division as the "molecular base of chyle," or that it is absorbed in different forms.

Mansfeld from his investigations (*Magyar Orvosi Arch.* 9; cited in *Jahresber. Tierchem.*, 1908, p. 34; *Pflüger's Arch.*, 1909, 129, 46, 63) concludes that some of the absorbed fat enters into some sort of combination with the protein in the blood and consequently is insoluble in ether. On this account, also, it may escape osmic acid staining. If this view is correct it necessitates the acceptance of the idea that fat exists in the blood in two forms: as free fat and combined fat, the free fat we assume being represented by the minute particles.

Our experiments with the dark-field microscope show results which do not accord with the observations of d'Errico so far as the *free* fat of the blood in the portal system is concerned. Observations were made upon five cats of various ages during different stages of fat absorption. A careful count was made of the free particles in the blood of the portal vein and that in the aorta representing the general circulation. In two of the cats counts were also made of the particles in the jugular vein. In all cases there were markedly fewer particles in the portal vein than in the other vessels. It was also found that the number of particles in the blood of the jugular vein was but

slightly less than in the blood of the aorta. If the view of free and combined fat is accepted, the obvious explanation for a greater amount of total fat in the portal blood is that a larger proportion of combined fat is present than in the general circulation and the combined fat is not visible in the dark field of the microscope.

The difference in the form, size, arrangement and development of the alimentary tract in the domesticated animals present an interesting and important field for investigation with the dark-field microscope in relation to the presence of these particles in the blood and their connection with fat absorption. Thus far only preliminary observations have been made upon the horse, cow, dog and man. In the case of the herbivorous animals a relatively small amount of fat is present in their ordinary diet, and a study of the blood curve in connection with digestion shows no unusually great augmentation of the particles.

Differences in the form of the curve may be expected in the different species, also in the same individual at different times, this difference probably being due to nutritional conditions.

EXPERIMENTS ON HORSES

Two observations were made upon the same horse upon an ordinary diet at different times. The animal was not at work and the morning meal received 4 quarts of oats with hay and in the afternoon 4 quarts of bran with hay.

The experiment in one instance was begun at 9 o'clock in the morning and the other at about 8 a. m. In both cases the observations covered a period of 24 hours and the first observation was taken before the morning meal was given. Examination of the curves shows the number of particles in the blood fluctuated during the day and evening until midnight. After midnight the number

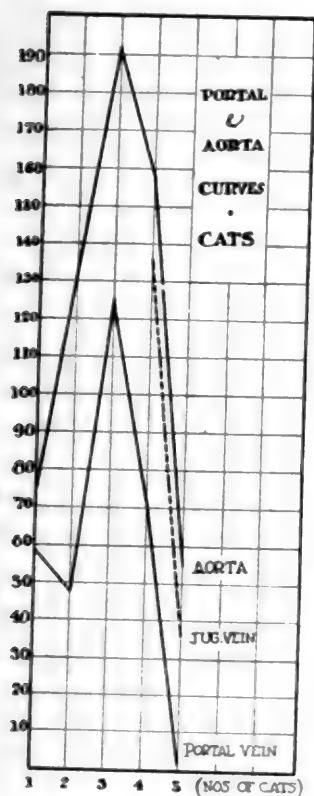


Fig. 2.—Curves from cats. This figure shows the number of particles in the blood vessels indicated during fat absorption.

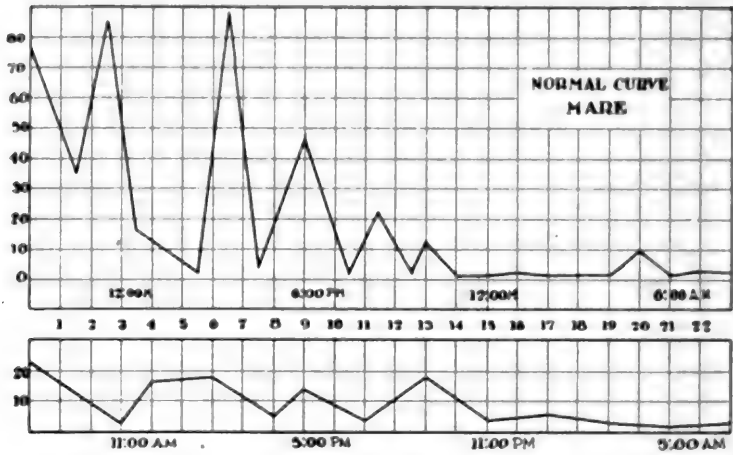


Fig. 3.—Curves from mare on normal diet

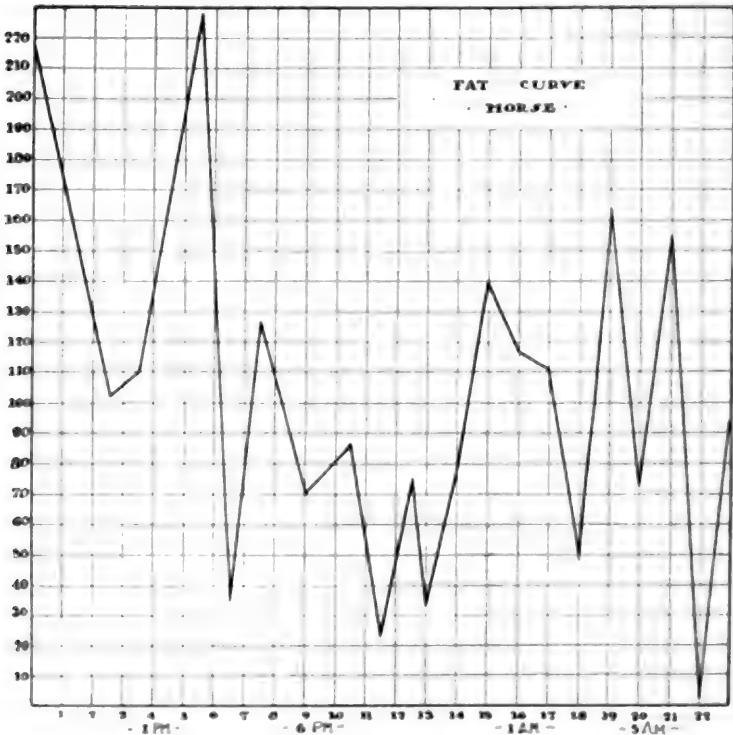


Fig. 4.—Fat curve from horse No. 1

of particles was small and there were no very marked changes. After the first meal the number of particles in the blood rose and fell until the second meal, after which there was a continuation of the rise and fall of the number of the particles until midnight.

Another experiment was carried out upon two other horses in relation to the absorption of fat. The horses had had nothing to eat since the afternoon of the previous day. At 9 o'clock in the morning a half pound of butter was given to each horse and the animals were fasted during the following 24 hours. The curves of the two horses were markedly different. In horse No. 1, the first observation, before the administration of the butter, showed an unexpectedly high number of particles in the blood. The number decreased during the next three hours and then rose to the maximum, as the butter was absorbed, between the fifth and sixth hours. Thereafter the number fell, showing some fluctuations with some rise again at the eighth, fifteenth, nineteenth and twenty-first hours.

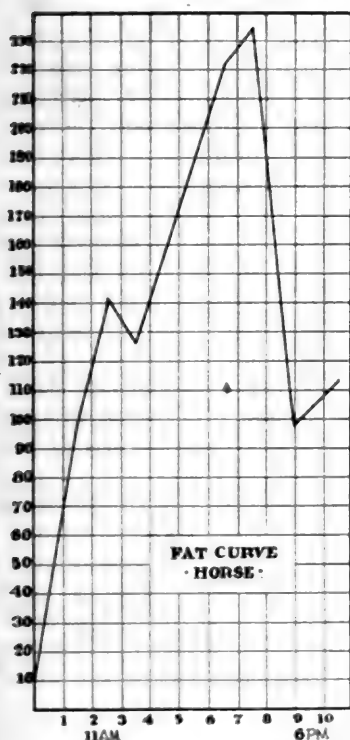


Fig. 5.—Fat curve from horse No. 2

Horse No. 2 showed but few particles in the blood before the butter was administered. The curve showed a rapid increase in the number of particles in the blood between the first and second hours, and this continued until the maximum was reached between the seventh and eighth hours. Thereafter the number of particles decreased rapidly. No observations were taken after the tenth hour because of the opposition of the horse.

The butter curve of horse No. 2 is similar to the butter curve obtained from man. In two human subjects it was found that fat absorption, as shown by the dark-field microscope, began in an hour or two, reached its maximum in from three to five hours, and then declined rather rapidly. The butter curve of horse No.

It seems to present unusual features and emphasizes the differences that may be found in different individuals of the same species. Both animals worked during the week, except Sunday when the observations were taken, and both appeared to be in excellent physical condition. In horse No. 1 the great number of particles in the blood before the butter was administered is difficult to explain under normal conditions. The variations in numbers that followed would indicate that the butter was absorbed at various intervals during the 24-hour period.

The method of digestion is a factor which must be considered. It has been taught that the stomach of the horse has very little peristaltic action and that some food may remain in it for a number of hours (18 to 36) before the stomach is completely emptied. When a meal is eaten the food does not pass out until the stomach becomes two-thirds full, and then the food passes through the stomach into the intestine as rapidly as it enters. After the meal has been finished the passage of the food from the stomach is greatly retarded and from 18 to 36 hours are required to remove the food completely, which represents the two-thirds capacity of the stomach. Accepting this view, it is possible to consider that in the case of horse No. 1 the contents of the stomach had been largely removed before the butter was administered and it was retained until the stomach was able to remove small portions of it at intervals during the following 24-hour period. In the case of horse No. 2 it may be considered that the stomach was filled more closely to the two-thirds limit and when the butter was administered it passed over into the intestine in a comparatively short time.

EXPERIMENTS ON COWS

Cow No. 1 had been fasted since the morning of the previous day except for a small amount of hay which remained in the stall from the previous feeding. She was milked twice a day but gave only about 3 pints at each milking. She had been fed upon bran, cut beets and hay. At 9 o'clock in the morning she was given one-half pound of butter. Her blood showed the presence of few particles until the sixth hour, when there was a considerable increase in the number, indicating some fat absorption. The decline in number was rapid within the next hour, and the number remained low until the twelfth hour, when there was some increase, with a fall, followed by the maximum increase at the fourteenth hour, with the number

remaining comparatively high until the sixteenth hour, when there was a fall, followed by another increase at the eighteenth hour, with a fall at the twentieth hour and the particles remaining few in number until the end of the experiment.

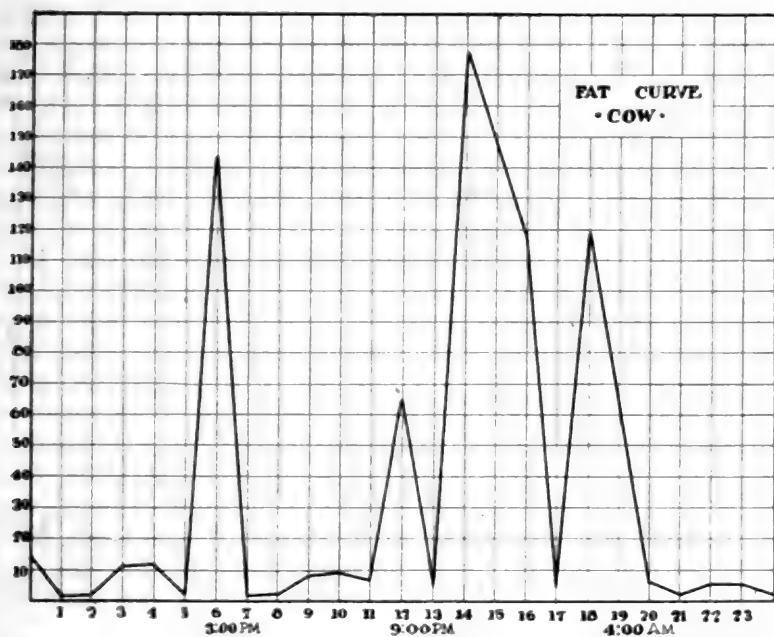


Fig. 6.—Fat curve from cow No. 1

Cow No. 2 was also giving only a small amount of milk. She was fed 8 quarts of bran and hay morning and night. She was fed as usual during the experiment, as the object of the experiment was to determine the changes in the number of particles in connection with her usual ration. The first observation showed but few particles present in the blood. There was some increase at the second hour.

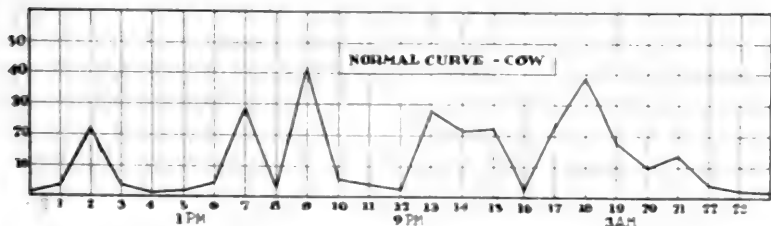


Fig. 7.—Normal curve from cow No. 2

followed by a decline, with a greater increase at the seventh and ninth hours. She was fed just after the ninth hour, and the particles remained few in number until the thirteenth hour; they continued fairly numerous until the fifteenth hour, when they decreased, to rise again at the seventeenth hour, to fall again at the nineteenth hour and remain at a low level for the remaining 5 hours.

In both cows the data indicate that fat absorption may occur at intervals during the greater portion of the 24 hours, and that only

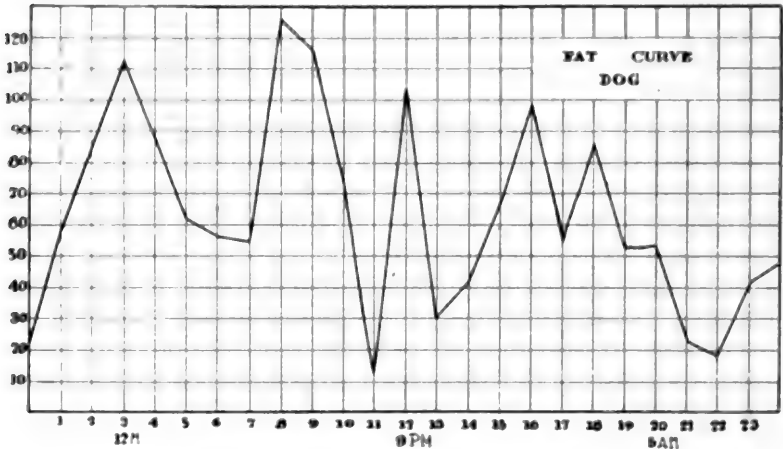


Fig. 8.—Fat curve from dog No. 1

during the last 4 or 5 hours there is no indication of it. To account for the results it is again necessary to consider the method of digestion, which, in the cow, is complicated with the process of rumination. If it is accepted that all, or the greater portion, of the food must pass to the rumen—the first compartment of the stomach—and remain there until the process of rumination brings it back to the mouth for remastication and passage to the fourth or true stomach, it may readily be understood why the absorption of fat may be delayed and occur at intermittent intervals.

EXPERIMENTS ON DOGS

Dog No. 1 was a young Boston bull dog and after the breakfast of the previous day had been fasting up to the time of the experiment (23 hours). At 9 o'clock in the morning there were given 30 grams of butter mixed with some rice flavored with meat extract, which was eaten readily. The rice served as a vehicle of administration, and being practically a pure carbohydrate, had no influence on

fat absorption. The curve obtained for the 24-hour period indicated waves of fat absorption occurring at the second, seventh, eleventh, fifteenth and seventeenth hours.

Dog No. 2, an Irish hound pup, was suffering from rickets and was unable to walk. A tablespoonful of cod-liver oil emulsion with hypophosphites was given at 9 o'clock after the animal had fasted 17 hours since the afternoon meal of the previous day. The obser-

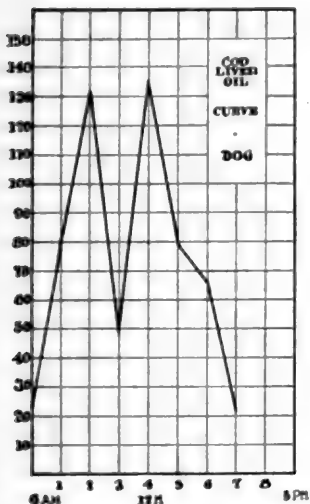


Fig. 9.—Fat curve from dog No. 2

ervations were continued for 8 hours. The curve shows a rapid rise during the first 2 hours, then quite a marked fall the third hour, a rise to the maximum at the fourth hour and a decline to the starting point at the end of the eighth hour. Under the cod-liver oil treatment twice daily the dog subsequently made a good recovery.

GLYCERIN EXPERIMENTS

An interesting question with regard to fat production is: If certain of the constituents are supplied can the necessary other constituents to build up fat be furnished by the tissues? The following experiments upon two dogs, while showing remarkable individual differences,

seemingly indicate that sufficient fatty acids can be furnished by the tissues to cause a marked increase in the number of particles in the blood.

Dog No. 1, a young bull terrier 6 or 7 months old, had fasted 17 hours since his afternoon meal of the previous day. At 9 o'clock in the morning 4 mils, or cubic centimeters, of glycerin diluted to 20 mils with water were administered. Observations were made over a nine-hour period. The curve showed an increased number of particles during the first hour, followed by a decrease, and then an increase which reached its maximum at the sixth hour.

Dog No. 2, a mature Airedale terrier, was fasted for 23 hours before the experiment. At 9 o'clock in the morning 16 mils of glycerin, diluted to 30 mils with water, were administered. The curve showed a slight increase in the number of particles at the fifth hour, after which there was a fluctuating decrease until the

twelfth hour, when there was another increase reaching its maximum at the fourteenth hour, with a somewhat gradual decrease until the nineteenth hour, after which the number of particles remained at a low level until the end of the 24-hour period.

A comparison of the two experiments shows that in one case fat production was accomplished early while in the other case it was long delayed. Other investigators have shown that if fatty acids alone be administered the tissues are able to furnish sufficient glycerin to form fat. The foregoing experiments would indicate that the rule may work also in the reverse direction and that a

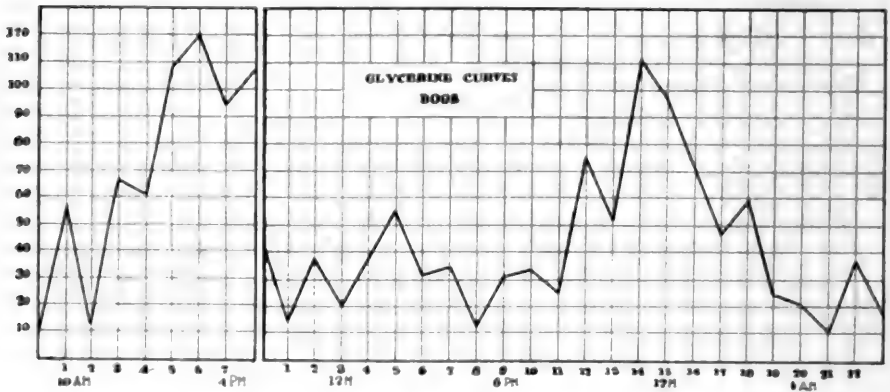


Fig. 10.—Glycerine Curves. The short curve at the left is from dog No. 1. The longer curve at the right is from dog No. 2

sufficient amount of fatty acids can be furnished by the tissues to build up fat from the glycerin that has been ingested. Further experiments are, however, necessary.

OLEIC ACID AND SUDAN III

An experiment was performed upon a male cat which had been castrated. After fasting for 24 hours he was fed some boiled rice with a little beef extract. A considerable portion was eaten at 10 a. m., and at 11 a. m. 5 mils of oleic acid with a knife point of Sudan III dissolved in it was poured into the cat's mouth. At 3 p. m. (4 hours later) the cat was killed and an examination made. The chyle in the truncus intestinalis was of a definitely pink color. The vessel was tied and opened at the peripheral end. Some of the chyle was taken up with a pipette and placed in a clean bottle. In mass it appeared decidedly pink. The thoracic duct appeared clear or only slightly cloudy. A count of the particles (five fields being

used as an average) showed in the thoracic duct an average of 115, in the aorta 13, in the jugular vein 15, in the portal vein 5.

There was much red material noticed in the stomach, and the small intestine contained pink substance nearly its whole length. Evidently fat absorption had not reached its maximum, and more striking results might have been expected if the process had been allowed to go on for one or two hours longer. The evidence also indicates that after the ingestion of one of the fatty acids the intestinal tissue was able to furnish a sufficient supply of the other constituents (i. e., other fatty acids and glycerin) to construct neutral fat.

BUTTER AND SUDAN III

A well-nourished dog was fasted for 24 hours,, and then fed 160 grams of beef, 40 grams of butter and one egg. The butter was mixed with 0.55 gram of Sudan III. The animal was killed 6 hours after it was fed. The lacteals, truncus intestinalis and thoracic duct showed a markedly pink color; the pink color was also marked in the blood serum. The blood was full of particles, as shown by the following count (five fields being used as an average): Aorta, 241; jugular vein, 215; portal vein, 237.

SECRETIONS

The blood with its accessory, the lymph, may be regarded as the fundamental fluid of the body, and the various secretions may be considered as by-products which have undergone more or less modification and addition by the glands which elaborate them. Without blood, secretions could not exist. It is not intended to imply that because these minute or ultra-particles exist in the blood and chyle they may also exist in the various secretions, or that if present in certain of the secretions they are necessarily of the same nature as those in the blood. In an incomplete preliminary examination the particles have not as yet been found in the saliva, bile, or urine, although these fluids show more or less viscosity comparable with that of the blood. Their presence has been demonstrated in milk. Kreidl and Neumann (*Arch. die Gesamte Physiologie*, 1908, v. 123, pp. 523-539) have found particles present in the milk of the cow, dog, cat, rabbit, guinea pig, elephant, goat, horse and rat. To this list we can add the milk of the ewe.

We have been able to demonstrate the presence of particles in the semen of man and of the stallion and have not thus far been able to

find mention of this condition in the literature available to us. Aside from the blood and chyle, the possible limitation of particles to two secretions functioning with the sexual system may or may not have special significance.

In milk the fat globules have, with the dark-field microscope, a characteristic appearance; they vary greatly in size and in some instances are so small as to make it difficult to distinguish them from the particles. There is, however, a difference in the power of refracting the light. The opacity of milk is believed to be due not merely to the fat globules but to a certain amount of casein in combination with calcium, or calcium caseinate, in suspension.

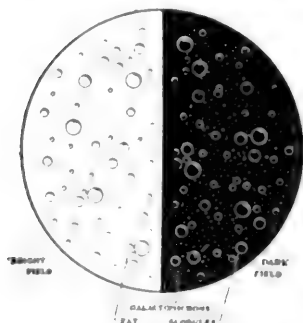


Fig. 11.—The left half shows milk as it appears with the ordinary microscope. The right half shows its appearance with the numerous particles under the dark-field microscope

When a drop of whole milk is placed under the objective of a dark-field microscope, there is so much material reflecting the light that a bluish or slate-colored background is presented instead of a distinct dark field. This interferes more or less with the study of the particles, but the difficulty may be overcome by diluting the milk with water in the proportion of 1 to 100 with very satisfactory results as to the dark field. Kreidl and Neumann state that in woman's milk the particles are "completely absent or almost completely absent," but observe later that if woman's milk be

shaken with ether "these structures are also shown, appearing finer and more delicate than in cow's milk, but quite clearly."

THE COMPOSITION OF THE PARTICLES IN MILK

The fact that there is naturally an abundance of fat globules in milk might reasonably justify the view that the fat is taken care of in this way and that any fat in the form of particles would be superfluous. Furthermore, when milk is shaken with ether, there is no apparent disappearance of the particles. As a matter of fact the mere shaking of milk with ether does not cause the disappearance of the fat globules, although ordinarily fat is readily soluble in this agent. Because of their insolubility when shaken with ether, Kreidl and Neumann reject the idea of the fatty constitution of the milk particles. They believe them to be of a protein nature and to rep-

resent casein in suspension. This conclusion is reached as a result of digestion experiments. To some fresh cow milk was added a slight amount of pankreon and the test was carried on 6 hours in an incubator. At the conclusion of the test they found under the microscope a complete absence of the particles. A similar test with pepsin on milk rendered weakly acid gave similar results.

Digestion experiments were also carried out by us with the proteolytic enzyme trypsin, and papain, a vegetable enzyme acting upon protein. Separate samples of milk were used with each enzyme, besides the control. The tubes were placed in the incubator and digestion was allowed to proceed for 21 hours. At the end of that time there was gross evidence of digestion changes in the trypsin and papain tubes, but none in the control tube. Under the microscope there was no longer the bluish or slate background but a distinct dark field in which there were still present numerous particles but much fewer than in the control. It was estimated that about one-third of the particles still remained. There appeared to be very slight or no difference in the digestive action of the trypsin and papain so far as the number of particles was concerned. This result suggests the possibility of the presence of two kinds of particles in milk, one kind of a protein nature, digestible by the enzymes, and the other not protein.

The fat-splitting enzyme (lipase) of the pancreas is considered to be a very sensitive enzyme, so that extracts or preparations made from the pancreas are deficient in this action. Results of its action are claimed, however, if a portion of the fresh pancreas is placed with neutral fat at the proper temperature as evidenced by the appearance of fatty acids. Another experiment was carried out in which a portion of fresh pancreas from a cat was added to some milk and the mixture with a control was placed in the incubator and digestion allowed to proceed for 22 hours. At the end of that time the particles had nearly all disappeared in the tube containing the pancreas, but the fat globules were numerous. The question as to the presence of more than one kind of particle in the milk needs further investigation, and it is hoped that more definite information can be gained in the future.

Of great interest in this connection are the observations of Mendel and Daniels on "The Behavior of Fat-Soluble Dyes in the Animal Organism" (*Jour. Biol. Chem.*, 1912-13, Vol. 13, pp. 71-95), in which they state: "The excretion of Sudan III and Biebrich Scarlet in milk, when they are given with the food fat, suggests that the latter

may pass directly into the mammary secretion. With cats and rats the results are striking, but the dye excretion in milk ceases when the stained fluid is no longer fed. In guinea-pigs and goats the secretion of the dye in the milk is positive; in the cow it has not yet been demonstrated (although large doses of Sudan III were administered). The variation in the outcome in the different species may be due to variations in the relative abundance in the dietaries of fat necessary for the absorption and transport of the dye. This explanation is emphasized by the observation that those animals (cats, rats, hens, pigeons) for which fat enters more largely into the diet, becomes stained more easily or speedily than animals which are accustomed to ingest relatively small amounts of fat."

ALIMENTARY LIPEMIA

Whenever fat has been ingested and a suitable time has been allowed for its absorption to take place, its path may easily be traced, by the milky appearance of the intestinal lymph vessels and thoracic duct, to the blood. The plasma or serum of the blood itself at this period has a distinctly milky appearance and if examined with the dark-field microscope will reveal a storm of fat particles in active Brownian movement. This means that the blood is receiving the particles more rapidly than it can dispose of them. In due time the storm subsides and the particles nearly all disappear. This excessive number of particles may be considered a temporary, normal, or alimentary lipemia. The disappearance of the particles may be due to the presence of a lipolytic enzyme which is believed to exist in the blood, or to their passage through the walls of the capillaries, or to a combination of these two factors. Ultimately the fat reaches the tissues and is demonstrable particularly in the liver, spleen, bone marrow and adipose tissue. The fat thus drafted from the food is mobilized in various depots as a reserve supply against the time of need. In starvation and under certain pathological conditions the reserves are called into action and fat again appears in the blood.

PATHOLOGICAL LIPEMIA

Diabetes was the first disease to attract attention in connection with the increased amount of fatty material in the blood. As far back as the days when blood-letting was common, a milky serum from the blood in many cases of diabetic coma was observed, from which it is said a "cream" arose on standing. Our earliest information relative to blood fat in disease dates from that time. Differences in results

have been observed in diabetic cases, and the reason for these differences is doubtless associated with the fat nutrition of the individual.

The "total fatty acids" of the blood have been found to be increased in nephritis, in pneumonia, in pregnancy, and in experimental anemia in animals (Bloor, W. R., *Jour. Biol. Chem.*, 1916, Vol. 25, pp. 577-599). Lipemia has also been observed in cases of chronic alcoholism, long continued narcoses, phosphorus poisoning and a number of other toxic conditions.

In starvation lipemia, Bloor (*loc. cit.*) observed that in some dogs there was an increase in the blood fat during fasting up to about the fifth day and after that a decrease; in others there was no increase. He concludes that the results depend upon the nutritional condition of the animals at the beginning of the experiment, as it was only the well-nourished ones that showed starvation lipemia.

Narcosis Lipemia. Bloor found that in dogs ether produced a rise in the fat content of the blood during the narcosis. Chloroform did not increase the blood fat during the narcosis unless the animal had been fed considerable fat previously. He found, however, there was an "after rise" in the blood fat in ordinary cases, during the two or three days following narcosis. This he believes may be due to necrosis of the tissue cells with liberation of their fatty constituents. In two fatal cases, one from ether and one from chloroform, there was a sharp rise in the blood fat which continued until the death of the animal. With alcohol there was a slight increase in the blood fat in the course of 8 or 9 hours. With morphine there was no appreciable rise during the first eight hours, but a considerable after rise in the course of the next two days.

METHODS

In carrying out the investigations, certain standards have been followed quite uniformly. Complete accuracy cannot be claimed in counting the particles. It is much like trying to count the flakes during a snow storm, since the particles are in active motion; yet even in a snow storm a fairly accurate estimate may be made of the number of snow flakes passing by a screen of a known limited area, and from this may be judged the number in a proportionately larger area. In these investigations the field in which the particles were counted was that included in the boundary lines of an ocular micrometer. By comparison with a stage micrometer the value of the spaces of the ocular micrometer can be determined and its proportionate area of the whole microscopic field. In this instance the

ocular micrometer area represented about one-tenth of the whole field. In focusing, a level was reached which showed the particles to the best advantage, and this focus was not changed while the count was being made. Only those particles were counted which showed the Brownian movement. In this way it was hoped to exclude particles of dirt or foreign material which might adhere to the slide or cover-glass. Each figure upon which the curves are based represents the average of the number of particles counted in five ocular micrometer fields.

TERMINOLOGY

The term *micron* has for a long time been used as a unit of measurement for microscopic objects. It represents one-thousandth of a millimeter. Despite its use for this purpose, it has, in recent years, also come into use to designate minute particles in colloid chemistry and in connection with the dark-field and ultra-microscope. Because it has been more or less generally adopted, and its use seems to be extending, the term chylo-microns has been introduced by Gage to designate the particles found in the blood and chyle, since the particles are of the same nature in both fluids, and the name fittingly indicates their origin. For the particles found in milk the term galacto-microns and for those found in the semen or sperm the term spermato-microns is suggested, the prefixes indicating the nature of the fluid in which they are located.

HISTORICAL SUMMARY

The milky appearance of blood serum sometimes found was described by Boyle in 1665 (*Philos. Trans.*, Vol. 1). The person had eaten a hearty meal four hours before being bled, and Boyle says: "The blood was white on top as if half chyle." Hewson also in his work on the blood, 1770-73 (*Philos. Trans. and Works*), showed in the clearest manner possible that the white serum might be due to the chyle poured into the blood, and that the whiteness was due to exceedingly fine particles of fat. When he dried this milky serum "the oil oozed out so much as to make the paper on which it was kept greasy."

Gulliver in the *Dublin Medical Press*, 1840, in an appendix to his translation of Gerber's *General Anatomy*, 1842, and in his notes to "The Works of William Hewson," 1846, gives further evidence and many references to medical writers showing that the milky appearance of the blood serum after a mixed diet was due to the chyle.

He shows too that the particles of the fat emulsion in the chyle and after being poured into the blood are nearly uniform in size, measuring from $1/24,000$ to $1/36,000$ of an inch in diameter. This agrees remarkably closely to the latest accurate measurements. He also states that these minute particles are in constant, active Brownian movement. Gulliver named the particles the "molecular base of the chyle."

While it is possible to see the minute particles in the chyle and blood by the bright-field microscope, Dr. James Edmunds in 1877 (*Monthly Micr. Jour.*, Vol. 18, p. 82) showed the great superiority of the dark-field microscope for the purpose. He says: "Blood and saliva may be seen as new objects [with the dark-field microscope]. * * * The [blood] serum is seen filled with a nebulous haze of points, as is mote-laden air in a sunbeam or in the electric light." In 1907 Dr. Alfred Neumann (*Zentrbl. für Physiol.*, Bd. 21) also used the dark-field microscope as had Dr. Edmunds. He also noted the minute particles and roughly estimated their number in different conditions as few, many and very many. He followed Hewson and Gulliver in attributing the particles in the blood serum to the chyle.

In 1918-20 we undertook an extended study of the blood with the dark-field microscope, and among other things, the determination of the origin of the free particles and their dependence upon the food ingested. By means of the eye-piece micrometer, as previously stated, quite accurate counts of the particles present in the blood under various conditions of food and digestion were made. We also used definite weights and kinds of food and continued the experiments from a period of fasting through an entire digestive cycle until the number of particles was as at the beginning. This usually required about 24 hours for a complete cycle, the blood being examined every hour.

We proved that the particles were fat, as had Hewson, by obtaining the grease spot on paper, by extracting the dried serum with ether and other fat solvents (xylene, benzene and chloroform). The extracts were dried and then stained with Sudan III and with osmic acid. Finally we fed cats and dogs with olive oil or butter stained with Sudan III, and found the chyle and the blood serum stained pink. This serum and chyle were likewise extracted with ether, etc., and the pink fat thus obtained was used to produce a grease spot upon paper, and to have superposed upon it the black stain of osmic acid. We are therefore certain that the milkiess is due to a fat

emulsion in the chyle and in the blood serum. We likewise found that with normal animals no milkiness of the chyle or of the blood serum was ever produced unless the ingested food contained fat or one of the fat constituents, viz., fatty acid or glycerin.

That there might be a milkiness of the blood serum in cases where very little or no food had been taken was pointed out as early as 1736 by Stuart (*Philos. Trans. R. S.*, 1735-36). Such a condition is now known as lipemia. Hewson (1770-73, *Philos. Trans. and Works*) also discusses milky serum where fatty food had not been taken, and concludes that the fat has been absorbed from the fat reservoirs of the body.

REMEDIES FOR CHICKEN LICE

EXPERIMENTS to determine what substances are best for exterminating or keeping under control chicken lice have recently been made by the Government. The following powdered substances were found to be effective when used as dusts: Arsenic trioxid, barium fluorid, barium tetrasulphid, borax, boric acid, cloves, naphthalene, paradichlorobenzene, sabadilla seeds, saffras bark, sodium fluorid, flowers of sulphur, and refined sulphur. Only a few of these materials, however, can be considered of any practical value in the control of chicken lice. Arsenic trioxid is too poisonous; barium fluorid, cloves, sabadilla seeds, and paradichlorobenzene are too expensive, or not readily available in large quantities; naphthalene is dangerous if applied too freely, and barium tetrasulphid does not kill all the lice. Sodium fluorid is the most practical remedy given in this list.

The following materials were found to be of no value against chicken lice in spite of popular opinion regarding many of them: Angelica root, calcium carbonate, calcium fluorid, calcium hydroxid, calcium oxid, calcium sulphate, colocynth pulp, diatomaceous earth, dolomitic lime, eucalyptus leaves, ferrous oxid, flour, wheat, gypsum, hellebore, lime (air slaked), lime (water slaked), magnesium carbonate, magnesium oxid, magnesium silicate, orris root, quassia chips, road dust, silica, sodium bicarbonate, vermilion, yellow ochre.

The fact that 26 different finely powdered materials—7 organic and 19 inorganic—were found to be of no value shows the fallacy of the old idea that any fine powder is effective against chicken lice if dusted into the feathers.

THE SUSCEPTIBILITY OF YOUNG PIGS TO HOG CHOLERA¹

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WITH the discovery of the Dorset-Niles anti-hog-cholera serum a great step in advance was made in the control of the most serious disease of swine, namely, hog cholera. This discovery, like all others of its kind, in no sense gives man a complete mastery of the subject. Instead it allows him to come one step nearer that goal. The fact is, the solution of a problem simply gives us so much more knowledge with which to combat our enemies. Further, and more important from the standpoint of the advancement of science, it opens up new avenues of thought and presents other problems for research, the solution of which may be taken as the milestone of our progress.

One of the greatest problems, and from certain angles absolutely the most important one, arising from the discovery of the anti-hog-cholera serum, is the proper method of handling young pigs. It is hardly necessary to state that there is a great diversity of opinion on the subject. This is probably due to the fact that the information of the average individual in this field is apt to be based on certain specific cases and not on the average results obtained from a great number of herds. In fact, it is possible for one person working with a litter of young pigs to obtain results diametrically opposite from those observed by another worker with a different litter at the same age and under apparently identical conditions. It is generally conceded that pigs born of and suckling immune mothers are much more apt to withstand the virus of hog cholera than those of susceptible mothers. This statement, however, does not always hold true, as numerous exceptions have been noted both in pigs from susceptible and immune mothers.

The problem is not even so simple as this. It is still further complicated by several other factors. One of these is the belief by many persons, which is supported to some extent at least by experimental data, that from 12 to 14 per cent of all hogs have a natural immunity. Further, do small and especially baby pigs react to cholera in the same manner as adults? Or, in other words, does

¹ Presented at the Fifty seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

cholera always produce a permanent immunity in those pigs, or is the immunity apt to be of a transitory nature?

Next, if we assume that young pigs are susceptible, we are reasonably safe in concluding that serum alone will produce a passive immunity. If this is true, what is the duration of this immunity? Also, if the pigs have a passive immunity at the time of treatment, what are the effects of the serum? Again, what are the effects of the simultaneous treatment under these conditions? In regard to this point, Dr. Cahill, in a recent article in our JOURNAL, records results obtained from several hundred pigs, which would indicate that only a certain percentage of these animals retain a permanent immunity from this treatment. On the other hand, Niles and Ritz report in a later article data which would lead us to believe that the vast majority of young pigs are permanently immunized by the administration of serum and virus.

These statements at first glance would appear to be diametrically opposed. On careful analysis, however, we find what to our minds is a reasonable explanation of the differences in results. It is the fact that the pigs used by Cahill were fed on a garbage diet and hence were under exposure to extreme infection practically all of the time. The animals of Niles and Ritz were not garbage fed and hence did not need the same degree of immunity for their protection. To put the proposition briefly as we see it, the hogs of Cahill were kept under special conditions and therefore needed a greater degree of immunity for their protection. The pigs worked upon by Niles and Ritz were kept under conditions more nearly simulating those of the average farmer, and that is in the last analysis our greatest concern.

In another experiment which we are conducting, under conditions comparable to those on the average farm, our findings to date seem to coincide with those obtained by Niles and Ritz. Undoubtedly they would not hold in a garbage-feeding plant.

Other questions which demand solution are whether or not we are warranted in using the so-called "sero-simultaneous" method of immunization. It also is important to know whether the immunity is largely transferred by the mother to the pigs at birth (true natal immunity), or whether a large per cent of it is obtained through antibodies present in the mother's milk. And last, if either or both of these types of immunity exist, is it possible to build an active or higher passive immunity upon either or both of them?

It is obvious that our reason for propounding these questions is not for the purpose of presenting experimental data toward their solution, nor would it be wise to waste the time of this meeting in presenting our ideas or pet theories, as these are worth no more than those of other workers with the same amount of experience in this field. The purpose, however, is to get these questions firmly in our minds and to determine from them if possible the really basic or fundamental problem involved.

After careful consideration of the foregoing, the logical procedure seems to be to start with the pigs at birth or as soon after birth as possible, and to determine the percentages of those animals which are susceptible or immune at that time. The age at which the immune at birth become susceptible, if they do, should also be determined. These projects, with certain modifications, are therefore taken as our problems, with the hope of adding more data to those already accumulated, and thus to throw a little more light upon an important question.

Unfortunately, susceptible sows do not readily lend themselves to this class of experimentation. Our data are therefore from necessity based entirely upon pigs born of and suckled by immune mothers.

PREVIOUS LITERATURE

Reymann has recently published an article on "The Transfer of the So-called Normal Antibodies from Mother to Offspring" (agglutinins). This work does not have a direct bearing upon our problems, as another species of animal and still another type of antibodies were involved. Indirectly it is worth considering, as will be brought out later. We are therefore quoting the summary, as follows:

"1. By examining the transmission of the agglutinins normally occurring in the blood from the mother to the offspring in goats, I have only in one case of fourteen been able to prove their recurrence; in all others the kids were born without agglutinins and probably derived it from the mother animal through the milk, in which it is to be found accumulated at parturition. From the milk as from the kid's serum it disappears in the course of a few days; then follows a period of a few months in which the blood of the kid is free of agglutinins, and then it appears again, probably in consequence of an immunization from the flora of the digestive tract. The research was concerned with coli and typhoid agglutinins as well as agglutinins against rabbit and horse corpuscles.

"2. In the blood of the kid there was in some cases more, in others less of the normal antibodies than in the blood of the mother

animals, and only in one case the blood of the kid contained more than the colostrum, so that it is not possible to deduct any quantitative rule from these experiments.

"3. In the colostrum the titre was higher than in the serum of the mother animal.

"4. By nursing experiments it was shown in one case that the agglutinin is probably transmitted to the kid through the mother's milk. In another case the result was questionable.

"5. The agglutinin maximum in the blood of the kid may occur as early as eleven hours after birth."

Minkler finds: "The claim that suckling pigs from immune sows carry such immunity during their nursing period was not verified, for losses were recorded among suckling pigs nursing immune sows, although the sows themselves were perfectly healthy."

McArthur reports the following experiment:

Pregnant sows which had not been exposed to the disease were given the Dorset-Niles serum with virus and kept in sheds with concrete floors until after the litters were weaned. In a few instances the serum only was used. The litters were exposed in different ways to hog cholera to test their immunity.

The results of the experiments would indicate that sows actively immunized against hog cholera transmit their immunity to their young. A large percentage of the pigs remained immune as long as they were suckling and the sows were immune. When the sow contracted the disease the young pigs did not usually survive more than a few days. There was considerable variation in different pigs of the same litter. As the immunity was found to last only a few weeks after weaning, the author considers it advisable to vaccinate pigs just before or shortly after weaning. Second litters were found as highly immune as first litters in all cases and in some cases even more highly immune. The above data were secured from 31 litters covering a total of 179 pigs, of which 39 succumbed during the course of the experiments. Of these only 15 showed cholera lesions, giving an immunity of 91.7 per cent of the pigs under observation.

Birch reports a case in which a sow was immunized as a young shoat. Later she was hyperimmunized and bled for serum four times. Soon after the last bleeding she was found to be pregnant, so she was not rehypered. In due time she farrowed 4 pigs, one of which was killed the following night. The sow and remaining pigs were placed in an infected house. One died at the age of 27 days. Postmortem examination failed to reveal cholera. The other two died on the thirty-first and thirty-seventh days, respectively. One

showed a few petechiæ and the other presented extensive lesions of hog cholera.

Birch in another article seems to believe that the difference between young pigs that receive permanent immunity by the simultaneous treatment and those that do not is the absence of natal immunity on the one hand and its presence on the other. He sharply differentiates between passive immunity produced by serum and natal immunity. He also seems to believe that the resistance of the baby pigs is almost or entirely due to natal immunity rather than to antibodies obtained through the mother's milk.

TECHNIC

Animals used in our experiment were not carefully selected, but were taken on from time to time as they became available after the completion of other projects (mostly feeding). None of the sows had even been used in hog-cholera work. They were mostly purebred hogs, although a few grades were included. As to breeding, they consisted of Yorkshires, Tamworths, Duroc-Jerseys, Berkshires and Hampshires. Some were bred straight and others were crossed in more or less of a hit-and-miss manner. Their ages varied from the first breeding to old animals. With one exception they were all immunized by ourselves in the usual manner, the ordinary doses of serum and virus being employed. This exception, sow No. 522, was an animal which came to us with a history of having received the double treatment. As will be noted later, subsequent events have caused us to question the accuracy of this statement.

The sows and pigs were kept in pens or yards large enough to allow them a reasonable amount of exercise. The premises were more or less infected, as they had previously contained hogs suffering from cholera, and no effort was made to clean and disinfect them. A strict self-imposed quarantine was maintained throughout the course of the experiment, which covered a period of approximately two years.

The pigs were tested for immunity at ages varying from 2 to 78 days. This was done by injecting them intramuscularly in the region of the ham with 1 c.c. each of hog-cholera virus. After this treatment the pigs were kept under as close observation as was practicable. The feed for the mothers and for the pigs after they were weaned consisted of different rations selected with the idea of conforming as closely as possible to that used by the average farmer. One exception, however, was made to the practice of many

swine raisers. This was that the mothers and pigs were not allowed to have corn. No medical or other treatment outside of reasonable care, plenty of water and regular feeding was given either the mothers or pigs during the 30 days during which they were kept under observation. All animals that died were "posted" at the earliest available opportunity and the postmortem findings were preserved.

For purposes of execution the experiment was divided into two parts. The first deals with the suckling pigs and the second with those that had been weaned before they were exposed to the virus. In part 1, 13 litters containing 108 pigs were used. They were exposed to the virus at ages varying from 2 to 55 days, this being about as long as a sow is usually allowed to suckle her pigs. In each litter from 1 to 3 pigs were given both the serum and virus for the purpose of checking the potency of the serum and also to protect the udder in case all the pigs receiving virus should die. This left 85 pigs to receive virus and 23 the double treatment.

While this work was being carried out the question arose as to the degree of immunity retained by the suckling pigs which had received virus. It was deemed advisable to obtain some information on this subject. The pigs of sow No. 10 were therefore selected as an average litter. At the expiration of the 30 days after these animals had received the virus they were weaned and removed from the sow. The 8 pigs and 2 double-treated checks were then given a second dose of 1 c.c. each of virus. The 2 checks and 6 of these pigs showed no signs of cholera from the second exposure. The other 2 pigs receiving the virus took sick and died of cholera. Table 1 presents in detail the data for the suckling pigs.

In the second part of the experiment, where all the pigs were weaned before they received the virus, 6 litters consisting of 48 animals were used. Their ages at the time of receiving the virus varied from 48 to 78 days. In the cases of litters from sows Nos. 2 and 3 the pigs were removed from the mothers and exposed to virus before weaning was completely over. Check pigs were allowed to suckle the sows for the protection of their udders. In the other litters the pigs were completely weaned with the exception of the litter from sow No. 8. In this case the pigs were believed to be completely weaned and were accordingly given the virus after they had been separated from the mother for 24 hours. At the expiration of 48 hours the sow's udder appeared to be full and somewhat painful. The pigs were therefore allowed to suckle once on this day

and once again on the following day. These were the only cases in which the pigs came in contact with the mothers after they had been exposed to the infection. All pigs received the virus in litter groups in from 24 to 72 hours after they had been weaned from the mothers. The details in regard to the weaned pigs are given in Table 2.

DISCUSSION

The results obtained in the case of sow No. 522, Table 1, are probably explained by the assumption that this animal never actually received the double treatment. In case the treatment was administered, it certainly did not hold. This sow came down with the disease in 6 days and the pigs in 4 to 5 days after the mother. The sow and pigs all died of cholera with the exception of the double-treated check. This animal remained healthy throughout the entire period of observation.

The case of sow No. 10 is also especially interesting. The data are not of very much value, as they are based on only one litter. They would tend to indicate, however, that the immunity of the suckling pigs was somewhat increased by the dose of virus, as 6 survived and 2 succumbed to cholera. The checks, double treated at the first exposure to virus, also remained well.

After a careful analysis of the data in Table 1, and especially if we are permitted to ignore the results obtained from the litter of sow No. 522, we find that not only all of the checks but all of the pigs receiving the virus alone showed no visible signs of cholera. We do not believe the sows with which we worked possessed any more immunity than the average double-treated animals, but undoubtedly if a larger number of animals had been used a small percentage of breaks would have occurred. The fact that these animals were kept on more or less infected premises may have aided in increasing their immunity to some extent. This increase, if it occurred, could not have been very material, however, as it failed to protect the weaned pigs noted in Table 2. It is also true that the weaned pigs had almost or entirely lost their natal immunity or that obtained through the mother's milk.

In the suckling pigs it was impossible to distinguish any difference in the degree of immunity possessed by the different litters or by individuals of the same litter, as, with the exception of pigs of sow No. 522, none of them contracted the disease.

In Table 2, giving the data of the weaned pigs, sow No. 8 seems

TABLE 1.—SUCKLING PIGS

NUMBER PIGS IN LITTER	SOW NO.	BREEDING	AGE AT EXPOSURE	NUMBER ON EXPERIMENT	QUANTITY OF VIRUS	CHECKS DOUBLE TREATED	NUMBER ON EXPERIMENT CHARGED	CHECKS DISCHARGED	TIME UNDER OBSERVATION (DAYS)	DIED OF CHOLERA	CHRONIC AND RECOVERED CASES
11	5	Yorkshire to Tamworth boar.	2 days	9	1 c.c.	2	9	2	30	0	0
8	11	Duroc to Duroc boar.	9 days	6	1 c.c.	2	6	2	30	0	0
10	2	Yorkshire to Tamworth boar	15 days	8	1 c.c.	2	8	2	30	0	0
0	238	Duroc to Duroc boar.	16 days	5	1 c.c.	1	5	1	30	0	0
4	6	do.	26 days	3	1 c.c.	1	3	1	30	0	0
8	4	do.	28 days	6	1 c.c.	2	6	2	30	0	0
8	16	do.	28 days	6	1 c.c.	2	6	2	30	0	0
9	1	do.	30 days	7	1 c.c.	2	7	2	30	0	0
10	500	Berkshire to Duroc boar.	31 days	7	1 c.c.	3	7	3	30	0	0
10	8	Hampshire to Yorkshire boar	36 days	8	1 c.c.	2	8	2	30	0	0
7	7	Hampshire to Duroc boar.	40 days	6	1 c.c.	1	6	1	30	0	0
6	522	Tamworth to Duroc boar.	40 days	5	1 c.c.	1	0	1	30	5	0
11	14	Yorkshire to Tamworth boar	55 days	9	1 c.c.	2	9	2	30	0	0
108	13			85		23	59	23		5	0

TABLE 2.—WEANED PIGS

6	8	Yorkshire to Yorkshire boar.	48 days	6	1 c.c.	0	0	0	30	5	1
9	2	do.	55 days	8	1 c.c.	1	0	1	30	8	0
12	3	Yorkshire to Duroc boar.	58 days	10	1 c.c.	2	0	2	30	10	0
8	141	Duroc to Yorkshire boar	69 days	8	1 c.c.	0	0	0	30	6	2
7	173	Duroc to Duroc boar.	73 days	7	1 c.c.	0	0	0	30	7	0
6	468	do.	78 days	6	1 c.c.	0	0	0	30	5	1
48	6			45		3		3		41	4

to be the only one which demands special attention. In her case the pigs were allowed to suckle for a short time on two days after they had received the virus. These pigs were slower in breaking than those of the other litters. They also lived a little longer than the average, and all but one finally died. The exception contracted cholera with the rest, but recovered from a more or less typical chronic form of the disease.

The general results in this part of the experiment are materially different from those recorded in Table 1. Here the checks were the only animals which did not contract the disease. Out of 45 pigs 36 died and 5 cases were discharged after 30 days, partial or practically complete recoveries having been observed. Here again, as in Table 1, it is to be expected that if a larger number of animals had been used our results would not have been so uniform. A few exceptions would undoubtedly have been noted.

The only factors denoting a difference in the amount of the immunity possessed by different litters and individuals of the same litter were a slight variation in the duration of the period of incubation, the difference in the number of days the pigs were sick before they died, and the severity of the disease. All of these conditions were undoubtedly greatly influenced by other factors, such as the physical condition of the animals at the time of exposure, the virulence and rapidity of the absorption of the virus, etc. With the exception of the pigs from sow No. 8, there were only 3 cases which survived out of the 6 litters. Generally, the pigs began showing symptoms from the fifth to the twelfth day, and 6 days after the sickness was noted they were usually dead. Of those that died, we only had pigs from the litter of sow No. 8 to live more than 20 days after they had received the virus. The difference in immunity of different litters or individuals was therefore not very great.

In comparing our results with those of other workers we seem to note at first glance a great variation of findings. After a more careful study, however, with one or two exceptions, they all appear to lead in the same general direction.

According to Reymann, in the goat the antibodies with which he dealt seemed to be transferred largely through the colostrum of the mother's milk instead of being obtained from the mother at birth. Birch, in dealing with hogs and the cholera antibodies, is inclined toward the other stand. Our data on this point, unfortunately, do not start until the pigs were 48 hours old, and again, according to Reymann, an animal may reach its highest immunity as early as the

eleventh hour after birth. Neither have we positive evidence to show that the immunity increased or decreased toward weaning time. The fact, however, that our pigs seemed to withstand the exposure to the infection equally well at different ages until weaning was in progress would tend to indicate that the mother's milk played some part in the continuation of the immunity. The fact that the division between the immunity and the susceptibility at weaning time was so sharply marked would also tend to bear out the previous statement.

Minkler's findings appear to be absolutely at variance with ours. We failed to obtain his article, but in the abstract available the number or percentage of young pigs which broke with the disease was not given. If this percentage was very low his findings may still have been along the general trend. The results obtained by McArthur coincide with ours in nearly every particular.

The case of the hyperimmune sow reported by Birch from which the young pigs died of cholera is very interesting. We would undoubtedly have observed similar cases if a larger number of animals had been used. We are inclined to believe from our data, however, that these cases are the exception rather than the rule.

CONCLUSIONS

The results from the data obtained would seem to warrant the following deductions:

1. Many baby pigs born of and suckling immune mothers from ages of 2 to 55 days withstand exposure to 1 c.c. of hog-cholera virus.
2. In case the mother contracts the disease all but the double-treated pigs soon take sick and usually die from hog cholera.
3. Most pigs weaned at ages of from 48 to 78 days which have been born of immune mothers usually contract hog cholera after exposure to 1 c.c. of the virus when not previously immunized.
4. The milk of immune mothers would appear to have some influence in maintaining the immunity of suckling pigs.
5. In case of grave danger or known exposure of weaned pigs to hog cholera, some method of immunization should be employed immediately.

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PROTOZOAN FORMS AND THEIR RELATION TO DIARRHEA AND COLITIS IN SHOATS¹

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THE presence of microscopic forms of protozoan life in the digestive tract of pigs has been known for many years. The literature shows that the forms found have been studied only in isolated instances, although their identification and classification are apparently quite dependable. While the different genera and species encountered have been mentioned as a possible cause of disease, no special significance has ever been attached to their presence.

During the last year requests have come to the Kentucky Agricultural Experiment Station for information concerning a disease of shoats which is apparently the same as the condition commonly classified as intestinal necrobacillosis, infectious necrotic enteritis, infectious colitis, infectious diarrhea, etc. In studying the cases which have come under our observation during the last six months a careful examination of the bowel content has been made, and the findings have been such as to indicate that it is quite possible that certain forms of protozoan life found in the intestines of swine may be important factors in initiating disease. In all, microscopic examinations of the intestinal contents have been made in 75 pigs.

The organisms encountered have been classified as *Balantidium coli suis* and *Trichomonas suis*. In some of the earlier pigs examined a large motile animal organism was found and identified as an Amœba. Considering this Amœba non-pathogenic, no record of its occurrence was kept. Further, an organism found in the small intestines of several pigs from a single herd and at first thought to be a protozoan is now believed to be a yeast. In smear preparations from the intestinal contents the organism was found in large numbers. It appears as a small round and oval body, considerably smaller than fully mature coccidia, although in some respects resembling them. It stains readily and has a definite cell membrane and a varying granular cell content. Stained preparations from the bowel contents show budding forms quite distinctly.

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In all of the pigs that died, death took place suddenly. The most striking gross pathological evidence of disease was an enormously enlarged liver. The liver was four or five times its normal size, of a brownish mottled appearance and exceedingly friable in consistency. From gross incision almost no blood escaped. Microscopic sections revealed an advanced granular form of cell degeneration, the cytoplasm of many cells being completely lost. Intra-lobular hemorrhages were found throughout the liver. None of the organisms found in the intestines have thus far, with certainty, been observed in sections of the liver.

As there was considerable clinical evidence suggesting virus infection, vaccination was recommended, following which losses ceased. Further study of the organism and tissue sections will be made at the earliest opportunity. No attempt was made to cultivate this organism when first discovered, and as it has been found only in the one outbreak, our observations have been made from fixed and stained preparations, except for the preparations that were examined at the time the fresh material was available for study.

As is well known to the veterinary profession and those who have attempted to investigate diseases of swine, the condition designated as intestinal necrobacillosis is exceedingly troublesome. Recognition of the disease in various parts of the country well indicates its increase and spread. It has become established on many breeding farms and in the feed lots of others to the extent of making it impossible to carry pigs through the shoat stage without losses that are economically disastrous to the breeder or feeder. The disease occurs in its most serious and destructive form in pigs from 5 to 6 weeks of age up to 4 and 5 months. Sucking pigs under 5 or 6 weeks seldom contract the infection. Heavy shoats are apparently equally resistant except under very favorable conditions.

The disease is clinically characterized by diarrhea and loss of flesh to the point of emaciation. Pathologically, the most constant lesion is an inflammation of the cecum and colon that, in the later stages, becomes of a typical diphtheritic type, extending over the whole mucosa. Death takes place only after several weeks, except in case of the development of a mixed septicemia.

A summary of the examinations of the intestinal contents indicates that *Trichomonas suis* is found consistently in cases of colitis that show typical symptoms and lesions of intestinal necrobacillosis. *Trichomonas suis* has been found in the feces of a few pigs that did not show marked clinical evidence of the disease; however, many of

these pigs were unthrifty, and all of them came from the open market. A few pigs showing emaciation, examined clinically, did not harbor *Trichomonas suis*, but neither did we find any evidence of colitis. This would seem to indicate that the emaciation, in those cases, was due to other causes; that is, the disease was not so-called intestinal necrobacillosis.

The accompanying table gives the results of the examinations of pigs studied up to this time.

TABLE SHOWING NUMBER AND CONDITION OF PIGS EXAMINED

No.	DISEASE		ORGANISMS FOUND			AGE	CONDITION
	SYMPTOMS	LESIONS	BALANTIDIUM COLI	TRICHOMONAS SUIS			
				NON-MOTILE	MOTILE		
371	Diarrhea	Colitis	—	—	+++	6 weeks	Emaciated
385	Cholera	Cholera	+++	—	—	3 months	Good
384	Cholera	Cholera	++	—	—	3 months	Good
386	Hemorrhagic septi-cemia	Hemorrhagic septicemia	+	—	—	10 weeks	Good
387	Diarrhea	Colitis, cholera	+	++	—	2 months	Emaciated
388	Diarrhea	Cholera, colitis	++	++	—	8 weeks	Emaciated
389	Diarrhea	Cholera, colitis	—	++	—	8 weeks	Emaciated
390	Diarrhea	Cholera, colitis	—	++	—	8 weeks	Emaciated
394	Diarrhea	Colitis	—	+++	++	7 weeks	Emaciated
395	Diarrhea	Colitis	+	++	++	7 weeks	Emaciated
396	Diarrhea	Colitis	+	++	++	7 weeks	Emaciated
397	Cholera	Cholera, hemorrhagic septicemia	+	—	—	3 months	Good
398	Cholera	Cholera	+	—	—	10 weeks	Good
400	.....	Septicemia	—	—	—	2 months	Unthrifty
401	Diarrhea	Colitis, hemorrhagic septicemia	—	++	—	2 months	Emaciated
402	Diarrhea	Colitis	—	++	+	9 weeks	Emaciated
403	Diarrhea	Colitis	—	++	+	9 weeks	Emaciated
405	Diarrhea	Cholera, colitis	—	++	—	7 weeks	Emaciated
404	Hemorrhagic septi-cemia	Cholera, hemorrhagic septicemia	+	—	—	3 months	Good
406	Diarrhea	Colitis	—	++	—	2 months	Emaciated
407	Diarrhea	Colitis	—	++	+	2 months	Emaciated
416	Diarrhea	Colitis	—	++	++	7 weeks	Emaciated
417	Diarrhea	Colitis	—	++	+	7 weeks	Emaciated
418	Diarrhea	Colitis	+++	+++	+	7 weeks	Emaciated
420	.....	Pneumonia	—	—	—	15 weeks	Good
421	Septi-cemia	Septicemia	—	—	—	12 weeks	Good
423	Diarrhea	Recovered	—	+	—	2 months	Unthrifty
425	Diarrhea	Colitis	—	+	—	2 months	Emaciated
426	Diarrhea	Colitis	+++	+++	+++	9 weeks	Emaciated
427	Diarrhea	Colitis	++	++	++	9 weeks	Emaciated
428	Diarrhea	Colitis	+++	++	++	9 weeks	Emaciated
429	Cholera	Cholera	—	—	—	3 months	Good
432	Diarrhea	Colitis	++	++	—	9 weeks	Unthrifty
439	Diarrhea	Colitis	++	++	++	2 months	Emaciated
440	Diarrhea	Colitis	++	++	—	3 months	Emaciated
444	Diarrhea	Colitis	—	++	++	3 months	Emaciated
445	Diarrhea	Colitis	—	+++	—	3 months	Emaciated
448	Virus pig	Cholera	—	—	—	14 weeks	Good
449	Virus pig	Cholera	—	—	—	14 weeks	Good
450	Virus pig	Cholera	—	—	—	14 weeks	Good

No.	DISEASE		ORGANISMS FOUND			AGE	CONDITION
	SYMPTOMS	LESIONS	BALAN- TIDIUM COLI	TRICHOMONAS SUI			
				NON- MOTILE	MOTILE		
451	Diarrhea	Colitis	+	+	-	4 months	Emaciated
453	Diarrhea	Feces only examined	-	++	-	10 weeks	Emaciated
458	Diarrhea	Colitis	++	++	++	3 months	Emaciated
459	?	?	-	++?	-	3 months	Emaciated
460	Brine poison	Gastritis	-	-	-	10 weeks	Good
461	Brine poison	Gastritis	-	-	-	10 weeks	Good
465	Pneumo- nia	Pneumonia and colitis	-	+	-	4 months	Unthrifty
468	Diarrhea	Colitis	-	+	-	3 months	Unthrifty
493	Septice- mia	Colitis, sep- ticemia	-	+	-	12 weeks	Unthrifty
494	?	On test	-	+	-	3 months	Unthrifty
495	?	On test	-	+	-	3 months	Unthrifty
496	?	On test	-	++	-	3 months	Unthrifty
497	Healthy	On test	-	-	-	3 months	Good
498	Healthy	On test	-	-	-	3 months	Good
499	Healthy	On test	-	-	-	3 months	Good
500	Healthy	On test	-	-	-	3 months	Good
501	Healthy	On test	-	-	-	3 months	Good
502	Healthy	On test	-	-	-	3 months	Good
503	Healthy	On test	-	-	-	3 months	Good
471	?	Gastritis	-	-	-	10 weeks	Good
474	Virus pig	Cholera	+	+++	-	3 months	Good
475	Virus pig	Cholera	+	+	-	3 months	Good
476	Virus pig	Cholera	+	+	-	3 months	Good
477	Virus pig	Cholera	+	+	-	3 months	Good
478	Virus pig	Cholera	+	++	-	3 months	Good
479	Virus pig	Cholera	+	++	-	3 months	Good
463	Dead	Gastritis	-	-	-	3 months	Emaciated
483	Cholera	Cholera, pneumonia	-	+	-	4 months	Good
486	Cholera	Cholera	-	+	-	4 months	Good
487	Menin- gitis	Enteritis, meningitis	-	+	++	3 months	Good
490	Cholera	Cholera, septicemia	-	+	-	4 months	Fair
491	Diarrhea	Colitis, pneu- monia	-	+++	-	4 months	Emaciated
492	Diarrhea	Colitis	-	++++	-	4 months	Emaciated (runt)
506	Dead	Cholera	+	-	-	5 months	Good
507	Dead	Colitis, pneu- monia	-	+++	-	5 months	Good

EXPLANATION AND SUMMARY OF TABLE

The plus and minus signs as used in the table indicate the presence or absence of the different organisms and their relative numbers.

Pigs Nos. 385, 384, 397, 398, 429, 448, 449, 450, 474, 475, 476, 477, 478 and 479 were apparently healthy. They had been injected with virus and were killed at the height of the reaction (hog cholera).

No. 506, acute hog cholera, field infection.

Nos. 386 and 404 died of hemorrhagic septicemia.

No. 420, pneumonia.

No. 421 was an apparently healthy pig that sickened and died suddenly.

No. 423 recovered.

No. 459, cause of death unknown. Organism found few in number, identification questionable.

Nos. 460, 461 and 471 were all from the same herd. All died suddenly. Nos. 460 and 461 were first diagnosed as brine poisoning. No. 471 died some days later, diagnosis botulism (?).

Nos. 493, 494, 495 and 496 were from the same litter and were purchased for experimental purposes. No. 493 died 48 hours following the injection of anti-hog-cholera serum and virus and castration.

No. 463 clinically showed marked emaciation; did not show colitis; was the only pig examined from a herd of 66, several of which were showing emaciation; all improved following a change of feed.

The remaining numbers in the list, 47 in all, were all clinically typical cases of so-called intestinal necrobacillosis. All but 2 died or were killed and showed extensive colitis, and all harbored *Trichomonas suis*.

A review of the table shows *Balantidium coli* to have been present in 26 out of 75 animals examined; 19 of these showed colitis and 7 did not.

Trichomonas suis, motile and non-motile forms, is found to have been present in 50 out of a total of 75 pigs examined. Thirty-five of the 50 were typical cases of infectious colitis, 5 were unthrifty, and 10 were in good flesh, showing no clinical evidence of the disease. However, they were purchased on the open market (stockyards, Lexington, Ky.).

Trichomonas suis has been found in the contents of the cecum and colon of all pigs suffering with infectious colitis (intestinal necrobacillosis) that we have examined up to this time. It may be found in apparently healthy pigs from infected herds and in pigs purchased on the open market. Further observations are necessary to confirm our findings as to the occurrence of this organism in infected and healthy shoats. The chronic nature of infectious colitis, and the fact that the mortality in infected herds varies from 25 to 75 per cent, depending on the conditions, would seem to show that many apparently healthy pigs harbor the organism.

The nature of the lesions and the frequency of a terminal non-specific septicemia would seem to indicate that various micro-

organisms which have been in varying degree incriminated as the cause of this disease no doubt become very important factors as secondary invaders.

We feel from the evidence available—and by this we mean to include all phases of the disease—that there is quite as much to show that *Trichomonas suis* is the primary cause of this disease (infectious colitis) as there is for any of the different bacteria that have been worked with up to this time. If further study confirms our opinion that *Trichomonas suis* is the initiating cause in intestinal necrobacillosis, infectious colitis, etc., then the name trichomoniasis would be the correct one for the disease.

CULTIVATION OF TRICHOMONAS SUIS

Pig 474.—On July 20, 1920, about 5 drops of the fluid contents of the colon which contained a large number of the non-motile form of *Trichomonas suis* were placed in each of two test tubes containing 10 c.c. water and two containing 10 c.c. normal salt solution. One of each was incubated at 37° C., the other at room temperature. On August 4, 1920, the tubes were examined. Both tubes containing water showed numerous motile forms of *Trichomonas suis*. The two tubes of salt solution failed to show either motile or non-motile bodies.

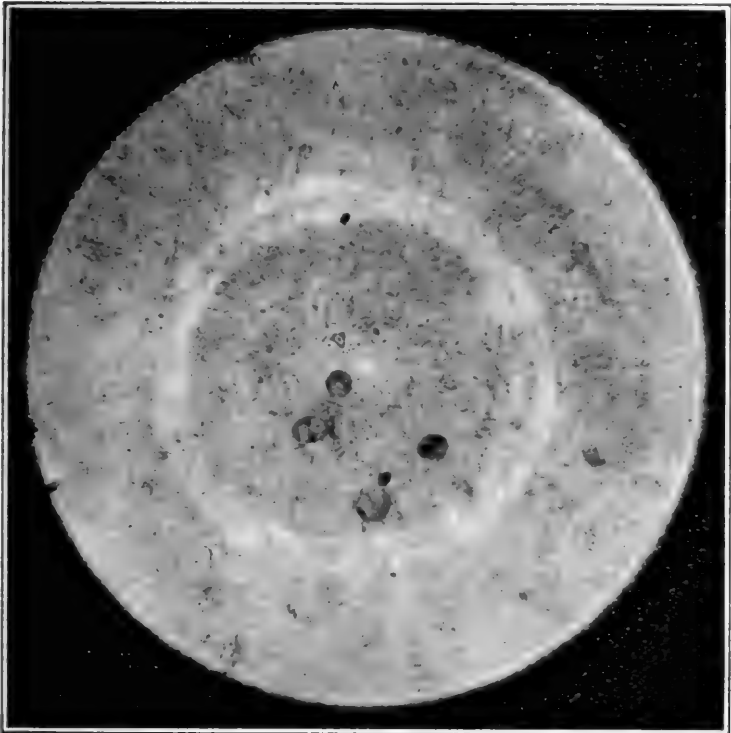
From the water tubes the following transfers were made: Two each of water 9 and pork bouillon 1; two each of water 8 and pork bouillon 2; two each of water 7 and pork bouillon 3; two each of water 5 and pork bouillon 5; two of pure pork bouillon; three of sterile water. One set of each was incubated at 37° C. and the other at room temperature.

On August 10 the tubes which had been incubated at 37° C. were examined. Those containing pork broth did not show any development of *Trichomonas*. Water tubes showed actively motile, sluggishly motile, and non-motile forms. On August 14 the tubes kept at room temperature were examined. Those containing pork broth did not show any development of *Trichomonas*. The water tubes showed many actively motile, some sluggishly motile, and a few non-motile forms.

On August 14 transfers were made from water tubes to water tubes.

On August 16 motile forms only were found.

In the tubes containing pork broth bacterial development was extreme, which may have interfered with the development of *Trichomonas*. In the water tubes bacteria were far less evident.



Microphotograph of *Trichomonas suis*



A Case of Infectious Colitis. Pig six months old two days before death. *Trichomonas suis* present in large numbers.

Pig 487.—August 11, 1920, 5 drops of the fluid contents of the colon which contained many actively motile and a few non-motile forms were placed in water tubes (10 c.c.) and incubated at 37° C. On August 14 the tubes showed numerous motile forms. On August 16 the tubes showed many small motile forms.

Pig 489.—August 11, 1920, 5 drops of the fluid contents of the colon which contained many non-motile forms of *Trichomonas suis* were placed in water tubes and incubated at 37° C. On August 14 the tubes showed many actively motile forms. Agar plates from the water tubes were made. Bacterial colonies were numerous but no *Trichomonas* could be found.

Organisms found in tube of No. 474, incubated at 37° C. for 4 days, were all smaller than those found in the infected pigs. On the tenth day there was apparently little if any increase in size. However, the water tubes of No. 474 left at room temperature, on the fourteenth day after inoculation, showed both motile and non-motile forms to be approximately the same size as those found in infected pigs.

On August 16 the original of No. 489, incubated at 37° C., showed many motile forms, and transfers made on August 14 showed a few motile forms.

Dr. H. Garman, of the Kentucky Experiment Station, to whom some of the material was submitted for examination, reports as follows:

“The flagellate protozoan found in the intestines of pigs under observation at the Veterinary Department of the Kentucky Experiment Station has been examined microscopically with some care in material taken from different animals and submitted by you at different times during the past month. The organism is undoubtedly *Trichomonas*, and is very similar to the *T. vaginalis* of authors, but may prove to be *T. suis*, to which I have seen a reference. The available descriptions of species of the genus are not sufficient for discrimination of the two species. The group needs overhauling by some one who will critically study and compare the flagellates from different animals, before satisfactory specific determinations will be practicable.

“The motile protozoan was found in some numbers in material from several of the pigs that had died, being especially common in your No. 437. In the single animals (No. 474) killed for examination, the motile form was not observed.

“Spherical, non-motile organisms having an appearance of being of the same nature as those described and figured by Dr. Philip B. Hadley (Rhode Island Station Bulletin No. 166, 1916) from the intestines of turkeys affected with ‘blackhead’ have proved common in all of the material submitted.

"The only other organisms especially noticeable in the material were: (1) Amœba; (2) the large ciliate protozoan, *Balantidium coli*; (3) the singular oval eggs with terminal plugs, of a worm, *Trichuris (Trichocephalus) crenatus*; and, of course (4) great numbers of bacteria of several different species."

Infectious necrotic enteritis in shoats has been for so long associated in its occurrence with cholera and hemorrhagic septicemia that it has, at times, seemed almost impossible, clinically and pathologically, to separate definitely these diseases. The fact that all three diseases may exist in a herd of pigs at the same time has been one of the great drawbacks to our understanding the true nature of this condition. That they are definite and specific entities there can be no longer any doubt, and when studied in their true and uncomplicated forms it is found that there are in the history, clinical symptoms and lesions special and distinct features characteristic of each that can be used with reliance in differentiation. Infectious necrotic enteritis has occurred in shoats known to be immune to hog cholera, that have been vaccinated against hemorrhagic septicemia, and also that have been given so-called mixed-infection vaccine for swine. In case of death, bacteriological tests and animal inoculations have shown that neither cholera nor hemorrhagic septicemia was present. Further, the disease is frequently found among shoats on farms where cholera has not occurred for years nor has vaccination been practiced.

The nature of the disease warrants our looking upon it as a specific condition, capable of occurring independently of other diseases. Infection apparently does not come from contact, but all animals contracting the disease do so from a common source. Pen infection is common and rather constant. However, where a large number are kept together the percentage loss is much higher than when only 10 to 15 are kept in a pen. Losses from the disease usually vary from 25 to 50 per cent of the herd; a higher mortality may now and then result. While the infection apparently exists in dry lots as well as in the presence of moisture, it is quite evident that on wet, muddy grounds the infection spreads more rapidly, the disease is more severe, and the losses considerably higher. Under this condition, and especially in shoats that have just gone through hardships and exposure of shipping, the mortality is not only high but death takes place earlier in the course of the disease, the animal upon postmortem showing evidence, both pathological and bacteriological, of septicemia. In the dry lot the pigs linger and a terminal septicemia is not so often observed.

Bacteria that have been found in association with the inflammatory lesions of the intestines would seem to stand specifically in direct relation as a causal agent of the disease. However, while their presence is more or less constant, a typical form of the disease has never been produced from feeding pure cultures of the various organisms isolated. Vaccination for the prevention of this disease has been extensively carried out under field conditions, both experimentally and commercially, and some benefit may be claimed; but when the animals so vaccinated are subjected to exposure in infected pens the disease will usually occur. Dr. R. A. Craig, of Purdue University, has demonstrated in his experimental work that pigs recovering from an attack of enteritis produced from the feeding of pure cultures of different species of microorganisms isolated from the intestines of swine have later, from pen exposure, contracted a fatal form of intestinal trouble which, upon postmortem examination, was found to be typical of what we understand as infectious necrotic enteritis.

Many animals in the herd may not show any appreciable evidence of sickness, but a careful study will show that practically all have stopped growing, and it sometimes requires weeks for them to get back to a full growing state of health. Therefore the animals that sicken from the condition and the losses that follow vary considerably in different outbreaks, depending upon the conditions and way in which the herd is handled and treated.

A review of a few herds in which it has been possible to study first hand every detail of an outbreak may be of interest and value.

Herd No. 1.—Investigated during August, 1913. Sixty-nine spring shoats in a dry lot, in one end of which there had been during the spring considerable water. Shoats receiving oats and corn. Approximately 50 per cent of the animals became extremely emaciated, dying only after several weeks' sickness. The owner of these pigs had been on this farm for nine or ten years, during which time there had never been any cholera, nor had he ever vaccinated against cholera. The pigs were raised on the farm.

On postmortem all pigs showed an extensive inflammation of the cecum and colon. The liver and spleen were in a state of atrophy. Kidneys showed a mild chronic interstitial nephritis with now and then a small hemorrhage. Microscopic sections of the liver and kidneys revealed a very granular condition of the protoplasm of the cells. No other gross evidence of disease in the internal organs was to be found. The loss in this herd was 50 per cent. Other pigs apparently remained well or recovered without treatment. Most of the pigs that were sick were killed. Culture tubes inoculated

from the blood and internal organs of pigs killed in an advanced stage of the disease failed to show bacterial growth.

Herd No. 2.—Investigated during July and August, 1919, and during June and July, 1920. Losses have occurred on this farm from this condition for the past ten years. During this time virus infection has been present and the simultaneous method of vaccination has been carried out every year. It has been a problem to determine where the virus infection ceases to be a factor as the cause of death. It has become a custom on this farm to vaccinate the young pigs twice by the simultaneous method, due to the uncertainty of the presence of virus and the sickness that occurs after weaning. A pig from this herd, which was vaccinated at 4 weeks of age, was found to be sick at about 10 weeks of age. Symptoms were depression, temperature 105, diarrhea. The animal was bled, the blood was filtered, and 2 pigs were injected with 10 c.c. each of filtered blood. They remained well for four weeks; were given the simultaneous treatment for cholera and disposed of. The pigs from which the blood was taken showed extensive lesions of infectious colitis with rather typical lesions of cholera, but limited in extent.

On March 30, 1920, 112 pigs, ranging from 3 to 5 weeks of age, were vaccinated against cholera by the simultaneous method. About May 15, 1920, all of these pigs had been weaned and were placed in a fresh pasture of 10 acres with a small feed and sleeping quarters separate. The sleeping quarters were in a large barn with a floor space of about 40 by 60 feet.

I was called to see this herd of pigs on May 16 and found about 50 per cent of them showing symptoms of sickness. Many of them were carrying a temperature of 105. Ten or 15 per cent were already showing marked evidence of loss of flesh and diarrhea. A number of the pigs died and were autopsied, showing extensive lesions of colitis and rather suspicious lesions of cholera. All the pigs were given the simultaneous treatment regardless of their condition. In all about 50 per cent died, showing extensive lesions of so-called intestinal necrobacillosis. Microscopic examination of the contents from the cecum and colon showed numerous *Balantidium coli* and *Trichomonas suis*.

Herd No. 3.—Examined in June, 1920. Herd consisted of 40 shoats averaging 50 to 60 pounds, 6 pigs about 8 weeks of age still nursing, 3 or 4 old sows and a boar. The suckling pigs and a few shoats were the first to show sickness characterized by diarrhea and emaciation. Postmortem showed extensive lesions of infectious enteritis; almost no lesions of cholera. The intestinal contents from pigs in this herd showed the presence of *Trichomonas suis*. There were so sudden deaths; in fact, the pigs were killed after having been sick for three or four weeks.

Herd No. 4.—I was called to inspect this herd late in June, 1920. The herd consisted of 75 shoats weighing from 60 to 80 pounds, a few small shoats just weaned, and 8 to 10 old sows. The small

shoots were taken sick one at a time, showing marked symptoms of diarrhea, and became more or less rapidly emaciated, dying after several weeks of sickness. The lesions were typical of infectious enteritis with now and then some lesions suspicious of cholera. In the intestinal contents from the cecum and colon were found numerous *Trichomonas suis*.

Herd No. 5.—Composed of approximately 50 pigs, 30 of which were some weeks older than the remaining 20. The oldest pigs were farrowed in March. They were kept on a cement floor in small pens until about May 1. In May they were allowed to run out on wet grounds. Were vaccinated at 3 or 4 weeks of age by the simultaneous method and revaccinated by the same method 6 weeks later. About 50 per cent of the 30 were lost and showed upon postmortem extensive and characteristic lesions of infectious enteritis. Numerous motile and non-motile forms of *Trichomonas suis* were found in all of these pigs. The 20 pigs in this herd which were farrowed about the first of May were kept on a cement floor until July 15. They were vaccinated twice by the simultaneous method. Only one pig (463) contracted colitis and died July 24, 1920. *Trichomonas suis* were numerous in intestinal contents. On August 18 about one-half were beginning to show clinical evidence of the disease. It should be stated that in Herd 5 about 50 per cent of the pigs farrowed during the last ten years, including both the spring and fall farrowings, have been lost from this disease.

Herds 2 and 5 have always been handled as cholera-infected herds, and it has never been considered possible to carry pigs through by one vaccination; that is, if they waited until the pigs were weaned before vaccinating them, they would die of cholera and enteritis at from 4 to 7 weeks of age. If they were treated by the simultaneous method at 3 or 4 weeks of age they invariably became sick some weeks later or about weaning time, always showing more or less suspicious symptoms and lesions of cholera plus colitis.

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RINDERPEST IN POLAND

REPORTS from Poland indicate that a serious outbreak of rinderpest is spreading throughout that country. Apparently the disease appeared only after the late offensive by the Bolsheviks, and investigations seemed to indicate that it was introduced into Poland deliberately by the Soviet Army, which is alleged to have driven herds of diseased cattle before it. The Chief of the Veterinary Department of the Polish Ministry of Agriculture believes that there is danger of the disease spreading throughout Europe unless immediate steps are taken to prevent it. Poland by itself is unable to check the infection and it has therefore appealed to other countries for aid, particularly for veterinarians, motor cars, disinfectants and medical supplies.

NEW BULLETINS ON ANIMAL BREEDING

TWO publications which have recently appeared should be found interesting and useful to the veterinarian who wishes to be well informed on the principles of animal breeding. One is *Farmers' Bulletin* 1167 on "Essentials of Animal Breeding," by George M. Rommel, which presents in simple language the rudiments of breeding and heredity and tells how to apply them in practice. The other, *Department of Agriculture Bulletin* 905, "Principles of Livestock Breeding," by Sewall Wright, goes deeper into the subject of genetics and treats it in a more thorough and technical manner.

FIELD OBSERVATIONS IN THE CONTROL OF INFECTIOUS SWINE DISEASES¹

By M. JACOB, *State Veterinarian, Nashville, Tenn.*

WHEN requested to present a paper before this section I decided on a subject which has been the outstanding topic during almost every similar meeting during the past few years. Since there have been nearly as many different opinions advanced as there have been meetings, it was felt that at least one more could do no particular harm. To say the least, the trend of events during recent years, especially within the past three or four, has not been conducive to settled feelings regarding the various phases of infectious swine diseases. It has not been an uncommon occurrence to hear highly efficient veterinary practitioners unhesitatingly admit that they were at sea on this great question, and if one were to draw conclusions from the utterances of those whom we are inclined to recognize as specialists, there is considerable excuse for those who are dependent upon the latter.

In presenting this subject I have taken the liberty of covering a rather broad field, but with the purpose of stressing those influences which, in my mind, are present-day factors in the control of these diseases. During this period the question of diagnosis has apparently become unusually difficult, previous to which most of us had no hesitancy in declaring hog cholera, based on what we then considered unmistakable indications. The profession as a whole does not enter the hog lot with the same air of confidence as has been the case heretofore, and unfortunately in many instances this has created a misapprehension on the part of the owner. It appears that the same influences which have created the feeling of uncertainty among the profession have had a similar effect on the swine breeders, and they, too, have erred in a way which probably would not have occurred previous to the time when the diagnosis of infectious swine diseases became such a disturbing question. Some might argue that we must be on the right track, otherwise the prevalence of the various swine infections would now show a decided increase rather than a decrease; but it should not be necessary before an organization of this kind to rehearse the things which have been and are now serving as factors tending to minimize the spread of infectious diseases.

¹ Presented at the Fifty seventh Annual Meeting of the American Veterinary Association, Columbus, Ohio, August, 1920.

On the other hand, I do not believe the subject under discussion would be complete without some reference to those influences which, in my mind, have been responsible for what has really been a chaotic situation. I say it has been for the reason that we are returning to the original path of progressive thought and action almost as rapidly as we left it. Probably the greatest factor in the upheaval was the term "mixed infection," and it would be a difficult matter to estimate in dollars and cents the loss which could be attributed to its adoption. Page after page has been written and innumerable discussions have taken place in an effort to explain its meaning and justify its usage, but to me it is about as blank as ever. Misery loves company, and consequently I have been elated on more than one occasion in finding others who were equally as dull of comprehension. It may be that someone will volunteer this much-desired information during the present meeting, and if so, I am open to conviction. I tried from the beginning to grasp its real meaning, with the hope that an advanced step had been made which might simplify and at the same time strengthen our work on the control of infectious swine diseases; but following what I presumed were the teachings of its sponsors failed to accomplish the desired results.

In reviewing the situation as it has occurred during the past few years, it now seems absurd that we should have permitted ourselves to deviate so markedly from what we now reflect as a better line of thought. Of course, we should all admit that there is more than a single infectious disease of swine; but from observations covering the work in our own State—and I don't believe it differs much from others—we are giving the principal recognition to hog cholera, swine plague and necrobacillosis, but with the former (hog cholera) as the one of paramount importance. I will repeat, as I have on previous occasions, that with hog cholera eliminated the others would in comparison be almost a negligible factor in our work on disease control. Furthermore, up to five years ago swine plague as an entity would have been given but little consideration. This disease, which has also been referred to as hemorrhagic septicemia, infectious pneumonia and swine influenza (or "hog flu"), has appeared as an epizootic throughout a large number of States. Some have objected very strenuously to the use of the term swine influenza or "hog flu," but there are several reasons why these terms are not at all inappropriate. But name it what we may, such an independent disease did appear, and singularly so during practically

the same period as that of human influenza. This statement should not be interpreted, however, as indicating any direct similarity between the causative organisms, as at this time I have no absolute proof to that effect. I am reasonably sure that if swine plague in its recent form had not made its appearance our original attitude toward hog cholera would not have been led astray to such an unlimited extent. But it soon became apparent to us that some definite guidance on differential diagnosis and acceptable treatment was absolutely urgent and essential in order to offset the influences which were clouding rather than clearing the question of disease control.

Experience with only a very few herds was sufficient to impress the importance of disregarding what we thought was meant by "mixed infection," and as yet we have had no cause to question our conclusion in this respect. As previously stated, we felt that to center our efforts on hog cholera, swine plague and necrobacillosis infection was quite sufficient, and so directed our work. After regaining our bearings we had no hesitancy in making investigations and venturing a diagnosis on what we have accepted as being conclusive evidence of the respective diseases, and in October, 1918, our Cholera Control Division, working in coöperation with representatives of the United States Bureau of Animal Industry, offered a chart on differential diagnosis, from which up to the present time we have not found it necessary to deviate to any great extent. The chart, as included herewith, evidently appealed, in part at least, to others interested in this work, as charts bearing the ear-marks of similarity have since then made their appearance from various sources.

It might be well to say here that hog cholera today is no different from what it was ten years ago, and any effort advanced to the contrary is, to say the least, misleading. I realize that even though much has been accomplished, our knowledge on some phases of the disease is comparatively meager, but I feel, as I dare say most of you do, that the future has some startling revelations in store for us.

When swine plague, or whichever name we wish to adopt, made its appearance as an epizootic, it gave us an opportunity to make some unusual observations and to draw conclusions which were far-reaching in effect. The suddenness with which it appeared seemed for the time being to create baffling situations and no doubt was responsible for unusual losses from hog cholera which would not

DIFFERENTIAL DIAGNOSIS OF INFECTIOUS SWINE DISEASES

	HOG CHOLERA	SWINE PLAGUE	NECROTIC ENTERITIS
Early Indications	Relatively small number sick at beginning. Marked depression. Very inactive.	Sudden onset. Relatively large number sick at beginning. Depression not extreme. Chilling.	Depression not marked. Sick animal active. Very few affected.
General Appearance	Hair rough. Drooping ears and tail. Nose held close to ground. Gaunt. Arched back.	Unless disturbed, will maintain sitting position or lie on breast. Pronounced coughing when made to move about.	Unthrifty. Gradual and marked emaciation.
Appetite	Loss of appetite is partial or complete during course of the disease.	Loss of appetite of shorter duration.	Animal as a rule continues to eat.
Bowels	Diarrhea or constipation; coated dung when constipation exists.	Diarrhea sometimes occurs, but if so, only at the beginning.	Persistent diarrhea. Frequently bloated.
Skin	Red or purplish blotches usually noticed on ears, belly, arm-pits and inside of ham.	Diffuse redness of thinner parts of skin frequently seen during later stage of the disease.	Dry and scurvy.
Gait	Weak or staggering.	Stilty.	Normal.
Respiration	Accelerated and frequently labored during later stages.	Thumps constant.	Normal.
Eyes and Nose	Early congestion of mucous membranes with later discharges.	Discharges profuse during early stage of the disease.	Mucous membranes pale.
Temperature	High temperature maintained during course of the disease.	High temperature of short duration, usually only 2 or 3 days.	Temperature disturbance less constant. Disease may persist with normal temperature.
Medicinal Treatment	No value.	No value.	Yields to medicinal treatment.
Postmortem Lesions	Lymph glands enlarged and hemorrhagic. Patches rounded and well marked over different internal organs such as kidneys, bladder, lungs and larynx. Congestion of lungs or typical pneumonia, but not constant.	Lymph glands slightly congested or normal. Patches irregular in outline and more often limited to lung tissue. Pneumonia constant; area of solidification distributed in patches.	Thickened intestinal walls with white or cheesy-like patches on last part of small intestine and first part of large intestine. Body tissues as a whole are pale.
Vaccination	Treatment with anti-hog-cholera serum and virus positively protects the well hog.	Value of various vaccines and bacterins questionable.	No satisfactory immunizing agent available at the present time.

have occurred under previous conditions. In other words, the presence of swine plague as it then occurred in conjunction with or complicating hog cholera resulted in unusual losses and left many under the impression, when good results from vaccination were not obtained, that the fault was in the quality of serum or virus. But later, when apparent "breaks" occurred, many went to the other extreme and either diagnosed swine plague when, as a matter of fact, they were dealing with hog cholera, or, having previously treated with anti-hog-cholera serum and virus, now proceeded to use the newer biologics, but were still further confused when the latter failed to check the disease.

From this we were able to conclude that a diagnosis should be based on history, symptoms and postmortem lesions, if treatment is contemplated and proper results to be expected. I wish here to lay some stress on history, for while we all appreciate its importance in a general way as an aid in diagnosis, I am inclined to believe the observations of Dr. Robert Jay have impressed this more forcibly than anyone else as an aid in determining infectious swine diseases, especially as to the effect of high-protein feeding and its influence as a predisposing factor on the occurrence of swine plague and possibly other infectious diseases. As an indication of respect for his theory, I may state that almost without exception where swine plague has appeared with us as an entity, the animals affected were on high-protein feeding and with limited exercise, consequently it did not occur to any great extent in our range or thin hogs, but was very prevalent in the fattening and show pens. As a matter of fact it has appeared as a permanent feature during our large fairs for the past three years, and from what I have been able to learn other States have had a similar experience, and as late as the last International Livestock Show at Chicago I observed pen after pen with its fill of "thumpers."

But the interesting thing in this connection is that even though many of these hogs became unusually sick with typical indications of pneumonia, the death rate was very small, not over 3 per cent, and the response obtained by taking the herd off of feed was oftentimes remarkable. Furthermore, treating the animal with the newer biological products, such as swine-plague vaccine, mixed-infection bacterin, etc., either as a preventative or a curative, appeared to be wholly useless. Some might argue that this is purely a digestive disturbance, but the rapidity with which it spreads through the herd, the high temperature and the invariable and constant pulmonary

lesion covering many postmortems, allays every element of doubt as to its infectiousness. But I must state in this connection that while we refer to this disease as swine plague, hemorrhagic septicemia, etc., I venture the opinion that there still remains a missing link as to the real causative organism.

Our investigations covering "breaks" following the use of serum and virus have also impressed us with a constancy of certain conditions. Almost invariably either the serum or virus is indicted as being responsible, but at the same time we find the same serial production has given good results in other herds. The interesting relation has been that with but few exceptions such breaks occurred in herds maintained on high-protein feeding. We already know from unmistakable observations that the virus, when a virulent form of so-called swine-plague infection already exists in the herd, is sure to be followed by disastrous results. Our further belief is that there exists an important relationship between high-protein feeding and susceptibility to the so-called swine-plague organism, especially as to its pathogenicity. If such is the case, does it not open up an avenue of danger to place simultaneously treated hogs on immediate and continued high-protein feeding? At any rate, while this offers an important field for experimental work, we are not overlooking the importance of definite feeding instructions when treating hogs with serum and virus, which should include elimination of high-protein constituents for a period of a least three weeks.

Fortunately necrobacillosis has not been a very serious problem with us, especially not to the same extent as in some of the other States. but here, too, we have been able to draw several conclusions, as with so-called swine plague, having a distinct bearing on hog cholera. To begin with, there should be no difficulty in making a diagnosis of this disease, as the indications are quite typical. In most instances we found heavy parasitic infestations in herds where this disease exists, and quite naturally so, as the environments conducive to either are quite similar. A point which in the past it has been difficult for me to understand was the frequent appearance of pulmonary lesions on postmortem resembling in some respects the lesion of so-called swine plague. This, however, has been cleared up considerably through the recent studies on the life history of the roundworm of hogs by Ransom and others. Treatment for necrobacillosis should be supplemented with an effective treatment for intestinal parasites. For us biologists have failed to give any evidence of efficiency, either as a preventive or curative for necrobacillosis.

in any of its forms. The appearance of hog cholera in a herd of pigs where necrobacillosis has existed for some time is quite unusual as the result of casual infection, but on the other hand it is extremely dangerous to use virus in an attempt to immunize against cholera until after necrobacillosis infection has been eradicated. This no doubt explains the frequent loss of pigs when a herd is treated with serum and virus, while at the same time results with the older and more thrifty hogs are good.

Sanitation, including change of location, has proven the most important step in the treatment of necrobacillosis.

Another factor in our control work has been the effect of "feeder" hog movements, both intrastate and interstate, and there is no doubt that where proper precautions have not been observed more outbreaks of cholera could be attributed to such a source than to any other means. I have been extremely interested to know whether the feeder is following a safer procedure to make selections here and there through the country, from herds maintained under varying conditions, with the intention of treating after they reach his premises, or to purchase through recognized public stockyards where the hogs are handled and treated under official supervision. My own opinion is that the latter is much to be preferred and I believe should have the indorsement of those engaged in hog cholera control work. Of course I realize that every movement of "feeder" hogs through public stockyards under official supervision has not been wholly satisfactory, but the percentage of losses is becoming less each year as the method of handling the situation is improved upon. During the period of high prices, when we had unprecedented movements of feeder hogs, both intrastate and interstate, this situation was a great problem in our control work. I can see in the future, as the various stockyards throughout the country become more generally equipped for the proper handling of "feeder" hogs under immediate official supervision, a partial but gradual elimination of at least one dangerous source of hog cholera.

Another influence bearing on future control work is the cost of immunization to the owner. It has been very evident that the treatment of hogs has fallen off considerably during the past year and is primarily accounted for by the general drop in hog prices. This constitutes a grave danger from the standpoint of continuous hog-cholera control work, for the reason that it permits the country to become stocked with a large number of susceptible hogs, and if an unusually virulent epizootic should make its appearance it would

entail unusual losses before general immunization could be resorted to. We must eventually come to some system which will insure more general treatment irrespective of market prices. Our greatest possibility for the time being lies in the treatment of pigs at an age and weight which will permit the minimum dose of serum. The rather recent announcements by the Bureau of Animal Industry regarding the lasting immunity obtained in the treatment of young pigs are indeed encouraging. If we can say to the farmer with assuredness that the logical time for the treatment of hogs in order to obtain permanent immunity is prior to weaning, it will be the greatest step in recent years toward an effective system of hog-cholera control. Our field observations seem to corroborate the Bureau's conclusions, although the profession as a whole is quite divided in its opinion. It appears to me, however, that an early and definite stand on this point should be taken.

Educational work has also made its impression as one of the essentials in a well-rounded system for disease control and should extend to everyone who is directly or indirectly concerned in the growth and development of the swine industry. The general public must know more about the intricacies of infectious livestock diseases if we hope to effect a real permanent showing, and this can be brought about without trespassing upon the domain of the veterinary profession. I am of the opinion that such a policy works to the advantage of the veterinarian.

I cannot permit this opportunity to go by without some reference to the much-discussed issue, the county agent. I can state unhesitatingly that with us he has been, on the whole, a highly beneficial factor in our control work on swine diseases; this, however, without the agent himself engaging in the actual treating of hogs. It is not my function to defend the county agent beyond the limitations of our own State, but I do believe that much of the fight, if we may call it such, has been misdirected. If the situation in a given State is irregular, it is one that should be remedied within the profession, because our own men are at least in part responsible. We should remember that the county agent represents the Division of Extension, which in turn is a part of the Agricultural College of the State in which he works. With but few exceptions, every State Agricultural College maintains a chair of veterinary science, which is occupied by a qualified veterinarian who is usually a member of this and allied associations. Such institutions have their administrative policies, and it does appear that a veterinarian holding such a posi-

tion should, and usually does, have some voice in outlining policies pertaining to his particular line of work. If he does not, there is something radically wrong. However, I have confidence enough in those who direct our educational institutions and their departments to feel that they will accept and abide by reasonable suggestions coming from their immediate co-worker, the veterinarian. It would seem, therefore, that the logical means of rectifying such an existing evil would be through the veterinarian of the institution from which the misdirected agent is working.

A harmonious working relationship with the various agricultural and livestock agencies is highly essential, and its influence, I dare say, is apparent to those engaged in field work. The rather recent and what is probably the most far-reaching organization is the American Farm Bureau Federation, represented in the various States through the County Farm Bureaus, which makes available a potent organization of inestimable value in control work. But, after all, the one thing that will bind every agency closer to the veterinarian, whether he be a general practitioner or an official, is efficient service. I make these statements based upon observations in the field.

DISCUSSION OF PAPERS ON SWINE DISEASES

DR. A. T. KINSLEY: I was particularly interested in Dr. Jacob's paper on the control of swine diseases. Dr. Jacob put it as most of us believe, that hog cholera is all important, but there are other diseases that must be recognized and need to be controlled. Ordinarily the other diseases are not such a factor from the point of view of fatality, but in many instances are of great economic importance in diminishing flesh and therefore decreasing returns realized from the hogs when marketed. Dr. Jacob apparently accepts that there is such a thing as swine plague, as hemorrhagic septicemia. He states, as others have, that the feeding is a very important factor in the causation of that disease. There is no question that feeding is an important predisposing factor, and from previous experience it would seem that the bipolar organism is the center of attack, and from that fact it appears that there is an infectious causative organism, and thus far no one has demonstrated the opposite. I seriously doubt if necrobacillosis is very important as a factor in the control of swine diseases.

The Doctor correctly condemns the so-called theory of mixed infection in swine. I suspect that what the Doctor terms necrobacillosis is what others call mixed infection. The Doctor does not go into details, and I am wondering if this is the condition which the Doctor calls necrobacillosis or necrotic enteritis.

The stock hog problem is one of the important things that we as veterinarians and particularly the sanitarians must endeavor to solve in such a way that the loss will be reduced in the future. Otherwise the public stockyards and the stock hog proposition are not going to be profitable.

and it is going to remove one of the very nice features we thought had been established. Some years farmers are short of crops, and if the swine can be removed to another part of the country as a stock hog product it is desirable to do so; but if we cannot control the loss of stock hogs, I am inclined to think that they will diminish in the future. This constitutes one of the interesting things, providing masses of literature that might be counted upon in the control of swine diseases.

It has always been my judgment that history is a very important consideration, and further, if there are lesions, we can always count upon certain manifestations in such cases. Coupled with the history of the case, most practitioners, I believe, could more easily diagnose the diseases of swine than in the past. As a matter of fact a great many practitioners do not consider the history of the case.

I want to call attention to another phase. I have visited stock hogs that have been immunized, where serum had been used, and find the practitioner and also Bureau men making diagnoses, certain lesions being the evidence for their diagnoses. Gentlemen, I believe those lesions will be found in practically all hogs from some other cause, in a great many instances that have been diagnosed as cholera. The filterable virus was there, but I seriously doubt, and in some instances where 80 to 90 were lost in some 100 to 300 hogs, I do not believe it is cholera that killed the hogs. We must consider the history, as Dr. Jacob has pointed out.

CHAIRMAN DAY: As Dr. Birch has arrived, we will now hear from him on the discussion of the papers on swine diseases.

DR. R. R. BIRCH: I am not going to discuss Doctor Dimock's paper, because I don't know anything about it. It is encouraging, though, to see careful and thorough work done on the subject of swine diseases, for much of the work during the last few years has been rather superficial and fragmentary.

The veterinary profession is not subject to the same limitation as is the medical profession, for we have experimental animals with which to work, and we are not in as great a degree at the mercy of field trials. Of course eventually all experimental work of this kind must be put to a practical test, but we can learn more about some things in a few months of experimental work than we can in years of field observation.

Dr. Pickens has given us some additional data which we need, but they are just a small part of the available data that apply to the subject. You will all agree that one cannot, as a routine measure in the field, give, as he did, 1 mil of hog-cholera virus alone, and it is in regard to some of these things that we are sometimes tempted to take entirely too limited a view of the situation as a whole. In many herds we will find the young pigs immune, but in others they are not, and in no given herd can we be sure whether immunity or susceptibility prevails. The only safe thing we can do in handling these herds is to assume that they are not immune.

It is a fact that in many large herds, especially those in the East which are fed garbage, we have to provide for protection against cholera before the pigs attain an age of 12 weeks. We do this by giving serum alone before the pigs are 6 weeks of age. What is the minimum age at which pigs may be given double treatment and acquire lasting immunity? Most of us

will agree that pigs 12 weeks old are rendered safely immune in this manner, but there is less unanimity of opinion regarding younger pigs. Supposing, though, that double treatment is administered to pigs 6 weeks old, and that as old hogs 5 per cent of them come back as susceptible, it would be much cheaper to double-treat pigs at 12 weeks of age than to sustain this loss. Some, I know, will take exception to these remarks, for the first serum-alone treatment is not necessary in many Corn Belt herds. It is necessary in most eastern herds that subsist on garbage.

Dr. Benner and I have been working on swine plague during the last year, and I will outline some of the results that we have obtained. All are familiar with the work of Dr. Theobald Smith during the late eighties. At that time nothing was known of the filterable virus, so it has seemed desirable to go over Smith's work again, using for experimental animals cholera-immune pigs. We procured laboratory and field strains of *Bacillus suisepiticum*, grew them on artificial media, and passed them through rabbits until suspensions of the organism would kill one over night in very high dilution. We then tried salt solution suspensions of the same organism on immune pigs, using subcutem injections in our efforts to infect. We used between 30 and 40 pigs in groups of 5 and 6 each, and succeeded in producing but one death. Then we tried intravenous injections. We were able to kill pigs in a short time in this manner, but a general septicemia following so closely upon a large intravenous dose of any organism does not prove that it is the primary cause of a specific infectious disease. A few of the pigs killed as a result of intravenous injections showed lesions that could not be distinguished from those due to hog cholera, but such lesions were not the rule. There was a strong tendency for the lesions to localize in the joints, and pigs that survived several days sometimes developed pneumonia. Out of more than 100 pigs exposed by being quartered with our experimental animals, only two deaths occurred as a result.

Just a word in regard to Dr. Kinsley's remarks. I would not want to follow him so far as to say that when a pig dies following simultaneous treatment, showing cholera lesions, we must seek causes for death other than the filterable virus. Under such conditions, although I hate to do it, I claim the pig and admit that I believe the treatment caused its death. It is true that there are many influences and contributing factors connected with "breaks" following simultaneous treatment, but if we could eliminate the part played by the filterable virus in such cases we would be a long way on the road toward clearing up some of the problems that now trouble us.

DR. A. EICHORN: In regard to the paper of Dr. Dimock, I think we should accept it with certain reservations, since he has not as yet furnished us sufficient conclusive evidence with regard to the etiological relation of *Trichomonas* in hog infections. *Trichomonas* are very common everywhere. The fact that successful cultivation is possible in ordinary water proves how widely they must be distributed in nature. We find *Trichomonas* in the digestive tract of almost every chicken we may examine. I doubt whether they could be or have been incriminated as producing a disease condition in fowls. In view of these facts it behooves us to await

further data before we attribute any pathogenic action to these parasites.

DR. BRUCE: One point might be of interest to Dr. Dimock. I have seen one case of dysentery in a cow that was due to *Trichomonas*.

DR. A. B. NIVEN: I would like to call the attention of the members to the practitioner's point of view on the subject. The author of this paper apparently is looking at it from the standpoint of the stock-hog men in the yards and the State and Bureau men in charge of this work.

I am located in the Corn Belt of the State of Indiana, and many feeding shoats are shipped in and finished for market on corn and clover. A large part of the work of the local veterinarians in this belt is the immunizing and caring for these hogs, therefore I take issue with the author of the paper just read. If you are going to call the stock hogs into the stockyards to be immunized and supervised by the State or Bureau men, then we, the local veterinarians, will have to go into some other business.

In the last three years I have immunized several thousands of these feeders that were procured in States south of Indiana. I have advised the farmers to go to the country to purchase the required feeders, load them into the cars and ship directly to the home station, never allowing them in stockyards of any kind, and I know that those who have taken this advice have had much better results. From my experience and close observation we have lost practically less than one-half of 1 per cent when these instructions have been carefully carried out.

The reports of the feeders who are quarantined and under the supervision of the State and Bureau men, as to losses sustained among the stockyard feeders, are inaccurate, because they wish to have the quarantine lifted as soon as possible. This is desirable because the quicker they can move the hogs and get them finished for market the bigger the profits.

I claim that the local practitioner is the proper man to handle these hogs, because he is in a better position to serve the feeders. They know where to find him every day in the year. Men who are feeding hogs often desire advice as to the proper methods of handling, feeding and treating these feeders. The men who treat the feeders at the stockyards seldom see the buyer. Therefore I claim that it is not conducive to success to carry out the work from that standpoint. The local veterinarian, who is known personally to the farmer, who knows the farmer and his qualifications as a feeder, and knows his farm and its possibilities and limitations, is far better able to care for these animals successfully.

We must have feeder hogs in our locality. We can raise corn, clover and some pigs, but not enough to supply the demand without keeping breeding stock in the same fields continuously, which is neither advisable nor possible to do successfully because of the danger of infection.

The last three years a great many thousands of hogs have been shipped in from the yards and the country for feeding, and from my personal investigation as the infections of these feeders, which developed after reaching the farms, 99 per cent of the breaks were traceable directly or indirectly to hogs procured from the stockyards.

After certain premises are infected it is necessary to change the feeding location in order to avoid further infection.

About 25 or 30 years ago when we were called to see hogs suffering with cholera we often found that the sick hogs had died before we could reach them. The virus of cholera was apparently very virulent and caused death before the secondary infections developed. This virulence is rarely found at this time. However, the other infections which we are finding in swine and which are causing so much trouble are apparently becoming more virulent and complicated. Any person conversant with these conditions with which we are contending must realize that the only individual who is qualified to differentiate between all these infections is the trained and experienced veterinarian, and then he must have the assistance of the bacteriologist in many cases. Therefore when the Bureau or State sends out young men to diagnose and pass judgment upon the cases which have been under the local veterinarian's care, much trouble is caused and nothing gained by the uncertainty which is left in the mind of the owner.

When a large herd of hogs that have been immunized by the local veterinarian break, possibly many weeks or months later, and a Bureau or State veterinarian makes a diagnosis as being possible cholera, it "gets us in bad" with the farmers. From my limited experience the majority of these cases have been demonstrated to have been a mistaken diagnosis.

A MEMBER (to Dr. Birch): I gather from the discussion that it takes a double immunization to carry pigs through life.

DR. BIRCH: The single immunization carries them to 6 weeks, and the double immunization at 12 weeks of age usually carries them through life.

THE MEMBER: You don't use the double immunization in pigs the first time?

DR. BIRCH: No, sir.

DR. W. L. CHANDLER: Regarding the questions of the probable pathogenicity of intestinal protozoa, I might call your attention to some investigations which I have under way at the Michigan Agricultural College on the treatment of intestinal protozoal diseases of man. A preliminary report of these investigations was published by Dr. E. I. Carr and myself in the *Journal of the American Medical Association* for May 22, 1920. We found that following intravenous injections of 0.6 gram nearsphenamin, both motile and encysted states of intestinal protozoa would invariably disappear from the stools of man. The results of this treatment appear to be permanent and a number of cases of enterocolitis have cleared up following this treatment. I should like, therefore, to suggest in cases of colitis in swine where a protozoan seems to be the causative organism, and especially in cases where the condition has apparently been induced through feeding the organism to young pigs, that an intramuscular injection of nearsphenamin be administered; then, if the animal's condition clears up following the disappearance of the organisms, it may be possible to determine whether the specific protozoan observed was in reality the primary cause of the colitis.

As to the size of the dose, I find that swine will tolerate at least six times the maximum dose for man, prorated on the body weight of the animals, and the dose should in most cases be repeated after a lapse of five days. Experiments along this line are at present being conducted in my laboratory at M. A. C.; and although they have not been in progress a

sufficient length of time to enable us to draw definite conclusions, one or two observations have been made which would lead us to assume that at least one organism, *Balantidium coli*, may be responsible for a colitis in swine. Just two weeks ago two runts exhibiting severe diarrhoea came under my observation. Each one was given an intramuscular injection of 0.6 gram neocarsphenamin. The organism disappeared from the feces on the second day, and on that day the diarrheal condition subsided. On the fourth day, however, the organism again appeared, but the diarrheal condition did not return. The fact that the organism returned does not indicate that we did not eliminate the organism from the intestine, but was undoubtedly due to a reinfestation, since we did not attempt to keep these animals under strict sanitary conditions. The fact that the diarrheal condition did not return with the reappearance of the organism may have been due to the fact that during the period of absence of the organism the animals were able to establish a resistance sufficient to overcome the action of the organism after it reappeared.

One other point, regarding the probability of various different species of protozoa being able to cause similar types of lesions in animals. I recently observed in a postmortem on a peacock lesions typical of "black-head." None of the organisms heretofore reported as the causative organism of blackhead were present, either coccidia, amebas, nor flagellates of the genus *Trichomonas*; indeed the only protozoan organism present was a flagellate belonging to the genus *Chilomastix*. This was present in both motile and encysted stages, and the cysts were morphologically identical to those of *Chilomastix mesnili* of man. It will surely be a rare occurrence if we find that protozoan parasites of man are able to establish themselves in the intestine of birds; and after all, the possibility of this peacock's having recently had access to infected human feces cannot be overlooked. I have been trying to infest chicks with this organism from man, but so far have not succeeded.

DR. C. H. STANGE: With your permission I would like to discuss for just a moment one of the protozoa which is sometimes associated with enteritis in pigs. I wish to refer especially to *Balantidium coli*, which was observed in considerable numbers in the necrotic areas of a considerable number of cases of necrotic enteritis by members of our research staff in 1918. This is not a new protozoan, it having been discovered by Malmsten in 1857. Considerable work has been done in attempting to produce enteritis in pigs by using this protozoan. Workers have succeeded in producing an enteritis, but in a large majority of cases they failed. They found that only the encysted stage or form transmitted the disease, and because it is so commonly present in hogs it was thought by many that these may serve as a source of infection for men. Brumpt claims to have infected young pigs by using *Balantidium coli* from infected monkeys. The fact that enteritis may be caused occasionally in pigs suggests that there may be pathogenic species as well as harmless ones, but this has not been established. On the whole the *Balantidium coli* seems to stand in somewhat the same relation to enteritis in pigs as the group of organisms already recorded as associated with this disease. Foreign literature contains considerable information in regard to work along the line I have re-

ferred to, but I think we should be very careful in accepting any statements in regard to these matters until they have been carefully worked out.

DR. J. W. CONNAWAY: I believe in progress in investigations, in finding out everything possible under the sun that produces diseases, and always try to add our little in the way of new work or try to prove up on some of the work that others have done.

I think I have given in the past a brief definition of hog cholera and the lesions of that disease. I have also expressed the belief that this is the only disease that we need to consider very seriously in the raising of hogs, aside from those common things like worms and things we might handle by application of ordinary or sanitary measures. I think we should not lose sight of the big thing, hog cholera, and should work as hard as we can to eliminate that disease. You open up a hog where many have died in the herd. This may be the only one you open, and you may not be sure that that farm has been infected with the disease. I don't think we have a lesionless disease, because I believe if we examine microscopically they will be found, but oftentimes to the naked eye there seem to be no lesions. Those lesions are minute hemorrhages. There is a tendency at the present time to call old-fashioned hog cholera by the name of hemorrhagic septicemia.

The pig is a dirty animal; it lives and eats in dirt and is exposed to all kinds of infection. Many of those lesions in hog cholera are secondary troubles or secondary effects. In those small hemorrhages all along the intestinal tract, the dirt germs, the coli germ, the necrophorus bacilli and others have an opportunity to make a sore, or if it is a spine-headed worm you will often find a button ulcer. You will find the worm with the head stuck down into the gut at that point. So I believe many of these things we are trying to inoculate against we could prevent as mixed infections if we will work strong enough to prevent hog cholera. We will not have much trouble with the necrobacillosis or the enteritis group.

DR. DIMOCK: I think we shall always agree that there are other dangerous diseases, and I think it is time that we are arriving at some definite conclusions. I believe this so-called infectious colitis is the second most dangerous disease we have. In some parts of the country it is becoming more impossible to raise pigs and feed them. It is a serious condition and it is one of the next that we must find a way to control. We have had for a number of years lists of organisms that have been incriminated as causing these diseases. These organisms I have mentioned have been known for fifty or sixty or a hundred years, and I do not mean to emphasize the dangers of these other bacilli. We find they are present, but we have found the *Trichomonas* source, and I say there is quite as much evidence to show that these are the initial cause of disease. We are pinning our faith to the *Trichomonas* source. I don't say I am right. Whether it is or not has to be proved. When you go to the horse race you pick out the horse you think will win. What you have worked with up to this time has not been satisfactory. If we can find out something that will work, let us go after it.

RECLASSIFICATION REPORT UNJUST TO VETERINARIANS¹

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I ENTERTAIN the hope, in which I am sanguine you concur, that the adversity which we have so lately sustained will be only transitory. In my judgment a right decision will depend more on the temper and the manner with which we may prevail upon ourselves to contemplate the subject than upon any other element. How can we make professions for ourselves and offer exhortations to Congress to right a manifestly unfair judgment filed against an element of society that has struggled earnestly for fifty years to become worthy of recognition?

During the half century of the transitionary period a valiant struggle was made by the veterinarians of America to build up their schools, their societies and their literature so that a struggling profession might demonstrate its worth. The self-love of an individual is not warmer in its sense nor more constant in its action than what is called in French "l'esprit de corps," the spirit of loyalty and comradeship among a body of people, that affection which a body of men is always found to bear toward its own prerogatives and power; what in our case we might term professional pride. The esprit de corps among that group of the profession who became members of the Bureau of Animal Industry was at a rather low state during the period subsequent to the signing of the Treaty of Peace at Versailles.

The profession had witnessed the ushering in of a new era in the affairs of the world, attended with a new vision of the relative proportion of men and material things. Financially we have undergone a revolution, commercially we have evolved with accelerated speed, industrially we have undergone such a change as could only be accomplished through the changing of views on the parts of employer and employee. As we look around and behold the new alignment of affairs, there does not seem to be anybody in their old places except the clerk and the annually employed scientific worker, teachers and ministers. They have stood steadfast, remained fixed.

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and the world has exulted in having some individuals without initiative or power to demand the new order of things. You and I have seen the butcher, the baker and the candlestick maker move from obscurity to opulence. Your families and mine have witnessed the acquisition by our neighbors of the little luxuries that help to make the world pleasanter to endure during our sojourn. It has not been with envious eyes we have viewed these events, but in wonderment, puzzled for the time being why all should prosper save us. Then came the ray of hope that cheers and brings solace to those in despair. The Congress had at last become conscious of the plight of the civil employees of the Nation and had taken the initial step to correct the inequalities. Pessimism became quickly dissipated, and there reigned thrilling optimism, that brings happiness, contentment and peace.

The appointment by Congress of a Joint Commission on Reclassification of Salaries was an ideal plan of reconciling inequalities that have obtained in the Federal service from time immemorial. Congress took cognizance of the position of employees and sought to rectify the unbusinesslike principles; therefore, in the act approved March 1, 1919, it provided for the creation of a Joint Commission on Reclassification of Salaries to consist of three Senators and three members of the House of Representatives.

Paragraph 2 of the act provided that "It shall be the duty of the Commission to investigate the rates of compensation paid to civilian employees by the municipal government and the various executive departments and other governmental establishments in the District of Columbia, except the Navy Yard and the Postal service, and report by bill or otherwise as soon as practicable what reclassification and readjustment of compensation should be made so as to provide uniform and equitable pay for the same character of employment throughout the District of Columbia in the services enumerated."

In the above-mentioned act the Commission was instructed to report its recommendations as early as possible and in any event by the second Monday in January, 1920. On January 10, 1920, Congress passed a joint resolution extending the time for final report of the Joint Commission to a date not later than March 12, 1920. The report of the Joint Commission was transmitted to Congress March 12, 1920. It is a voluminous report covering 884 pages and is probably the most exhaustive volume ever compiled on the subject of the reclassification of a group of employees.

The United States Government is the largest employer in the world. It is "without a modern classification of positions to serve as a basis for just standardization of compensation and without a central employment agency having adequate power; in short, without an employment policy. This lack of a comprehensive and consistent employment policy and of a central agency fully in power to administer it, has produced most glaring inequalities and incongruities in salary schedules, payroll titles, and departmental organizations, with much resultant injustice, dissatisfaction, inefficiency and waste."

The Commission had under consideration the reclassification of approximately 107,000 employees. It divided the positions held by these employees into something more than 1,700 classes. The employees in a given class are those doing substantially the same kind of work, needing the same general qualifications and assuming about the same degree of responsibility.

The Commission, in commenting upon its work in a letter of submittal to Congress, states as follows:

"In separating the positions into appropriate classes our classifiers being only human have undoubtedly made some mistakes, but those mistakes can be rectified by the agency which takes over our records in cooperation with the heads of the various departments and bureaus."

As to the lack of uniformity and equity in the present rates of salaries the Commission found (1) that the salary and wage rates for positions involving like duties and responsibility showed wide variations and marked inequalities, (2) that the salary and wage rates for positions of the same class are different in different departments and independent establishments, the scale of pay in some departments being markedly higher than the scale for the same class of work in other departments.

In reclassifying the veterinarians in the Bureau of Animal Industry service it is quite evident that the Commission committed the same error to which attention is called in the two preceding paragraphs; that is, that the salary and wage rates for positions involving like duties and responsibilities and calling for the same qualifications show wide variations and marked inequalities. The veterinary service is classified by the Commission in three groups; first, veterinarian; second, veterinary bacteriologist; third, veterinary pathologist. The evil is not in a division of the group, but in the salary schedule for the three divisions.

Veterinarian

Junior veterinarian	\$1,380 to \$1,560
Assistant veterinarian	1,620 to 1,980
Associate veterinarian	2,100 to 2,820
Veterinarian	2,940 to 3,660
Senior veterinarian, compensation to be fixed by Congress.	

Veterinary Bacteriologist

Junior veterinary bacteriologist.....	\$1,800 to \$2,160
Assistant veterinary bacteriologist.....	2,400 to 3,000
Associate veterinary bacteriologist.....	3,240 to 3,840
Veterinary bacteriologist	4,140 to 5,040
Senior veterinary bacteriologist, compensation to be fixed by Congress.	

Veterinary Pathologist

Junior veterinary pathologist.....	\$1,800 to \$2,160
Assistant veterinary pathologist.....	2,400 to 3,000
Associate veterinary pathologist.....	3,240 to 3,840
Veterinary pathologist	4,140 to 5,040
Senior veterinary pathologist, compensation to be fixed by Congress.	

The discrepancy in the salaries is not the only error that was committed, for if the report is adopted by Congress no veterinarian or veterinary bacteriologist can be promoted to the position of Chief of the Bureau of Animal Industry. The only provision made by the Commission for promotion to that position is through the channels of veterinary pathologist. A senior veterinary pathologist may be promoted to be Chief of the Bureau of Animal Industry, but a senior veterinarian or a senior veterinary bacteriologist for some unknown reason can not climb to the top of the ladder in the Bureau.

The channels that lead to the highest veterinary position in the Government service, however, are not confined solely to veterinary pathologists, as is indicated in the paragraph of qualifications for that position, which is as follows:

"Training equivalent to that represented by graduation with a degree from an institution of recognized standing with major work in biology and agriculture; graduation with a veterinary degree from an institution of recognized standing; 3 years' graduate work or experience regarded as its equivalent; broad knowledge of live-stock and general agricultural problems; research experience with biological and economic animal problems and the application of scientific methods for the solution of such problems; not less than 5 years' administrative experience; and capacity to determine fruit-

ful lines of scientific research, to arrange work and direct staffs of investigators and of regulatory workers."

In all the annals of the adversities of the veterinary profession it has never encountered an obstacle that would tend toward demoralizing it as the classification given by the Congressional Commission. The aforementioned errors, grave as they are, are mild in comparison to the onerous isolation given to the veterinarian as compared to all other associated groups of scientific and technical workers. The scientific, technical, professional, subsidiary service contains the following groups:

- Actuarial Service.
- Agricultural Promotion and Extension Service.
- Architectural Service.
- Art Service.
- Biological Science Service.
- Chaplain Service.
- Community and Recreation Service.
- Economic and Political Science Service.
- Educational Service.
- Engineering Service.
- Law and Examiners Service.
- Library Service.
- Medical Science Service.
- Physical Science Service.
- Social Science Service.
- Statistical Service.
- Translating Service.

There are a few groups in the scientific and technical service whose compensation is not larger than the veterinarian; for instance, the Chaplain Service provides a compensation at salary of \$1,500 per annum, but it is presumed that the duties of the spiritual adviser are neither so arduous nor so constant, inasmuch as he may devote part of his time to the administration of his religious duties outside of the governmental institutions. There may be a few other isolated instances of smaller compensation, but they are not among the positions that are comparable in any way with the duties assigned to the veterinarian, such as the Biological Science Service, which is composed of the following classes: Agricultural explorer, agronomist, anthropologist, botanist, dairy manufacturing specialist, entomologist, fruit and vegetable technologist, horticulturist, animal husbandryman, dairy husbandryman, insect pathologist, animal

parasitologist, plant pathologist, zoologist, and many other groups.

Beginning with the agricultural explorer, which is the first group classified under the Biological Science Service, to the zoologist group, which is the last, the proposed salaries range from \$1,800 for junior zoologist to \$5,040 for full-grade zoologist. A careful examination of the entire report fails to reveal any group doing work of a scientific or technical nature that is not recommended for a uniform rate of salary of \$1,800 to \$5,040 except the veterinarian—not the veterinary bacteriologist or the veterinary pathologist, but the veterinarian. It is clearly evident, therefore, that the person or persons responsible for the classification of our group either did not possess a sufficient knowledge of the character of the work performed by the Bureau veterinarian, or, knowing the nature of the work, held it in low esteem. But the latter could not possibly be the case, because, when it became evident that the position was not being judged upon its merit, the Chief of the Bureau in an interview with one of the classifiers specifically called his attention to the equal importance of the veterinarian compared with the veterinary pathologist and veterinary bacteriologist, and in a statement to the Chief of the Bureau the classifier acknowledged that he had the wrong impression and definitely stated that all veterinary work belonged in one class. Now, after acknowledging that there should be no division between a veterinary bacteriologist, a veterinary pathologist and a veterinarian doing other lines of work in the Bureau service, discrimination was made against the latter, and for that reason we protest against the classification and propose to employ every means at our disposal to correct the injustice meted out.

Soon after the appointment by Congress of the Reclassification Commission, the employees of the Government in the District of Columbia engaged in scientific and technical work held a mass meeting for the purpose of discussing plans for aiding in furnishing the proper information to the Commission. It was debated at the mass meeting whether an organization should be effected to act independently of any other organization or to affiliate with the Federal Employees' Union. The latter proposition prevailed and the association was perfected. It held meetings from time to time and on several occasions had members of the Reclassification Commission deliver addresses. It was evident from the outset that the personnel of the Commission were giving much of their time and thought to the work in hand, and it was clearly apparent that they were seeking the very best information obtainable and were in sympathy with

rectifying the incongruous conditions that existed in the various Departments with respect to the inequality in the matter of compensation paid for the same class of work in the various departmental branches.

The Commission called for assistance for employees in the various lines of activities, and from each Department several representatives were detailed to work with the Commission for a period of several months; they were actually taken over by the Commission and worked in its offices. Of course, the strategical position for any group was to have a direct representative, but those employees were selected by the higher authorities and therefore there was no alternative but to accept those who were so assigned. The scientific and technical association did splendid work, as you may judge from the ultimate plan agreed upon. By degrees they approached the question of recommendations to be made to the Commission, and ultimately every group in the scientific association, composed of thirteen different branches, agreed upon the Macey scale, with which you are familiar.

The Commission announced that hearings would be held and an opportunity given to each group to present its case. The scientific group outlined a program for the presentation of their case covering all the various lines of work, and at the appointed time there appeared before the Commission some of the best authorities in the United States familiar with scientific lines of work, both inside of the governmental service and in the commercial world; and the manner in which they presented the subject to the Commission was worthy of great praise. They presented indisputable facts showing that the employees of the United States Government were underpaid and in consequence the turnover in the governmental service was productive of demoralization, and that unless some means were taken to attract and retain in the service competent employees, it would become a farce comedy.

During the days on which the hearings were held the Bureau veterinarians were represented by the most thoroughly conversant, the most able advocate, the most highly respected, and the peer of all veterinarians in America, the Chief of the Bureau of Animal Industry. Dr. Mohler submitted a brief showing the activities of the Bureau and the part played in them by the veterinarian. He made no distinction between the veterinarian, the veterinary pathologist and the veterinary bacteriologist. The statement was clear and conclusive and was accepted by the Commission without comment.

Just prior to the hearings the Commission sent out tentative plans for dividing the veterinary service. It had that group classified under three headings: veterinarians, veterinary bacteriologists, and veterinary pathologists. When Dr. Mohler saw that arrangement he recommended that it should not be adopted, but that all three should be grouped as one class. This is rather an important step in the reclassification workings. It indicated that someone outside of the Bureau service was separating the veterinary personnel, and immediately the Chief of the Bureau, who should be in a position to know more about it than anybody else, protested against such a classification.

Several weeks after the termination of the hearings two representatives of the staff of the Commission called on the Chief of the Bureau, and during their conversation the question was asked by them, How do the duties of the veterinarian compare with the duties of the veterinary bacteriologist and the veterinary pathologist? They asked the direct question, Do not the veterinarians confine their work strictly to inspecting meats? And just as emphatically they were answered: "The veterinary group should not be divided. The veterinarians do not confine their work to the inspection of meats. They are engaged in meat-inspection work; they are engaged in the administration of the meat-inspection act of 1906; in the control and eradication of Texas fever; in the eradication of cattle scab, sheep scab and dourine; in the control of hog cholera; in the eradication of tuberculosis; in supervising the importation and exportation of animals and hides; in the suppression of outbreaks of infectious diseases, and in many other activities."

Now, in reply to the clear statement of the activities of the veterinarians, the representatives of the Commission stated they understood now that the duties of the veterinarians are such as to justify placing them in the same group as bacteriologist and pathologist, and Dr. Mohler replied that that was where they should be placed.

At this juncture I want to state that the authority of the Commission was very broad. They had the right to conduct investigations outside of the District of Columbia, to gather data relative to similar groups of employees in States, counties and municipalities or in private employ; and a vast amount of material of this character was obtained. There is no doubt the Commission obtained from the various States, counties and cities information as to the salaries paid veterinarians in those respective services; and from our knowledge of this phase, the data would not be so illuminating as to make the

salaries paid by the Bureau look meager. Our Association gathered these data over a year ago for the purpose of using them in submitting a brief to the Commission, but they were unsatisfactory and showed clearly that these branches of State and municipal governments were as clearly far behind present-day conditions as the Government with respect to paying employees. Therefore we did not use that information.

This brings us down to the time when the report was submitted, March 12, 1920; and as we have reviewed that rather at length, we will proceed on another phase of the subject.

A few days after we received the news, a meeting of the local branch of Bureau of Animal Industry Veterinarians was called and the following resolution was adopted and sent to the Chief of the Bureau:

"Whereas, The Congressional Reclassification Commission in its report to Congress on March 12, 1920, places veterinarians in a class lower than that of other employees engaged in scientific and technical work;

"And whereas, The qualifications required of veterinarians in the service of the United States Department of Agriculture are scientific and technical and are so defined by the Department, and were so represented to the Reclassification Commission;

"And whereas, The services rendered by veterinarians are highly important not only in the administration of scientific and technical projects, but also because of the great economic value of such service to the Nation in general and to the livestock industry in particular;

"And whereas, The salaries accorded veterinarians by the Reclassification Commission are wholly incommensurate with their qualifications or the importance of their duties or the responsibilities discharged by them;

"Be it resolved, That we, the veterinarians in the Department of Agriculture, declare the Commission's classification of veterinarians to be clearly erroneous and wholly inadequate, and that we protest its adoption, basing such protest upon the ground that adoption would work injury and injustice to the veterinarians, and materially impair the service which the Department of Agriculture is rendering the Nation in general and the great livestock industry of our country in particular;

"And be it resolved, That we earnestly and respectfully appeal to the Secretary of Agriculture and to the Chief of the Bureau of Animal Industry that such official action as may be proper in the premises be instituted by the Department or the Bureau for securing to the veterinarians in the Department an adequate and just classification;

"And be it resolved, That we gladly accept the assistance of the Federal Employees' Union in placing before the proper committees any data that may be necessary to present proof of error in judgment by those responsible for salary classification of veterinarians;

"And be it resolved, That copies of this resolution be forwarded to the Secretary of the Department and to the Chief of the Bureau for their consideration, as well as to the President of the Federal Employees' Union."

On April 14 Secretary Meredith addressed a letter to Hon. Andrieus A. Jones, Chairman of the Joint Commission on Reclassification of Salaries, United States Senate, in which he clearly set forth that the veterinarians were improperly classified, and in concluding he stated:

"It is my understanding that a supplementary report is to be issued by the Reclassification Commission, and it is hoped that you will appreciate the importance of correcting the error that was made by the Commission in classifying veterinarians and lay inspectors."

Senator Jones, in reply, stated in part:

"The Commission realizes that this report is not perfect and that doubtless a number of changes will be necessary. The report, however, has been referred in the Senate to the Committee on Appropriations, and changes can only be made through that Committee. When the Committee takes up the report for action I am sure that it will give to your suggestions full consideration. I shall be glad to refer your letter to that Committee. As I understand it the Commission no longer has jurisdiction."

The Secretary of the District Branch of the National Association of Bureau of Animal Industry Veterinarians, Dr. F. W. Meyst, on April 14 addressed a communication to Secretary Meredith accompanied by the resolution above referred to. The Secretary, in acknowledging receipt of the letter and resolution, stated:

"I * * * desire to assure you that I am in sympathy with the attitude of your Association in regard to the apparent discrimination against a part of the veterinary service in the report made by the Congressional Joint Commission on Reclassification of Salaries. The matter has been called to the attention of Hon. Frederick R. Lehlbach, Chairman of the Committee on Reform in the Civil Service; Hon. Francis E. Warren, Chairman of the Committee on Appropriations, and Hon. Andrieus A. Jones, Chairman of the Congressional Joint Commission on Reclassification of Salaries, and others, and energetic efforts are being made to have the error corrected."

Congressman Lehlbach, Chairman of the Committee on Reform in the Civil Service, in acknowledging receipt of Secretary Meredith's letter, said:

"I am very glad to receive the information contained therein; also your views on the classification of veterinarians. There will be hearings on the report and I will later advise Dr. Mohler of the date in order that he may present his views before the Committee."

I think you will agree that the administration force at Washington have taken every measure available to rectify the error. The Chairman of the Commission states that no change can be made in the report until it has been considered by the Congressional committee to which the bill was referred.

On March 23, 1920, your Committee on Legislation and Publicity addressed a letter to the members of the Association containing the facts with respect to the classification of veterinarians by the Commission. In the last paragraph you were urged that—

"The important thing to do now is to organize in such a manner that if a hearing can be arranged for, you will be prepared to have representatives come to Washington to appear before the Committee or that they will send proper forms of petitions and resolutions. The next thing, especially for those living in States where there is a member of the Committee on Reform in the Civil Service, is to get the leading veterinarians and leading livestock owners and others interested in trying to arrange for a hearing."

The following day, March 24, a follow-up letter was sent to the same persons, in which it was stated:

"We have been very busy here in Washington since the report was submitted, in trying to have the error corrected. A committee visited the Commission's office and was informed that the classification of veterinarians is an error and in their judgment it can be corrected. Dr. Mohler has taken the matter up with the Secretary and also taken the matter up with the chairman of the Reclassification Commission and has asked for an early hearing on the subject.

"In view of what has transpired in the past few days, it is recommended that no definite action be taken by any local branch of the National Association until you receive notice to do so. In the meantime, I recommend that you hold a meeting and get your machinery in order so as to take immediate action if notified to do so.

"If this is not plainly outlined I suggest that you hold the matter in abeyance and write me and I will try and explain more in detail our views on the subject. It is possible that this matter can be corrected without going to a great deal of trouble and expense, and, of course, that is the desirable thing to do."

After careful inquiry was made of what action could be taken, it was clearly apparent that nothing could be done until the report was taken under consideration by the committee in Congress to which

it was referred. Your committee endeavored to explain this to the members and recommended not to undertake any campaign until it appeared the proper time, for it was believed then and confirmed by subsequent events that much of the effort put forth to have the wrong righted would be lost.

The observation made by the Bard of Avon is very applicable to our particular condition: There comes a time in the affairs of man which taken at the flood leads on to victory. From March 12 the tide has been on the ebb. When the water slackens in that direction and it begins to flow in the opposite way, then will be the time for us to take action. I am very glad to observe that all of our local associations worked in harmony on this plan and did not go any further than to prepare to call attention of Congress to the error in the report. Some excellent work was done and will be productive of results at the right time.

As most hearings before Congressional committees are limited in time, it is probable that when this matter is taken under consideration we will probably have not more than one day, or part of a day. Within that time it would behoove us to have appear before the Committee the most representative spokesman of the livestock industry of the United States that we could interest in the subject. It appeared to us that it would be of little assistance to notify a large number of veterinarians of the Bureau to appear before the Committee. We believe that we could not select any veterinarian who through knowledge of the subject and through personal interest in the matter would be as well qualified to represent our group as the Chief of the Bureau. This statement is made in all sincerity and in deep appreciation of the valuable services rendered the Bureau veterinarians by those outside of that organization on many occasions.

The American Veterinary Medical Association should be represented before the Committee, because through the Legislative Committee of that organization wonderful results were obtained in favor of the veterinarians in the Army and in other lines of work. I do not think it is necessary for the Legislative Committee of the American Veterinary Medical Association to be specially instructed at this meeting to take care of this matter, because we know they are interested in our work and will eagerly respond at any time they can be of assistance. The United States Live Stock Sanitary Association should have representatives appear before the Committee, and spokesmen representing the following named livestock associa-

tions should also appear before the Committee: American National Live Stock Association, Texas Cattle Raisers' Association, American Wool Growers' Association, Southern Cattlemen's Association, Swine Growers' Association. A committee representing the American Agricultural Editors' Association should be present at the hearings and take part. There should be a representative of each of the following named purebred cattle breeding associations in attendance who may be called upon at the proper time: American Aberdeen-Angus Breeders' Association, Ayrshire Breeders' Association, Brown Swiss Cattle Breeders' Association, American Devon Cattle Club, Dutch Belted Cattle Association of America, American Galloway Breeders' Association, American Guernsey Cattle Club, American Hereford Cattle Breeders' Association, Holstein-Friesian Association of America, American Jersey Cattle Club, American Kerry and Dexter Cattle Club, Polled Durham Breeders' Association, Red Polled Cattle Club of America, American Polled Hereford Breeders' Association, American Shorthorn Breeders' Association, Milking Shorthorn Cattle Club of America.

In addition to the above mentioned, if we could augment the assembly by individuals of national reputation who are conversant with the livestock industry and the service rendered by veterinarians, they should also be enlisted to attend. A representative of the veterinary colleges could play a very important part at the hearing in explaining the educational side of preparing and training men for the profession.

Your committee proposes to delegate to certain local branches the work of selecting representatives from the various lines of activities to appear before the Congressional committee. It will be necessary to outline the program for the guidance of the representatives, and it is believed that each local branch is well enough conversant with the subject to prepare a brief on the subject for their guidance. It is probable that notice of the date of the hearing will be given in sufficient time in advance so that ample preparation may be made.

Congress does not assemble until the first Monday in December, and it is probable that no action will be taken with respect to the Congressional report until after the Christmas holidays. Therefore, while we do not propose to be tardy in taking up this work, we recommend that the virtue of patience be practiced as far as possible.

PIONEER WORK IN TUBERCULOSIS CONTROL¹

By LOUIS A. KLEIN

Dean of the School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa.

IT is my privilege and pleasure to welcome you to the University and to say to you that we shall be very glad to place at your disposal any facilities we may have which will be of service to you. It is very appropriate that this, the first conference of its kind held in this section, should meet here, for it was here and in this neighborhood that the first important steps were taken which in the course of time led up to the inception of the work in which you are now engaged. The first tuberculin test made on this continent was applied in 1892 near Villa Nova, twenty miles west of Philadelphia, to a herd of purebred Jersey cattle. The cattle were owned by the late Mr. J. E. Gillingham, one of the Trustees of the University, and the test was made by the late Dr. Leonard Pearson, at that time Professor of the Theory and Practice of Veterinary Medicine in this school. There were 79 cattle in the herd, some of them imported and all purebred, and 51 reacted to the test. On March 16, 1892, 6 of them were brought to the Veterinary School and killed for postmortem examination.

Dr. Pearson was a student in Germany in 1890 when Koch discovered tuberculin, and he became deeply interested in the substance when Professor Gutmann, of the Veterinary Institute at Dorpat, Russia, used it for the first time as an agent for diagnosing tuberculosis in cattle in January, 1891.

Early in 1892 Pearson was called on to examine a cow in the Gillingham herd, and on making a physical examination found symptoms indicating tuberculosis and recommended the destruction of the animal. The cow was killed the next day and the postmortem examination confirmed the diagnosis. The entire herd was then subjected to a physical examination, and five more cases were found and destroyed. Some time later a cow that would not breed was sent to the butcher and was found to be tuberculous. It was then decided to apply the tuberculin test to the herd, and approximately two-thirds of the animals reacted. The reactors were valued at \$10,000.

¹ Presented at the Tuberculosis Eradication Conference, Philadelphia, Pa., October 11-13, 1920.

Pearson was a young man at that time, only 25 years old, and had but recently returned from Europe, where he had spent a year in post-graduate study after completing the course in this school. He had been engaged in practice and in teaching only a few months. Very naturally the results of this new and practically unknown test applied by an apparently inexperienced young man were questioned by many veterinarians and physicians, some of whom held Federal, State and city positions. One physician went to the trouble to interview Mr. Gillingham and tried to induce him not to have the cattle destroyed. But Mr. Gillingham did not question the diagnosis, and as he did not wish to keep or to sell the tuberculous cattle, he decided to have them destroyed.

As before stated, six of the reactors were killed here at the Veterinary School and examined postmortem on March 16, 1892, nearly 29 years ago. Many veterinarians, physicians, scientists and livestock owners were present to see if the postmortem findings would confirm the results of the test. There were not a few skeptics among them, and one can readily imagine what these doubting Thomases said when the first cow that was killed failed to show any very definite lesions of tuberculosis. But the five other cows destroyed on the same day were plainly tuberculous, and microscopic examination of the lesions from the first cow disclosed the presence of tubercle bacilli. The other reactors were destroyed and buried on the farm near Villa Nova.

You will find no report of this test and the postmortem demonstrations in the veterinary journals of that day. The only record to be found is in the *Philadelphia Public Ledger* of March 17, 1892. It was a peculiarity of Dr. Pearson that he rarely took time to write up his work.

During the following three years Pearson used the tuberculin test in his private practice. Some veterinarians and livestock owners were slow to take it up, and several State and Federal officials and some livestock journals even vigorously opposed it. Its efficiency and reliability were recognized by veterinarians, physicians, sanitary officials and the more progressive livestock owners when they became more familiar with it. But the opposition of some of the livestock owners and journals continued for a long time. They claimed that tuberculin would transmit tuberculosis to a healthy animal, that it would produce abortion and sterility, and that animals would react to it which were not tuberculous.

In 1895, when the Pennsylvania State Livestock Sanitary Board was organized and Pearson became its Secretary and the State Veterinarian, he introduced another method in connection with the control and eradication of tuberculosis which has had far-reaching results. This is the principle of testing herds on the voluntary application of the owner. A law authorizing compulsory tuberculin testing was passed in Massachusetts a few years before, but when it was put into operation the livestock owners raised such vigorous objections that the next Legislature repealed it. The principle of testing only on voluntary application was the keystone of what became known as the Pennsylvania plan for controlling tuberculosis, and it is also one of the features of the accredited herd plan.

Time will not permit me to speak further of the work of this great pioneer in the control and eradication of tuberculosis in cattle, but what I have said will be sufficient to bring to your attention some of the difficulties that had to be dealt with in the early days of this work. You, of course, are not without your problems and difficulties, but you are in a much better position than those who first traveled this way, for they have broken the road for you and smoothed the path in many places.

The eight States represented at this meeting contain more than 10 per cent of all the cattle in the country and over 12 per cent of the milk cows. There are in these States over 7,000,000 cattle of an estimated value of nearly \$4,000,000,000. If we add to this sum the value of the lands and the buildings and equipment necessary to care for them and their products we will have a total of probably \$8,000,000,000. Viewed from a purely economic standpoint, and leaving aside the question of public health, the control and eradication of tuberculosis in cattle is a matter of great importance not only to the cattle owner, but also to all consumers of meat and milk. The subject which you have gathered here to consider is therefore worthy of careful and serious attention, and we here at the University feel that we shall be rendering a public service by assisting you in any way that we can. I wish you a successful and profitable meeting and hope you will come again.

HOW THE COOPERATIVE TUBERCULOSIS ERADICATION CAMPAIGN AFFECTS AND APPEARS TO THE PRACTITIONER¹

By J. F. DEVINE, *Goshen, N. Y.*

HOW the cooperative plan of tuberculosis eradication affects and appears to the practitioner I presume will depend largely upon the veterinarian as an individual and the locality in which he practices. Every veterinarian has a right to his opinion on the matter, and I assume, therefore, that I have a right to mine, and I shall take advantage of the privilege given me by your program committee to express my views. All my life I have suffered the failing of two peculiarities. One is that I never volunteer advice to anyone except my children. The other is that if I am asked for my opinion I give my opinion and not one that has been dressed up for the occasion to satisfy someone's vanity. My opinion of the cooperative tuberculosis eradication campaign is that it is the embodiment of more things in the way of bovine tuberculosis eradication than all other things that have been attempted or carried out since Koch first isolated the organism and tuberculin was discovered as a diagnostic agent. I would further add that any veterinary practitioner who does not look upon this work with the same attitude is either lacking in broadness of vision or is selfish enough to put personal gain in advance of a great public good.

Having been a veterinary practitioner most of my life, and having had to depend upon veterinary practice for shelter, raiment and the necessities and comforts of my family and the support of my business ventures, I am in a position, I think, to know something of the hardships and vicissitudes of a general practice; and I question if there were many men in the United States who did more tuberculin testing during the first decade of this century than I did. Nevertheless I have counseled all of my clients who have purebred herds or who have grade herds, that I think are reasonably free from tuberculosis, so that the client would not suffer too great a loss, to put all their herds under State and Federal supervision; therefore I know what the loss of revenue from this work means to a country practitioner. I am also in a position to know the damnable persecution a man in general practice must suffer for honest tuberculin testing; and I say to all veterinarians, young and

¹ Presented at the Tuberculosis Eradication Conference, Philadelphia, Pa., October 11-13, 1920.

old—and I say it after twenty-five years' experience—that a veterinarian who cannot make a better living in his community without ever tuberculin testing a cow, with the possible exception of one now and then as a favor for a few clients, is either in the wrong community and had better move out, or is incapable or too lazy to give real service. I realize that this statement may not be fair in some cases, that somewhere there may be a veterinarian who finds the practice in his locality has changed or that he is tied down to a community by age or property holdings, and that tuberculin testing just fills out a living; but it is more than likely that the State would be glad to avail itself of such a man's service, if he can devote much time to tuberculin testing; and at any rate we must not neglect millions of people and a great industry to favor a few. A real practitioner can soon make his services so valuable at other work in his community that he is well rid of tuberculin testing, and the present method of Federal and State coöperation has taken it out of the realm of barter and abuse and put it on a plane of thorough, impartial, scientific eradication.

There is no phase of veterinary practice where honesty, accuracy and skill have been received so thanklessly as tuberculin testing in many instances. Up to the last few years, until breeders awoke to the disasters of bovine tuberculosis and the losses that follow in its wake, many cattle dealers and some breeders would employ a veterinarian to make a tuberculin test and then "cuss" him for finding the diseased ones. The veterinarian was ever facing the limitations of tuberculin on one hand and the hostility of its accuracy on the other.

Tuberculin testing always has interfered with a busy practitioner's other work, and the other work of busy practitioners has too often interfered with satisfactory tuberculin testing. The eradication of tuberculosis requires systemized, concentrated tuberculin testing by men who can make a special study of it and devote their time to it. Up to the present time we have simply been getting information to prepare us for the work. With men specially trained and devoting all their time to it, and using the combination tests which we are learning more about daily, we are placed in a position to do such accurate work as to demand the support and reliance of the public. The more we specialize and the more accurate we become, the more we may expect the public's support.

I realize the shortcomings of Federal and State inexperienced men and the advantages in some cases of the intimate knowledge of a herd

the local man may have, but the latter is simply a matter of coöperative detail that is now being worked out by the authorities taking into counsel the local man. As to the former, it is the duty of every veterinarian and stock owner to appeal to Congress for sufficient funds that the veterinarians employed for this work may receive a salary such as professional men doing such important work should receive. In this way we insure high-class service to the stock owners and the public and make it possible for those in authority to eliminate from their forces unreliable or undesirable men.

I do, however, strongly object to Federal or State authorities persecuting local practitioners by allowing certain practitioners who are on the State force, and so coöperating with Federal and State men, to test herds the owners of which are regular clients of other veterinarians in the same community. Some of these practitioners are unscrupulous enough to proselyte the other veterinarian's clients. We have this condition going on in our own State, and it is a serious injustice to our honest practitioners. No practicing veterinarian, so long as he is in practice, I care not if he is on the State list, should be allowed to take any part either in testing or autopsy of the stock of another practicing veterinarian's clients in that locality. If the local practitioner is not to assist in the work in his own client's herds, then a man from a considerable distance or a man who gives his whole time to the State or Government should do the work. This is an important matter that perhaps the official who has never practiced may think lightly of, but it is by far the most serious and objectionable thing that is occurring to the general practitioner under the present method.

As a stock owner I am just as strong for the work. Things are not perhaps as smooth as they should be, but large bodies move slowly. The conflicting State rulings should be eliminated, and eliminated at once, and I predict that they will be as rapidly as possible.

Breeders and veterinarians should rejoice that the administrative work of this great problem is not in the hands of crooks or politicians, but in the hands of such capable, honest men as John R. Mohler and J. A. Kiernan in the Federal Department, and I believe equally reliable men in the State Departments.

CLINICAL AND CASE REPORTS

GASTRO-HYSTEROTOMY IN A HEIFER

By LOUIS LEVINSON, Middletown, Delaware

ON June 21 about 5 a. m. I received a rush call to make a 30-mile trip to deliver a calf. Arriving at my destination, I found a 17-months-old purebred Holstein heifer vainly attempting to give birth to her calf. Upon inquiry I was told that the heifer had been in labor for 12 hours and that continuous efforts had been made to remove the calf. The heifer was in good condition and her expulsive efforts were strong. Examination was extremely difficult, due to previous exploration and narrowness of the pelvis. The presentation was anterior and the head was deviated to the left.

After two hours' hard work on an empty stomach, without making any headway, I decided to do a gastro-hysterotomy, or, as I told the owner, a Cæsarean section.

The right flank, the site of the operation, was thoroughly washed, clipped, shaved, and painted with tincture of iodine. A white bed sheet was asked for, and it was dipped in a warm 3 per cent therapogen solution and the entire right side of the animal was covered. The sheet was carefully cut so as just to expose the operative site. Restraint consisted of a half hitch around both hind legs, in which condition they were drawn backward and fastened to an upright support.

An incision was made 10 inches long in the right flank, midway between the ileum and the last rib, about 6 inches below the external angle of the ileum. The incision was carried through the external and internal abdominal muscles. The peritoneum was incised with a blunt-pointed bistoury to protect the abdominal viscera. Some trouble was encountered by the prolapsing of the small intestine through the incision.

After thoroughly cleansing the hands and arms again, an exploration of the abdomen was made. It was a strenuous task to bring the gravid uterus into view so that a favorable site for an incision could be found. It seemed best to make the incision on the greater curvature because there were no large blood vessels to contend with. The incision in the uterus was about 12 inches long. Care was taken to prevent any of the infected intra-uterine liquid

from entering the abdominal cavity. Both hind legs of the fetus were secured by clean cotton ropes and placed in the hands of an assistant. A vaginal examination was made and the fetus pushed back into the abdominal cavity. The fetus was then easily removed from the uterus. The placenta was removed at the same time.

The incision was cleaned and the edges carefully approximated by a continuous Czerney catgut suture which was followed by a continuous Lembert suture. The sutured incision and adjacent area were thoroughly painted with tincture of iodine. All prolapsed intestine was carefully swabbed with a mild therapogen solution and replaced. The peritoneum and the internal and external abdominal muscles were separately sutured with a continuous catgut suture, the skin with interrupted silk sutures. About $1\frac{1}{2}$ inches of the external abdominal muscle and of the skin were left open at the bottom for drainage. Food was withheld for 24 hours.

The heifer got up the same afternoon, but showed symptoms of weakness by getting up only for an hour or so at a time.

The following tonic and milk stimulant was prescribed:

	Troy ounces
Antim. sulphid.....	11½
Sulphur sublim.....	11½
Gentian pulvis.....	3
Sal. Carol. fact., q. s.....	10

Misce et fiat chart. No. 15.

Signa: One powder b. i. d. on feed.

As the case was about 30 miles from my office, it was not possible for me to see it inside of a week, so I thought it best to advise that the wound be left alone and not syringed. Another call was made a week after the operation, and the incision was making splendid headway in healing. The animal was eating well and increasing in milk. No flinching was noticeable upon palpation or exploration. There was a little discharge, and an antiseptic wash was advised. One month after the operation the wound was completely healed and the heifer had gained remarkably in weight and was giving 16 quarts of milk daily.

Although I was careful regarding antiseptics, I realize that the operation was far from being aseptic. I further believe that a cow will stand a gastro-hysterotomy better than hours of intra-uterine manipulation.

TWO DOG CASES

ON the evening of May 14 last, an aged spaniel bitch was brought to hospital with a large dropsical abdomen and prolapse of the vagina about four inches long, which had evidently been rubbing on the floor for some days, as it was rough, bluish in color, and had a fleshy growth and a very offensive smell. The owner said the bitch was not pregnant, and I could not satisfy myself by manipulation that she was. After antiseptizing the vagina, it was easily returned and the passage appeared to be normal. On the morning of May 15 it was out again, but easily returned; and as it came out several times during the day, I obtained a spring pessary and inserted it after being softened in hot water to keep it *in situ*.

On the morning of the 16th the pessary had been forced out, and three pups born alive; a large quantity of fluid was discharged. The vaginal passage remained out in its inverted condition; it was kept aseptic, and on the 17th two more pups were born, and on the 18th one more, these three being dead.

On the 20th there was a distinct line of demarcation between the fleshy part of the vaginal protrusion and the vaginal passage, and after injecting with cocaine, I applied a catgut ligature which almost cut off the enlargement, which was very soft, and in a couple of hours dropped off, and vagina retracted at once. The bitch was discharged cured, with three live puppies on May 28.

On May 14, a client advised me that three days previously a fox-terrier puppy of his had extruded a tape worm from the anus, where it remained; that he had been unable to pass feces since, and was in pain.

I told him to bring the dog to the surgery. Upon examination I found a projection from the anus of what appeared to be cotton, clogged with dried feces. After softening with a sponge of warm water, and clipping off some hair that was fast in the substances, I was enabled to seize it with a pair of forceps when it easily came away. It turned out to be a needle and thread, the point of the needle projecting outwards from the anus and surrounded by the thread rolled around it, which was traced up to the eye of the needle where it was threaded. The dog passed feces immediately and was not seen again.

ARTHUR NEW, M. R. C. V. S.,

The Veterinary Record, Nov. 20, 1920.

TO ANESTHETIZE BIRDS

IF you have never had occasion to anesthetize a chicken, turkey or duck with chloroform or ether, you still "have something coming." If you have tried it, you probably know the chicken's spirit in most cases went soaring away, not on the chicken's wings either. Most birds will die under general chloroform or ether anesthesia because the vapor gets in the air sacs and stays there until absorbed. As the area of the air sacs is enormous, a corresponding amount of anesthetic is taken in them. We recall an instance when a helper took some young chickens home to cook, that we had been experimenting upon, and later reported that they were "no good; could taste the ether."

Doctors Pearl and Surface, of the Maine Experiment Station, who have done a large amount of experimental research work on birds, give in the *Journal of the American Medical Association* their method of anesthetizing birds that has proven very satisfactory:

"The exact method of procedure which we now follow in anesthetizing birds is as follows: Immediately before beginning the administration of the anesthetic a 1/200-grain atropin sulphate tablet is dissolved in 1 c.c. of warm normal saline solution. The salt solution with the dissolved atropin is then injected subcutaneously in the axilla. Ether is used as the anesthetic. It is administered from a small improvised mask which admits of the condition of the comb being seen during the operation. Depending on how hard the ether is pushed, the bird is ready for operation in from fifteen to twenty minutes after the anesthesia is begun. The dosage of 1/200-grain atropin to a bird may seem large, but we have never been able to see the slightest bad effect from it, provided the administration of ether was begun immediately after the injection of the atropin."

N. S. MAYO.

Dr. Robert W. McCully, Dr. Cassius Way, and Dr. Howard E. Winter were the official veterinarians for the National Horse Show Association which recently held its exhibition at Madison Square Garden, New York City.

"A premium of 10 cents a hundred pounds on milk from cattle that are free from tuberculosis will be paid to dairymen in McKean County, Pa."—*The Farm Journal*.

Ice cream made of goats' milk and flavored with rose leaves is the delicacy par excellence of Greece and Crete, according to an American Red Cross worker recently returned from abroad.—*Milk Reporter*.

ABSTRACTS

THE RELATION BETWEEN THE QUANTITY OF SERUM ADMINISTERED AND THE ACTIVE IMMUNITY PRODUCED IN THE SIMULTANEOUS VACCINATION AGAINST HOG CHOLERA WITH VIRUS AND SERUM. Thomas P. Haslam. *Journal of Pathology and Bacteriology*, Vol. 23 (1920), No. 3, page 333.

The author states that authorities upon this subject differ as to whether too great a quantity of serum administered in the serum-simultaneous vaccination against hog cholera inhibits the ability of the virus to produce active immunity. The great practical importance of this question is indicated because both experiments and experience have shown that if simultaneously vaccinated pigs receive a sufficiently large dose of serum with virus, they do not disseminate hog cholera. Hence if a large dose of serum does not interfere with the immunizing properties of the virus, the simultaneous vaccination may be applied without fear of creating new centers of infection.

As a result of his experiments he concludes that—

1. The largest amount of virus administered did not prevent 2 c.c. of defibrinated blood virus from producing active immunity, as evidenced by the resistance to virus six months after vaccination.
2. Filtered virus failed to produce active immunity in the serum-simultaneous method.
3. There seems to be no fundamental drawback to the serum-simultaneous method of immunization against hog cholera, since large doses of serum do not interfere with active immunization.

GERM-FREE FILTRATES AS ANTIGENS IN THE COMPLEMENT-FIXATION TEST. W. S. Gochenour. *Journal of Agricultural Research*, Vol. 19 (1920), No. 10, p. 513.

From the data at hand the author concludes that—

1. A blackleg filtrate produced under favorable conditions will possess a distinct antigenic value demonstrable by the complement-fixation test.
2. Those blackleg filtrates that conferred a solid immunity on calves were found to possess a high antigenic titre.
3. The complement-fixation reaction should be of much value as a laboratory control test to determine whether the filtrate has been produced under conditions favorable to the blackleg organism or whether the blackleg organism has been supplanted in part or wholly by contaminating anaerobic microorganisms.

4. Botulinus filtrate also acts as an antigen in the complement-fixation test when type B serum is used with type B filtrate, but fails to cause fixation when one type of serum is used with the other type of filtrate as antigen.

5. The phenomenon of germ-free filtrates acting as antigens in the complement-fixation test is new and promises to play an important part in the differentiation of the spore-bearing anaerobes, more especially those having closely similar cultural characteristics.

DIRECTORY OF A. V. M. A. MEMBERS

Secretary Mayo has copies of the directory of considerably over 4,000 A. V. M. A. members for sale to non-members of the Association. The price per copy as fixed by the Executive Board, is \$2.50. All inquiries and orders should be addressed to N. S. Mayo, Secretary, 4753 Ravenswood Avenue, Chicago, Ill.

PROGRESS IN TICK ERADICATION

THE release of 32,171 square miles of quarantined area in the cattle-tick infested States of the South is made in a revised quarantine order signed by Secretary of Agriculture Meredith, which became effective December 1, 1920. Failure of county officials to coöperate in eradicating the tick in their areas caused the requarantining of 7,917 square miles. Under the revised quarantine approximately 218,000 square miles are held to be infested. The total net area released since the beginning of systematic tick eradication in 1906 now amounts to 510,000 square miles, or 70 per cent of the originally infected territory. The work against the cattle tick generally is progressing very successfully, though the failure in "mopping up" certain sections is responsible for many districts still being held under quarantine which would otherwise be released. It is expected, however, that during the coming year such coöperation will be obtained and that a much more substantial area will be freed from quarantine.

The many friends of Dr. John H. Blattenberg will be pleased to learn of his recent marriage to Miss Helen May Painter, of Mansfield, Ohio. He appeared in Chicago at the meeting of the United States Livestock Sanitary Association with his charming young wife, but it was necessary for the Major to produce his credentials before his colleagues would believe that he had left the ranks of the benedicts. The JOURNAL extends its congratulations and best wishes.

ARMY VETERINARY SERVICE

MORE ABOUT CIRCULAR LETTER 47

To the Editor:

The October issue of the JOURNAL contains an analysis and criticism of "War Department Circular No. 47," of April 1, 1920, signed "M. C. H." (This should be "Surgeon General's Office, Circular Letter No. 47.")

It seems to me the writer takes too pessimistic a tone, and that his criticism is entirely destructive and in several of his points based on incorrect premises. He states: "The subordination and dependence of the Veterinary Corps to the Medical Corps is to be emphasized." Keeping in mind the continued efforts of the past to have it placed under the control of the Quartermaster Department, and the fact that in the A. E. F. a veterinary officer was actually displaced and a quartermaster officer put in his place, it is a big question whether it is not for the best interests of the Corps to be a subordinate and dependent part of the Medical Corps. I believe we are all agreed that the Veterinary Corps should be entirely distinct from the Remount Service, and under no direct control of the Quartermaster Corps, and I further believe the best informed, and the conservative, veterinarians both in the Army and in civil life consider that it is not yet ready to stand alone as a separate corps.

M. C. H. states that a change in Special Regulations No. 70 is contemplated, by which the veterinarian of a post or command will be required to report through the surgeon. A careful study of Circular Letter No. 47 does not seem to the writer to warrant this conclusion, though S. R. 70 certainly will be changed many times, as it has already been to some slight extent. While it is not to be desired that this change should be effected, it would not be such a calamity as M. C. H. infers. As far as reporting to the War Department is concerned it makes little difference, beyond slight delay, if the correspondence has to go through the surgeon's office; it will be handled by the veterinary division of the Surgeon General's Office just the same. And in the much more important relations with the commanding officer of the post or command there are some advantages in having the surgeon take up important matters with the C. O. In a division the surgeon has the ear of the C. G. and the

Chief of Staff at all times, and has great influence, and even authority, in all matters pertaining to the health and efficiency of the command—far more than a veterinary officer, whether he be second lieutenant or major, can ever have. All veterinarians who served as such with tactical units can recall numerous cases of inability to get results because it was impossible to present the case to the highest authority. The Division Surgeon, however, can usually get things done where the veterinarian cannot even get a hearing.

M. C. H. complains of the proposed use of the enlisted men of the Corps. If any success at all has been gained in the effort to improve the Veterinary Corps, it lies in the addition of an enlisted personnel. And if provided at all these men should certainly be made the most of. It is no concern of the Army if any of these men take to practice after leaving the Army. It is up to veterinary associations and the civil authorities to enforce the laws on the subject of quackery. The Army is interested only in the animals of the Army, and to object to assigning a farrier to "a station of such limited animal strength as not to warrant the assignment of a veterinary officer," even if he is to work under the direction of the surgeon, seems absurd. And it is incorrect to say this will be a return to old conditions. In the old days, before 1917, there was nothing to compare with this, and sick and disabled animals were treated by the stable sergeants or company officers, or I. C.-ed and discarded with little or no attempt at salvage. Take, for an example, a company or battalion of infantry on border patrol, with an animal strength of a dozen to a hundred draft mules. It would be impracticable to have a veterinary officer assigned, but a very important thing to have a farrier or veterinary sergeant. And it is certainly better to have him under the authority of the M. O. than of the line officers, or, as might easily result, under the stable sergeant of the supply company. As was illustrated time and again in the war, an enlisted man without an official home is in an unenviable position. He must have a commanding officer to get him rationed, clothed and paid, and the Hospital Corps detachment is the logical unit to attach him to.

The objection that "the enlisted man will combine the functions of an enlisted man with those of a veterinary officer" is no objection at all, but is a concrete statement of his purpose and duties. In France, both in action and "in rest," the horse strength was very much scattered and it was impossible for the V. O. to see all his

animals every day. An enlisted man was assigned to each infantry unit having a detachment of the supply company, or to each battery, whenever this was possible, and proved invaluable in preventive and first-aid treatments of all kinds. We found this man did not have enough authority and it would be an improvement to have more sergeants for this purpose, but in many cases a farrier, or even a private, by his own personality and from the line officers and men knowing he represented higher authority, acquired much of the authority and influence of an officer. The fact that these men were effectively used, and were appreciated by the troops, was well proved by the numbers of units which asked for one to be assigned, and by the objections made when one was withdrawn.

Nor does it seem reasonable to object to a trained enlisted man of the V. C. inspecting meat and food products. This was done by civilian laymen in some of the cantonments and has always been done by laymen of the B. A. I., so why shouldn't a soldier do it after instruction and experience under the commissioned meat inspector?

"Do medical officers prepare enlisted men of the Medical Corps for competition with medical men in civil life as unqualified practitioners?" Certainly not, but they do train them to act in their place, in the Army, so far as their qualifications permit, and not to do so would render the enlisted personnel useless. Everyone who served in the Army knows that the Hospital Corps men do a very large proportion of the treatments administered. Perhaps too much of the "pill dispensing" is done by them, but the M. O. cannot be everywhere at once, and has numerous duties besides treating the sick. And so it should be with the veterinary farriers—only let us try to improve the Corps by promoting these men to sergeant and giving them more authority, as in the British Veterinary Corps. They *must* be instructed "in diagnosis, therapeutics, theory and practice of veterinary medicine, meat and milk inspection, etc.," to properly perform their duties. If not informed on these matters, what in the world are they meant for? "Stable attendants to sound animals" is all they will be if not taught strictly veterinary work.

And why worry over the danger of their setting up as quacks, when every agricultural college is teaching hundreds of students courses in veterinary science and giving far more instruction than is necessary for these enlisted men? The question of quackery should not concern the Army, and will cease to be of importance to the profession when the latter measures up to the standards it should

be striving for. The more the knowledge of the care and treatment of animals is spread through our population, the greater will be the need for, and the demands on, the veterinary profession. Quackery has been based on the ignorance of these matters among the general public, the same as quackery in human medicine in the Middle Ages; and the more teaching and instruction given to soldiers, farmers, agricultural students, school-boys and school-girls in animal husbandry and elementary veterinary science, and in human health matters, the better off will be our animal population and the resources of the country.

In conclusion, the criticisms of Circular Letter No. 47 seem to me to be too theoretical and not based on practical experience with the veterinary service with troops.

EMLEN WOOD,

Ex-Captain, V. C., U. S. A., Division Veterinarian, 28th Division; Assistant State Veterinarian, South Carolina.

Columbia, S. C., November 15, 1920.

A REJOINDER TO THE FOREGOING

A consideration of Dr. Wood's letter and the original communication from the present writer shows in most respects what amounts only to a difference of opinion. But the essential thing is a difference in point of view with reference to the present and future status of the Veterinary Corps.

In the opinion of the present writer, the V. C. will never function properly until it has a general officer at its head. There are now veterinarians in and out of the Army that have the professional and administrative ability, the experience, the educational qualifications and the personality which would qualify them for the rank and duties of a B. G. Personality and executive ability are monopolized by no profession; these qualities are conferred even upon veterinarians. It is a maxim of pedagogy that *we learn by doing*. The only way to qualify a veterinarian as a general officer in command of the V. C. is to elevate a veterinarian to that position and allow him to function.

Dr. Wood states in regard to the V. C. that he believes "the best informed, and the conservative, veterinarians both in the Army and in civil life, consider that it is not yet ready to stand alone as a separate corps." If we adopt this opinion, it is presumably on the

ground that we have no men capable of heading such a corps. Such an idea seems to me a bit pessimistic; a sad thing, if true. If, as Dr. Wood says, the surgeon has more influence and authority than a V. O. can ever have, we must believe that the caduceus on the officer's collar stands for authority, but a V on the caduceus stands for authority Vetoed! It is conceivable that we may have better men in the future; if we make the progress we should make, we will have. In the meantime, however, we should stand ready to have the Veterinary Corps taken over by veterinarians at any time and should work to have it taken over. If we stand back and allow the V. C. to become thoroughly incorporated with the Medical Corps, a divorce from that Corps will become in due time impossible and will receive no consideration from army officers or Congress.

The V. C. is headed today toward permanent subordination to the Medical Corps or toward independence of function under a general officer. Our attitude as to the course it should take should be determined by our belief in the likelihood of its functioning most effectively as a subordinate or as an independent unit. If veterinarians can manage the V. C. better than non-veterinarians, we favor an independent corps; if they can not, then by all means let the Medical Corps furnish the requisite professional ability, personality and judgment which the veterinarian lacks. Waiting for veterinarians who are not general officers to prove in any other capacity that they should be general officers will automatically settle the question in favor of the permanent subordination of the V. C. to the Medical Corps. If veterinarians have no confidence in veterinarians, no one else will have.—M. C. H.

Brigadier General Frey, Chief Veterinarian of the French Army during the war and an honorary member of the A. V. M. A., has retired from active service and has been placed in the Reserve Section of Veterinary Inspectors.

Dr. Frank R. Osborn, who formerly practiced at Logansport, Ind., resigned from the Veterinary Corps of the Army in October and is now associated with the well-known veterinary firm of Merchant & Rice, Little Rock, Ark.

Dr. Harry C. Crawford has left for Oriental Park, Havana, Cuba, where he will have charge of several stables of Thoroughbreds.

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of Fifty-seventh Annual Meeting, Columbus,
Ohio, August 23 to 27, 1920

(Continued from the December JOURNAL)

SECTION ON GENERAL PRACTICE

TUESDAY MORNING, AUGUST 24, 1920

The meeting convened at 10 a. m., Dr. H. E. Bemis, Ames, Iowa, presiding.

CHAIRMAN'S REMARKS

THE CHAIRMAN: I have prepared a few remarks, not in any way in the nature of an address, as indicated on the program, but perhaps a few words which might be considered as a keynote.

The program of the Section on General Practice ought to be the one of most interest to the practicing veterinarian and in my opinion should be contributed to largely by him. It is, however, very difficult to obtain papers for the program from the practitioners, for the reason that they are very busy and not in the habit of writing. In preparing this program an effort was made to obtain papers from practitioners or those working on problems of direct interest to them, including practice on all species of animals and obtaining contributions from all sections of the country. This we were unable to do to our entire satisfaction, as some who at first promised were later forced by various circumstances to withdraw. To those who have contributed we wish now to express our thanks and hope that others will be encouraged to offer papers in the future.

To some practitioners the outlook for the future seems not to be encouraging, but to others, and I believe to the majority, the outlook never was better for real sound, sane practice based upon a thorough and accurate diagnosis and rational treatment. The kind of practice and the methods of practicing are changing, but always for the better. The more valuable animals are receiving better care, and as a consequence wire-cuts, kicks and acute indigestion are on the decrease, while dental operations and abdominal surgery are on the increase. We already have the specialist in bovine, swine, sheep and canine practice, and in a few instances specialists upon certain diseases. I believe the time is almost here when we will see practically the same division that obtains in human medicine, the rank and file doing general practice and minor surgery, while others establish hospitals for major surgery and the treatment of certain diseases. Even now valuable animals are being shipped long distances to such hospitals for special treatment. Nothing is too much

to do for a favorite dog or cat or for a valuable cow or hog worth from a few hundred to perhaps several thousands of dollars.

We need in these meetings a presentation of the problems which are met with and the experiences of the men who may have a solution of them, that we may all go back with more determination and better preparation to render a better service.

Since coming here I have heard some indications that there may be those interested in certain lines of practice who would like to have a separate section or possibly a separate organization. I have not talked this over carefully enough to come to any conclusion, but it seems to me that the more sections we might have, the more confusion we probably would have in our meetings, and that the small-animal man ought to be interested in the general program, and vice versa; so I hope that, in the future at least, the programs may be so arranged that the program of this one section will be of interest to all practitioners, whether they are specializing or whether they are in a more general practice.

This is merely my personal opinion, based perhaps upon the experience of the past year in obtaining contributions. It is difficult for one set of officers to keep in mind all who might be interested to prepare papers and have good material for a program of this section. They need a lot of help. The coöperation has been fine, and I think always will be, if we can only reach those who can do us the most good.

PRESENTATION OF PAPERS

CHAIRMAN BEMIS: In our sessions we will try to live up to the rules of the Association as to the twenty-minute limit on papers and five-minute limit on discussion; that is, five minutes for each one who may be discussing any particular paper. If any of the contributors have papers which take a longer time than twenty minutes, it is always possible for the Section to extend the time if the members so desire; so the practice will be that at the end of twenty minutes I will call to order and ask for the further pleasure of the members. I hope if I rap time on any of the contributors they will not take offense, but simply bear in mind that we are trying to run this session properly and to get through with the program so as to get the most good out of it.

We have to make a little change in our program. We will call first on Dr. Dykstra for his paper on "Anesthesia in Veterinary Operations."

(Dr. Dykstra read his paper, which was published in the JOURNAL for October, 1920, page 74.)

CHAIRMAN BEMIS: We will now go back to our first paper. Dr. Merillat informs me that he has changed the topic of his paper a little, but it will be on this same general topic, "The Comparison of French and American Practice."

(Dr. Merillat read his paper entitled "Some Notes on the Comparative Study of Veterinary Medicine in France and the United

States." It was published in the JOURNAL for October, 1920, page 64.)

CHAIRMAN BEMIS: I am sure we have been much interested. There probably will be no discussion, but I am sure if there are any questions Dr. Merillat will be glad to answer them. If there are no questions concerning this paper, our next will be by Dr. Udall on "Traumatic Indigestion in Cattle."

(Dr. Udall read his paper, which was illustrated with lantern slides. It will be published in a later issue of the JOURNAL.)

CHAIRMAN BEMIS: Dr. Murphey is ready now and will give a lantern demonstration illustrating "Some Practical Points on the Anatomy of the Ox and Pig."

(Dr. Murphey showed and explained a series of lantern slides.)

CHAIRMAN BEMIS: It seems that the anatomy of the inguinal region of the pig is becoming much more important nowadays because of the greater demand for surgery in this region, particularly in handling inguinal and scrotal hernias. We, at least, are getting a great demand along that line.

Adjournment.

SECTION ON GENERAL PRACTICE

WEDNESDAY AFTERNOON, AUGUST 25, 1920

The meeting convened at 1:30 p. m., Dr. H. E. Bemis presiding.

PRESENTATION OF PAPERS

THE CHAIRMAN: The first paper will be "Cæsarean Section in Swine," by Dr. W. E. Macklin.

(Dr. Macklin read his paper. It was published in the JOURNAL for November, 1920, page 197.)

CHAIRMAN BEMIS: The next paper is "Prolapse of the Vagina and Uterus in Brood Bitches and of the Rectum in Puppies: Their Causes and Treatment," by Dr. Flynn.

(Dr. Flynn read his paper, which was published in the JOURNAL for October, 1920, page 91.)

CHAIRMAN BEMIS: The next paper is on "Sclerostomiasis in Horses" by Dr. Covault.

(Dr. Covault read his paper, which will be published in a later issue of the JOURNAL.)

CHAIRMAN BEMIS: The last paper is the "Treatment of Cryptorchidism," by Dr. E. E. Wegner, of Pullman, Washington.

(Dr. Wegner read his paper, which was published in the JOURNAL for October, 1920, page 80.)

ELECTION OF OFFICERS

CHAIRMAN BEMIS: The election of officers is now in order. Nominations for Chairman are in order.

(Dr. Hoskins nominated Dr. Bemis as Chairman of the Section on General Practice, but Dr. Bemis declined the nomination.)

DR. N. L. NELSON (Ames, Iowa): I would like to nominate a practitioner as Chairman of the Section on General Practice, one whom you all know, Dr. Ferguson. (Seconded.)

(It was voted, on motion duly seconded, that the nominations be closed, and Dr. Ferguson was declared elected Chairman of the Section on General Practice.)

DR. DYKSTRA: I would like to place in nomination Dr. Muldoon for Secretary. For the information of those who do not know him, I want to say that he is a graduate of the New York Veterinary College. He has been in the Army. He has worked in Cornell University, and at the present time holds the Chair of Medicine in the Kansas Agricultural College. (Seconded by Dr. Lacroix.)

DR. FLYNN: I rise to second the nomination. I know Dr. Muldoon. He is a good man for that place. It should be a pleasure to second the nomination of a man, from my standpoint, who has been actively connected with the small-animal practice.

(It was voted, on motion duly seconded, that the nominations be closed, and Dr. Muldoon was declared elected Secretary of the Section on General Practice.)

DR. LACROIX: Is this the time and place for the election of a Sub-Chairman on Small-Animal Practice?

CHAIRMAN BEMIS: Dr. Muldoon being a small-animal man, I did not know whether that would be necessary. I don't know whether we might be going contrary to the rulings of the Association or not in establishing a sub-chairman.

DR. LACROIX: I think the Executive Board reported favorably on that.

DR. MERILLAT: That will be acted upon next year.

DR. STANGE: The Executive Board considered that matter and they thought it would be inadvisable to complicate these sections by providing for sub-sections, and we thought it would be better for the small-animal men and the others to get together in the same section, so that I don't think a sub-section in this section will be recommended.

The Executive Board has authority to provide and create sections. We also have a request for new sections in another direction, and we solved that by combining with one of the sections already existing. One of the reasons for doing that was very evident this afternoon by the small attendance in this section. If you split your sections still more, you will have still smaller attendance, and the Executive Board does not feel that it is advisable to make any more subdivisions which will mean still smaller sections, because you realize that every time you create a section in the Association you are increasing the expense of running the Association.

You have to think of all these things, and we believe that unless there is a bigger attendance at these sections it will be better to keep your work combined as much as possible. We instructed the Secretary of the Association to see that provision was made for the small-animal man in connection with this section.

DR. MERILLAT: I think that is a very good move. I think that almost every practitioner is almost as much interested in the small animals as the small-animal man. A great many of the practitioners have not had the opportunity to hear all the papers. When you hold meetings on these subjects alone, then the man interested in the other things is denied the benefit of the work we do.

DR. FLYNN: Take it from the standpoint of the small-animal practitioners, they haven't heretofore been getting very much out of the program. Take, for example, this afternoon, we had three papers on small-animal practice. Men who were not interested in small animals, in order to hear the other papers, had to sit and listen to the small-animal papers, and vice versa. Several of the small-animal practitioners have been considering forming an association so that they could compare ideas and get something of interest, and that didn't seem to meet with the approval of a great many. They wanted to get a sub-section or a branch here in which these subjects could be brought up and freely discussed, and let those interested in them attend, and get all out of them that they can. That is why the resolution was introduced to the Executive Board, and I will be frank with you, gentlemen, unless the small-animal practitioner has something of interest in these programs, there will be an association formed, and if it is formed, it will necessarily divide the attendance to some extent, which is not the wish of any small-animal practitioner. The small-animal practitioners want to come to these meetings, but they don't feel that heretofore they have had the recognition that is due them. That is partly due to the fact that they haven't asked for it, but they have asked for it this time. However, if the committee does not see fit to give them a sub-section, we will be satisfied with a satisfactory program. That is all we want, but we do want that.

DR. LACROIX: I don't want to be misunderstood. I didn't want to try to "railroad" anything through, and I didn't want to be misunderstood in regard to the report of the Executive Board.

DR. STANGE: The Executive Board is also confronted with a great many complaints that we are dividing up the program so much that the general practitioners can't get what they want. They find papers in that section and this section and they can't get to them. We are increasing the problem for the general practitioner. The Executive Board had not one side, but two, and we tried to arrive at a reasonable solution. We are thoroughly in sympathy with the small-animal men. I don't want them to feel that we are not interested in their request, but we had others to consider, and you must consider that we have to think of all those in our deliberations. We have been confronted by a number of those criticisms.

Adjournment.

SECTION ON SANITARY SCIENCE AND POLICE

TUESDAY MORNING, AUGUST 24, 1920

The meeting was called to order at 9:30 a. m. by the Chairman, Dr. L. Enos Day, of Chicago.

CHAIRMAN'S ADDRESS

CHAIRMAN DAY: It has been the custom that the chairman of this as well as of other sections of this Association present an address at the opening session of the Section. Since this precedent has been established, it is, no doubt, expected that I follow in the wake of those who preceded me. However, it is not my desire to burden you with an address in the true meaning of that word, but rather to make a few remarks on a subject of special interest to the veterinary profession in general and this Section in particular.

In viewing the present status of the veterinary profession from the standpoint of one who is not in regular practice, it appears to me that the present trend is toward preventive procedure rather than curative medicine. A decade or two ago the demands of our clients were toward measures to relieve individual sufferers of disease. Today we are called upon to prevent disease from spreading to entire herds and flocks and to prescribe measures intended to improve, if possible, the health and thriftiness of the animals, thus rendering them more profitable to the owner. The veterinarian of the future will act more and more in the capacity of a consultant along these lines than in the past. He must, therefore, be ready to cope with these duties which he will be called upon to perform.

Some years ago a movement was begun to place an agricultural adviser in properly organized agricultural counties making a request for same. This movement has had a steady growth from the start, and at the present time some of our leading agricultural States have an agricultural adviser in almost all of their counties, and I understand that the salaries paid these men are increasing and in keeping with the high cost of living. While there are cases where these advisers have made mistakes by attempting to advise the farmers and stock raisers concerning curative measures in the control of disease in flocks and herds, we must admit that the county agents, or, probably more properly speaking, the agricultural advisers, have rendered a vast amount of valuable service to the agricultural districts they serve.

Within the past year some of the more progressive counties have taken steps to secure the services of a veterinarian to work in coöperation with the agricultural adviser. The duties of the veterinarian are not to treat individual cases as individuals, but to advise with reference to quarantine and sanitary measures, animal husbandry, feeds and feeding, and concerning the best animal breeds adapted to the particular location. In counties where such veterinary advisers have been secured, apparently very satisfactory results have been obtained. If this movement acquires the confidence of the

people as the introduction of the agricultural adviser did, it will gain in adherents and it may not be long before every county that has an agricultural adviser will also have a veterinary adviser. With the economic value of farm and dairy animals and their products, and poultry and eggs, which more than equals that of the products of the soil, the farming communities will soon realize that the same protection must be afforded the former by the employment of a veterinary adviser as is rendered by the agricultural adviser on questions of crops, soil, etc. It will thus be seen that the time may not be far off when the veterinarians of this country will be called upon to extend their activities in a comparatively new field. We must, therefore, be ready for the occasion.

The veterinarian of the future must be given special training along the lines of sanitary science and police measures, as the demands along these particular lines will constantly increase in proportion to our increased knowledge of the etiology and dissemination of those diseases which were formerly quite obscure. In order to meet the requirements of the profession, a higher educational standard must be established for veterinary graduates and greater educational facilities must be provided for the study of veterinary science. A veterinarian to fill a position compatible with the future requirements of the profession must be one of high moral character and with a broad knowledge not only of matters pertaining to veterinary science but also allied sciences, and should be capable of making an address before an audience whenever the occasion demands. I am glad to note that some of our veterinary colleges have already seen the needs of this qualification and have added English and public speaking to their curriculums.

The American Veterinary Medical Association has always endeavored to keep abreast with the times in these respects. Two years ago at Philadelphia the matriculation requirements for veterinary students were raised to four years of high school or its equivalent, which was a step in the right direction. However, I feel that it will not be long before it will become necessary to make the entrance requirements even higher. In order to be on a level with the scientific men of the allied professions with whom the veterinarian becomes associated in his work, he must possess an equal fundamental education and a wider basic intellectual training than is required at the present time. Some of the other professions have made a two years' collegiate course a prerequisite to the study for the particular profession. The veterinary profession may be obliged to take similar steps in the near future. The standard of the veterinarian must keep pace with that of other professions, and this can be done only by requiring the veterinarian to possess a basic training appropriate to the importance of the duties he is to perform, and, as I endeavored to point out above, the field of activity of the veterinarian is constantly becoming broader and broader. The veterinarian of the future will, therefore, have to be one with sufficient training along the newly required lines above enumerated.

REPORT OF SECRETARY

CHAIRMAN DAY: The next in order will be the report of the Secretary, Dr. H. P. Hoskins, of Detroit, Mich.

DR. H. P. HOSKINS: There is really very little to incorporate in a report of this kind. Our Constitution and By-Laws do not impose very strenuous duties upon section secretaries other than securing and arranging programs for the sessions of the sections. Thanks to the hearty cooperation received from a number of our members, we have been enabled to present a very full program, perhaps the most comprehensive that has ever been offered to the Association. In the programs for the two sessions of this Section there are 23 papers and discussions listed. In addition to these our Section has contributed a major portion of the programs for the general sessions for Wednesday and Thursday. This was made possible through the nature of the papers, the subjects suggesting that they should be presented to the entire Association rather than any one section.

To the Bureau of Animal Industry veterinarians we offer our regrets for our inability to arrange the program of one session for the Government men. There being time on the program for only two separate sessions of this Section, it was found impossible to devote either one to the particular interests of the Bureau men. We believe, however, that they will find much to interest them throughout the program.

Your Secretary would like to reiterate the suggestions made by him on other occasions that some consideration be given to the creation of additional sections. As the work of the veterinarian becomes more diversified and more highly specialized, coincident with the growth of the Association in membership, the greater will be the need and the demand for more specialization in the programs. There has already been some discussion for the creation of a section for small-animal practice, and likewise a section for laboratory subjects, where papers of a somewhat technical character could be presented and discussed. One other suggestion is that members who wish to present papers should not be either modest or slow in making their offers to contribute. One reason why the programs of certain sessions appear unusually long is because some of the papers were offered after the section officers had practically completed their arrangement of the program.

Your section officers wish to acknowledge their indebtedness to and thank heartily all of the members who have lent their assistance in securing the papers presented, as well as the contributors themselves.

PRESENTATION OF PAPERS

CHAIRMAN DAY: We have something like thirteen or fourteen numbers on the program and I am going to ask you to make your discussions just as brief as possible, as well as the papers. It will take something like four hours if all the members take up twenty

minutes each who read papers, besides the discussion on them. We are going to confine ourselves to the twenty-minute rule.

The first paper on the program is "Eradicating Tuberculosis in Pennsylvania," by Dr. S. E. Bruner, of Harrisburg.

(Dr. Bruner read his paper, which was published in the JOURNAL for November, 1920, page 147.)

CHAIRMAN DAY: The next paper, entitled "Disposition of Tuberculous Cattle," will be given by Dr. O. H. Eliason, Madison, Wis.

(Dr. Eliason read his paper, which was published in the JOURNAL for November, 1920, page 155. During the reading of this paper the twenty-minute limit expired, and a motion prevailed permitting Dr. Eliason to finish his paper.)

CHAIRMAN DAY: The next paper on our program is "The Preparation of Tuberculins," by Drs. Fred Boerner, Jr., and Miller F. Barnes, of Philadelphia, Pa.

(This paper was read. It was published in the JOURNAL for November, 1920, page 160.)

CHAIRMAN DAY: The next paper, entitled "Combination Tuberculin Tests," will be read by Dr. Henry W. Turner, of New Hope, Pa.

(Dr. Turner read his paper, which was published in the JOURNAL for November, 1920, page 165.)

CHAIRMAN DAY: The next paper is "The Superiority of Combination Tuberculin Tests over any other Method," by Dr. L. B. Ernest, Washington, D. C.

DR. ERNEST: Before reading my paper I want to emphasize one point. No attempt is made in this paper to describe any of the methods. The facts given bear out the title of the text. In the preparation of any material for tuberculin, a wide field is presented. I shall include a brief report just received of a herd tested by the subcutaneous method sixty days prior to the injection of the ophthalmic and the intradermic tests.

(Dr. Ernest read his paper, which was published in the JOURNAL for November, 1920, page 173.)

CHAIRMAN DAY: The next paper will be "Activities of the Bureau Laboratories at Washington," by Dr. J. S. Buckley, Washington, D. C.

(Dr. Buckley read his paper, which will be published in a later issue of the JOURNAL.)

Dr. Kinsley offered a motion, which was duly seconded, that the rest of the papers appearing on the morning's program and not yet read be placed at the end of the program at the next session on August 25. Dr. Eichhorn objected to an amendment which was offered to place the papers not yet read at the beginning of the next session, and commented on the undue length of the program for one session. Dr. Hoskins, Secretary, explained that some of the papers were received after the program was made up and their authors were informed that they would be read if possible. Chair-

man Day said the Secretary's explanation was in keeping with the understanding of the Chair. The amendment was put to vote and declared by the Chairman to be lost. The previous question was then put to vote and carried.

The meeting then adjourned.

SECTION ON SANITARY SCIENCE AND POLICE

WEDNESDAY AFTERNOON, AUGUST 25, 1920

The meeting convened at 1:30 p. m., Dr. L. Enos Day presiding.

PRESENTATION OF PAPERS

CHAIRMAN DAY: According to the motion yesterday, we are to begin with the program today as printed. The first on the program will be the subject "Susceptibility to Cholera of Young Pigs from Immune Mothers," by Dr. E. M. Pickens, College Park, Md.

DR. PICKENS: I am afraid my paper is a little long for twenty minutes, so I am going to take the liberty of omitting the reading of the introduction, but I think after a little you will be able to get the run of the paper.

(Dr. Pickens's paper appears elsewhere in this issue of the JOURNAL.)

CHAIRMAN DAY: The next paper is entitled "Protozoan Forms and Their Relation to Diarrhea and Colitis in Shoats," by Dr. W. W. Dimock, Lexington, Ky.

DR. DIMOCK: In the preparation of this paper, I have tried to be conservative, by which I mean that I have tried to keep my enthusiasm within bounds. I have no chart, but will give you a summary of the tables I have prepared.

(Dr. Dimock's paper, as well as the discussion which followed, appears elsewhere in this issue of the JOURNAL.)

CHAIRMAN DAY: The next paper is "Field Observations in the Control of Infectious Swine Diseases," by Dr. M. Jacob, Nashville, Tenn.

(Dr. Jacob read his paper, which appears elsewhere in this issue of the JOURNAL. Time expired during the reading of this paper and a motion prevailed permitting Dr. Jacob to finish its reading.)

CHAIRMAN DAY: The next paper is by myself on the subject "Rhabdomyoma in Sheep." I am going to ask that this be read by title. I have some slides, however, to show you, and I will explain the pictures as they are thrown on the screen.

(The lantern slides were shown and explained by Dr. Day.)

ELECTION OF OFFICERS

CHAIRMAN DAY: This ends the program for the day, except the election of officers. Nominations for Chairman are first in order.

(Dr. H. W. Jakeman, of Indianapolis, was nominated, and a motion prevailed that nominations close. A motion prevailed instructing the Secretary to cast the entire vote of the membership for Dr. Jakeman, which was accordingly done.)

(Dr. H. Preston Hoskins, of Detroit, was placed in nomination to succeed himself as Secretary, but said he thought someone else should be recognized; whereupon the member nominating Dr. Hoskins withdrew his name and nominated Dr. B. T. Simms, of Corvallis, Oregon. A motion prevailed to close the nominations, and the Secretary was instructed to cast the entire vote of the Section for Dr. Simms for Secretary, which was accordingly done.)

Adjournment.

A. V. M. A. EXECUTIVE BOARD MEETINGS

THE Executive Board of the A. V. M. A. held a meeting at the Hotel La Salle, Chicago, Sunday evening, November 28, at 8 p. m. Those present were Chairman Hilton, Drs. Kinsley, Munce, Kiernan, Bennett, Stange and White. Doctor Lamb, of Colorado, came before the Board and presented the matter of the place for the next annual meeting in Colorado. After a careful consideration, it was voted that the 1921 annual meeting of the A. V. M. A. be held in Denver, Colo., September 5 to 9, inclusive.

It was also voted that the Secretary be authorized to charge \$2.50 for copies of the A. V. M. A. directory to non-members of the Association.

At the suggestion of Treasurer Jacob, it was decided that the bonds of the Treasurer of the A. V. M. A. be increased to \$25,000.

It was moved by Doctor Kinsley that Doctor Bennett and Secretary Mayo be appointed a committee to investigate the matter of appointing a body similar to the Council on Pharmacy and Chemistry of the American Medical Association and to report at the next meeting of the Executive Board in Colorado. Carried.

Doctor Munce moved that the Secretary be instructed to count only the official postal card vote as received. Carried.

Doctor Munce, as chairman of the subcommittee of the Board to consider the matter of combining the offices of Editor and Secretary, reported that the matter was still under consideration.

It was voted that the offer by Doctor Cary of a house and lot in Auburn, Ala., for the permanent home of the A. V. M. A. be received and filed for consideration at the next meeting of the Executive Board.

It was agreed that the Executive Board recommend to the Association at the next meeting that the Constitution and By-Laws be amended as follows:

Section 7, Article G, adding "excepting members residing in coun-

tries other than the United States and Canada, the said ballot shall be returned in ninety days after the date of issue," and also that in Article 11 of the by-laws, adding "excepting the Editor, Secretary, Business Manager and Treasurer, who shall assume their duties within thirty days following their election."

A second meeting of the Executive Board of the A. V. M. A. was held at the Hotel La Salle, December 1, at 2:30 p. m. The meeting was called to order by Chairman Hilton. Those present were Doctors Kiernan, Munce, Bennett, Stange, Kinsley and President White.

The Executive Board decided to recommend that Article IV, Section 1, of the Constitution and By-Laws be changed by striking out the words "within 60 days after the annual meeting."

Moved by Doctor Munce and seconded by Doctor Stange that the matter of a questionnaire on intradermic tuberculin test be referred to the committee on tuberculosis with power to act, it being understood that the expense of the committee was not to exceed their appropriation.

It was moved by Doctor Kiernan and seconded by Dr. Munce that Doctor Stange be appointed a sub-committee of one to confer with the Committee on Intelligence and Education with reference to the matter of educational publicity. Carried.

Doctors Kinsley and Bennett, who were a sub-committee to inspect the Secretary's office, reported as follows:

"As per your instructions, the undersigned visited the Secretary's office on November 30, and beg to submit the following report:

"The financial records of the A. V. M. A. are, in our judgment, maintained in an up-to-date businesslike manner, there being employed the various methods of rechecking all accounts, thus diminishing the possibility of error. The correspondence of the Association is conducted in a businesslike manner, files of same being maintained. Different lists of the names of members are maintained so they can be properly transferred and correct addresses preserved.

"We found the Secretary using office space of the company with which he is associated, and help is also employed on part time from the same company. This arrangement, we believe, is very economical and also efficient, the cost being much less than if a separate office were maintained."

There being no further business, the Board adjourned.

N. S. MAYO, *Secretary.*

OTHER MEETINGS

UNITED STATES LIVE STOCK SANITARY ASSOCIATION

The twenty-fourth annual meeting of this Association was held in Chicago, Illinois, November 29, 30, and December 1, 1920. The excellent program attracted a large attendance at every session and the meeting is regarded as one of the largest and most interesting in the history of the organization. A conservative estimate placed the attendance at from 450 to 500.

Owing to the death of President S. F. Musselman on October 26 and the absence of Dr. E. M. Ranck and Dr. F. A. Bolser, First and Second Vice-Presidents, on account of illness, the meeting was called to order with Dr. W. F. Crewe, Third Vice-President, in the chair.

The address of welcome was given by Mr. Thomas E. Wilson, President of Wilson & Company, in which he said in part:

"I think any city might be proud and would be proud to welcome your convention. Your work is national in scope, and while you are looking after the herds and flocks of the country, you are also protecting the health and the welfare of the American people.

"Much has been accomplished by the application of sanitary science in the livestock industry, that you men are more familiar with than I, but it has been with great satisfaction that I have followed to a considerable extent the work of the men of your profession—of your Association. Any one of the big things that you have done would be sufficient to justify your existence.

"Your efforts in the elimination of the fever tick, making it possible for our southern country to compete in the markets of the world with their livestock—that alone is sufficient, or would be sufficient compensation to justify your existence.

"Your efforts in the elimination of hog cholera is another work to your credit. Great wealth has been added to the country by the control of that dreaded disease.

"Scabies is another, but probably the most trying one that you have had contact with recently is foot-and-mouth disease. The very nature of the disease itself made it difficult, but the manner in which it was taken hold of by your profession and handled and controlled in conjunction with the Government was a very great credit to you.

"There is one other that you are working on today, and I hope and believe that the outcome of your gathering here will be the enlargement of the program in connection with this work, and that is the control of tuberculosis. I think if the amount of work and the accomplishment of this Association in that direction were known, you would not have me here to welcome you; you would have the citizenship of this great country here to applaud the work that you have done. But it is not known and you must take your satisfaction out of your own conscience and your own knowledge that you are accomplishing great things in that direction. Science has proven to us that that dreaded disease in animals is conveyed to human beings, and I think you men may feel satisfied in your own conscience and your own heart, if through your work in controlling that disease among the animals, you have stopped the transmission of that disease to just a few of our babies who are depending upon the cow as their foster-mother. You have sufficient satisfaction in that one thought to justify the work that you have done, and to encourage its continuance.

"There is one other germ that is threatening the life and the activity of the livestock industry, and that germ I think most of you men are familiar with. It is incubated by misinformation. That germ attacks one of the branches of the livestock industry. The serum for it, in my estimation, gentlemen, is confidence, which, unfortunately, is lacking to a very great extent in this industry. We must understand—this industry must understand the entire progress from calf to table, and you men are in a position to understand at least a portion of it; you are in a position to understand clearly the operation of the packing industry.

"As I said, gentlemen, much is left undone for you to do. You have made great strides; you have had considerable support from the State Governments and the Federal Government, but you have so well established yourselves now that I believe by the proper backing on your part, by the proper efforts for legislation such as you may require, it will be obtainable. And my express recommendation to you gentlemen is that you get back of the proposition, that you get back of the effort to legislate for necessary funds to carry on the work, to carry on your quarantine efforts, and that you get back of the Department of Agriculture, which, after all, has been the pathfinder in this work, and support them to the fullest extent."

In responding to the address of welcome, Mr. A. J. Glover, Editor of *Hoard's Dairyman*, stressed the progress that has been made in veterinary science and the benefits derived from the Association, and suggested that the trend of the meetings is too much toward veterinary subjects and not enough attention is being given to such matters as the handling, care, and feeding of farm animals to keep them healthy and strong. It was suggested by Mr. Glover that in future one day be set apart for discussing animal husbandry subjects and that two or three breeders be placed on the program.

The response to the address of welcome was followed by the reading of the minutes of the last meeting and the Secretary's report, after which the regular proceedings were suspended to devote the remainder of the forenoon period to memorial exercises for departed members.

Dr. Robert Graham of the University of Illinois, in speaking of our late and lamented President, said in part:

"He was one of America's foremost citizens in the work of live-stock sanitarians. The esteem in which he was held by his fellow-men is vividly portrayed through the long years of confidence reposed in him by virtue of his office in the State Government of Kentucky, and any word of mine could not add to the many honors voluntarily conferred on him by this and other societies or social orders to which he belonged. A genial, wholesome and unselfish man whose first thoughts were of home, friends and duty. His friendship was a source of joy to all and his memory and likeness will always hold that lofty challenge to courage and duty that fires inspiration to right and noble living of which his life was a true example."

Hon. Joseph Mercer, Commissioner of Agriculture of Kansas, spoke of Dr. Musselman as a State official and the high esteem in which he was held by those with whom he came in official contact.

Dr. W. W. Dimock, of the Kentucky Agricultural Experiment Station, referred in a touching manner to Dr. Musselman's home life and the sterling qualities that characterized him as a courteous, considerate gentleman and capable practitioner, always firm in his stand for what he believed to be right and just and always ready to perform his duty.

Appropriate eulogies were delivered for other departed members, as follows:

Dr. Joseph Hughes by Dr. E. L. Quitman, Dr. J. F. DeVine and Mr. A. J. Glover;

Dr. E. M. Wiggs by Dr. C. A. Cary and Dr. L. G. Cloud;

Dr. S. E. Cosford by Dr. J. S. Koen;

Dr. John F. Winchester by Dr. Horace Hoskins;

Dr. George McEvers by Dr. A. T. Peters;

Dr. H. J. Beer by Dr. N. S. Mayo.

It is regretted that we have not space to publish all of the beautiful tributes paid to the members of the Association who passed away since the meeting a year ago.

During the reading of his paper on the "Progress of Coöperative Accredited Herd Testing," Dr. J. A. Kiernan called attention to the presence of Hon. Charles Sloan of Geneva, Nebraska, who introduced the original bills in Congress asking for appropriations for tuberculosis eradication and hog cholera control. In response to the request of the Association, Mr. Sloan delivered an interesting, forceful address in which he reviewed the history leading up to the action of Congress in making the appropriations. He paid a glowing tribute to the memory of the late Hon. James Wilson, formerly Secretary of Agriculture, who was so anxious to get tuberculosis and hog cholera eradication under way before the termination of his duties as Secretary. In referring to the rapid progress of tuberculosis eradication, Mr. Sloan thrilled the audience when he said: "The dreams of 'Uncle Jim' Wilson are coming true and the United States is leading in this great work." The part of Mr. Sloan's address referring to the economic and humane features of the fight against tuberculosis was especially impressive. Our yearly mortality from human tuberculosis is approximately 140,000. The gravity of the menace from this insidious plague is realized when we stop to consider that tuberculosis kills more human beings in the United States in one year than we lost altogether on battlefields, aboard ships, in army and navy hospitals and camps during the whole period of the recent war.

Other important papers on tuberculosis were presented by Drs. D. F. Luckey of Missouri, C. H. Case of Ohio, and W. J. Fretz of Minnesota.

During the afternoon session of November 30, Mr. Wayne Dinsmore, Secretary of the Horse Association of America, favored the Association with a brief address in which he presented strong arguments in favor of the horse and mule as the most reliable, economic

and effectual motive power on farms and for interrupted hauls and condemned the activities of those who are engaged in overzealous automobile propaganda.

The Report of the Committee on Infectious Swine Diseases was read by the Chairman, Dr. W. W. Dimock. On account of the chaos that has prevailed in field diagnosis, this report was received with more than ordinary interest. It was stated that hog cholera is the most important disease of swine and will continue to be. Veterinarians should have fundamental knowledge of pathology and bacteriology to attempt diagnosis. Procedures were suggested for diagnosing hog cholera and it was urged that all resources, including the laboratory, be used in making differential diagnoses. A very able supplementary report on Diagnosis of Pneumonia of Swine was read by Dr. R. R. Birch. In another supplementary report, Dr. Robert Jay discussed the subject of "breaks" following immunization of swine by virus and serum. In his discussion Dr. Jay cited an experiment in protein feeding conducted at the University of Tennessee, which aroused considerable interest.

Dr. T. P. White of the Bureau of Animal Industry, Chairman of the Committee on Hog Cholera Control, read the Report of that Committee. In a short preface Dr. White called attention to the fact that hog cholera in relation to the value of the swine industry should attract the same amount of effort for its eradication as in the case of other diseases of livestock. The report contained timely data and urged the coöperation and support of each member of the Association for renewed and determined action not only for the control of hog cholera but its elimination from American farms.

The Report of the Committee on Inter and Intra-State Shipment of Swine was read by Dr. U. G. Houck of the Bureau of Animal Industry. The Committee called attention to the variations that exist in the laws and regulations of the various States and urged that action be taken looking toward securing uniformity. A tentative outline of regulations was presented in the Report for the consideration of the Association, and, in conformity with the recommendations of the Committee, the following resolution was passed:

"Be it resolved, That a committee of seven State regulatory authorities representing the swine-growing sections of the United States be appointed and instructed to prepare regulations for the inter and intrastate movement of swine, to be reported at the next annual meeting of the United States Live Stock Sanitary Association."

Dr. J. I. Gibson, Chairman of the Committee on Resolutions, presented the following resolution, which was passed by the Association:

"Be it resolved by the United States Live Stock Sanitary Association, That we recommend that the livestock sanitary authorities of each State take steps to gather reliable information concerning the health of livestock in the State with definite information as to any and all existing outbreaks of communicable diseases, and that the information thus gathered be forwarded to the chief of the Bureau of Animal Industry, U. S. Department of Agriculture, with the request that the statistics and the information thus gathered be edited and published by the department and distributed to the various State sanitary boards in sufficient quantity so that distribution may be made among those interested in animal health and livestock sanitation in the various States."

In connection with the Report of the Committee on Tick Eradication a resolution was passed, providing:

"1st. That the national association of livestock sanitarians in convention assembled at Chicago in 1920, do hereby urge all States having infested territory to take measures and action to kill the last tick and thus speedily end this long-continued and costly war on the dangerous cattle tick.

"2d. That in order to force early action on the part of reluctant and inactive areas, we most earnestly request Congress to pass an act to prevent or prohibit the interstate movement of all cattle-tick-quarantined animals on and after March 1, 1922.

"3d. That each State officer and all others herein represented make special request of their respective Congressmen to support and pass such an act at the earliest possible date.

"4th. That the secretary have 500 copies of this resolution printed and a copy be sent to each Senator and Representative and to all the State officials."

Dr. A. W. Miller, of the Committee on Special Skin Diseases, read a very comprehensive report on the prevalence of the skin diseases of animals, especially scabies of sheep and cattle, in which he asserted that the scab mite cannot be killed by talk—it requires poison effectually applied to exterminate it.

Valuable papers on anthrax and scabies were then presented by Drs. A. Eichhorn of New York, and B. F. Davis of Wyoming, respectively.

The Report of the Committee on Live Stock Diseases was read by Dr. V. A. Moore. In this report attention was called to a noncontagious disease of cattle that has appeared in the State of New York, which is a puzzle to all who have observed it. Whether this is a new disease cannot be stated positively. Among the other diseases covered by the report were a lymphangitis of cattle which in some respects resembles tuberculosis, contagious abortion of swine, bovine botulism, exudative septicemia of geese, bowel trouble in cattle caused by coccidia, avian tuberculosis, and a nutritional disease of poultry investigated at the University of California.

A very creditable Report by the Committee on Abortion Disease was presented by Dr. Ward Giltner, the Chairman of the Committee, while the subject was further elaborated upon by the excellent papers of Drs. J. F. De Vine of New York, I. F. Huddleson of Michigan, and E. S. Good of Kentucky.

Before the closing of the meeting, the following officers were elected for the coming year:

Dr. W. F. Crewe, Bismarck, North Dakota, President, elected by acclamation.

Drs. R. W. Hoggan, J. H. McNeil, A. E. Bott, W. K. Lewis and P. Malcolm were elected vice-presidents.

Dr. Theodore A. Burnett of Columbus, Ohio, was elected Secretary-Treasurer.

From the viewpoints of attendance, interest, character and quality of papers and discussions, the meeting was a great success. The complete report will be published as usual by the Association.

SECOND ANNUAL GENERAL TUBERCULOSIS CONFERENCE

AT the Tuberculosis Conference held in Chicago, October, 1919, a strong sentiment was expressed in favor of making it an annual event. It may be advisable to have annual conferences, but as yet that policy has not been adopted. There were many things in connection with the tuberculosis eradication campaign to be discussed this year, and, obviously, there would be insufficient time to devote to detailed discussion of the work at the annual meeting of the United States Live Stock Sanitary Association. Therefore, after consultation with many State livestock sanitary officials it was decided to hold another conference in Chicago, November 27, 1920.

There were a larger number of States represented at the second

conference than at the one held in 1919. On the first day of the meeting, when a vote was taken on the report of the tuberculin test committee, 42 States were represented. The principal item of discussion was the report of the committee on tuberculin tests. This discussion consumed the greater part of the first day's session, but it was time well spent, in view of the fact that a definite plan was rounded out and adopted. This report dealt particularly with the intradermic test. The report was referred to the United States Live Stock Sanitary Association, and on December 1, 1920, the recommendation made by the Tuberculosis Conference was adopted after a few minor changes had been made.

The effect of the action taken on the uniform accredited-herd plan is to amend Sections 1, 6 and 14, as follows: Section 1 as adopted by the Live Stock Sanitary Association in December, 1920, reads as follows:

"1. A tuberculosis-free accredited herd is one in which no animal affected with tuberculosis has been found upon two annual or three semi-annual tests, and by physical examination, applied by a veterinary inspector of the United States Bureau of Animal Industry or a regularly employed veterinary inspector of the State in which co-operative tuberculosis eradication work is conducted by the United States Department of Agriculture and the State.

"Section (a). The subcutaneous, intradermic and ophthalmic methods of applying the tuberculin test are approved.

"Section (b). The initial testing in accredited-herd work may be by either the subcutaneous or intradermic method, but the ophthalmic method shall only be used in combination with the subcutaneous or intradermic method.

"Section (c). The final test on herds shall be by such combination of methods as may be deemed most advisable by the State and Federal officials."

The amendment made to Section 6 in brief is that officially accredited herds shall, when ordered by the livestock sanitary officials of the State, be tuberculin tested by any veterinarian whose name is upon the accredited list of veterinarians approved of by the United States Bureau of Animal Industry and the State for that purpose.

These veterinarians can only qualify for accredited-herd work by passing a satisfactory examination.

Section 14 of the uniform plan was amended by adding paragraph 3:

"After the bull is no longer used in the herd, that herd may be fully accredited after two successful tuberculin tests applied not less than six months apart."

Other phases of the accredited-herd plan were discussed fully by the Conference, and many constructive points were brought out and agreed upon.

The Conference was a very successful one, and should there be occasion for holding another in 1921, no doubt the livestock sanitary officials of the respective states would attend in large numbers.

WESTERN PENNSYLVANIA VETERINARY CLUB

THE Western Pennsylvania Veterinary Club held its regular meeting October 19 at the John A. Bell Livestock Farm, Coraopolis Heights, Pennsylvania. The club was very grateful to Mr. Bell for this opportunity, for the courteous and generous entertainment, and for the excellent dinner served to all at his farm hotel.

Mr. Bell is President of the Pennsylvania Holstein-Friesian Association and has a herd of about 160, which consists of well-selected individuals from championship families. Besides the cattle he has other good examples of purebred livestock. It is his aim to make this the leading Holstein-Friesian herd. The buildings are well located and well arranged on high and dry land, an excellent view, with good facilities for drainage, and with a ventilating system which is simple, unique and efficient.

The greater part of the afternoon was devoted to a judging contest conducted by Dr. G. A. Dick, Professor of Animal Industry of the Veterinary Department of the University of Pennsylvania, who discussed the dairy type to the gratification of those present and placed the four cows which were used for the contest in their proper classes after every person had been given the opportunity to place them and mark a score-card which was furnished. Two castration operations were performed by Dr. F. A. Marshall, assisted by Dr. S. E. Young, who is the resident veterinarian.

The Western Pennsylvania Club was the first veterinary club organized in Pennsylvania, of which there are seven at the present time. This was probably the first veterinary club meeting of this character. There were fifty-two present.

The following guests were present: T. E. Munce, State Veterinarian, Pennsylvania; Dr. L. A. Merillat, Orrville, Ohio; Prof. G. A. Dick, University of Pennsylvania; M. C. Gilpin, Assistant Editor of the *National Stockman and Farmer*; Dr. H. W. Turner,

New Hope; M. F. Barnes, Philadelphia; G. A. Burdick, of the F. R. Babcock Holstein-Friesian Farm, Valinca, and the superintendent of Mary Vale Jersey Farm, Sharon, Pennsylvania.

FRED WEITZEL, *Secretary.*

CHICAGO LIVESTOCK EXCHANGE BANQUET

ON Monday evening, November 29, the Chicago Live Stock Exchange acted as host to a large number of State and bureau officials, as well as representatives from all of the purebred cattle breeding associations. A beefsteak dinner was served, followed by addresses on the subject of tuberculosis. The Hon. E. C. Brown, President, American National Live Stock Exchanges, acted as toastmaster, and in stating the purpose of the banquet set forth indisputable facts regarding the prevalence of tuberculosis, and the necessity of continuing and increasing the forces that are now waging the fight against that insidious disease.

President M. D. Munn, of the American Jersey Cattle Club, sounded the keynote of the evening when he declared that the accredited-herd plan should be kept at the very highest standard possible, and that no herd should be kept upon the accredited list if tuberculous animals are subsequently found in it.

Mr. T. E. Wilson, head of the well-known packing concern, stated that he had great confidence in the campaign which was now being waged against tuberculosis, and was giving it his support in every direction.

Among the other speakers were ex-Congressman Sloan; Commissioner Hogue of New York; Commissioner Norgard of Wisconsin; President Stafford, Chicago Live Stock Exchange; Livestock Commissioner H. R. Smith; George E. Martin, *Breeders' Gazette*; State Veterinarian Spencer of Nebraska; J. Scott of the Illinois Farm Bureau; Drs. J. A. Kiernan and J. R. Mohler.

UTAH VETERINARY MEDICAL ASSOCIATION

• THE tenth annual meeting of the Utah Veterinary Medical Association was held in the Capitol Building, Salt Lake City, October 7.

The meeting was called to order at 10 a. m. by President Parker.

Dr. R. W. Hoggan, State Inspector of Live Stock, addressed the members on matters of general interest, and thanked them for their assistance.

Dr. D. J. Hickey of the B. A. I. represented Dr. F. E. Murray, in charge of field work in Utah, who was unable to be present, and spoke on the ophthalmic test of cattle for the detection of tuberculosis.

Informal talks were made by several members. A number of new members were elected. The Secretary reported the financial condition of the association as satisfactory.

The following officers were reelected for the ensuing year:

Dr. Frank Parker, Ogden, President; Dr. W. H. Hendricks, Richmond, Vice-President; Dr. E. A. Bundy, Ogden, Sec.-Treas.

A schedule of prices for certain lines of work was adopted.

The members expressed themselves as in favor of a winter meeting and clinic.

E. A. BUNDY, *Secretary*.

FLORIDA VETERINARY MEDICAL ASSOCIATION

THIS meeting, which was held at the Seminole Hotel, Jacksonville, Florida, November 22, was first an impromptu affair, called by Dr. Schofield of Miami. His call resulted in a representative gathering of Florida veterinarians and veterinarians in the services of the Department of Agriculture and State Live Stock Sanitary Board. It had the desired effect of bringing the Florida Veterinary Medical Association again into life.

The first question before the preliminary meeting was whether to continue the old organization or to reorganize.

A majority vote decided to continue the old organization and Dr. Charles F. Dawson, as President, called a regular meeting of the Florida Veterinary Medical Association to order. Roll call showed the following members and visitors present: Dr. Charles F. Dawson, Pres.; Dr. W. J. Tanner, Vice Pres.; Dr. Fred. W. Porter, Sec.-Treas.; Dr. W. P. Link, Dr. Major Schofield, Dr. G. S. Davis, Dr. J. W. DeMilly.

Minutes of the previous meeting at Gainesville, Fla., Jan. 18, 1917, were read and adopted.

The financial report, read by the Treasurer, and showing a cash balance of a little more than fifty dollars, was accepted.

Dr. A. L. Shealy, of the University of Florida, asked for the assistance and coöperation of the professional men throughout the State for his department at the U. of F., stating that he already had the nucleus for a diagnostic laboratory, with a stock of small ex-

perimental animals, and would be glad to do diagnostic work if specimens were sent to his department.

Dr. Dawson spoke of the need of a qualified veterinary bacteriologist.

Discussion brought out the dangers of abortion disease to both dairy and beef cattle of the State. The advisability of the agglutination and fixation tests on cattle for importation into the State brought out statements that the Sanitary Board had power to impose these tests and to require certification of tests before cattle were allowed to enter the State. It is not known that any other State makes this requirement.

It was moved by Dr. Dawson that the B. A. I. be asked to give protection against this disease and to prohibit interstate movement without certificate of tests. Carried.

General discussion on a local condition known as "salt sick" showed this to be an anemic condition, brought about by many causes, notably intestinal parasites, especially uncinaria, chronic tick-fever, poor pasturage or feed, unsanitary stabling, etc., which could be successfully handled, when not too far advanced, by tonics containing iron, change of local conditions and change of pasture.

The discussion of the use of thymol versus chenopodium against internal parasites, favored thymol. Chenopodium was believed to be safer for dogs than for cattle.

Discussion of "blacktongue" of dogs showed it to be a canine typhus, which would yield to intestinal antiseptics.

The question of a veterinary practice act being brought up, it was moved and seconded that the president appoint a committee to draft such an act, with power to appoint a representative at the coming legislative meeting and expend necessary funds to get such act on our statute books. The president appointed Drs. Schofield, Porter, Tanner, Link, Shuminiger, DeMilly and Houchin.

All B. A. I. men were invited to become honorary members of this association, with full privileges of membership but no dues.

On motion, Dr. Schofield was reimbursed for his expenses in calling the meeting.

All membership dues since meeting of 1917 were remitted.

The following officers were unanimously elected for the ensuing year: Dr. Charles F. Dawson, President; Dr. Major Schofield, Vice President; Dr. Fred. W. Porter, Sec.-Treasurer.

On presentation of petitions for membership, the following named men were voted on and declared elected as members:

R. C. Shuminiger, H. Bannister, S. C. Smode, B. A. M. Brayer, G. E. Pace, Arthur S. Houchin, E. L. Reed, H. M. Clarrol, J. W. Etheridge, A. L. Shealy, Paul Fischer, H. C. Nichols, and M. J. Ernest.

The President was instructed to call the next meeting some time within the next twelve months, the date, place of meeting and hour to be selected by him.

FRED. W. PORTER, *Secretary*.

VETERINARY CLUB OF PHILADELPHIA

THE Veterinary Club of Philadelphia held its monthly meeting on Tuesday evening, November 23, at the Veterinary School, University of Pennsylvania, with a large attendance. Dr. George H. Hart, of California, at present in charge of Veterinary Extension at the Veterinary Department, U. of P., gave a very interesting talk about the veterinary activities in California, and the opportunities for veterinarians in that State, especially in the treatment of food producing animals, and also in the control of contagious diseases, such as anthrax and scabies, which appear to be more prevalent in the dry season.

C. S. ROCKWELL, *Secretary*.

MASSACHUSETTS VETERINARY ASSOCIATION

THE regular monthly meeting of the Massachusetts Veterinary Association was held at the New American House, Boston, Mass., Wednesday evening, November 24. Dr. E. T. Ryan presided. The meeting was given over to the discussion of interesting cases.

Dr. E. T. Harrington, the Massachusetts Secretary of the American Veterinary Medical Association, was present.

HARRIE W. PEIRCE, *Secretary*.

VETERINARY INSPECTORS' ASSOCIATION OF ILLINOIS

A MEETING of the Illinois State Veterinary Inspectors' Association was held in B. A. I. Hall, Drivers' National Bank Building, Chicago, for the purpose of discussing methods of procedure by the legislative committee relative to the Reclassification Report.

The meeting was attended by the largest number of members

present at any of our previous meetings this year and seemed to be of unusual interest to every member present.

The question of reclassification of government employees and the slogan of our National President, Dr. N. L. Townsend, for 100 per cent membership were the principal topics of discussion.

A legislative committee was appointed by our president, Dr. J. H. Whalen, consisting of the following members: Drs. W. N. Neil, Chairman; H. B. Raffensperger, G. M. Otis, Thomas Quincy, R. A. Moonan. This committee was appointed at the suggestion of the Chairman of the Committee on Legislation and Publicity, Dr. J. A. Kiernan, for the purpose of having an interview of sufficient length that the whole subject of reclassification and the injustice received by the veterinarians could be taken up in detail with the president of the Live Stock Exchange, the Editor of the *Breeders' Gazette*, the American Aberdeen Angus Breeders' Association, the Farmers' Bureau, Hon. William Graham of Illinois, who is on the Committee on Civil Service Reform in the House of Representatives, and Hon. Lawrence Y. Sherman of Illinois, who is on the Committee on Appropriations in the United States Senate, to try to secure a just reclassification for the B. A. I. veterinarians.

All of the members present pledged their support unanimously to Dr. W. N. Neil as chairman of the legislative committee with a 100 per cent membership from the Chicago Branch of the Illinois State Association.

The question of securing the membership of all Federal and State veterinarians was raised by the Secretary and Dr. A. A. Swaim, our Zone Vice President, called our attention to Article 3, Section 2, of our constitution which states that only veterinarians employed by the Bureau of Animal Industry can become active members of our association and further stated that we should make every effort possible to secure the membership of all Federal veterinarians, in serum and virus control, hog cholera control, and tuberculosis eradication in the State of Illinois and keep these men informed of the interest and proceedings of the association.

Dr. A. A. Swaim also approved Dr. S. J. Walkley's news letter and stated that he had ordered copies for every Federal veterinarian in the Central Zone who was not a member of our National Association for the purpose of stimulating interest and helping to secure their membership.

There was a motion made, regularly seconded and passed that the

Secretary of the Illinois State Association send a brief outline of the proceedings of our meetings to the National Secretary of our association, Dr. S. J. Walkley, the Editor of the A. V. M. A. JOURNAL and Editor of *Veterinary Medicine*.

Dr. W. N. Neil reminded us of the seriousness of the classification that we have been given. He pointed out a few of the other classes of civil employes which showed very clearly that the veterinarians had been given a very unjust classification and stated that the Reclassification Commission had given us the old "Horse Doctor slap in the face" and that we should not remain silent and let Congress pass the Reclassification Bill, but should fight for our rights before the bill passed the Congressional Committee.

Dr. L. Enos Day stated in a few words that every man who had a diploma from a recognized veterinary college should be interested in a just classification by the Reclassification Committee, for it sets the standard of veterinarians not only in the B. A. I., but for all State veterinarians and the profession in general. Dr. Day also reminded us of a few things that the A. V. M. A. was doing for the advancement of our profession and the standard it was setting for the veterinary profession.

Dr. M. Guillaume stated that we should make preparations to have a lively meeting of the Illinois State Veterinary Inspectors' Association during the National Live Stock show and try to interest some of the livestock men and the U. S. Live Stock Sanitary Association in giving us some support on the Reclassification Report.

Our president, Dr. J. H. Whalen, in his closing remarks, reminded the members that they were not to forget their pledge to the chairman of our committee, Dr. W. N. Neil, but that they should give the committee all of the suggestions they had and help in securing the membership of every veterinarian on the force.

L. T. HOPKINS, *Secretary*.

D. C. DIVISION OF B. A. I. VETERINARIANS

The regular meeting of the District of Columbia Division of the Bureau of Animal Industry Veterinarians on the evening of November 10 was made the occasion for a pleasant gathering at one of the local hotels in Washington, D. C., where a repast was served and appropriate entertainment provided and enjoyed. Dr. John R. Mohler, Chief of the Bureau, and Dr. J. Franklin Meyer, of the Bureau of Standards, were guests. Dr. J. A. Kiernan, Chief of the

Tuberculosis Eradication Division of the B. A. I., acted as toastmaster, and addresses were delivered by Dr. Mohler, Dr. R. A. Ramsay, President of the District Division of the Association, and Dr. Meyer, who spoke on the work of the Reclassification Commission, with which he was associated during its official existence. Dr. D. I. Skidmore, who was a delegate at the annual meeting of the National Association, read his report of the proceeding at Columbus.

Films of the Department of Agriculture, depicting a day of celebration among the cowboys of the West, were shown, the celebration consisting of "broncho busting," roping and throwing cattle, and other Wild West stunts. A number of difficult and mystifying feats in legerdemain were performed by one of the members of the local meat-inspection force. A part of this phase of the entertainment bordered on the tragic when one of the Bureau officials relaxed his hold on a 50-cent piece to help in the work of the magician. For a time there was a possibility that the money would not be recovered, but it was finally located in a small box wrapped in "red tape." Sighs of relief were noted.

Those present were so well pleased with the evening's entertainment and the general good fellowship prevailing that it was voted to have a series of these social meetings during the winter at which the wives of the members would be in attendance. The meeting afforded a realization that all work and no play makes the veterinarian a dull boy.

Dr. M. H. McKillip, who has been in active practice in Chicago for many years, has left for De Land, Florida, where he will spend the winter enjoying a well-earned vacation.

Another Chicago practitioner who will shortly leave for a six months' vacation in Florida is Dr. D. M. Campbell, Editor of *Veterinary Medicine*. Dr. Campbell is anticipating much pleasure as a follower of Izaak Walton in the waters about St. Petersburg.

Dr. Mazyck P. Ravenel, formerly associated with the late Dr. Leonard Pearson at the Veterinary Department of the University of Pennsylvania, and more recently President of the United States Live-stock Sanitary Association, has been elected to the Presidency of the American Public Health Association. Dr. Ravenel is also an honorary member of the A. V. M. A.

NECROLOGY

DR. WILLIAM A. DUNBAR

THE Veterinary Association of Manitoba, Canada, recently lost its oldest and one of its most highly respected members in the death of Dr. William A. Dunbar, which occurred October 15, 1920.

Dr. Dunbar was born in Aberdeenshire, Scotland, in 1841. He came to Canada in 1858 and for a considerable time carried on his trade of horse-shoeing, later entering the Ontario Veterinary College and graduating in the class of 1876. He went to Winnipeg early in 1882 and carried on the practice of his profession with considerable vigor up to the time of his death. He took a deep interest in the affairs of his local association and occupied all the offices in the organization at different times during his membership of over 38 years.

Dr. Dunbar was one of the charter members of Clan Stuart (Society of Scotland) and also took an active part in all its deliberations. He was very fond of Scottish lore and also had a good acquaintance with the Gaelic tongue. He will be greatly missed by those who enjoyed the privilege of knowing him intimately and who came in contact with him in the discharge of their duties.

The late doctor celebrated his golden wedding anniversary in 1916. He leaves a widow, a sister and one grandson to mourn his loss.

W. A. HILLIARD.

BROTHER OF DEAN HOSKINS DEAD

A cablegram has been received by Dean W. Horace Hoskins, of the Veterinary College of New York University, announcing the death of his brother, the Rev. Franklin Evans Hoskins, in Beirut, Syria, where he did missionary work for thirty years in connection with the Presbyterian Board of Foreign Missions, and extensive work with various editions of the Arabic Bible.

"Who's Who" states that the Rev. Franklin E. Hoskins was born in Rockdale, Delaware County, Pa., September 23, 1858. He received the degree of A. B. from Princeton in 1883 and his A. M. in 1886. He was graduated from the Union Theological Seminary and received honorary degree of doctor of divinity from New York University in 1903. He was editor of the American Mission Press in Syria, honorary life director of the American Bible Association,

member of the Victoria Institute of Great Britain, honorary director of British Relief in Palestine, and commissioner of Syria and Palestine Relief, 1914-1918. He was the author of "From the Nile to Nebo," a great work dealing with his explorations, and with Prof. William Libbey wrote "Jordan Valley and Petra."

DR. V. A. NORGAARD

Dr. Victor A. Nørgaard, Territorial Veterinarian of Hawaii, died on November 16 as the result of a revolver shot through the heart, apparently self-inflicted. Despondency due to ill health during the past year is believed to have been the cause.

Dr. Nørgaard was born at Copenhagen, Denmark, November 4, 1868, and graduated from the Royal Veterinary College in that city in 1889. After coming to the United States in 1890 he practiced veterinary medicine first in Massachusetts and later in Wisconsin, becoming an inspector in the Federal meat-inspection service at Chicago in 1891. In 1893 he was transferred to the Pathological Division of the Bureau of Animal Industry at Washington, where he investigated various outbreaks of disease and tested various dips for cattle ticks and remedies for hog cholera and actinomycosis. In 1896 he became Chief of that Division and at once started to improve on Kitt's blackleg vaccine, which resulted in the method that is still being used for preparing Government blackleg vaccine. He represented the United States Department of Agriculture at the Seventh International Veterinary Congress at Baden-Baden in 1899. In 1902 he resigned from the Bureau to take a commercial position with the West Disinfecting Company and three years later moved to Honolulu after receiving the appointment of Territorial Veterinarian, which he held until his death.

Dr. Nørgaard was a kind, courteous, and very helpful executive, a capable veterinarian of wide experience, and the author of numerous articles on contagious diseases of livestock.

ARTHUR WILFRED SHILSTON, OF INDIA

By the death of A. W. Shilston, from acute glanders, at the early age of 34, veterinary science in India has lost one of its most promising and valuable workers. In research and in routine work Shilston gave of his best. He had the true gift for research—foresight and rational imagination coupled with patience, perseverance and an infinite capacity for attention to detail. In routine he

was prompt and resourceful. In both of these fields of work India is deeply indebted to him.

Shilston entered the Royal Veterinary College, London, in October, 1904, and took his diploma in July, 1908. His college career was brilliant and he was a marked man from the time he entered. Shortly after obtaining his diploma he was appointed to the Veterinary Research Laboratory at Pietermaritzburg, Natal, first as assistant to Colonel Pitchford, and subsequently in charge. In March, 1914, after a brief period of five weeks spent in England, he took up the appointment of Assistant Bacteriologist at the Muktesar Laboratories under Colonel Holmes. From February, 1915, till October, 1916, Shilston officiated as Imperial Bacteriologist and afterwards held the appointment of Second Bacteriologist up to his death.

In Africa Shilston did valuable work in connection with the sheep scab, piroplasmiasis, East Coast fever, and the production of anti-snake-venom serum. In India his energies were devoted to problems connected mainly with rinderpest, surra and dourine, and much valuable work in these subjects stands to his credit. Shilston first became ill on June 17th, and as he failed to make satisfactory progress he was sent on to Naini Tal on the 21st. The disease from which he was suffering steadily progressed and terminated fatally on July 6th. It can truly be said that his life was sacrificed to his work.—*The Agricultural Journal of India.*

Dr. F. M. Potter, veterinarian of the New York Hippodrome and the owner of a number of well-known Thoroughbreds, was burned to death on December 1 in his apartment house in New York City. Dr. Potter had just returned from Bowie, Md., where he supervised the shipping of some of his color-bearers to the New Orleans race track.

“Foot-and-mouth disease is making wide ravages among cattle in Bavaria, Southern Germany. The estimated loss to July 17 was 50,000,000 marks.”—*National Stockman and Farmer.*

Arrangements have been made for exporting 35,000 head of Texas cows to Germany for the purpose of rehabilitating the depleted herds of that country. . . . The matter was taken up with the Government and the necessary permission for the exportation of the animals was obtained. It is stated that all cattle will be dipped according to the Federal regulations.”—*Hoard's Dairyman.*

MISCELLANEOUS

COMBATING FOOT-AND-MOUTH DISEASE IN ENGLAND

WHENEVER a series of outbreaks of foot-and-mouth disease occurs in this country it is safe to say that somebody will protest against the policy employed for its suppression; as recently as last month three such protests from agricultural societies were sent to the Ministry from various parts of the country.

It should be understood at the outset that the principle of immediate slaughter is the most scientific method, in the sense that in accordance with the knowledge of the day it promises the greatest measure of success and embodies the results of the latest knowledge that has been acquired. Carefully considered, it may claim a very large measure of success, as will be seen by reference to what took place before the policy of immediate slaughter was adopted. Between 1877 and 1884, Great Britain suffered from a very severe visitation. As no slaughter policy was then in vogue, and contact animals were allowed to remain at large, the number of outbreaks per annum varied during those disastrous years from 858 to 18,732. In one year alone, 400,000 animals were affected. It is, of course, well known that foot-and-mouth disease may be cured. A mortality of 20 per cent in a serious outbreak is considered high, but if initial disease centers are not completely and immediately eradicated, the disease will spread to considerable distances, and something akin to a general invasion of the countryside may ensue. Should such a trouble occur, it is estimated that the direct loss to farmers in this country would be at least three million pounds, while the country, in all probability, would suffer from a milk famine and the export trade of pedigree livestock would come to an end. In this connection, it should be pointed out that countries importing pedigree stock from Great Britain almost invariably require certificates to the effect that the whole of the country, or the county or the district from which the animals are sent, is and has been free from foot-and-mouth disease for a definite period before exportation.

It will be understood that in view of the extraordinary infectivity of the virus of foot-and-mouth disease, which is ultramicroscopic and is thought by many people to be air borne, it is extremely dangerous to run risks by keeping infective animals alive and attempting cures. Little doubt exists about the possibility of curing a

sick animal, as has been pointed out above, but while the cure is in progress the disease may spread far and wide. In countries like the Argentine, where the slaughter policy is not adopted, it is said that during a recent outbreak some farmers lost more than half their cattle. So great is the importance attached to immediate destruction of affected animals by the Veterinary Branch of the Ministry of Agriculture, that officials are on duty night and day. It often happens that the news of a suspected outbreak reaching the Ministry in the evening is telegraphed to a veterinary inspector during the night, so that, as soon as his confirmation is obtained, a closed area may be established, affected and contact animals immediately destroyed, the carcasses burned and the premises disinfected. In this way and in no other was it possible to keep the serious visitation of the past few months within bounds.—*The Dairy World*, London.

SEVENTY-FOUR HERDS TAKEN FROM ACCREDITED LIST

SINCE the beginning of the work, about three years ago, 74 herds of cattle have been removed from the list accredited as being free from tuberculosis. The presence of one or more reactors was the cause for removal. The number of herds taken off the list is small compared with the total number of accredited herds, which now exceeds 4,000. In most cases reinfection was traced to carelessness. Either the accredited animals had been permitted to run in pastures with infected cattle or else animals of doubtful health had been brought on the premises and stabled with the others. This is in violation of the agreement which the owner signs when he applies to have his herd tested. In one instance a breeder with an accredited herd purchased an entire herd whose history he knew little about. About half of the animals bought reacted to the tuberculin test when it was applied. But instead of segregating for a time those which did not react, he immediately added them to his officially accredited herd. This was one of the herds taken from the list following the discovery of several reactors. In only 5 instances out of the 74 "discredited" herds the presence of reactors could not be explained. This is considered a small number in proportion to the nation-wide extent of the work.

Where only one reactor is found in an accredited herd it is possible for that herd to get back on the list again within six months if a retest at that time shows the herd to be clean. When several

reactors are found it takes from a year to a year and a half for the herd to become accredited again. In all cases reactors must have been removed.

There is increasing evidence also that cattle which, though not reactors, are "suspicious" should be looked upon as a constant source of danger. Frequently the disease is so far advanced in such cattle that they fail to respond to the test, yet are more dangerous to the herd than some reactors. Suspicious animals can not be officially condemned, but breeders who are familiar with the situation sometimes permit them to be slaughtered rather than jeopardize the health of other animals.

Another important precaution in tuberculosis-eradication work is the protection of cattle at fairs and exhibitions. Owners of accredited herds are now demanding that such herds at least be kept in separate barns so that they will not have to mingle with untested cattle. Some fair associations have gone so far as to require a tuberculin-test certificate for all cattle shown.

Dr. N. S. Mayo writes in the *Breeder's Gazette*:

"When *Tales from the Bar X Horse Camp* came I did not dare open it at the office, but at home, after supper, I wandered to scenes 'far away and long ago.' Toward sunset the cattle came drifting slowly in to water, and the horses, with streaks of sweat and dirt, were standing belly-deep in the river drinking, as we shifted in the saddle and looked anxiously toward some cottonwoods, where wood smoke drifted lazily away, and we wondered why that 'dod-blanked' cook didn't holler 'grub pile'; but what's the use, when one is 'hog-tied' in a city? It's like trying to get a chance to say 'How' over the bar of the 'Palace Saloon.' We can, however, light a pipe to Will C. Barnes, and hope that many other delightful stories from the short-grass country will come drifting in before he hits the grit alone on the long, long trail."

"This is a joyful life if you don't weaken." Thus spoke a prominent veterinarian as he emerged from the Kissimee River, down whose steep bank he was precipitated into six feet of water, when the automobile he was in became mired in the quicksand and it was necessary for all hands to get out and push. This is the kind of joyrides that Congressmen tell about in their *Congressional Record*, but Dr. R. A. Ramsay and Dr. E. M. Nighbert believe the joy is more in the telling of such experiences than in their actual participation.

VETERINARY ASSOCIATIONS

Secretaries of Veterinary Associations are requested to cooperate with us in keeping this directory up to date.

Name of Organization	Date of Next Meeting	Place of Meeting	Name and Address of Sec'y.
Alabama Vet. Med. Ass'n.		Birmingham	C. A. Cary, Auburn
Alumni Ass'n College of Vet. Med. O. S. U.		Columbus	W. R. Hobbs, care O. S. U. Columbus, Ohio
Alumni Ass'n N. Y.-A. V. C.	Sept., Dec., March	338 E. 26th St.	Adolph Eichhorn, Pearl River, N. Y.
Alumni Ass'n U. S. C. V. S.	June	Wash., D. C.	
American Vet. Med. Ass'n.	Sept. 5-9, 1921	Denver, Colo.	N. S. Mayo, 4753 Ravenswood Ave., Chicago
Arkansas Veterinary Ass'n.			R. M. Gow, Little Rock
B. A. I. Vet. Ass'n of Iowa.		Ames, Ia.	F. Jelen, Cedar Rapids, Ia.
B. A. I. Vet. In. A., S. Omaha.	3d Mon. each mo.	S. Omaha, Neb.	J. V. Giffie, So. Side, Omaha, N. Y.
B. A. I. Vet. Ass'n, Metro Div		338 E. 26th St.	
British Columbia Vet. Ass'n.			K. Chester, New Westminster, B. C.
California State V. M. Ass'n.	June	Fresno	J. P. Bushong, Los Angeles
Central Canada V. Ass'n.			A. B. Wickware, Ottawa
Central N. Y. Vet. Med. Ass'n.	June and Nov.	Syracuse	W. B. Switzer, Oswego
Chicago Vet. Society	2d Tu. each mo.	Chicago	A. A. Leibold, Chicago
Colorado State V. M. Ass'n.	Jan. 20, 1921	Denver	I. E. Newsum, Ft. Collins
Conestoga Veterinary Club.	2d Thur. each mo.	Lancaster, Pa.	H. B. Brady
Connecticut V. M. Ass'n.			G. E. Corwin, Hartford
Dominion Vet. Meat Inspectors' Ass'n of Canada.	3d Sat. each mo.	Toronto	Wm. Tennant, Toronto
Eastern Iowa Vet. Ass'n.		Muscatine	S. E. Houk, Muscatine
Genesee Valley V. M. Ass'n.		Rochester	J. H. Taylor, Henrietta, N. Y.
Georgia State V. M. A.		Athens	W. M. Howell, Valdosta
Hudson Valley V. M. A.			W. H. Kelly, Albany
Idaho Ass'n Vet. graduates.			C. V. Williams, Blackfoot
Illmo Vet. Med. Ass'n.		Collinsville, Ill.	L. B. Michael, Collinsville, Ill
Illinois State V. M. Ass'n.			L. A. Merillat, Chicago
Indiana Veterinary Ass'n.			G. H. Roberts, Indianapolis
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THE VETERINARIAN AND THE PUBLIC

ABSORBED in the development and the pursuit of his professional career, the veterinarian, in the majority of cases, has been entirely oblivious to the fact that activities of the body politic have materially affected the circumstances under which he must offer his services to the public, whether in the laboratory, in the class room or in the practical application of veterinary knowledge and training in the field.

Veterinary science in its broad scope of today is no doubt as valuable an asset to the nation as any of the other groups concerned in the scheme of advanced knowledge. As old as any of the sciences, its modern progress in the world of research relative to the etiology, diagnosis and elimination of animal diseases, all of which are closely allied to the ills of humankind, places it in the rank of the foremost in the value of its work to the general public, not only in the matter of wealth conservation but in the protection of the people's health as well. For example, it is not generally known that the serum transported by aeroplanes for the saving of life endangered by a recent occurrence of olive poisoning that attracted nation-wide attention, was the product of the veterinary laboratory.

Better known, of course, is the achievement of this particular branch of science that has given to the world the knowledge of the transmission of disease by insect carriers.

Very few communities and municipalities are today without their veterinary specialists. The rural district has its general practitioner, essential for the welfare of the section. The city has its veterinary bacteriologist, in whose laboratory are analyzed samples of products offered for human food. The States and National Government have large numbers of veterinarians trained specially for the detection of the diseases of animals and in the application of proper methods to prevent, control and eradicate such diseases with the view of protecting the livestock industry, an item of national wealth estimated at a valuation of over ten billions of dollars. The guarantee to the meat-consuming public that the animal products forming a part of its daily food are sound and wholesome is secured and delivered through the skill and training of veterinary scientists.

Viewing and studying the problems that confront the veterinary profession at present, can the veterinarian, regardless of his assignment, afford to remain aloof or ignorant of the various activities and factors that to a certain degree affect his chosen career? True, the scientist has but little time to devote to other pursuits. And yet, this is a sordid world, which often fails to recognize the true value of individuals and services, and unless particular attention is given to economic conditions by all classes of citizens, those of scientific attainments as well as the laborers and the business men, circumstances are very likely to be created which, while apparently of no moment, do not provide for a proper status of recognition and remuneration except to a favored few in each community. The veterinarians, particularly those in the employ of States, municipalities and the Federal government, know only too well the inconvenience, the struggle, to say nothing of the humiliation, caused by the inadequate rate of salary in effect in many of these positions.

In certain cases laws are needed for the proper consideration and recognition of veterinary services. In all instances, worthy principles and ethics, as well as constructive policies, must be adopted and maintained within the profession itself. Upright dealing and efficiency must govern. With these qualifications as standards the veterinarian need have no fear or hesitancy in bringing to the attention of those in quest of his knowledge the proper value of such services and the justice of adequate compensation. No reasonable objection can be taken if the veterinary profession as a whole is

forced to make use of appropriate actions to impress the true facts upon the officials having to do with legislation affecting the status of individuals and classes as well as the masses. Fair means of making clear to the law-makers of cities, States and Federal government the necessity for better protection against the encroachment of non-professionals in veterinary practice; recognition of veterinary science as being of a higher standard, and increased compensation for efficient and competent employees, should no longer be regarded as engaging in activities of a character detrimental to the dignity of our profession.

T. P. W.

VETERINARY INTEREST IN ANIMAL HUSBANDRY

INCREASING evidence points to the need for veterinarians to have a well-rounded knowledge of animal husbandry. In its broad sense this includes the feeding, breeding, housing and general care of farm livestock. The recent meeting of the U. S. Livestock Sanitary Association reflects the sentiment that if veterinarians are to keep abreast of the times their knowledge of veterinary science must be reinforced with a knowledge of nutrition, breeding and related topics.

Certain diseases are now known to be closely associated with faulty nutrition, and veterinarians necessarily must recognize the extremely important part which feeding plays in the recovery of animals under treatment. Likewise in the field of breeding a few veterinarians have attained increasing recognition for their success by mere mechanical manipulation in overcoming sterility especially in cows.

The unusually large number of entries at the recent International Livestock Exposition indicates how greatly the number of livestock breeders is increasing. This condition certainly will lead to an insistence by owners that veterinarians called upon to treat valuable animals understand at least the broad fundamentals of livestock raising. The basic knowledge which veterinarians have of animal anatomy and the functions of organs should enable present practitioners to acquire the needed supplementary information without great difficulty. There are good books and bulletins on the subject. Livestock shows and the winter college courses are other particularly valuable sources of information. Already several veterinary schools, recognizing the signs of the time, have enlarged their courses to equip their graduates for meeting the situation. Establishing the

proper boundaries of the veterinary profession in this respect is a matter of utmost importance and deserving a place on the programs of future conventions.

BELGIUM ERADICATES RINDERPEST

THE latest official reports from Belgium show that success has been reached in eradicating the outbreak of rinderpest with which that plucky little country has been struggling for several months. From other sources we learn that the infection is supposed to have been introduced with an importation of zebu cattle from India last summer. According to the official reports the malady spread to 97 communes and attacked cattle on 279 premises. Besides 279 animals which died naturally from the disease, there were slaughtered 182 affected and 1,778 exposed animals, making a total loss of 2,539 head.

The Belgian veterinary service showed commendable energy and ability in dealing with the outbreak. The methods followed were similar to those employed in the United States in eradicating foot-and-mouth disease, namely, inspection, quarantine, slaughter and disinfection. The Government paid indemnity for slaughtered animals at the following rates: For affected animals, 70 per cent of the appraised value; for exposed animals ready for slaughter, 50 per cent, and for those not ready for slaughter, 70 per cent. In the case of exposed animals the four quarters of the dressed carcass, if passed by the veterinary inspector as fit for food, and the hide after disinfection, were released to the owner. For contaminated fittings and articles destroyed by the inspectors two-thirds of the value was allowed. All indemnity was forfeited in case of violation of the regulations.

We extend hearty congratulations to our professional brethren in Belgium on their splendid work and its successful outcome.

Hoard's Dairyman says editorially of bovine tuberculosis: "The Federal Government and the State governments should be more liberal than they ever have been in paying for condemned animals."

Breeder's Gazette says editorially that "good blood is not all," and tells breeders that "pushing the animals along and not allowing them to want are the main secrets of success. Starve them, and you will soon have only scrubs again."

TRAUMATIC GASTRITIS IN RUMINANTS¹

By D. H. UDALL

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THE digestive tract of cattle is the seat of some of the most frequent and destructive affections that afflict the species. Indigestions due to a wide variety of causes are perhaps the most important of the group, and in intensive dairy districts they are the cause of considerable loss. According to Hess (Switzerland), one-fourth of the affections in cows are of the digestive system.

On account of the habit of cattle of swallowing foreign bodies, especially nails and pieces of wire found in the feed or picked up from the ground, they are frequent sufferers from the effects of internal perforation of the reticulum. These injuries may result in local inflammation and healing through which the animal may pass without developing serious symptoms, or from which it may recover after what is usually diagnosed as a severe attack of indigestion. Such cases result in a circumscribed adhesive chronic peritonitis between the reticulum and the diaphragm and to some extent other abdominal viscera. This may cause no further trouble. But in many cases the infection spreads during advanced pregnancy or following parturition, and the sharp body extends its fistulous tract, inducing serious and extensive lesions in adjacent organs.

Until recent years it does not appear that injuries from foreign bodies have been the cause of any serious loss to American owners of cattle. European literature on the subject is rather complete and indicates that their losses have been sufficient to attract considerable attention. In this country, since the use of wood and string has been supplanted to a considerable extent by wire, and the old-fashioned blunt nail by sharp ones, the number of fatal cases appears to have increased and to be still increasing. Our conditions and habits favor the occurrence of the disease. Frequent repairs on wooden stables and barns where nails are carelessly used and scattered about, dumping ashes in barnyards, throwing rubbish containing rotten boards and nails into pastures or yards, allowing wire fences to rust and fall to pieces without removal, the use of wire to attach tags to bags of cow feed and to bale

¹ Presented at the Fifty-Seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1929.

hay, and the frequent custom of leaving nails and wire in stables are sufficient to explain its frequency.

In view of the importance of this disease a study of 50 cases has been prepared. On account of the wide variety of lesions, symptoms and complications that develop it is not easy to make a systematic classification of all the facts. The customary textbook description under two distinct and separate heads, traumatic gastritis and traumatic pericarditis, simplifies the description, but does not correspond with the sequence of events as they actually occur. I have, therefore, used the term which applies to a lesion that is never absent—traumatic gastritis. Gastritis is always present on the peritoneal surface of the injured organ (reticulum), and it might be still better to use the term traumatic peritonitis, since the lesion and induced symptoms correspond more closely with those of peritonitis than they do with gastritis as commonly understood.

The following conditions, named in order of most frequent occurrence in this series, have been recognized:

1. Traumatic pericarditis and myocarditis.
2. Traumatic peritonitis.
3. Traumatic pleuritis.

Less frequent associated conditions are:

4. Splenitis.
5. Hepatitis.
6. Pneumonia and bronchitis.
7. Emphysema. subcutaneous and subserous.

Occasional secondary conditions are:

1. Pyemia.
2. Septicemia.
3. Mitral thrombosis.

It is possible to base this classification on the dominant lesion and its resultant clinical reaction. In each case two or more of these conditions are always present and no two have been found to be identical, though fairly uniform types are presented.

ETIOLOGY

1. Careless small farmers with whom the cattle industry is more or less of a side line are said to suffer most. Our experience verifies this claim to a slight extent. Four came from one small farm where repairs and building were conducted, and there were four instances of two cases from a single farm. In one of these the cows were

cared for by women, in another the cows had access to a badly disintegrated wire fence.

2. *Predisposing causes.*—The custom of cows of swallowing foreign objects, the small size of the reticulum, the honeycomb-like structure of its mucous surface, and the activity of its contractions, combined with any marked increase in the abdominal contents, form a combination of circumstances very favorable to perforation of the reticulum by any sharp object that it may contain. The anatomy of the forestomachs is such that practically all foreign bodies swallowed remain in the reticulum, where they usually rest in the lower anterior part adjacent to the pericardial sac. And it is this part of the reticulum that is most often injured.

3. *Seasonal occurrence.*—In estimating the seasonal occurrence the date of first call has been taken. They occur as follows: Seven in January, 2 in February, 6 in March, 5 in April, 6 in May, 3 in June, 1 in July, 1 in August, 2 in September, 5 in October, 9 in November, and 3 in December. In the third of the year, June to September, only 7 of the 50 cases are recorded. This is the period when in our experience indigestions in cattle are relatively infrequent. These facts support the general observation that advanced pregnancy and parturition aggravate the symptoms of traumatic gastritis. In the months of June to September there is little stable feeding and few cows are advanced in pregnancy.

4. *Pregnancy and parturition.*—In 18 the history is associated with advanced pregnancy or parturition. In some the observed symptoms date from parturition, but more often the animal has not been right during the period of advanced pregnancy, and the symptoms become aggravated after delivery. In 15 no definite relation was observed between the development of the symptoms and pregnancy; in 17 the evidence showed no connection with pregnancy. Two were males and one was a 10-months-old heifer.

5. *Age.*—The injury is about uniformly distributed between the ages of 2 and 8. Two were under 1 year and 3 were over 10.

6. *Foreign body.*—The lesion was found to be due to wires in 18, nails in 11, small pins in 2, and other bodies in 1. No (foreign) body was found in 7, and from 3 there was no report. As many as 19 short nails and wires have been found in the reticulum of one animal, and numerous short rusty wires have been found in a single pericardial sac.

In extensive abscess formation between the reticulum and diaphragm a small foreign body is not readily found. The abscess

may have ruptured, the pus escaped into the reticulum, and its cavity become filled with food. When the lesions and foreign body are small there may remain only a slight adhesion, with the tracks of the passage of the body represented by a small round fibrous cord. In extensive and chronic lesions a body may completely oxidize, or it may escape with the flow of pus when an abscess is opened.

To find the body most readily the carcass should rest on the right side; carefully remove the abdominal viscera with the exception of that around the anterior portion of the forestomachs, explore the contents of the reticulum from behind, and search carefully for the fibrous cord that usually unites the reticulum with the diaphragm. The size of the foreign body and the direction that it takes determine the character of the lesion and the entire course of the disease. Most often it passes directly forward and perforates the pericardial sac. When the perforation through the diaphragm is at a lower level the foreign body misses the pericardium and results in pleuritis, which is usually chronic and associated with extensive abscess formation and thoracic adhesions. Bronchopneumonia is an occasional complication. Gravitation downward and backward may lead to abscess formation in the region of the ensiform cartilage, circumscribed peritonitis, external rupture of the abscess and escape of the wire. In most cases a perforation of the reticulum that does not pass through the diaphragm leads to a more or less acute diffuse peritonitis. One wire perforated the abomasum through the reticulum, causing death in less than 48 hours. A long, sharp wire may injure both the peritoneum and pleura and induce an acute diffuse inflammation which takes a rapidly fatal course.

CLASSIFICATION OF CASES

Based on the lesion responsible for the dominant symptoms, the 50 cases have been classified as follows: Twenty-six pericarditis, 18 peritonitis, 4 pleuritis, 1 emphysema, 1 splenitis.

PERICARDITIS

Symptoms.—A study of the records indicates that in many cases there is a past history of indigestion, an attack of sickness of some kind, or unthriftiness over a period of at least one month. In the 26 there were 10 intermittent indigestions, 4 had been unthrifty, 1 had been uneasy at milking time for 2 months, and 6 were acute without past history. The course varies from 1 to 6 months.

The general attitude is similar in all forms, though it is most seriously affected in diffuse peritonitis. They tend to remain in one place, remain down much of the time, rise slowly, and walk slowly with a stiff or stilted gait. In some the elbows are abducted and trembling of the muscles behind the shoulder is not infrequent. In the latter stages weakness develops, there is a slight stagger when walking or they may fall and remain down unable to rise. This condition is observed in septicemia; when the body travels in the direction of the abomasum recumbency may occur from the beginning. Grunting with each expiration is frequent; it is most marked in peritonitis. In practically all there is depression, the back may be arched, the expression staring or painful. In peritonitis groaning, colic and uneasiness are more marked than in pleuritis or pericarditis.

The condition is usually poor with the exception of the more acute cases; in all there is a loss of flesh. Those which have a history of intermittent attacks fail to gain in condition when the acute symptoms recede; the cow appears better, but the loss in condition is progressive. The milk secretion is always affected; in the acute forms and peritonitis the loss of milk secretion is sudden and complete. The mucous membranes are pale whenever the lesions are well developed, but in a high fever they may be redder than normal. Congestion of the conjunctival mucosa may occur in septicemia.

Edema of the submaxillary region and along the ventral border of the neck and sternum occurs in this series only in traumatic pericarditis. In most cases the edema has not been observed until within a week before death. Swelling of the limbs has been observed in septicemia and pyemia and in one case of pericarditis with recovery.

Whenever the lesion becomes well marked, anorexia for food and water is complete; in those which improve, the appetite remains impaired for a long time; often the animal goes for days without eating.

The prevailing temperature in pericarditis is between 102 and 104°F. It has been found less than 102 in 6 and above 104 in 6. The higher temperatures are more often found in the beginning of the attack; as the disease progresses a lower temperature is recorded, and in the last 24 hours it is subnormal. Unless observations are made repeatedly one observes no distinct difference between the temperatures of traumatic gastritis and those of primary indigestions. It varies widely in different cases and in different periods of the

same case; very little reliance can be placed on the temperature reading as a means of diagnosis. A medium-grade fever is of some value when considered in conjunction with other symptoms. In peritonitis the temperature runs slightly lower; none above 104°F. were recorded.

The abdomen is normal or below normal in size; rumination, contractions of the rumen, and peristalsis are slight or entirely absent. In pericarditis, tympany or distension of the flank has not been observed. The feces are scanty and somewhat dry or normal in consistency. Involuntary diarrhea may develop as a terminal symptom.

Breathing is shallow, often abdominal in type; there is a long pause at the end of each inspiration, the expiration being short and accompanied with a grunt. In two there was a history of occasional cough, and in one a cough could be induced; it has been observed in absence of lung lesions, possibly as a result of congestion of the pleura.

An examination of the circulatory system reveals symptoms by which the disease may be readily diagnosed in practically all cases. Increased frequency of the heart-beat is one of the early characteristic changes. A record of 100 or more was found in about half of the cases, and in none was it less than 72. Pain on percussion over the heart can be detected in nearly all in which the animal is able to stand and have the front leg carried forward so that percussion can be applied directly over the heart. Pain is more marked in acute forms than where the lesions have developed gradually; the pericardium becomes thickened and an abundant fibrinous exudate has been deposited. Dullness on percussion is less frequently recognized, due to some extent to the fact that the examination has not been completed. Modification of the heart sound can be heard in practically all. In 15 it was reported as splashing (liquid), in 1 tinkling (fibrin with liquid), in 2 blending (fibrin with liquid), and in 2 diminished or absent (fibrin); in 1 the sound was increased, due to direct injury to the heart; occasionally it is most marked over the right side. Distension of the peripheral veins has been observed in a few; probably it is often overlooked.

The facts of chief importance in making a diagnosis are: Increased area of dullness on percussion; pain induced on percussion; sounds revealed by auscultation and the frequency of the beat. Edematous swellings in the submaxillary region, the neck and

sternum have not been observed in this series except in pericarditis. Swellings of the limbs have been of a pyemic or septicemic nature. Edematous swellings of the hind limbs developed in one case of pericarditis that recovered, and this was probably due to toxemia rather than to heart weakness. At the onset of a traumatic pericarditis it may be mistaken for a severe primary indigestion. This occurs when, regardless of the lesion, the cardiac sounds are not materially modified and the patient improves under the usual treatment. As the disease progresses, however, and with a recurrence of the acute symptoms, cardiac sounds finally reveal the real nature of the lesion.

Acute indigestions of advanced pregnancy not infrequently present the characteristics of traumatic gastritis, and unless the animal comes to an autopsy or distinctly abnormal cardiac sounds develop, an accurate diagnosis may be impossible. One case showing emaciation, diarrhea, staggering gait, apparent incoördination of movements, and final collapse was diagnosed as forage poisoning, but the autopsy revealed a pericarditis. With opportunity to make a careful examination or more than one observation, an error is seldom made. Tuberculous pericarditis or pleuritis, and mitral thrombosis may present a practically identical clinical picture—pulse of 100 or more, cardiac sounds muffled, blended or imperceptible.

The exact course may be difficult to determine; it has been estimated by the symptoms, history and lesions found on autopsy. In one it was 3 days, one 7 days, two 14 days, eight a month, five 2 months, five 4 months, and three 6 months. The course is shortened by mitral thrombosis, perforation of the ventricle (non-perforative injuries appear to be tolerated), injury to the auricle, by a concurrent subacute or acute pleuritis, or by a pneumonia.

Lesions in pericarditis.—Subcutaneous edema in the submaxillary and sternal regions is often found as a record of the terminal heart weakness. Purulent tendovaginitis was found in one case in which there was also a thrombus in both the right and left ventricles. In the abdomen the most constant lesion is a chronic circumscribed adhesive peritonitis between the reticulum and diaphragm within which one finds a cord-like sclerosis corresponding to the fistulous tract. Less frequently peritonitis is more extensive, involving the abomasum, parietal peritoneum, small intestines, spleen and liver. Abscesses are sometimes found in the thickened peritoneum, the spleen or liver, but they are more frequent in injuries that do not

involve the heart. The presence of quantities of straw-colored fluid (serum) in the body cavities is the result of a prolonged heart weakness in which subperitoneal and subcutaneous edema may also be found. Occasionally a pericarditis is combined with an acute peritonitis and pleuritis, both body cavities containing a sanguineous fetid fluid. A reddish serous fluid is often found in conjunction with abscess formation where its presence is explained by the peritonitis.

The changes in the pleural cavity are counterparts of those in the abdomen; the most frequent lesion is a circumscribed adhesive chronic pleuritis with or without abscess formation. Adhesion between the pericardium and diaphragm is always present. The pericardial sac is always greatly distended (18 by 12 inches) and may appear to occupy nearly all of the left chest cavity; occasionally it is partly necrotic as if about to rupture; it contains pus or fibrin, often both. The pus often amounts to 2 or 3 gallons. When the course has been shortened by concurrent acute diseases (pleuritis, peritonitis, cardiac injury, pneumonia) the quantity is less, but even then one may find a gallon if the course has extended over three or four weeks. In recovered pericarditis the epicardium is granular and the two surfaces may be partially adherent.

PERITONITIS

Symptoms.—The history is usually definite and short. Fifty per cent are associated with advanced pregnancy or parturition. There is marked depression and in the beginning pain is often manifested by uneasiness, kicking the belly and groaning. The animal is often recumbent and unable to rise; weakness is pronounced. The milk secretion shows a marked and sudden loss; all of the gradual losses in milk are recorded under other forms. The skin shows no evidence of edema in the submaxillary region, but in other places, especially the limbs, the subcutis or tendon-sheaths may be swollen and inflamed from septicemia or pyemia. The temperature is between 102 and 104° F. It seems to be slightly lower and less irregular than in pericarditis. The average heart rate is from 65 to 75, though in one that recovered it was 100 to 128. In all anorexia is complete and of sudden development. Occasionally the abdomen shows bloating; peristalsis and rumen contractions are slight or absent. Pain on percussion or palpation is found in about 50 per cent. When the foreign body is located at a considerable distance from the abdominal wall, as in gravitation toward the median or

the abomasum, it may be impossible to induce pain, and it is not readily brought out when the animal is in a recumbent or partially comatose condition. The feces are suppressed or scanty; in the terminal stage they may be thin, fetid and voided involuntarily (septicemia).

The breathing is irregular, varying from 12 to 36. Occasionally a cough or induced cough is found. This has been more frequent in cases that recovered when the diagnosis was less certain. Hematuria was an initial symptom in one recovered case. In 14 the course was less than 2 weeks, and in 3 less than a week; exceptionally it is 6 months.

Diagnosis.—It is interesting to note the diagnoses recorded at first call: Nine indigestions, 5 metritis, 1 dystocia (collapse), 1 hematuria, 1 traumatic pericarditis, and 1 suspected intussusception. In about 50 per cent the diagnosis was made with reasonable accuracy before death. Acute indigestion from overloading may terminate fatally because of a previous adhesion of the reticulum. The physical examination may fail to reveal symptoms other than those of an acute indigestion terminating in peritonitis. If the cow is also advanced in pregnancy a combination of circumstances exists that may be solved only by an autopsy. When migration is in a posterior direction in the region of the median line the symptoms closely resemble primary indigestion; the differential symptoms consist in persistence of a disease which can not be explained by the character of the food or feeding, a possible history of previous attacks, history of restlessness or pain, and the fact that very few primary indigestions run a course of one week.

Except in advanced pregnancy or overeating of spoiled food, both of which are easily determined, primary indigestion usually responds to treatment within 24 to 48 hours. When an acute indigestion persists for a longer period traumatic peritonitis may be suspected. Acute metritis following parturition may completely mask a traumatic peritonitis until revealed by an autopsy. Treatment of the uterus aggravates the peritonitis, the animal immediately becomes worse and the operator may be deceived with the belief that he has punctured the uterus and caused a fatal inflammation. Seasonal occurrence may be of assistance in eliminating a primary indigestion, the latter being of rare occurrence in pastured animals.

Hematuria associated with acute gastrointestinal symptoms at the onset of a perforation is very misleading; this symptom is some-

times associated with an acute gastroenteritis when it is usually explained by the presence of a secondary nephritis. Tendovaginitis and arthritis with a history of stiffness and loss of condition is not infrequently the result of a traumatic peritonitis. And various degrees of septicemia with or without edema and necrosis of the skin if associated with "chronic indigestion" suggest a traumatism.

Intoxication following perforation of the abomasum, and associated with collapse and straining in a cow due to freshen, may closely resemble the septicemia of an emphysematous or macerating fetus; careful examination of the genital organs, however, will exclude the latter. Other affections, such as mastitis or parturient paresis following parturition, may be so modified by a traumatic peritonitis as to present a confusing clinical picture until explained by an autopsy. Peritonitis due to necrobacillosis or to spontaneous uterine rupture with escape of the fetus into the abdominal cavity closely resembles traumatic peritonitis.

Lesions.—In cows that have died from peritonitis the most constant lesion is a chronic adhesive inflammation with abscess formation, to which is usually added an acute serofibrinous inflammation. A fistulous tract often leads from the reticulum to the diaphragm, less often to the liver, spleen, or in a posterior direction between the reticulum and abomasum. The abdominal cavity may contain gallons of a serofibrinous exudate, the latter causing extensive adhesions between the serous surfaces of the intestines. Not infrequently perforation of the reticulum is immediately followed by an acute diffuse fatal inflammation; in these cases fistulæ and abscess formation are absent. In both forms the peritonitis of the intestines may be hemorrhagic and the mucosa affected with various degrees of inflammation.

Intercurrent indigestion in an animal affected with a chronic adhesion presents a marked overloading of the rumen and an acute peritonitis. On the ventral and anterior surface of the rumen one finds a fibrinous exudate and the abdominal cavity may contain a small quantity of serum. Metritis is the most frequent intercurrent disease; advanced pregnancy and parturition have "lit up" a chronic peritonitis and the supposed fatal inflammation of the uterus proves to be a mild metritis and a severe traumatic peritonitis. Septicemic lesions in the form of hemorrhages on the serous membranes, edema and hemorrhage in the subcutis, degeneration of the parenchymatous organs, and swollen hemorrhagic lymph glands are frequent. Pyemic tendovaginitis in the region of the fetlock, carpal and tarsal

joints is not rare. In conjunction with swellings of the skin one may find an edematous infiltration of the retroperitoneal and adjacent tissues.

PLEURITIS

Traumatic pleuritis is always chronic, with the few exceptions in which it is concurrent with peritonitis. It extends over a period of two to six months. The cow shows a gradual loss of condition combined with respiratory and digestive symptoms which vary according to the location and extent of the lesions (pleuritis, pulmonary abscess, bronchopneumonia, prolapse of reticulum into thorax, communicating fistula between bronchus and reticulum). A past history of stiffness is very suggestive. The temperature, even when taken repeatedly, may not register over 103° F. The pulse is about 75 and variable. The respirations are either normal or increased in frequency. Finally emaciation becomes extreme, but the animal retains such a remarkable tenacity on life that the final termination is usually by slaughter. In one case with a communication between the reticulum and bronchi, swallowed water was returned through the trachea until death from suffocation followed a hearty drink.

The respiratory symptoms are characteristic. In the presence of a large circumscribed abscess in the lung or pleural cavity there is an area of complete dullness on percussion which is sharply defined from the adjacent normal structures. Often there is also marked pain on percussion. In most cases injury to the lungs has resulted in a chronic bronchopneumonia as well as abscess formation, so that on auscultation one hears a variety of moist rales. Cough is always present in bronchopneumonia; it is frequent, painful, suppressed and easily induced.

Lesions.—In this form the foreign body misses the pericardium (small body perforating at a low level), so that the chief lesions are a chronic diffuse adhesive pleuritis with extensive abscess formation. Numerous fistulæ leading to multiple abscess cavities are frequent. The lungs are partly hepatized and may contain large or small abscesses or be affected with bronchopneumonia. An acute diffuse pleuritis may be found as a terminal lesion.

EMPHYSEMA

Emphysema may become marked when a sharp body perforates the lung in such a manner that air escapes into the subpleura (interstitial emphysema). It extends beneath the skin, pleura, peritoneum,

and into the mediastinum, resulting in death in from one to three days. Again it may follow an abscess formation, extend less rapidly, causing death in three to four weeks.

The symptoms consist in a subcutaneous emphysema that extends over the entire body. Breathing becomes very labored and death results from suffocation. Two of the 50 cases belonged in this group.

SPLENITIS AND HEPATITIS

Splenitis and hepatitis may occur independently. In one case of multiple liver abscess combined with peritonitis and pulmonary abscess the pus contained numerous ray fungi (actinomycosis). Pain on palpation over the liver and spleen may be induced when the inflammation becomes well marked, and one may be able to locate peritoneal adhesions by means of a rectal examination. Pyemic arthritis and tendovaginitis resulted from a small circumscribed splenitis. The course was afebrile, death resulting from decubitis after about two weeks of progressive lameness and stiffness. There were no general symptoms until near the end.

DISCUSSION

DR. DEVINE: I question if there is anyone in the room who can add much to the discussion of Dr. Udall's paper, but as a cattle practitioner I feel that it would be an injustice to a man who has prepared a paper of such importance as Dr. Udall's if no one said anything either for or against it. If there is anyone here that is interested in this particular subject, or if there are some peculiar things that have occurred in their practice relative to digestive symptoms and pain, this is the time to discuss it.

Dr. Udall has done much work on this subject. His knowledge on it is thorough and practical. I know of no condition in cattle in which it is quite as hard to make a diagnosis on your first visit, as he points out, to determine definitely whether you have traumatic peritonitis, or whether you have simply an acute indigestion. The grunting on expiration that he pointed out to you is of great importance, counted with other physical examinations and clinical examinations. If you can eliminate by rectum or other manipulation other troubles, if you can eliminate invagination, if your history indicates that this is rather a hanging-on case, if you can eliminate sudden change of diet or distress caused by food, that grunt on expiration is one of great clinical importance. Don't overlook the difference between traumatic peritonitis and traumatic pericarditis. I hope that some of the men who are interested in this will ask some questions and discuss it.

DR. FOGLE: I would like to ask if there are any of the members who find it practicable to operate, whether the diagnosis shows a traumatic condition, for the removal of foreign bodies.

DR. UDALL: In talking to Dr. Ferguson yesterday he referred to the use of operation, I gathered, rather frequently for the relief of this condition when it was diagnosed early. I am sorry he is not here to discuss the subject, because he has seen many more cases than I have and has had much more experience with that phase.

CHAIRMAN BEMIS: We have had experience in two cases of this kind, and our experience bears out the statement just made by Dr. Udall that if an operation is to be performed it must be performed early. I believe not many of the cases will be diagnosed in the proper stage for operation. If they could be diagnosed early, there is no reason at all why the foreign body could not be removed if it is still present in the reticulum. One of these cases made a very nice recovery. The foreign body was a new ten-penny nail which had only partially penetrated and was producing the first acute symptoms. The other case died, and, being the operator, I like to think that it died because the process was already too far advanced to be relieved by the removal of the foreign body.

POST-GRADUATE SCHOOL

THE College of Veterinary Science of the State College of Washington, Pullman, Wash., again offered this year a post-graduate school for veterinarians.

This school extended over a period of four days, beginning January 10 and ending January 14, 1921. The principal men who aided with the conduct of this short course, besides the faculty of the College of Veterinary Science, were Dr. A. T. Kinsley, of Kansas City; Dr. W. H. Lytle, of Salem, Oreg., State Veterinarian of Oregon; Dr. B. T. Simms, Professor of Veterinary Medicine, Oregon Agricultural College, Corvallis, Oreg.; and Dr. W. T. Johnson, Experiment Station Veterinarian, State College of Washington, Puyallup, Wash.

The program contained a fairly wide variety of subjects that were of particular interest to the practicing veterinarians. These schools are conducted yearly and are intended for the benefit of the practicing veterinarians of the West. They are usually very well attended and have received splendid support from the veterinarians. This year the school was conducted under the auspices of the College of Veterinary Science, State College of Washington, Pullman, Wash., the Oregon Veterinary Medical Association, and the Washington Veterinary Medical Association. Each of the two associations chose representatives to cooperate with the college authorities in conducting this school and gave very splendid support to this movement.

E. E. WEGNER, *Vice Dean.*

STUDIES IN INFECTIOUS ABORTION¹

By I. FOREST HUDDLESON

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IT IS our desire to assist in clearing up many of the conflicting theories maintained by different investigators by presenting a brief discussion of several important problems in infectious abortion, which we have been studying at the Michigan Agricultural Experiment Station for several years, and the results thus far obtained. The compiled data from which this paper obtains will be presented in later publications.

The subjects presented in this paper are:

1. The immunization of non-pregnant cows and heifers against infectious abortion (caused by *Bacterium abortus* Bang).
2. The isolation and cultivation of *Bacterium abortus*.

From the viewpoint of the immunologist, infectious abortion may be considered a most perplexing problem, in that the infecting organisms may be present in the tissues of the animal without inducing apparent symptoms, or the symptoms, if manifested, may be followed by a number of disastrous secondary complications and sequelæ.

An effort has been made to study the efficiency of vaccines in controlling this disease by Bang (1) in Denmark, by Stockman (2) in England, by Giltner (3), Hallman (4) and Williams (5) in this country. Also the possibilities of commercialization have attracted many biological laboratories into the manufacture of various anti-abortion remedies, but their usefulness and value is greatly questioned, due to the absence of well-controlled experiments and observations.

The results obtained by European investigators from the use of large doses of living abortion bacilli on non-pregnant animals, in a way, appear encouraging, but the failure to mention the duration of time over which the observations were conducted, the number of cases of sterility which developed thereafter, or the number of animals which became carriers of the abortion bacilli after the inoculation of living organisms, makes the data somewhat difficult to interpret. The difficulty which one encounters in collecting experi-

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

mental data in the field, of course, is realized, but information concerning these subjects would be of immense value in judging the efficiency of a vaccine.

In this country the results obtained from the use of vaccine have not been altogether encouraging. However, this may be due to the small number of animals used in experiments of this nature and the failure to use control animals for comparing results.

Considerable stress seems to have been laid upon the use of massive doses of living abortion bacilli in immunization, the theory of which appears to have originated from observations of acquired immunity to this disease. In other words, it has been commonly believed by many that after the first abortion an animal becomes immune as a result of the presence of an enormous number of living organisms, but the harm which might result should the animal become a potential carrier of the organism appears to have been overlooked. From our present knowledge of the carrier state which concerns this disease, we know that *Bacterium abortus* may establish itself in the uterus for a short length of time and in the udder for a considerable length of time. In other words, there is established in the above-mentioned organs a state of equilibrium between the defensive forces of the body and the invading microorganism. This usually leads to a state of chronicity in which the infection does not progress or recede. It seems to us that the criterion for judging the efficiency of any abortion vaccine should be based upon the prevention of this condition as well as the more manifest pathological effects of *Bacterium abortus*.

During the winter and spring of 1917 an opportunity was afforded us for studying the effect of three types of abortion vaccine upon a number of animals in two different herds. One (to be designated as herd A) was composed of purebred Jerseys, Guernseys, Holsteins and Brown Swiss. Abortion and sterility had existed in herd A for a number of years and was causing considerable loss at this time. The other, herd B, was composed of grade Holstein heifers whose histories were known from the date of birth. Not one of the animals had ever given a positive blood reaction, nor had they ever been subjected to the abortion infection knowingly until this experiment was begun.

The animals in herd A were injected as follows: Four non-pregnant animals received subcutaneously (in front of the shoulder) 20 c.c. (100 billion) of living abortion bacilli in sterile physiological salt solution (type I vaccine). Thirteen non-pregnant animals re-

ceived 10 c.c. (50 billion) of killed organisms in phenol (0.5 per cent) salt solution, and after a lapse of seven days 20 c.c. (100 billion) of living organisms (type II vaccine). Twenty-six non-pregnant animals received three doses at seven-day intervals of 5 c.c. (10 billion) and 10 c.c. (50 billion) of a suspension of killed and 20 c.c. (100 billion) of living abortion bacilli. It is realized that the amount of inoculum, the number of injections and the interval between the injections are wholly experimental, but it was hoped that by employing several types of vaccines one might be developed which would be of some value.

The effects of the different vaccines in herd A were observed under natural conditions, while in herd B they were observed under artificial conditions, that is, as soon as conception was determined each of the animals was subjected to different methods of infection, as feeding, intravenous injection and intravaginal infections of living organisms.

An effort was made to note the local and systemic reaction of each animal, to isolate *Bacterium abortus* from the fetal membranes and uterine exudate following a normal parturition or abortion, to isolate *Bacterium abortus* and determine the presence of agglutinins in the milk of animals following parturition or abortion, to determine the blood reaction of calves from these cows at the time of birth, and to note any complications or sequelæ which are believed to result from the injection of killed or living cultures of *Bacterium abortus*. It is to be regretted that all of the above-mentioned conditions were not observed or complete data kept throughout the three years that these experiments were conducted, owing to the absence of the writer from the Experiment Station for about twenty months. However, there are sufficient data at hand to warrant a statement of the results obtained.

The calving and abortion history of herd A, beginning three years previous to the vaccine treatment and for the two years following, show that in 1914 there were 23 calves and 4 abortions (17 per cent); in 1915 there were 30 calves and 3 abortions (10 per cent); in 1916 there were 30 calves and 4 abortions (13 per cent); in 1917 there were 48 calves and 9 abortions (18 per cent); in 1918 there were 41 calves and 2 abortions (4.5 per cent); in 1919 there were 16 calves and 4 abortions (8.6 per cent).

About the time this experiment was begun a storm of temporary sterility invaded this herd, that is, estrum apparently occurred in the cows and heifers of breeding age, but they failed to conceive

except after several servings of the bull. We found that the failure of the Jerseys to conceive was partly due to a sterile bull, but we are at a loss to explain the failure of the other breeds to conceive. It is readily seen from the following data that the large percentage of temporary sterility did not occur in the treated animals.

During the year 1918, 40 of the treated heifers and cows and 19 untreated were bred, of which 35 of the treated and 6 of the untreated conceived. In the fall of 1918 a large number of heifers and cows were sold from this herd, including 14 of the treated animals. This left only 29 of the treated animals for observation for the year 1919. During the year 1919 there were bred 29 treated and 21 untreated animals, of which 29 of the treated and 14 of the untreated conceived.

In comparing the abortion rate of the two groups for the past two years we find no abortions in the treated animals and but two in the untreated in 1918; one in the treated and three in the untreated animals in 1919. In other words, there was a calving efficiency in 1918 for the number of animals bred of 88 per cent in the treated and 21 per cent in the untreated; in 1919, of 96 per cent in the treated and 52 per cent in the untreated animals.

These data apparently indicate a decrease in the abortion and sterility rate of the treated animals and a marked increase in the breeding efficiency of the treated over the untreated animals.

Our data show a very little increase in the specific agglutinins of the milk of several of the cows a short time after treatment. The milk from several of these cows was injected into guinea-pigs in the fall of 1919 with negative results. We failed to examine the blood of the calves from these cows for the presence of specific antibodies.

In herd B there were in all 15 heifers used, of which 6 received type III treatment of vaccine about thirty days before conception, 3 received an intravenous injection of 1 c.c. of a suspension of *Bacterium abortus* after conception was determined, 2 were fed living cultures of *Bacterium abortus* for a period of two weeks after conception was determined, and 4 were kept as normal controls.

Five of the treated heifers were subjected to periodical feedings after conception, and one was given several intravaginal instillations, before conception, of living cultures of *Bacterium abortus*.

Each of the treated heifer- was bred some time during the fall and winter of 1917. One aborted (the heifer receiving intravaginal in-

stillations of living cultures) and one failed to conceive. Five were bred in 1919, of which all conceived and calved normally. Each of the 4 normal heifers was bred in 1917, of which 3 calved normally and one failed to conceive. The 4 were again bred in 1919 and calved normally.

Each of the infected controls aborted about ten weeks subsequent to the appearance of specific antibodies in the blood serum. The breeding efficiency of treated animals in 1918 was 66 per cent, and in 1919, 100 per cent; for normal controls in 1918, 75 per cent, and in 1919, 100 per cent. The abortion rate was 100 per cent in the infected control heifers.

Each of the calves born to the treated animals gave negative reactions to the serological tests at birth. Further, after repeated examinations (cultural and guinea-pig inoculations) we failed to find *Bacterium abortus* present in the milk of the treated animals, while on the other hand *Bacterium abortus* was isolated from the milk and from the aborted fetuses of the infected controls. The calves of the treated animals are all seemingly normal in appearance and have never been affected with white scours, pneumonia or other affections so often attributed to *Bacterium abortus*.

This summary of data gives only tentative conclusions as to the relative value of vaccines in the treatment of this disease. Its value should be gauged only by the failure of an animal to abort and the absence of subsequent harmful effects. It is true that we have many other secondary complications following the abortion disease, but these complications follow parturition in the absence of the abortion disease as well. So, to devise a system of vaccine treatment which would eliminate all the secondary complications which follow abortion or parturition in the absence of the abortion bacilli would mean an accomplishment never to be obtained in practice and hardly conceivable in theory.

The value of vaccines in the control of this disease can be determined only through carefully controlled experiments with a large number of animals. These data, while very suggestive, are too few to warrant final conclusions as to the value of vaccine treatment.

The difficulty which is encountered in isolating *Bacterium abortus* from infected material has many times led to erroneous conclusions. It is especially difficult to isolate *Bacterium abortus* from uterine exudate several days after abortion, or to determine its presence in milk by cultural methods, owing to the predominance of other organisms which are usually present in considerable numbers and

thus overgrow the inoculated medium. In fact, the only means which we have had in the past for isolating *Bacterium abortus* under such conditions was by guinea-pig inoculations. Even this method often proves unsuccessful when other bacteria predominate, as a guinea-pig will succumb to a septic infection.

The inconsistent results and the difficulty we have had in isolating and growing *Bacterium abortus* made necessary the development of a more reliable medium and method for growing this organism.

The factors which we have considered in rendering the isolation and cultivation of *Bacterium abortus* a comparatively simple process are the medium and its preparation, the proper reaction of the medium, the employment of an agent which will eliminate rapidly growing organisms, and the method of incubation.

After a series of experiments we found liver or spleen (bovine or porcine) infusion agar to be the most suitable medium for isolating this organism. The technique for preparing the medium is similar to already described methods for preparing meat and infusion agar, except that glass wool should be used in filtering. Previous investigations have shown that about half of the initial growing properties of media are removed when employing cotton, cloth or paper in filtration.

We find that the reaction of the medium is a very important factor in the isolation of this organism which cannot be overestimated. The reaction of amniotic fluid and meconium of several aborted fetuses as determined by the H-ion colorimetric method has been found by us to lie between a pH of 6.4 to 6.8, depending upon the lapse of time between the abortion and the titration. The acidity of these fluids decreases very rapidly on exposure to the atmosphere, as the free CO₂ contained in the fluid volatilizes very rapidly. Other factors being favorable, a medium possessing an H-ion reaction between the above-mentioned limits will produce a luxuriant growth of *Bacterium abortus*.

We have succeeded in eliminating a large number of rapidly growing organisms from overgrowing the inoculated medium by incorporating in the medium a saturated aqueous solution of gentian violet in such a quantity that the final dilution of the dye is 1-10,000. The growth of *Bacterium abortus* is not in the least inhibited, but practically all of the other bacteria (especially Gram-positive organisms) fail to grow, owing to the toxic action of the dye. This method has been applied successfully in the isolation of *Bacterium*

abortus from infected milk, from the fetal stomach and from uterine exudate.

In the past it has been the custom to consider *Bacterium abortus* as an organism possessing peculiar biological characteristics with respect to oxygen. That is, a decreased oxygen tension has been considered necessary for its primary growth. Our researches reveal that its growth is not a question of oxygen tension, but depends upon an increased CO₂ tension. The proper CO₂ tension for the growth of this organism appears to exist in the gravid uterus and in the udder, but not in the non-gravid uterus. This may explain the failure of the organism to persist in the uterus for any length of time after abortion or parturition.

We have been able to arrive at the proper CO₂ tension of the gravid uterus artificially by introducing different per cents (by volume) of CO₂ gas into a series of closed jars, and estimating the change in reaction of the contained atmosphere by the H-ion colorimetric method. The jar containing 10 per cent of carbon dioxide gas gave the desired pH reaction of 6.6. Media inoculated with infected material and placed in a sealed jar in which 10 per cent of the air has been replaced by CO₂ and placed in a 37° C. incubator will grow *Bacterium abortus* in from 24 to 48 hours. The growth will be luxuriant and the individual colonies very large, varying in size from 1 to 3 mm. in diameter.

Comparing the relative delicacy of this method with guinea-pig inoculations, it may be stated that in many cases the cultural method has proved superior in instances when there were only a few abortion bacilli present. However, the two methods agree very closely.

The results of this study may be summed up as follows:

1. The proper medium for the isolation of *Bacterium abortus* is liver infusion agar which has been prepared without excessive heating and filtered through glass wool instead of cotton, cloth or paper.

2. The growth of *Bacterium abortus* in culture is markedly influenced by the H-ion concentration of the medium. It is important that the medium be adjusted in terms of H-ion concentration.

3. The reaction necessary for the optimum growth lies between a pH of 6.8 and 6.4.

4. By incorporating a saturated aqueous solution of gentian violet in medium in sufficient quantity to give the dye a final dilution of 1 to 10,000 a large percentage of microorganisms occurring in infected material other than *Bacterium abortus* may be eliminated.

5. The most suitable method for growing *Bacterium abortus* is obtained by placing inoculated media in a closed chamber in which 10 per cent of the air has been displaced by CO₂ gas.

6. This technique, if carefully followed, yields results identical with the guinea-pig inoculation method for determining the presence of *Bacterium abortus* in milk or in infected material.

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FAUNA OF MONGOLIA

The fauna of Mongolia was described by Roy C. Andrews, explorer for the American Museum of Natural History, during a recent lecture before the National Geographic Society in Washington, D. C. Of particular interest were the antelopes. The explorer's party were equipped with automobiles with which they sometimes hunted. After running about a mile at the rate of 45 miles per hour, an antelope had no difficulty in increasing its speed to 60 miles per hour. This was judged from reliable speedometer observations.

The women of Mongolia are excellent horseback riders and can ride their ponies against any wind in spite of their very elaborate hair-dress which spreads from shoulder to shoulder.

The dogs were a savage lot because they are fed on human flesh. Dead bodies are tied to a rope, the rope is tied to the end of a cart, and the cart driven over the rough road out of town. When the driver is sure the rope has snapped, he returns to town. The dogs finish the job.

The party was well equipped with scientific apparatus, etc., suitable for careful observation. Motion pictures were shown of antelopes in flight. A casual glance was sufficient to show that they were running with remarkable speed; even the very young animals can do this.

W. N. BERG.

INFECTIOUS ABORTION STUDIES¹

By B. T. SIMMS and F. W. MILLER

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At the Oregon Experiment Station agglutinations using suspensions of *Bacillus abortus* (Bang) with serum from cattle in different sections of the State have given the following results:

1. With one exception herds in which abortion is prevalent show some positive agglutinations.
2. Where definite histories can be obtained the aborting cows give positive agglutinations in more than 95 per cent of the cases. Sometimes the reaction remains negative until just about the time of abortion but changes to positive in less than a week thereafter.
3. Herds with no abortions or retained placenta give almost uniformly negative agglutinations.

The correlation between abortion and positive agglutinations being so uniform, and attempts at isolating other causal agents being always negative, the conclusion has been reached that *Bacillus abortus* (Bang) is the principal cause of abortion among Oregon cattle. The term infectious abortion as used in this paper will refer to infection with this organism.

The object of the problem as outlined has been to find practical methods of herd management which will prevent the introduction of the disease into clean herds and which will build up abortion-free herds from abortion-infected herds. The work has been controlled and checked by agglutination tests, clinical observations at termination of pregnancy, and guinea-pig inoculations.

METHODS OF SPREAD OF THE DISEASE

The following methods of spread of the disease have been studied:

1. Uterine Infection Previous to or at the Time of Copulation

Some writers have claimed that the infection either is present in the uterus at the time of service or that it is introduced by the bull during copulation. Were this true it might be expected that implantation of the ovum would be prevented in some cases, while in others early expulsion of the implanted ovum would occur. In either case the animal would be classed as a shy breeder.

In a herd where abortion is prevalent breeding records were tabulated. Eleven different bulls, all of which gave negative

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

agglutinations, had been used. It required 189 services to produce 111 pregnancies which terminated normally, or 1.7+ services per conception. It required 84 services to produce 43 pregnancies which terminated in abortion, or 1.9+ per conception. This slight variation is well within the limits of error.

2. *By Service of Negative Bulls Which Have Served Positive Cows*

In this experiment 20 heifers were used. They were bred to five different negative bulls which had been bred to aborting cows with positive agglutinations. Each bull was bred to from 1 to 6 heifers. The majority of the heifers conceived promptly. They were not exposed to abortion-infected cows or premises after pregnancy began. All of them gave birth to calves that were apparently normal. Seven of these were not tested during pregnancy. The 13 that were tested remained negative until after pregnancy had terminated.

3. *By Feeding Infected Milk to Heifer Calves*

Forty-six heifer calves have been fed milk from infected cows. *Bacillus abortus* (Bang) has been isolated from samples of this milk. These calves have had monthly agglutination tests. Heifers from positive dams are frequently positive at the time of birth, but all the calves in the experiment were negative before they had reached the age of six months.

There is a possibility of a quiescent localized infection being so small that a systematic reaction will not occur. Were this true the negative heifers might change to positive after pregnancy had taken place. Twenty-three of this group of 46 have terminated their first pregnancies. After being bred they were handled in such a manner that they were not exposed to infected cows or infected premises. All of them carried their calves full term and dropped calves that were apparently normal. Their agglutinations remained negative throughout their pregnancies.

4. *Through Barn, Pen and Pasture Exposure of Pregnant Heifers*

Thirteen negative pregnant heifers were penned and pastured with cows which were infected. In some instances the cows aborted in the pens with the heifers. Of these 13 animals, 8 aborted and 5 calved normally. The 8 aborters gave positive agglutinations.

5. *Through Barn, Pen and Pasture Exposure of Cows*

Four pregnant cows from an abortion-infected herd were placed in a herd of about 30 females. No agglutinations had been run

on this herd, but it had been under observation for two years and there had been no abortions. Three of the 4 added cows aborted. A young bull was bought and used for serving these cows, but they were kept in the barn and pasture with the other cows of the herd. The original herd was in three groups, a separate bull being used for each group. No new animals were added to any of these groups, nor were the bulls used for serving outside cows.

The results of this exposure were as follows:

The first abortion among the original cows occurred about ten months after the new cows were brought in and six months after the first abortion among the new cows. The disease spread gradually until some cows in all three groups were aborting. The relation of positions in the barn occupied by the different groups to the spread of the disease is of some significance. The infected cows brought in stood at the south end of the west row of stanchions. Group 1 stood in the other stanchions of this row. Group 2 stood directly across the alley from the infected animals, being in the south end of the east row of stanchions. Group 3 stood diagonally across the barn from the originally infected animals. The percentage of reacting cows in each group was in direct proportion to the proximity to the infected group. Four years after the infection was introduced the percentages of reactors were as follows:

	<i>Total number</i>	<i>Number reactors</i>	<i>Per Cent reactors</i>
Group 1.....	17	16	94
Group 2.....	20	11	55
Group 3.....	11	4	36

CONCLUSIONS

1. Abortion is not necessarily preceded by shy breeding.
2. Negative bulls which have been bred to positive cows have not spread the disease when mated with abortion-free heifers.
3. Feeding infected milk to heifer calves has not resulted in infection of these calves.
4. Barn, pen and pasture exposure of abortion-free pregnant heifers to pregnant and aborting cows has resulted in a high percentage of infection and abortion.
5. Barn, pen and pasture exposure of mature cows has resulted in the spread of the disease. The rapidity of spread seems to have been in direct proportion to the amount of exposure.

RECOMMENDATIONS

The results obtained justify the following recommendations concerning control and eradication of the disease:

1. Abortion-free herds may be built up from abortion-infected herds by adopting methods of herd management which will prevent exposure of heifers after they reach sexual maturity.

2. Testing all cattle and eliminating the reactors will certainly tend to control and possibly eradicate abortion.

3. The most common method of spread is through exposure of cows and pregnant heifers to infected cows and premises. Cattle owners should protect their herds by not allowing exposure to any sexually mature cows unless it is known that these animals are free from the disease.

4. In buying females to be added to the herd, young unbred heifers should be preferred.

DORSEY PARDONED

Shortly before Christmas, President Wilson granted a pardon to James J. Dorsey, of Gilbert, Ill., known as the "millionaire cattle king." Dorsey was sentenced to eight years in Leavenworth prison by Judge K. M. Landis after conviction for selling tuberculous cattle in Western States by representing them to be Government tested and free of disease. He began to serve his sentence in June, 1919. In July, 1920, the President reduced his sentence to four years, and now has pardoned him outright, causing Judge Landis to announce in the public press that he is unable to understand the circumstances surrounding the pardon of such an offender and that he is going to watch Dorsey's future activities with interest.

The 1919 meeting of the International Livestock Show was made notable by the phenomenal winning of the breeders from the South, a section of the country that is rapidly coming to the front in the production of improved livestock. This year the awards were more equally divided, the northern breeders taking the bulk of the honors. Among the most prominent southern winners were Frank Schofield, of Texas, who had the Grand Champion Shorthorn female; Dr. J. I. Huggins, of Tennessee, Grand Champion Angus bull; Senator J. N. Camden, of Kentucky, Grand Champion Hereford bull; G. C. Parsons, of Kentucky, Grand Champion Angus female; and B. P. Evans, of Kentucky, who exhibited the Grand Champion Hampshire boar.

THE HERD RESTRAINT OF ABORTION DISEASE IN CATTLE¹

By JOHN P. TURNER, *Washington, D. C.*

SINCE 1900 it has been the writer's privilege to be attending veterinarian and animal husbandman to St. Elizabeths Hospital, which has a herd of 200 cows and 50 heifers.

This herd is maintained in a rather thickly populated area in the District of Columbia, there being practically no pasturage. A large exercising field of 30 acres is provided, in which there is no grazing but an abundance of shade against the hot sun of Washington summer.

The grain ration consists of corn meal, bran, and either cottonseed or oil-cake meal, depending on the season. Clover hay is provided throughout the year. Corn silage in very limited amount is fed for 7 months a year. Soiling crops are fed during the summer.

The cows are turned into the exercising field daily, save in very cold weather or during cold rains. During the spring, summer and autumn they are out save at the milking periods. Bulls are kept in box stalls in the bull stable, each bull having an outside yard with water trough. The milking herd is maintained in two modern barns with a capacity for 200 cows. Dry cows are stabled in a separate barn and have an exercising lot distinct and away from the milking herd. Calves are kept in large box stalls in the barn used for dry cows but do not come in contact with them.

Calves are allowed to nurse for 3 days after birth and are then removed from the cows and fed raw herd milk in specially constructed tin buckets which fit into the grain box of the calf stalls. Calves receive milk until 3 or 4 months of age, depending on their growth, but are encouraged early to eat a grain ration of corn meal and bran. When 4 months of age they are turned into a grass lot and fed grain and are kept outside save in the winter. When 6 months of age calves are removed to a farm in Maryland, where they are kept until they freshen with their first calf, and are then returned to the milking herd.

Nothing but heifers and 2 bulls are kept on the Maryland farm. The heifers are divided into 2 herds on this farm. All of breeding age (18 months) are kept in a pasture with a young bull; the younger heifers are in another pasture.

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

The herd has had its share of the usual epizootic diseases.

When the writer began his work in this herd 20 years ago the Bureau of Animal Industry was combating an outbreak of rabies, and in making postmortems for this disease found the herd badly tuberculous. Later a tuberculin test was applied, and 79 out of 115 cows were destroyed. Barns, lots, etc., were cleaned and disinfected, and a fight against tuberculosis was begun, which ended successfully in 5 years.

Abortion disease had existed for many years, but was not given much attention, as all calves were vealed, the herd being replenished by carload purchases of cows from the mountain section of Virginia.

It was noticed at this early period that abortion was more prevalent among the newly purchased cows than among those which had been in the herd several years.

Additions to the herd were generally made at the end of the fiscal year in June, and from 20 to 30 cows were purchased after being tuberculin tested. These cows were either fresh or were forward springers. They were bred in September following purchase, and abortions were generally noted by February and March. Frequently from 25 to 50 per cent of these newly purchased cows would abort. The number of cows aborting annually would be 15 to 20. If the cows that aborted gave sufficient milk to warrant their retention in the herd, they were kept; if not, they were sold for beef. At this time (1900 to 1908) there were no facilities for caring for aborters, and proper isolation of them could not be maintained. Abortion to a certain degree was looked upon as a part of the year's loss to the herd.

In 1909, due to some sanitary requirements on this farm, the writer was enabled to get two box stalls at the end of an abandoned piggery for use as isolation stalls for aborters. Fortunately, these stalls were connected with concreted yards having sewer connections. Then we were able to control the spread of infection from vaginal discharge, as it was possible to secure infected placentæ and burn them and disinfect the floor of this yard regularly.

The record of abortion disease in this herd is as follows:

<i>Year</i>	<i>Number of cows in herd</i>	<i>Number of abortions</i>
1900.....	115.....	10
1901.....	128.....	14
1902.....	135.....	16
1903.....	140.....	13
1904.....	145.....	12

<i>Year</i>	<i>Number of cows in herd</i>	<i>Number of abortions</i>
1905.....	155.....	15
1906.....	150.....	16
1907.....	145.....	20
1908.....	149.....	16
¹ 1909.....	150.....	11
1910.....	155.....	18
² 1911.....	145.....	14
1912.....	150.....	13
1913.....	152.....	9
1914.....	157.....	6
1915.....	169.....	3
1916.....	161.....	4
1917.....	192.....	7
1918.....	197.....	9
1919.....	202.....	4
1920.....	213.....	4

Owing to the increasing price of cows and the lowering of their quality, it was decided to raise calves and endeavor to build up the herd. In 1909 25 heifer calves were raised, and from that time from 25 to 40 heifer calves were raised each year. The last purchase of cows was made in 1911. Since that time the only additions to the herd have been young, registered Holstein-Fresian bulls and the annual crop of heifers.

It will be seen that the disease has gradually diminished and the herd has nearly doubled in numbers.

The cows purchased in 1911 aborted as usual in the spring of 1912, 12 of the aborters this year being among the cows purchased in 1911. The other was a heifer raised on the farm. To show the extent of abortions among newly purchased cows, during the years 1909 to 1912 there occurred 65 abortions in the herd; of these 61 were among purchased cows and 4 were heifers raised on the farm.

Since 1909 this herd has raised over 300 heifers with a total abortion among them of 41, or an average of 3.7 per year. These abortions occurred as follows:

First calf	4
Second calf	10
Third calf	15
Fourth calf	1
Fifth calf	4
Sixth calf	4
Seventh calf	3

¹ Began raising heifer calves.

² Last year cows were purchased.

Of these abortions 4 are second abortions. These second abortions occurred as follows:

- o 1 cow aborted fourth and sixth calves.
- o 1 cow aborted fifth and seventh calves.
- o 1 cow aborted third and sixth calves.
- o 1 cow aborted fifth and sixth calves.

While many writers state that abortion usually occurs at the first calving, such has not been our experience. Of the 4 aborting with their first calf, one of them occurred after a violent attack of some gastro-enteric disease which affected several of the heifers.

It is believed that the removal of these heifers while young (6 months) from the dairy farm in the District of Columbia to another farm in Maryland and their segregation from pregnant cows until fresh accounts for the low rate of infection. Dick (1) has also noted this fact.

That plenty of abortion disease existed in this herd is proven by the work done by Schroeder and Cotton in February and March, 1911, when they found abortion bacilli in the milk of 18 cows in this herd in one examination. The herd record of these 18 cows is as follows: Ten of them have either aborted prior or subsequent to this milk examination. Eight of these cows never aborted.

In September, 1916, the Bureau of Animal Industry made an agglutination test of the herd of 161 cows and found 33 reactors. During this year only 4 cows aborted. It is probable, however, that more of the disease existed in the herd, as several young calves died and some cows retained their placentæ.

A record of these 33 reactors is interesting. Eleven of these cows have aborted either prior or subsequent to this blood examination. Nine calves born of these aborters have died when young. Twenty-two have never aborted. Eleven of these non-aborters have had 25 calves die when very young, as follows: One cow lost 4 calves when very young; 4 cows lost 3 calves when very young; 3 cows lost 2 calves when very young; 3 cows lost 1 calf when very young.

Twenty-one of these reactors have been sold as unprofitable milk cows since 1916; 1 died; 11 are now in the herd. Many of the cows that reacted have had from 4 to 7 normal calves.

From a breeder's standpoint it would have been better to slaughter these reactors which repeatedly produced calves that died when young, but as milk producers they were profitable, as a daily milk record has been kept for the past 10 years.

In connection with the agglutination test as a means of restraining abortion, Dr. E. M. Robinson (2) reports some very interesting work in a herd of 100 cows, heifers, bulls and oxen, in which 10 actual abortions had occurred previous to August, 1915, and 16 other cows were positive to the agglutination test. Sixty-three cows and bulls remaining as non-reactors were brought to the Experiment Station and put on a clean farm in August, 1915. By error a cow (No. 1148) had been included in the herd when removed; this cow had given a positive reaction in January, 1915, in dilution of 1 to 200. In August, 1915, she gave a positive reaction in 1 to 1,000 dilution. The reactor was removed from the clean farm after the first test on this farm, which occurred in January, 1916, together with 5 reactors of the original 62 clean cows.

A second test was made of this herd 2 months later (March), and 3 more reactors were removed and isolated with the previous 5 reactors.

A third test was made in May, 1916, and only 1 reactor was found and isolated.

A fourth test was made in July, 1916, and 2 more reactors found and isolated.

The remaining cows were then sent to a clean farm, and on August 17, 1916, the fifth test was made without any reactors.

The nonreactors were then removed to another farm, and two years later no further reactions have occurred either on this farm or among other clean herds into which some of them were introduced.

METHODS OF RESTRAINT

1. It is believed that it is necessary to discontinue the purchase of susceptible cows for aborting herds and depend upon bulls to raise the herd milk standard. In this manner a herd immunity is established.

2. Aborters are not to be sold unless they are without value for milk production.

3. The absolute segregation of aborters for a period of at least one month and longer if any vaginal discharge exists is the rule. The fetus and placenta are burned and the stall or place infected is disinfected.

4. The isolation from the milking herd of cows far advanced in pregnancy is practiced.

5. Heifer calves are fed raw herd milk. For several years, when abortion was very prevalent, all milk from aborting cows was fed to

calves without visibly increasing the amount of abortion disease. The fact that the majority of abortions in home-raised cows in the herd occurred at the third pregnancy rather precludes any danger from this source.

6. Heifers are maintained apart from the milking and pregnant herd and at 6 months of age are removed to another farm and are bred at 18 months and kept on this farm until fresh. This practice has been highly successful on this farm.

7. A grade bull is used on aborters and the calf sold for veal. This is done to save the time and annoyance of cleaning herd bulls.

Aborting cows as well as cows which do not pass their placenta promptly are hospital cases and are given uterine and vaginal treatment until they are clean.

Retained placenta are not forcibly removed. A suggestion made by Dr. Cassius Way has lately been tried and seems to be good treatment in these cases. A pint of mineral oil is introduced into the uterus at the twelfth, twenty-fourth and thirty-sixth hours, and gentle traction is made daily after the tail and external parts have been scrubbed and the vagina flushed with warm normal salt solution. These vaginal washings are maintained daily for at least 2 weeks and then every 2 or 3 days until the cow is clean.

Endo-metritis and cervicitis cases are treated with weak Lugol's solution with the Albrechtsen uterine catheters and local treatment of pure Lugol's to the os uteri when necessary, guarding the vagina with a cotton plug. An open capsule filled with iodoform and boric acid is introduced into the uterus if there is any apparent odor. Iodoform is never used in the milking herd, bismuth-formic iodide being substituted.

No anti-abortion vaccines or bacterins are used.

Drs. Mohler and Traum did a great deal of experimental work in this herd in 1910, using suspensions of killed abortion bacilli without conclusive results.

While this herd is not free of abortion, it is believed to be under practical control, the herd breeding efficiency being 80 per cent, 160 live calves having been born from 200 cows in the calendar year 1919.

The practical restraint of abortion disease and the total elimination of tuberculosis, together with the introduction of registered bulls of excellent producing families, have resulted in a marked improvement in the average production of the herd, which with 115

cows in 1900 produced less than 5,000 pounds of milk a year, while the present herd of 200 cows averages 8,000 pounds.

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DISCUSSION OF ABORTION PAPERS

DR. E. C. SCHROEDER (Bethesda, Md.): Dr. Turner told us that when the milk of these cows was examined it was found that ten of them had at some time aborted; eight never had. This illustrates in a splendid way that we should constantly keep before our minds that abortion disease may spread to apparently healthy cows. I can tell you of apparently healthy cows that have shown those symptoms and a large proportion of them disseminate abortion bacilli.

In regard to the paper presented by Dr. Simms, I wish to say that the etiological studies of abortion which have been in progress at the Bureau of Animal Industry Experiment Station for quite a number of years have given results which, had Dr. Simms used them for his conclusions, would have been identically the conclusions he has presented here today.

DR. C. W. EDDY (Cleveland): I would like to ask Dr. Turner one question. He has shown a great diminution in the number of abortions. I want to know about the number of retained placentas in cows.

DR. TURNER: I think during this year I have removed four or five placentas. A few will stand for ten or fifteen hours, but will not stand longer. In prior years I remember I had a job of that kind almost every visit. Now it is very unusual. The cows calve naturally; the calves are much healthier. The whole herd is improved in health, and where before we had difficulty in getting the number of calves, now we have success with them.

DR. FERGUSON: I would like to ask the Doctor what percentage of less than 280-day calves he had in that herd, and what per cent of calves have goiter, if any.

DR. TURNER: I have not noted goiter at all. As far as the per cent of 280-day calves is concerned, we find our calves come right up to the breeding dates. Three or four calves this year came at the period of about three weeks before their period, but on looking up the breeding records we found a service which corresponded exactly with that period, but they had been served the second time, showing that they possibly showed the first service. I think most veterinarians will find that both in cows and mares.

DR. WATSON: I would like to ask Dr. Schroeder a question. I think he has just drawn attention to the fact that apparently healthy cows are a danger and a possible source of infection. I would like to ask Dr. Schroeder if a cow that is being immunized with bacilli would also be a possible danger of infection.

DR. SCHROEDER: It is generally assumed that when abortion bacilli are

injected subcutaneously they do not permanently infect the injected cows. When those bacilli are injected intravenously they are likely to establish themselves in the udder. I object to either method in healthy herds because a subcutaneous injection may, at any time, unknown to the person who gives such an injection, become a partial intravenous injection.

DR. CONNAWAY: I wish to add a little experimental data to this matter of the retention of infection in the animal. I have injected a bull, as many others no doubt have, and I find that that animal retains that infection a good long time somewhere in his body. We had a little steer. We tested him and found that he was a nonreactor, and we injected him with the living cultures of the abortion bacillus. That was nearly a year ago. That little fellow is still a reactor. I believe that he has those abortion germs somewhere in his body and is producing the antibodies.

It may be that it is not necessary to have a living organism to produce antibodies. It may be that those have been encapsulated in some way and as dead antigens may be stimulating the production of antibodies and giving this reaction. I feel, as Dr. Cotton says, that it is a dangerous proposition to inject breeding stuff with the living organisms and risk those being killed and at the same time giving that animal any permanent immunity against this disease.

A NEW METHOD OF MILKING

DR. C. H. MCFALL, of Florida, Ala., stands sponsor for the following story which was recently published in his local paper:

Atlanta has her gold-tooth baby and Dawson its two-headed calf and several other towns have recently reported freaks, all of which does pretty well for nature, but a man at Forsyth, Georgia, has eclipsed all in native genius. He has discovered a new way to milk a cow. He has trained his cow to give down her milk by the simple process of working her tail up and down like a pump handle.

He began his training by using one hand to draw the milk and at the same time moving her tail up and down with the other. In the course of a few lessons he would occasionally release the cow's teats and continue the tail movement and after a few days' time he could milk her "dry" in a short time with the tail.

He found it necessary, however, to always begin milking in the old-fashioned way. At first he was apprehensive of his success, because he was afraid his cow would milk herself fighting insects with her tail, but he has learned that, unlike a horse, a cow can switch her tail only from side to side.

According to the *Wisconsin Farmer*, hog-cholera outbreaks have been noted in scattering parts of the State and local veterinarians are working industriously to stamp out the disease.

A PRELIMINARY STUDY OF THE NORMAL VARIATION IN THE TEMPERATURE OF CATTLE¹

By E. A. HEWITT

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A STUDY of the normal temperatures of cattle and their variations was undertaken at the University Farm in hopes of shedding some additional light upon the subject. Few observations of normal temperature variation have been made on cattle known to be free from tuberculosis. A review of the literature upon the subject reveals the fact that the opinions are as numerous almost as the investigators.

Friedberger and Frohner as quoted by Wooldridge (2) consider 101.8° F. (38.8° C.) as the average temperature. They further quote Hadschopulo, who from 50,000 temperatures gives an average between 101.1° and 101.8° F. (38.4° to 38.8° C.).

Meade Smith (3) gives the average temperature for cattle to be 100.4° to 101.3° F. (38° to 38.5° C.). He further states that a variation of 1 degree or more indicates some failure in the organism or some departure from the natural process of metabolism.

Howell (4) in discussing the temperature of the human body states that the difference between early morning temperature and late afternoon temperature may amount to a degree or more Centigrade, which would be equal to 1.8° F.

From our observations we would conclude that the diurnal variation in individual cattle rarely exceeds that of a human individual or 1.8° F. But the range of variation of normal temperatures of cattle is greater than the range of variation of the human temperature.

Colin (5) and Thanhoffer (6) agree with Meade Smith and give the average temperature of cattle as 100.1° to 101.3° F.

Wooldridge (2) made 520 observations on 63 apparently healthy dairy cattle and found the average temperature to be 101.4° F. (38.5° C.). The lowest recorded temperature of the 520 was 100.4° F. (38° C.) and the highest observed was 102.8° F. (39.3° C.). He further states that these extremes are seldom met with.

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The writer made 490 observations on 70 head of purebred Hereford cattle which were in good condition, although not in show condition, and found the average temperature to be 101° F. The lowest temperature of the 490 observations was 98° F. and the highest observed was 102.4° F. This showed a wider range of variation by 2 degrees than was obtained by Wooldridge, the range in this case being 4.4 degrees, while that obtained by Wooldridge's observation was 2.4 degrees, the highest range of any one individual being 1.8 degrees. The temperatures of these cattle were taken after they had been stabled one day, as the average on the first day of stabling, shown by 210 observations, was 101.8° F. The lowest temperature of the 210 was 100.4° F. and the highest was 103.6° F. The higher temperatures in this case were due to the excitement of being stabled and tied up. These cattle were known to be free from tuberculosis.

The cause of the daily variation of temperature has been much discussed. There is no doubt that several factors are concerned, among the most important being the variation in the amount of contraction of the skeletal muscles and the influence of food. From our experience we are inclined to believe that heavy feeds are capable of raising the temperature considerably, especially in animals which are in show condition. More work on this phase is needed at present.

There is no doubt also that drinking water may cause a little reduction in the temperature, but under normal and accustomed conditions the reduction is slight.

Pregnancy is also said to cause a rise in temperature. Wooldridge in comparing the temperatures of pregnant with non-pregnant cows found the average temperature of the pregnant cows to be 0.3 degree higher than that of the non-pregnant cows.

Various other conditions are said to cause variations in temperature in health, such as active lactation, estrum, housing, and, as shown, excitement may cause a considerable elevation of temperature.

There is a great difference in individuals in the variation of temperature, there being a decided variation in certain individuals at the same hour on successive days, although we believe these cases are fewer in number than those which maintain a more constant temperature during the same hour of the day.

Following are the temperatures of cattle stabled in a modern barn, showing a range of variation of more than 0.6 degree. These temperatures were taken at 9:30 a. m. on each day.

NO. OF ANIMAL	DEC. 22, 1919	DEC. 23, 1919	DEC. 24, 1919	DEC. 29, 1919
283	100.9° F.	102.4° F.	101.2° F.	102. ° F.
279	102.	101.4	102.1	101.9
288	102.3	102.3	101.8	102.7

Animal 283 shows a range of variation of 1.5°. The conditions were the same each day.

The following table shows the temperatures of cattle stabled in the same barn as above, which show a more constant temperature, having a variation of 0.6 degree or less. These temperatures were taken at 9:30 a. m. each day.

NO. OF ANIMAL	DEC. 22, 1919	DEC. 23, 1919	DEC. 24, 1919	DEC. 29, 1919
295	101.6° F.	101.6° F.	101.5° F.	101.5° F.
281	101.6	101.4	101.7	101.5
Calf 297	101.5	101.4	101.4	101.9
Guernsey cow	101.3	101.3	101.4	101.5
Calf 293	101.6	101.6	101.6	102.2
Calf 298	101.4	101.8	102.	102.

The temperature of the stable ranged from 42° to 58° F.

The following table shows temperatures of cattle in another stable, which again shows that some individuals have a wider range of variation than others during the same hour. The first three series of temperatures were taken at 8:30 a. m. each day, while the last two series of temperatures were taken at 9:30 a. m.

NO. OF ANIMAL	NOV. 10, 1919	DEC. 22, 1919	DEC. 23, 1919	DEC. 24, 1919	DEC. 29, 1919
Calf 305	102.7° F.	101.8° F.	101.7° F.	101.9° F.	102. ° F.
285	102.2	101.6	102.4	102.	102.4
287	102.1	101.	102.1	101.6	101.6

The following table shows cattle having a fairly constant temperature confined in the same stable as those in the preceding table. On the first three days these temperatures were taken at 8:30 a. m., and at 9:30 a. m. the last two days.

NO. OF ANIMAL	NOV. 10, 1919	DEC. 22, 1919	DEC. 23, 1919	DEC. 24, 1919	DEC. 29, 1919
Jersey	101. ° F.	101. ° F.	100.8° F.	101.1° F.	101.2° F.
289	101.6	101.4	101.5	102.	101.8
280	101.9	101.6	101.8	102.3	102.5
300	102.4	102.	102.	101.5	101.9
286	102.2	102.6	102.7	102.1	102.6
178	102.3	102.4	102.3	102.5	102.4
Bull	102.2	101.9	102.1	102.2	102.

The animals studied in the preceding tables were all normal and in good condition, consisting of the experimental herd at the Veterinary Division of the University Farm.

Observations were made on 70 head of purebred Herefords in August, 1919, to determine the variation throughout the day. The average temperature of the 70 head at 6:00 a. m. was found to be 101.1° F.; at 8 a. m., 100.8° F.; at 10 a. m., 100.8° F.; at 12 noon, 100.9° F.; at 2 p. m., 101.1° F.; at 4 p. m., 101.1° F.; at 6 p. m., 101.3° F. The results of this observation do not coincide with the statement of most authors that the temperature is lowest early in the morning. However, this topic would merit further study.

The effect of watering animals in their accustomed manner was also studied. The animals observed were the veterinary experimental herd of the University Farm. These animals were accustomed to receiving all the water they would drink at about 10 o'clock in the morning. The temperature of each animal was taken at 9:30 each morning, one-half hour before receiving water, and beginning at one-half hour after receiving water, or 10:30. The temperatures were taken every half hour for three times. The temperature of the water averaged 43° F. The results are shown in the accompanying table:

COW No.	DAY	TEMPER- ATURE OF STABLE	ANIMAL'S TEMPER- ATURE AT 9.30 A.M.	LITERS OF WATER GIVEN	ANIMAL'S TEMPERATURE AT		
					10.30 A.M.	11.00 A.M.	11.30 A.M.
281	Mon.	45° F.	101.6° F.	20	101.8° F.	101.3° F.	101.2° F.
	Tues.	46	101.4	28	101.6	101.4	101.8
	Wed.	42	101.7	28	100.9	100.5	100.
283	Mon.	47	100.9	20	101.5	101.	101.3
	Tues.	49	102.4	28	101.	101.4	101.
	Wed.	44	101.2	28	100.2	100.4	100.
288	Mon.	48	102.3	20	101.3	101.5	101.6
	Tues.	52	102.3	28	100.8	100.6	101.6
	Wed.	47	101.8	28	101.1	100.6	100.7
279	Mon.	51	102.	28	100.8	100.7	100.6
	Tues.	54	101.4	28	100.7	101.	101.2
	Wed.	46	102.1	28	101.2	101.3	100.6
Guern- sey E 24192	Mon.	50	101.3	28	100.	100.	100.3
	Tues.	53	101.3	28	99.5	100.	100.4
	Wed.	54	101.4	28	100.6	100.2	100.4

A study of the table leads one to believe that if animals are watered in the manner they are accustomed to, and not allowed to become exceedingly thirsty, the effect of the water upon the temperature is slight.

CONCLUSIONS

1. That the normal range of variation in the temperature of cattle is somewhat higher than is usually given by most authors. In extreme cases there may be a range of 4.4° F.
2. That the average normal temperature of cattle is around 101° F.
3. That there are differences in individuals in their daily variation.
4. That water if given cattle at accustomed times and quantities usually causes little variation in the temperature.

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Grove City National, in commenting on the non-existence of county fairs, agricultural departments, purebred stock, etc., among the peoples of the 26th century, B. C., says: "Of necessity they had only low-grade livestock. There is, however, no justification for such livestock on the modern farm. If there is a scrub cow, hog, or sheep on your farm, list it as a poor investment."

In advocating the passage of purebred sire legislation in Colorado, *Western Farm Life* says: "Experience in other Western States has shown that the only effective protection is to compel the use of registered sires on all open grazing land. Utah and Idaho are among the States that have benefited their cattle industry by such legislation and Colorado should no longer remain behind."

KENNEL HYGIENE AND FEEDING¹

By E. D. KING, JR., *Valdosta, Ga.*

UNDER kennel hygiene comes feeding, watering, exercising and housing, and anti-parasitic measures.

The feeding of dogs is a subject on which much improvement could be made over most of our present practices. The nutritive ratio best suited to the needs of the average dog is about one to five, and the average dog owner knows very little about what a dog should eat and never thinks of this until the dog refuses to eat. No attempt will be made to outline remedies, as the only sane procedure then is to call a veterinarian and he can determine what is wrong and prescribe suitable treatment, after which proper diet should be given.

The writer has obtained good results from feeding a ration of a mixture of prunes and wheat bran for breakfast, prepared as follows: Prunes, 1 quart; wheat bran (or shorts for pregnant bitches), 1 quart. Cook the prunes and remove the pits, mix the bran (or shorts) with the prunes, and add enough water to make a dough. Bake into a loaf and feed once a day ad lib. to effect, then every second day, substituting milk and corn-bread.

For the mid-day meal, ground lean beef and corn meal, equal parts, by bulk, cooked as follows: Cover with cold water and bring slowly to a boil, boil for twenty minutes, cool, and feed just what the dog will clean up well.

For the evening meal, restaurant scraps containing a liberal amount of meat will do very well.

These suggested meals will keep a dog in good shape, but many of my readers can substitute some local fruit for prunes for the laxative effect, which is essential to digestion and sometimes is all that is necessary to correct minor digestive disturbances.

Water should be kept in reach at all times and frequently changed so as to be kept fresh and the container clean.

Under housing, too much emphasis cannot be placed on the danger of digestive derangement that can be caused by chilling, and for that reason the following kennel is recommended:

No special form of kennel is necessary, but strips or wires should be placed across the top of the kennel at 3-inch intervals, and on each wire or strip should be hung a piece of burlap or flannel as

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

wide as the kennel, suspended by its middle and each end touching the bedding, and these should be split into 4-inch strips. Bedding on floor should be of excelsior or straw and covered with burlap or flannel. Door should be of canvas tacked at top and split half way up the middle from lower end, and across the wires or strips should be placed a sheet of heavy cloth to prevent draft. This arrangement permits the dog to go in and out without leaving the door open and keeps him covered so he cannot roll the cover (strips) off. In warm weather this can all be taken out.

Among important problems to the practitioner are the unhygienic handling of dogs in the field in hunting after the hunt is finished, and the erratic medicinal treatment attempted by breeders and owners.

Under the first usually a case of bronchitis results from hunting the dog hard and then putting him in an automobile and driving 10 to 30 miles without protecting him from the draft. This is very easy to handle, but the erratic treatment by owners and breeders is apt to be anything from bichloride poisoning, introduced in the shape of calomel and changed by combining with an additional atom of chlorine from the hydrochloric acid, which is marked in the dog's gastric juice, to feeding stale dog biscuits.

A favorite mistake is to assume that all the trouble with pups is caused by worms and when they seem indisposed fill them with patent worm remedies.

If we will consult Sisson, and look at the table of dentition for the dog, we will find that between 3 and 5 weeks of age a pup erupts 22 teeth. This causes more or less trouble, which is best treated by mild digestive corrective measures. Heroic treatments for parasites are usually disastrous. Five to seven months of age is another period of teething for the pups, during which mild treatments are to be recommended.

The subject of canine practice and kennel hygiene could be dwelt on indefinitely, but permit the writer to say in closing that our hardest patients to handle are in the hands of breeders. In these cases we should exact implicit obedience to instructions.

Department of Agriculture Bulletin 855, entitled "Saponified Cresol Solutions," by Jacob M. Schaffer, describes experiments which show that saponified cresol solutions made with rosin soap have fully as great disinfecting power as those made with linseed oil or other vegetable oils or fish oil, and are much cheaper.

THE HORSE AND THE MULE THEIR INDISPENSABILITY TO MANKIND¹

By WAYNE DINSMORE

Secretary, Horse Association of America, Chicago, Ill.

I AM indeed glad to have the opportunity of addressing you, because I know that your members constitute one of the most influential bodies in the United States and that you are in a particularly strategic position to influence horse breeding and use.

The Horse Association of America is a non-profit corporation, organized under the laws of Illinois, supported by five great groups of interests and devoted to the work of aiding and encouraging the breeding, raising and use of horses and mules. At the conclusion of my talk, if you believe in this work, you are invited to take such action, officially, as you think should be taken to indorse it, and to select, in some proper manner, some representative of your Association to serve on our Advisory Board.

The American Remount Association has recently officially indorsed our work and has appointed Major Stanley Koch as its representative upon our Advisory Board. All of the great draft-horse record associations—the Percheron, Shire, Clydesdale, Belgian and Suffolk breeds—have gone in with us heart and soul, are supporting us financially and in other ways, and have designated responsible representatives from their directorates to act upon our Advisory Board. We have also been honored by the official indorsement and coöperation of the American Saddle Horse Breeders' Association, and more recently by similar action on the part of the Arabian Horse Club of America.

Very few farmers realize the great debt that they owe to the veterinary profession. No country is so free from disease as this one. In none is there so slight interference with interstate commerce or free shipment from place to place as here, and that is due to the splendid preventive work of the veterinary profession of this country. I know that, as time goes on, the livestock breeders will measure your work and estimate it at more nearly its true value.

Coming directly to the subject of "The Horse and the Mule—Their Indispensability to Mankind." I am going to deal with this from a very practical standpoint, because I know you men are

¹ Address at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

interested in it from that standpoint. I have talked with many veterinarians in the Central West and they tell me that practically one-half of their annual income comes from their work with horses and mules. While that may not be true in all sections, it is certainly true in the Central West. In other words, you gentlemen have a direct financial interest in the production and use of horses and mules, and because of that direct financial interest I want to deal with this from a purely practical standpoint.

Since civilization began, the horse has been the servant and companion of man. His speed served the earliest peoples who lived by their horses and flocks; his power and docility aided in the first crude attempts at agriculture and transportation; his courage and strength won battles and decided wars. From the very beginning the nations that have possessed ample resources in horse flesh have been the dominating nations of the world. And even in the last great titanic conflict, where aeroplanes and every conceivable type of mechanical motive power were utilized to the limit, it was still found necessary to rely upon horses and mules to the extent of one for every four men engaged in combat. It is safe to say that in this war, as in previous ones, the presence of ample reserves in the shape of horses and mules decided the day.

The horse-breeding situation in this country in recent years has been complicated. Just before I came up here I talked with Dr. Reynolds, and I asked him, "What is the situation in Minnesota?" He answered, "There is a general feeling of uncertainty among our farmers. They do not know what the future has in store for them." I asked, "How many of your veterinarians have the necessary information to tell your farmers what horses and mules are going to do in the future?" He said, "Very, very few of them have facts and figures, or know where they can get them."

No industry in America has been so lied about, no industry has had so much erroneous information distributed about it, as the horse and mule industry in recent years. The incoming of mechanical motive power has led the makers to spread propaganda widely over this country. Much of it has been misinformation and much of it has been plain lies. They have sought to lead the city man to believe that the horses and mules were not economical or efficient in city work, and have told them that farmers were quitting the raising of horses and mules, and that they, city users, should quit using the horse and use mechanical motive power instead. And they have gone to the farmers and said, "Horses and mules are not

being used in the cities any more. You had better not raise horses and mules." So they have played both ends against the middle. That is not legitimate propaganda or legitimate competition.

Only last November the *Scientific American*, a reputable journal in New York City, ran an article in its columns, practically a full-page article, which contained more absurd and ridiculous statements about horses and mules than anything I have ever read. It started out with the general premise that there were so many tractors in general use in this country, and that every one had developed 13 horse-power at the draw-bar. The article went on to say that there were displaced by tractors on that basis, within the last four or five years, something like 4,862,000 horses and mules, and that at this rate all the horses and mules in the United States would be displaced and turned out to graze with nothing to do in a very short time. When I read that editorial before the Association of American Engineers they simply laughed at the thought of a tractor developing 13 horse-power at the draw-bar, displacing 13 horses per tractor on farms. Records show that tractors have displaced only 2.4 horses per tractor, and that on many farms the displacement is practically nothing. Furthermore, men are learning, as they use tractors, that they are not as economical, not as efficient, and not as reliable as the horse. The best friend the draft horse has in the country is the man who has used a tractor four or five years. (Applause.)

In 1914 the war came on. There was general uncertainty. Late in the fall of 1914 army purchases began, and in 1915 and 1916 these purchases continued at a rapid rate. Those purchases disclosed unexpectedly large numbers of horses ranging from 1,200 to 1,400 pounds, particularly suitable for artillery and transportation use. Of course they used the horses running over 1,500 pounds for transport. It also revealed an apparently unlimited supply of horses under 1,200 pounds. The ranchmen became discouraged. They said, "We have more horses than we dreamed we had. We had better not breed any more."

Today the advance census reports show that there has been but a slight increase in horses during the last decade, and a substantial increase in mules. In 1910 we had over 27½ million horses, mules, asses and burros on farms and in non-agricultural service. If the later figures bear out the advance census reports so far received, we shall have a little over 28 million head when the 1920 census data are completed. Aside from this we have exported during the last ten years 1,149,763 horses and 376,836 mules. Yet today, in spite of the

existence of approximately 27,000,000 horses and mules, there is a greater shortage of high class, 100 per cent efficient horses and mules than at any time in the past, because for the last three years breeding in the important horse and mule producing States has been practically at a standstill. This can mean but one thing—a shortage in the future.

Dealers, beset on all sides by city transportation users who want good, big draft teams, go into the West, find teams on farms that are suitable in size, age, conformation and quality for their needs, and say to the farm owners: "We want this team, and we will pay you \$650, \$700 or even \$800." The farmer says, "I can't sell them. I haven't any young horses to take their place." That is the situation today. So today we are confronted in the city with a lack of horses. The farmer has no young horses to take the place of the old ones, so our whole problem is increasing production and particularly increasing the immediate supply.

What is the situation in relation to horse and mule production? Pennsylvania and States east and north are largely a consuming area. They do not produce in that district one-fourth of what they need. The area south of the Ohio River and east of the Mississippi, with Arkansas and Louisiana thrown in for good measure, is another great consuming district. They don't produce one-eighth of the animals they actually use. The Central West States—Ohio, Indiana, Illinois, Iowa, Missouri, Oklahoma, Kansas, Nebraska, South Dakota and North Dakota—constitute the great producing district for draft horses. In that area they produce over 80 per cent of our draft horses and mules, and probably that percentage of driving and saddle horses. The great producing areas in Minnesota, Wisconsin, Michigan and the Virginias produce a slight surplus, but very few of the kind in demand. They do produce somewhere near what they need.

The belt lying along the eastern slope of the Rocky Mountains—Texas, Colorado, Montana and Wyoming—constitutes another district of distinct type in our horse and mule production, for they do produce a surplus. They have conditions that are ideal from the standpoint of producing good horses and mules, yet they produce very few horses that will measure up to the draft standard. Why? Because they have not a sufficient food supply out there to permit those animals to come to real draft standard. They may have colts they've topped on the range that carry four crosses of draft blood, yet because they live on the open range, without a bite to eat except

what they themselves can get on the range, they do not have sufficient food supply to mature to the full size their blood warrants. Most of them do mature at from 1,300 to 1,500 pounds. The same applies to saddle and driving horses, which are retarded because of lack of feed. In Texas the conditions are still more unfavorable. An owner told me he had shipped 500 grade draft mares up from Texas to Colorado, keeping an equal number for breeding in Texas. Those kept in Texas matured around 1,100 to 1,200 pounds, and those sent up to Colorado grew up to 1,500 pounds. The same thing is true in cattle as in horses.

The breeders in Wyoming, Montana and Colorado have used good purebred sires for the last 20 or 25 years; yet those horses, if left on the open range, will not mature at more than 1,400 or 1,500 pounds. Those same horses, however, if taken into the Corn Belt as three-year-olds and worked on farms where more ample food supplies are available, will mature at 1,600 or 1,700 pounds, increasing in height, weight, strength and value while doing farm work. The existence of considerable reserves in these Western States is therefore an important source of immediate supply for us.

The farmer in the Corn Belt, the buyer of western mares, should buy mares that will stand 16 hands and 1,200 pounds or over at 3 years of age, because we know from past experience that if such young mares come to the Corn Belt, they mature around 1,600 and you have a gain all around, because farmers are displacing their mature animals with these younger animals. At the same time the older ones are sold and the farmer is thus furnishing a supply to the dealer, who in turn passes them on to the city users. The city user gains in getting a supply of mature draft horses just at the age he wants. The farmer gains because he sells his draft horses before depression sets in, and buys younger horses that he can work. The western man gains because he sells those animals at an age that suits him, leaves him profit, and they go on where they will grow out better than on the western range; so that is the way.

We must come to an increased production in breeding, which you are in a position to influence in a very marked way. Those of you who are actually out in practice know that the farmers are very uninformed upon the facts about horses and mules today.

Coming to the city situation, we have two problems, one to increase the use of horses and mules, and the other to increase the production of the animals. What is the situation in the city? Within the last three months the American Horse Association has

had investigators at Boston, New York, Philadelphia, Chattanooga, Memphis, Birmingham, Atlanta, St. Louis, Kansas City, St. Joseph, Omaha, St. Paul and Chicago as well as in San Francisco. We have had trained men digging into the situation in all of those cities, and what do we find? We find that there has been a great displacement of horses in the last ten years. There is no argument because the automobile has come in and wiped out the driving horse. Many men who would drive horses can not do so because of the slipperiness of the streets and because there are so many automobiles. On top of that you have the inclination of the average American wife or daughter to insist on an automobile if the next-door neighbor has one. You have also the inclination of people to have their pleasure, no matter what the cost. You know, as I know, that when it comes down to a question of pleasure there isn't one person in a thousand that will count the cost. There would be fewer divorces if they did.

What do we find to be the situation in these cities? We find a great displacement in horses, beyond what it should be. In New York they lost practically one-third of their horses in the past three years, 1916 to 1919. In Chicago the number dropped from 80,000 in 1911 to 40,000 this year—cut squarely in half. The displacement has gone beyond what it should, and men who are using both teams and auto trucks are finding that they can do the work more economically with heavy truck teams than with auto trucks. I won't go into all these reports. I have hundreds of them. In every case we went to the head of a firm and got the information from his records and submitted it to him and had it signed before we used it.

In summarizing, I would say the situation in the cities is this: On all short hauls, or rather on all hauls within a horse's working radius, which is within 12 miles—25 miles a day—where low cost of moving heavy freight is the prime consideration, horses are more economical, more efficient and give better satisfaction. Also on all frequent stops, such as milk wagons, grocery wagons, etc., the horse is more efficient and more economical, and they are increasing instead of being reduced in number.

We also find there is a desire among the city transportation users to have the facts. They have been fed up with the motor side so long that they don't know what the real situation is. No organization, prior to this, has dug out these facts and put them before city team users, but we are getting the facts and are putting them out in leaflet form.

We have not only had investigators in all these cities, but have also had a trained horseman visiting the farms all through the important horse-producing area. We have found that farmers generally are in an uncertain frame of mind. They don't know what the future is, and have been led to believe that there isn't going to be much market for horses or mules in cities or on farms.

We are working in various sections through our publicity campaign. We are reaching 1,500 newspapers with news letters every week, and all of the trade papers. We are offering prizes at the leading country and district shows, extending from Maine on the East to California on the West, and in that classification we have said, "Teams, to compete, must stand 16 hands in height and weigh 3,200 pounds per pair, and be driven by a driver under 18 years of age." Horsemen have said that is the best step taken for years to set a standard. We have also offered prizes on mules throughout the Southern States.

Then we have the question of schools and colleges. I found one of the professors in agricultural engineering in one of the eastern colleges was traveling around the State advocating that men should sell horses and buy tractors whenever a tractor would displace two horses, even on 60-acre farms. That is ridiculous on the face of it, because the most exhaustive studies made by the Farm Management Department of the University of Illinois showed that on all farms under 260 acres horses furnished the most economical and reliable source of power, and on farms over 260 acres 75 per cent of the work would still be done most economically by teams.

We have a royal fight on our hands; don't forget that. The motor interests spent \$18,000,000 last year in 25 magazines alone. They have sought to discourage production, because they know if they can discourage the rearing of good horses and mules city men can't buy them and will be driven to auto trucks. An instance of that kind occurred in Philadelphia. A department store had let their horses run down and the traffic manager was sent out to buy horses. He came back and said he could not get the kind of horses he wanted except for a certain sum which he thought was high. The directors said, "Let's switch over and motorize our whole delivery equipment." That department store has gone to trucks. In time it will learn its lesson, just as a department store in Chicago has learned that horses are more economical and recently offered for sale 19 auto trucks and bought 50 draft horses. I can't give you

the name of the store, because they are afraid of the influence of the motor interests. They have reason to be afraid.

A well-known newspaper two years ago threw out trucks and put in horses. They saved \$30,000 the first year by doing it, for the horses did that work for \$30,000 less than it cost to do it with auto trucks. We gave publicity to that, and the motor interests went to the newspaper and said, "Stop that publicity, or we will withdraw all of the advertising we have with you." The newspaper representative said to us, "We can't let you go on with that. It is true, but we can't afford to lose all that advertising." That is what they are willing to do. That is what we are up against.

Our idea is, in a nutshell, to get the facts about horses and mules in the country and cities, and put them before the people interested, directly or indirectly; and our one great problem is to prove to average farmers that the raising of good horses and mules is most economical. Gentlemen, you have every chance in the world to prove to the farmer that he can get all the motive power on his farm at no cost at all. All he has to do is to keep enough big draft mares to handle his year-round work, and then buy some extra teams in the spring to tide him over the peak load in the spring and summer. These motor people say, "You must have emergency power, and consequently you should buy tractors for that purpose," but that is not necessary.

What is the best emergency power to tide over the peak load of the spring season? A pair or two of good, big mules is the best thing you can buy. You can purchase those big sugar mules late in the spring at \$500 or \$550; put them to work, and in the fall you can sell them for a good deal more than you paid. D. E. Van Pelt, of Iowa, bought two pairs in the spring of 1919, worked them all summer, put them through heavy work, and in January, 1920, after all the fall work was done, he sold them for \$1,700.

A mule is the only fool-proof tractor ever built, the only motive power that you can absolutely depend on, that you will get a spark out of every time you come down with the whip, the only kind of motive power you can send to the field and rely on the mules coming back whether the man does or not. That is your practical motive power.

This is one of the big national problems we have before us today, because if you are going to displace horses in the cities and towns and villages and in the country, by replacing them with mechanical motive power, it simply means you are drawing more labor into the

iron mines, coal mines and everywhere else, where men are being drawn to those big centers to produce motors, tractors and trucks. If this continues, eventually you will have a condition in which the factories and cities will dominate our whole country. If such a change comes, industrialism will triumph, and the whole course of our national life will be changed. For a nation dominated by manufacturing interests soon seeks to buy foodstuffs in the cheapest markets of the world, regardless of injury to its own agricultural interests, and this brings about such profound changes that no one can foresee the end.

NEW YORK COLLEGE IN NEW QUARTERS

Dean W. Horace Hoskins announces that through the gifts of Charles M. Schwab, Dr. John P. Munn, and Miss Jenny Young, the Veterinary College of New York University, the oldest institution of its kind in the country, is now housed in new quarters in the two four-story buildings at 331 East 26th Street, New York. Hitherto the college used the hospital and ambulance of the Society for the Prevention of Cruelty to Animals, but now it will be able to work independently.

The new quarters will contain an animal clinic with rooms for blacksmithing, box stall for animal observation, anesthetic and operating room on the first floor; a library of 4,000 volumes donated by Alexander Liautard, founder of the school, and an anatomical museum on the second floor; lecture and demonstration rooms on the third, and a capacious anatomic laboratory on the fourth floor. A new feature of the school will be the pharmacy department where students will learn to prepare their own prescriptions.

Dr. C. W. Tittle has just completed a modern veterinary hospital at Bartlesville, Okla., and is looking for a partner to assist him in taking care of his large practice.

Dr. W. A. Boucher, of Pasadena, Calif., has just built a fine small-animal hospital. This is a two-story concrete building, heated by gas radiators. Kennels and yards in the rear are surrounded by a solid concrete fence. There is also a screened "sun parlor" and special distemper ward. Doctor Boucher is one of the leading practitioners in Southern California and takes an active interest in civic affairs.

SOUND LIVESTOCK LAWS FOR THE FARMER AND THE VETERINARIAN¹

By H. H. HALLIDAY

Commissioner of Animal Industry, Lansing, Mich.

THE privilege of addressing an organization such as the A. V. M. A. is a distinct pleasure and pride. The wheels of progress are turning so rapidly, so much is being learned and accomplished today that never was dreamed of before, that your profession is necessarily a part of the great improvement, and so well have your members responded to the call for painstaking, efficient service that every observing layman can point with pride to the work you are doing.

The old-time horse doctor is no more. He is not wanted or tolerated, because you have shown people the workings and results of the scientist and skilled veterinarians. A thousand avenues of assistance to the livestock industry and to humanity have opened up during the last few years because of the progress made in your profession. You have a right to be proud of your work, and I congratulate you.

As you continue to uphold the dignity of your calling and venerate the achievements, present and past, just so surely will you rise to the honorable station you deserve.

The ethics of your profession should be so fine that laws would be little needed for your guidance, because the absolute honesty and ability would regulate a large majority of your practices; but, unfortunately, human nature is still to be reckoned with, and a well-defined course of action is necessary, not only for the safeguarding of the public, but of your own interests as well.

Laws are recognized to be edicts which are right and just and necessary to the well-being of humanity. They can be obeyed and enforced only as they represent the will of the people and aim at justice and helpfulness. Punishment is just when it follows the disobedience of these laws or is inflicted to secure obedience, and so prevent the evil consequences of disobedience. The necessity for laws governing livestock is no different from that in other lines of human activity, but they are just as important. Laws that are a benefit to the producer of livestock must necessarily be a benefit to the whole country and to the world at large and the

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

wealth and health of many millions of people rest upon sound, wise laws and careful obedience to them.

Sometimes laws seem to be a hardship from one certain viewpoint, but let us always get around and take a view from some other angle and the justice of the matter will often appear very forcibly. Also let us remember that it sometimes takes a real friend to be cruel. So that some provisions necessary to the public at large are only the kind-hands of friendship and not personal hardships.

Livestock sanitary laws are necessary to guarantee to the breeder and farmer security against disease; and in these days of increased value of farm animals this is fast becoming a serious problem and one that can only be met by efficient veterinary service and laws governing the care and shipment of livestock. These laws are of far-reaching effect upon the health and wealth of the nation. In order to have healthy, virile people, they must be well fed and nourished, and practice and custom have established meat eating as essential in our varied climates. The vegetarians have much force in their contention against the practice, but meat consumption continues with great increase. Milk is also one of the essential foods in the growth and development of the young and should only be used from animals which are known to be healthy. Animals are becoming higher priced all the time, and consequently more care is exercised in their health and handling. The preservation of the livestock industry is also essential in maintaining the fertility of the soil, thus keeping an intimate relation between the various branches of farming.

Laws should deal rigidly with shipments from State to State regarding contagious or infectious diseases and should also define accurately the duties of persons engaged in handling such traffic. All carelessness and indifference should be eliminated and provision made for quarantine of all livestock and stockyards where contagion exists. All farms and adjacent property should be held under restrictions wherever communicable diseases occur.

The laws should be concise, definite and uniform throughout all the States, thus simplifying the work of enforcement and rendering an easier understanding by those who should obey them. We realize that certain conditions, as soil, climate and prevalence of certain diseases peculiar to those conditions, would necessarily vary the laws to some extent, but many laws could be more uniform to the great advantage of all concerned.

Unfortunately, some of our laws are so worded that one section seems to conflict with another, leaving a doubt, even in the mind of an attorney, as to what the real provision is. Let us have them simplified and more definitely stated. Your profession is entrusted largely with the matter of formulating these laws, and you see the far-reaching effect of your wisdom, and we have faith in your ability and integrity to put these matters straight wherever you have an opportunity, thus securing millions of dollars to your country by the preservation of our livestock.

The veterinarian should also be protected in his vocation. Let the State boards eliminate the frauds and the unqualified. No worse calamity can come to you, as individual practitioners or as a profession, than for dishonest and unqualified men to enter your ranks and discredit your work and degrade your profession. I am glad that entrance requirements to veterinary colleges have been raised and that a good fundamental education must precede the veterinary course, and the course has been lengthened to full four years.

Laws should also cover the inspection of these colleges to determine the excellence of work done. It is a deplorable fact that institutions are turning out graduates that are absolutely lacking in knowledge and experience needed for practice.

Laws should be so rigid that veterinarians who are not qualified could be eliminated when proof could be found that they had evaded the law or disobeyed the spirit of the law. State boards should have the power to revoke licenses. It is up to the veterinarian who has spent his time and money to qualify himself to put out of business the charlatan and quack or their near relatives.

We believe the most needed law at present is one creating the county veterinarians all over this country. The county veterinarian is a coming factor in good, sanitary farm conditions. His services are sought upon a hundred problems and practices. The farmer is being educated to the idea of skill and care for his animals. He wants help and instruction about hog cholera, tuberculosis and all contagious and infectious diseases of livestock. The county veterinarian, working in coöperation with the local veterinarian, is a big asset to the farmers, and the idea works out splendidly wherever tried. The State Department can not reach its helpful offices to the great numbers needing and asking for assistance without some such agency. The laws should provide for the payment

of part of this expense by the county, the work remaining at all times under the supervision of the State Department. The State should vest the county veterinarian with complete police power, he, of course, being amenable to the State Department laws and regulations.

The effective means used to enforce laws should be vigorous campaigns of education, stiff penalties for disobedience, and hearty coöperation between veterinarians, farmers and sanitary bureaus. The educational work must come through the writings, speeches and work of all concerned in this great industry. Each man must be a missionary with his leaven. Laws will be enacted as their desirability and necessity become apparent.

These laws must have force in them in the matter of severe penalties for violation, as respect for laws does not always compel obedience. But the strong, all-important factor in this work lies in cheerful, helpful coöperation between all factions interested.

In closing, let me add that it is my belief that every growing city in the United States should employ one or more qualified veterinarians to look after its sanitary conditions. These veterinarians should be so trained that improved conditions would be noticeable and that the air which we breathe and the food which we eat would not be contaminated as it is in many of our cities at the present time.

KENTUCKY'S NEW STATE VETERINARIAN

At a meeting of the Kentucky Live Stock Sanitary Board, held at Frankfort, Ky., on December 16, Dr. W. H. Simmons was elected to the office of State Veterinarian, to succeed Dr. S. F. Musselman, deceased.

Dr. Simmons is a graduate of the Ontario Veterinary College, class of 1892, since which time he has lived in Kentucky, engaged in various phases of veterinary work. For twenty-two years he was an active practitioner; for two years he served as a Meat Inspector in the State Pure Food Department, and a like period in introducing and demonstrating the use of serum and virus in the vaccination of hogs against hog cholera; for the past two years he has been connected with the Department of Veterinary Science of the University of Kentucky as Extension Specialist in Veterinary Science.

During the outbreak of foot and mouth disease in Kentucky in 1914 and 1915 he was employed by the B. A. I. in assisting in diagnosing and eradicating the disease in that State.

DOLLARS VERSUS HEALTH¹

By WILLIAM THOMPSON

Dominion Veterinary Inspector, Keremeos, British Columbia

IT affords me much pleasure to have the honor of addressing one of the most important, useful scientific organizations in the world. I desire to address you on the necessity for resolving some policy to educate public opinion on the importance of adopting some adequate system of inspection, by properly qualified veterinarians, of all meats for home consumption, before and after slaughter. I hope you will not be bored by my reiteration of certain facts and the unavoidable repetition of arguments that have already gone to establish the principle on which similar papers of mine were formerly written. If I appear to some to be far too aggressive, surely in the force of my remarks will be found sufficient extenuation when the justness and urgency of the cause are properly considered.

In the past, State and Provincial veterinary associations have had the bitter experience of seeing their legislatures repeatedly shelve meat-inspection bills. The British Columbia meat-inspection bill has been shelved in two successive sessions of the Provincial Parliament. I am now, I hope, permitted to plead for public education in this respect, before the highest veterinary sanitary tribunal in North America, before the very bar of veterinary hygiene, where the chief witnesses for the prosecution are the thousands of cattle, sheep and hogs annually slaughtered anywhere and at any time without the vestige of supervision or veterinary inspection. Let this international council deliver judgment in the form of resolutions that will be heard and acted on by those holding the health of their peoples as being only second in importance to financial interests.

To my plea and the facts: My arraignment is against all those in high State and Provincial authority who, after being warned of the danger of uninspected meats, have turned a deaf ear to the pitiable cries of the 120,000 consumptives that die annually on this North American Continent, to say nothing of the millions of fresh cases every year. In order to prove my case I must necessarily quote some circumstantial evidence.

The report of the sub-committee of the conference of the Allied Red Cross Societies under the presidency of Sir Robert Philip states: "The center and pivot for the control of tuberculosis is the dispen-

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

sary." Now, had a properly qualified veterinary surgeon served on that honorable committee, in all probability he would have added: "The center and root of prevention of tuberculosis is the slaughter-house whence all infected herds could be located."

It is most regrettable that the many societies working toward the eradication of tuberculosis in mankind know so little about the invaluable services that could be rendered by qualified veterinarians in this respect. It is a regrettable fact that on those anti-tuberculosis committees, headed by medical doctors, also State and Provincial health boards, veterinary surgeons are notoriously conspicuous by their absence. That medical men and veterinarians do not work more together toward prevention of tuberculosis in the people seems unfortunate for the latter. It is a fatal waste of effort. Medical doctors can not be impeached for what they do not know. Sometimes they are milk inspectors, but if they can not follow the milk up to the dairy, it should be left in the hands of competent veterinarians, because medical men are by their education unfitted to pass an opinion on the animals that produce the milk. They are daily prescribing for their patients meat which has been cut from diseased carcasses, and they are incapable of knowing it in the absence of properly qualified veterinary inspection.

After many years of observation I am disappointed with the increase of tuberculosis. There is something lacking, and it is likely to continue so until the day of proper recognition for veterinary services dawns in the minds of the people. Then they will know the truth, which is that it is hopeless to expect to prevent this widespread disease by medical doctors, however eminent, without the cooperation of veterinary scientists. Until then the dispensaries will continue to function out alleviation to the already afflicted, and the ever increasing fresh cases coming on, no doubt; but the main roots of this disease will continue to grow luxuriantly from the private slaughterhouses.

It is greatly to be deplored, after all the discoveries of veterinary scientists, that those noble-minded anti-tuberculosis bodies fail to appreciate this fact. It is ignorance, not prejudice. What greater proof is there than this of the necessity for educating public opinion (which has been the judge in all ages) to the value of veterinary services. It therefore would reflect great credit on this Association were it to take steps toward this end. I ask you to recommend a declaration of war against this ignorance, load your guns and shoot straight with leaflets and printed matter of any kind, providing you

hit the mark; use the film and lecture hall to denounce it, and eventually veterinary hygiene will be accorded, for the purpose of preventing spread of disease from animals to mankind, an equal place in public opinion with that of medical hygiene.

From the earliest times the forces of enlightenment and progress have combated ignorance, which is the greatest hereditary enemy of mankind and the worst menace to civilization. No nation is immune from its evil influence. It has sent millions of humanity to early graves, and raised the worst men of every civilization to power.

Ignorance, with comparatively few exceptions, is abroad in the masses of this Continent regarding the dangers of uninspected animal products utilized for human food. It is the duty of every government to combat ignorance in the people, which in this case is hygienic.

The fault of uninspected meat and the invariable insanitary conditions surrounding those barbaric premises of private slaughterhouses, where the greater bulk of our meat is prepared for market, can not in every case be laid at the door of the authorities; it is just as consistently the fault of the people who through ignorance continue to tolerate it. I am of opinion that 90 per cent of people never saw the inside of a private slaughterhouse. One reason is because such premises are generally located in remote or secluded places, where the public seldom visit. Most of these places are heaped up with the bony *débris* of years; piles of skulls, some white with exposure, others still green with adherent diseased tissues; and in wet weather pigs wallow through muddy defiles of bones and offal, fighting and squealing for the newly thrown entrails of the slaughtered animals, covered with soil, slime and manure; the whole generally presenting a spectacle of abomination and filth beyond description.

In my opinion pigs are being infected as frequently by uncooked offal as from unpasteurized creamery products. Then pigs are slaughtered, smoked and cured, to be ingested by human beings, 95 per cent of whom are totally ignorant of the conditions under which such meat is grown.

I estimate that on this Continent during the war approximately 600,000 people died of tuberculosis. During that dark period we were accustomed to listen with bated breath to the daily casualty list, which brought home to us some realization of the military struggle. Were we to receive similar daily reports of the white plague cas-

ualties, the people would be aroused out of their accustomed lethargy to a state of hygienic consciousness and a fear for their physical safety.

The Canadian Medical Health Association met in Ontario this year, and like the majority of such meetings all over the Continent, no mention is ever made of employing qualified veterinary surgeons on their respective staffs. To continue to ignore to the people the value of veterinary services in stamping out tuberculosis in mankind is gross medical presumption, and the right to arrogate their opinion to the ruling authorities, preferably in the absence of veterinary scientists. Therefore it is not surprising when State and Provincial law-makers refuse to enact meat-inspection bills.

Lloyd George said: "We could have put into the fighting ranks—if the health of the people had been properly looked after—one million more men." I reckon that on the North American Continent only one-third its adult male population is fit for the hardships of the battle-field. And so long as the public health is entrusted solely and absolutely in the hands of the medical men, who are by reason of their education unfitted to opine on the food products of the cow, the sheep and the pig, their absolute ignorance on the food they prescribe, in the absence of veterinary inspection and the absence of veterinary scientists on those national health boards, so long will the health of the people on this Continent be improperly looked after. If the Governor of each State or Province would convene those national health boards, he would see that the health of the people was being properly looked after by inviting the veterinary fraternity as well as the medical to attend.

President Wilson is reputed to have once said that nothing should be allowed to stand in the way of preventing the spread of tuberculosis, and asked in the name of God why it was not done. I have good reason to say that question was never answered, but I purpose answering it here, before this honorable body: The medical fraternity in the very exclusion of veterinary scientists from their health boards disclose either their ignorance or aversion to the truth.

I believe, in the report of the dispensary work, that fresh air and light, regularity and plenty of good food, generally restore tuberculous children to a manifestly healthy state; but I also believe that prevention in the first place, in the supply of healthy meat, milk, eggs, butter, cheese, dripping, lard and fish after passing veterinary inspection, is the key note of a far better policy, which

would furnish some real and practical results in eradicating this disease.

If there be a real desire to eradicate this disease from mankind, on this Continent, the campaign should be directed from government health departments, whose heads should be capable of appreciating the fact that medical veterinary scientists must coöperate in order to combat successfully this great scourge.

I have always noticed that the greatest number of tuberculous children come of the poorer classes, whose bread-winner is economically forced to purchase the cheapest meat on the market, which means the old tuberculous cows and pork from tuberculous pigs. I have observed that the poorer children are devitalized, not so much for the want of fresh air as for a sufficient supply of guaranteed pure food, containing sufficient essential vitamins. The anti-tuberculosis policy of separating children from tuberculous parents until they are three years of age, without due regard to the purity of the food they eat, is too credulous a policy to expect full results in the matter of prevention.

I believe the idea that human tuberculosis originated from the bovine and porcine types to be basically correct, and all attempts to eradicate it from mankind without a due regard for this origin are fundamentally wrong. After many years of close observation, I believe that this transmission is going on all the time, more or less. So long as we are meat-eating nations we can not get rid of the plague in our kind until it is stamped out of the animals that supply us with about 37 per cent of our food.

Many believe and others teach that meat is harmless when properly cooked. But if this could be admitted by the veterinary or medical profession, it may kill the live germs, but does not purify the meat. Again, certain well-intentioned authorities order all milk to be pasteurized, which *may* render it harmless, but does not purge the tubercle bacilli from the flesh of the cow which produced it, so that tuberculosis is obtainable in the end in the absence of meat inspection. It is far more likely that those consumptives that lose ground after they return from the sanatoria have done so in consequence of ingesting degenerate animal foods.

If the billions of cells that in the aggregate make up a living animal—each cell containing millions of units, each with its separate electron—are of a degenerate order, their growth having been supplied from degenerate lymph cells, it is easily conceivable how tuberculosis supplants lymphatic and adjacent tissues. Therefore, it is

logically essential to growing tissues that the food we eat be cellularly pure and of a high generate order of vitamins; otherwise the feebly resistant cell walls of lymphatic tissues soon break down before the steady blows of the tubercle bacillus.

It is therefore perfectly clear that children should receive food containing not only sufficient vitamins and free not only of active tubercle bacilli, but absolutely free of the taint of susceptibility. It is just as important as the invasion of the tubercle bacillus that the mass of cells or food units that go to build up the tissues of growing children inherit resistance. Therefore, cooked or uncooked, I maintain that uninspected meat is a continual source of danger, and the too frequent reference to the purifying process of cooking is born of a fallacy on one hand and the desire to escape the financial consequence of inspection on the other.

The destruction of the seven hundred milch cows for tuberculosis by the Health of Animals Branch of Canada since its adoption of the policy of aiding cities desirous of assistance in this respect had in my opinion a more far-reaching effect in preventing tuberculosis in the children of Canada than all the efforts of the anti-tuberculosis societies in the country. Just fancy seven hundred potential centers of spreading this infection indefinitely snuffed out and this danger zone purified and made safe for those children. This achievement alone is worthy of a monument as high as the Eiffel Tower; yet I was miserably disappointed to read in the Annual Report of the Canadian Association for the Prevention of Tuberculosis only a passing commonplace comment.

Those seven hundred diseased milch cows are a standing rebuke to those persons, medical or laymen, who imagine they can prevent consumption in the children of the Nation without the coöperation of qualified veterinary surgeons. When it is considered that in the present state of medical knowledge there is no medicinal cure, only the assimilation of sufficient pure food being efficacious, it is manifestly apparent to anyone that a clean-cut, comprehensive policy of prevention from the slaughterhouse up to the dispensary is the most reasonable and wisest course to follow.

Again, it is advanced by invertebrate politicians and evasive tradespeople that uninspected meat never kills anyone. It kills insidiously, which they do not understand. There are, however, many deaths annually from uninspected meat, where the victim dies quickly. I have no time here to enumerate them, just one instance: Last year, June 7, at Dawson City, a coroner's jury declared a verdict of death from meat poisoning in twelve men as a result of

eating uninspected meat. Besides this form of poisoning, which is common, there are other diseases obtainable from uninspected meat of which you are well aware.

As soon as the public mind is educated to the danger of uninspected meats, the consumers, with the farming class, will see to it that their departments of agriculture are headed by the most eminent veterinary surgeon in their respective States. These men will possess the necessary outlook and the powers to advise the various State or Provincial boards of health. They could render them official veterinary advice and provide trained veterinarians so that an all-round comprehensive policy of prevention could be inaugurated.

In the meantime, until monetary grants are made by State and Provincial governments to educate public opinion no valid excuse can be advanced by them for delaying or refusing to enact a bill for inspection of all meat for home consumption.

And until adequate measures are adopted to induce large numbers of qualified veterinarians to enter the sanitary service of their country, medical doctors will continue to be handicapped in controlling the most widespread death-dealing plague of all times and 94 per cent of children will continue to become infected in the danger zone where there is no veterinary inspection and people on this North American Continent will continue to fill early graves at the rate of about 120,000 annually.

Gentlemen, in resolving on this important matter, you have a verdict to declare, a record to make, and in doing so you have an unprecedented opportunity to bring the veterinary profession more prominently before the public, and to convince the various State and Provincial governments of the wisdom and necessity of making money grants for educational purposes of this kind.

I therefore hope you will resolve upon and place yourselves on record as (firstly) favoring and strongly recommending State and Provincial governments to make monetary grants for educational purposes, embracing meat and milk inspection by accredited veterinarians; (secondly) to recommend that the private slaughter-houses as they stand be abolished as potential centers of infection, and impediments to a proper rectification of these places be swept away; (thirdly) recommend veterinary inspection of all meats for home consumption, under the most suitable system available and under State or Provincial control.

When these recommendations have assumed practical shape and veterinarians sit down with medical men in the councils of national health, then indeed will a new epoch in veterinary history be reached, and the honor and credit shall be eternally yours.



Private Uninspected Slaughterhouse and Yard

THE NEBRASKA HEMORRHAGIC SEPTICEMIA EXPERIMENTS AND THE CRITICS

By L. VAN ES and H. M. MARTIN

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THE publication of certain results of experiments with commercial vaccines and bacterins against hemorrhagic septicemia and fowl cholera by Van Es and Martin (31, 32) has induced a number of employees of bacterin manufacturers to assail this work, showing even a little tinge of ill temper. On the reviewer's page of veterinary journals, in quasi-veterinary journals and in beautifully decorated advertisements they have undertaken to prove that the conclusions arrived at by Van Es and Martin are all wrong, maliciously concocted, and that the scientific foundation for the use of hemorrhagic septicemia vaccines and bacterins cannot be questioned. Pasteur, Kitt, Lignières, and even the inevitable buffaloes of the Yellowstone National Park, are marshalled upon the stage to impress the reader with the strength of the hemorrhagic septicemia vaccine and bacterin cause.

All this is extremely interesting, both on account of what is said and above all because of what is not said and kept in the dark. In view of the latter especially, it may be useful to engage the readers' attention to what may be called a brief review of reviews.

Most of the critics (3, 22, 29) indicate or assert that Van Es and Martin practically murdered their immune animals by means of overpowering doses of virus. They find fault because nothing was said about the minimum lethal dose. As a matter of fact Van Es and Martin were not concerned with minimum doses as long as it is a well-known fact that really immune animals withstand doses of *Bacillus bipolaris* of enormous virulence which are much in excess of those which were actually used by them. Hadley (8), who is actually quoted and highly indorsed by critic King (22), describes that his immunized rabbits survived doses of 1/100 c.c., 1/10 c.c., and even 2 c.c. of bouillon culture of his strain No. 48, of which he states that from one to four organisms will kill the controls. In another publication by Hadley (6), which, by the way, conveniently escaped review by the critic King (22), this author states in his summary: "Resistance in rabbits to ten billion times the minimum

lethal dose of a very virulent culture has been artificially produced by a single large dose (3 c.c.) of the homologous culture."

Mack and Records (24), whose work is also approved and highly commended by the same critic, in a series of experiments did not consider it wrong to use test doses of from 1 to 4 c.c., while in other series the dose of 1 c.c. was given. Pasteur (27, 28) does not even mention minimum doses, while Kitt rarely refers to doses at all, and when he does he mentions $\frac{1}{2}$ c.c. of a gelatin culture (16) or one drop of virulent blood (19).

It is strange that with those facts, mostly quoted from authors who apparently enjoy the confidence of King (22) and whose writings he actually pretends to review, so much fault should be found with the doses used by Van Es and Martin, who, in nearly all their series, used one loopful, even if the dose is not always shown in their data, and who only once used $\frac{1}{10}$ c.c., and on several occasions used $\frac{1}{10}$, $\frac{1}{4}$ and $\frac{1}{50}$ of a loopful. When King (22) encountered those latter smaller doses he deemed it wise to withhold the facts from his readers.

In order to permit a comparison of the doses used by Hadley with those used by Van Es and Martin, the latter quite lately had an experienced analyst weigh a number of their loopfuls. This showed that a loopful contains a little less than 5 milligrams of a bouillon culture, so that the smallest dose quoted from Hadley was still twice that ordinarily used by Van Es and Martin.

In addition, the cultures used by the Nebraska workers do not compare in virulence with the No. 48 of Hadley. The virulence of *B. bipolaris* ranges from that claimed by Hadley for his No. 48 strain to perfect avirulence. How King, Eichhorn and the other critics, complaining that Van Es and Martin failed to inform them on the subject of virulence, can claim that the presumably immune rabbits and chickens were killed by overwhelming doses is more than we know. If not informed, how could they know that those doses were overwhelming?

The reference made by some of the critics to the testing and use of antidiphtheritic and antitetanic serum has no bearing on this case. We scarcely need to point out that toxin and antitoxin unite in definite proportions and the former will always kill when in excess. In antibacterial immunity the modus operandi is entirely different.

However, all this smoke and fume about minimum doses has created in the present writers a little curiosity as to how commercial

bacterins would actually perform if, for instance, the minimum lethal doses were used in the final test of the vaccinated or bacterinated animals. The following experiment may thus be of interest to our critics as well as to more disinterested readers.

As a preliminary to the vaccine-bacterin test proper the following tests were made in order to determine so far as possible the smallest virus dose which promptly kills the subjects inoculated. We selected a virus strain No. 620, a *B. bipolaris* isolated on a former occasion from a vaccine which was virulent to a number of test animals. This strain had never shown an unusually marked degree of virulence. Table 1 shows the details of this preliminary experiment:

TABLE 1

RABBIT NO.	INTRAVENOUS VIRUS INJECTIONS OCT. 22, 1920 (24-HOUR BOUILLON CULTURE)	DATE OF DEATH	REMARKS
894	0.001 c.c.	.....	Lives
895	0.001 c.c.	Oct. 26, 1920	No organisms found by microscopic examination.
896	0.002 c.c.	Oct. 24, 1920	
897	0.002 c.c.	Oct. 24, 1920	
898	0.010 c.c.	Oct. 23, 1920	
901	0.010 c.c.	Oct. 23, 1920	

The table indicates that if the virus dose of 0.002 c.c. were used in testing the immunity of the treated rabbits, we would be gratifying as nearly as possible the demands by our critics that their products be tested against something like a minimum lethal dose. At least the charge of killing immune rabbits by overpowering doses with malice aforethought would not be valid in this case.

The bacterins and vaccines tested were as follows: Vaccine sample No. 620 (bovine), commercial origin, again tested against the organism from which it was made (autogenous vaccine).

Bacterin sample No. 717 (bovine), of commercial origin.

The expiration date of sample No. 620 was given as February 1, 1921, and that of sample No. 717 was given as September 23, 1921. The vaccine doses used were those recommended on the labels.

Table 2 shows the details of the immunity test.

TABLE 2

RABBIT NO.	VACCINE OR BACTERIN USED, NO.	DOSE OF SAME, C.C.	INJECTION DATES (1920)			VIRUS IN- JECTIONS, 0.002 c.c. <i>B. bipolaris</i> No. 620, OCT. 25	DATES OF DEATH	REMARKS
			SEPT. 30	OCT. 5	OCT. 11			
862	620	2	x	x	x	x	Oct. 27	
863	620	2	x	x	x	x	Oct. 26	
864	620	2	x	x	x	x	Oct. 28	
865	620	2	x	x	x	x	Oct. 26	
866	717	5	x	x	x	x	Nov. 4	
867	717	5	x	x	x	x	Oct. 26	
868	717	5	x	x	x	x	Oct. 28	
869	717	5	x	x	x	x	Oct. 26	
870	717	5	x	x	x	x	Oct. 28	
871	717	5	x	x	x	x	Oct. 27	
878	.....	.....	.....	.....	.....	x	Oct. 28	Control
879	.....	.....	.....	.....	.....	x	Oct. 26	Control
880	.....	.....	.....	.....	.....	x	Oct. 26	Control
881	.....	.....	.....	.....	.....	x	Oct. 27	Control
882	.....	.....	.....	.....	.....	x	Oct. 26	Control
883	.....	.....	.....	.....	.....	x	Oct. 26	Control

From these results it is apparent that the results obtained and recorded in Nebraska Bulletin 17 by Van Es and Martin (31) were again repeated and absolutely confirmed when the tests were made in accordance with the expressed or insinuated wishes of bacterin-producing critics.

Another fault committed by Van Es and Martin which in the eyes of their critics can not be sufficiently condemned is the entire omission of references to the work of other authors. In the publications mentioned Van Es and Martin do not deal with the question of immunity against hemorrhagic septicemia in general and were not concerned with the results of those who experimented in an effort to throw light on its possibility or on the means by which it could be made useful if it should exist. For so far as they know now there is no literature which shows that any disinterested worker had ever subjected the commercial vaccines and bacterins to any experimental inquiry. Van Es and Martin undertook to find an answer to the question, Are the hemorrhagic septicemia bacterins and vaccines of commerce good, bad or indifferent? and found nothing in literature indicating that such inquiry had ever been made by anyone. The literature which the critics urge should have been consulted throws absolutely no light on this question, as all the workers mentioned used materials prepared by themselves. Why, then, should

Van Es and Martin have padded their publications with irrelevant and immaterial evidence?

The critics mentioned (3, 22, 29) make pretention in their reviews to supply what they would have the reader believe to be a flagrant deficiency of the articles by Van Es and Martin. As will be shown later in this paper, they quoted conclusions without the same challenging of evidence as displayed in dealing with the Nebraska bulletins, withheld much that may be interpreted as unfavorable to the bacterin cause, and even went so far as actually to misquote or falsify the statements made by writers referred to.

We will presently return to the evidence contained in the literature, as we are willing that our critics shall have their appetite for quotations and reviews appeased to the extent of our ability at least. Before doing so it may be well to examine some of the further criticisms offered by the reviewers individually. For instance, Eichhorn (3) ventures the opinion that if the work of Van Es and Martin were carried out with any human or veterinary biologic products, we would hardly have today a single biological product which would be considered dependable for the prevention or cure of disease.

While we are loath to permit ourselves to be drawn away from the concrete case in hand, it may be well to recognize the fact that the number of useful immunizing agents is indeed quite small and that the value of these has always been proven by well-controlled laboratory experiments or field trials before they became articles of commerce. On the other hand, there is some probability that there are indeed great numbers of others which would prove to be as worthless as the anti-hemorrhagic septicemia products of commerce if they were subjected to the kind of tests which Eichhorn seems to condemn. We are sure that if such a thing came about nothing worth while would be injured in particular.

The review by the critic King (22) may also be examined more closely, as it is a fair sample of the tendentious nature of his efforts. At first sight the heading of his article conveys the impression that the following publications were reviewed, viz: Nebraska Bulletins 17 and 18 by Van Es and Martin, Rhode Island Bulletins 144, 146, 150, 157, 159, and 179 by Hadley, and Nevada Bulletin 85 by Mack and Records. A closer examination of the text, on the other hand, reveals the fact that this is not the case, and that this critic is indeed in more than one way a reviewer of titles. Nowhere does this partial reviewer analyze Rhode Island Bulletins 144, 146,

150, 157, and 159, so that of the nine publications which are displayed only four come in for discussion. The lion's share is measured out to Nebraska Bulletins 17 and 18, although, as in some of the others, the reviewer finds it convenient here and there to suspend his critical observations and leave things entirely without either his approval or his disapproval. For instance, quoting the conclusions of Bulletin 17, he omits what may perhaps be regarded as a very essential part of those, the sentence: "We encountered uniform negative results no matter if we injected those substances once or a dozen times."

Van Es and Martin are taken to task for having followed the lines of destructive methods, for having manifested a distinct "prejudice," "discrediting the work of experiment stations, rather than that of the biological laboratories." How this critic arrives at those conclusions we can not know. We believe to have laid the cards fairly on the table in the publications mentioned. The immunizing value of commercial vaccines and bacterins was tested, and no essential detail of those tests was withheld. That the results and conclusions were highly disagreeable to this reviewer seems plain enough, but in the face of the evidence where is the prejudice? One moved by prejudice might perhaps find far more vulnerable ventures among the so called "biologics" of commerce upon which to wreak vengeance. The Nebraska bulletin may for a time have destroyed the sweetness of this reviewer's temper, but we believe that nothing more valuable was injured in the process.

Continuing his critical offensive, King (22) further charges that in Experiments V, VI, VII, VIII and XI second injections of virus were given to surviving animals after the controls had died, for the evident purpose of not letting a bacterin-treated animal get by. We fear that the critic King (22) is taking some liberties with the truth in two of the instances he mentions and that he severely bends it his way in the others. The truth is that Tables V and VI show most clearly that no second injections were made. Table VII shows that a second injection was made because the first virus injection failed to kill the controls, although it killed a number of the presumably immune rabbits. As the data of Table VII are presented for discussion, we may point to them as a commentary to the charge of "overwhelming doses" of very virulent material as well as the high (?) degree of immunity engendered by the bacterins used. We gladly admit that in Table VIII the record is found to show that a single surviving animal received a second virus injection three

days after the first one. It is a case of a rabbit bacterin-treated not less than eight times. Its two mates as well as the two controls died promptly, but when three days later the survivor was injected with a different strain of culture, it died likewise.⁸ We are, however, not certain which of the two injections actually killed this animal.

In Table XI another single rabbit is shown to have been injected a second time. As this animal was injected with 1 c.c., 1 c.c. and 10 c.c. of vaccine, a high degree of immunity was expected when it failed to succumb. After two days a second injection was given, and it died four days later, with the greatest probability that the first virus dose was as much responsible as the second one for its death. It is also interesting to observe that in this series the virus was isolated from the very vaccine which was used to immunize the animals.

Then speaking of the fowl-cholera series the critic says further: "In three out of six of these experiments in which one overwhelming injection of virus did not kill, although all controls were dead, a second injection was given from four to six weeks later for the apparent purpose of fatally terminating all survivors." It looks as if the critic is straining himself to make a mountain out of a mole-hill to the extent of practicing deception.

Here are the facts. Of the chickens referred to in the series mentioned there were altogether left nine, of which eight were chronically sick on account of the first virus injection. Only one had not become sick, and its immunity was challenged by a second virus injection, and at the same time the sick ones were also given a virus dose. It was not immune. These results in no way affect those of the experiments, as the sick chickens were already checked off as not immune. This is what the critic King (22) describes as "manipulation of experimental results." It is not by any means, but if the critic desires to score the two rabbits and the one chicken as proof of the immunizing value of the bacterins and vaccines, the present writers have no objection.

Another critic (29) brings Hutyra and Marek upon the scene and says:

"According to Hutyra and Marek, page 86, Vol. 1, test animals inoculated with a (hemorrhagic septicemia) vaccine will show a resistance against a virulent infection, while control animals will die or become severely affected, with the exception of very virulent intravenous infections. * * * In connection with the above, the same author further states that in the use of this vaccine in the field, when

used in the slower forms of the disease which are frequently associated with other organisms, the results were less favorable than in the acute septicemic form, but even in these cases the mortality was conceded to be reduced from 50 to 12 per cent."

We have before us the English translation of Hutyra and Marek, second American edition of 1916, and the third German edition of 1910. On neither of the pages 86 do we find the statements mentioned, but we find something like it on page 93 of the American edition and on page 87 of the German edition.

According to the critic mentioned, the words quoted by him must be taken as Hutyra and Marek's own opinion and as their indorsement of bacterins and vaccines. A closer inspection of what is said in the editions at our disposal reveals something entirely different. In the first place, the words used by Hutyra and Marek relate merely to work published by Lignières (23) and the claims made by the latter. In the second place, our critic either commits a mistake or a falsehood by using the words "but even in these cases the mortality was *conceded to be reduced* from 50 to 12 per cent," where the originals read: "Although even in these cases the mortality has been *supposedly reduced* from 50 to 12 per cent."

For the sake of a better appreciation of what Hutyra and Marek actually do say, as rendered in the second American edition, we quote as follows:

"Lignières therefore prepared a so-called polyvalent vaccine, which is potent against all the diseases of this group. The vaccine is prepared from mixed cultures of the hemorrhagic septicemia bacteria of sheep, cattle, dogs, horses, hogs and chickens and attenuated at a temperature of 42°-43° C." (What next follows is in small print.)

"The vaccine prepared from the six varieties of virus is *supposed** to immunize against all of the six diseases. Test animals inoculated with this vaccine will show a resistance against a virulent infection, while control animals will die or become severely affected (with the exception of very virulent intravenous infections). In practice the vaccinations are *supposed** to have given good results, especially against the acute septicemic forms of hemorrhagic septicemia, as, for instance, against chicken cholera and hemorrhagic septicemia of sheep. On the other hand, the results in the slower forms which are frequently associated with mixed infections were less favorable, although even in these cases the mortality has been *supposedly** reduced from 50 to 12 per cent.

"The immunization consists in a subcutaneous or intraperitoneal injection of the vaccine; the second inoculation follows in from twelve to fifteen days. In infected localities, it is advisable to under-

* The italics are our own.—Van Es and Martin.

take the vaccination on sucking animals eight to ten days after their birth or at least shortly before weaning. The immunity produced by the vaccination lasts for about a year and therefore it is advisable in infected localities to repeat it annually."

Let us point out in passing that even if Lignières's method were a great success, it differs quite materially from the vaccines and bacterins tested and mentioned in Nebraska Bulletins 17 and 18. Furthermore, there is nothing in the remarks of Hutyra and Marek which indicate that they think at all favorably of Lignières's work. No doubt it was necessary and proper to mention this work in a text-book, but as we read the reference there is between the lines something which looks like skepticism, delicately and politely permitted to come to the surface. We found nothing in Hutyra and Marek's work which by any stretch of the imagination can be interpreted as an indorsement of bacterins and vaccines against hemorrhagic septicemia.

As stated above, our critics have nearly all condemned the work published in the Nebraska bulletins because no reference was made to investigations published by prior writers. We hope to have made it plain why this was not thought to be necessary, but in view of their clamor for bibliographic quotations, and as a mark of our desire to comply to what the critics deem to be a reasonable demand, we will ask the reader to accompany us on a little journey through literature so far as it pertains to the authors quoted by the critics themselves and to those who are commonly mentioned in less critical documents, remarks at veterinary meetings, etc.

No author has been more often quoted in connection with the hemorrhagic septicemia of fowls than Pasteur (27, 28). It is, however, a well-known fact that the method of vaccination proposed by the master failed either in the hands of other investigators or when used in outbreaks. Kitt (14), while rendering tribute to the genius of Pasteur, describes his fowl-cholera vaccine as "highly superfluous," "dangerous," and "absolutely without practical value." The work of Pasteur is of extreme importance because it showed for the first time that pathogenic germs could be attenuated and that they might in that condition become useful as immunizing agents. As a practical solution of the fowl-cholera problem it accomplished little or nothing.

Along with the name of Pasteur the one of Kitt (14, 15, 16, 17, 18, 19, 20, 21) is commonly named when the use of hemorrhagic septicemia bacterins and vaccines is to be justified or their sale to be promoted. No investigator has made more persistent and conscien-

tious effort to bring about a practical method of controlling the various forms of hemorrhagic septicemia than this meritorious worker. From every possible angle he attacked the problem, by the use of Pasteur vaccines, killed or attenuated cultures, the egg white of immune fowls and serum. In many instances did he secure immune animals, but his writings show nowhere that the results of his labors had developed beyond the laboratory stage or that this scientist showed any inclination to be responsible for the introduction of any method into the field. Only in one publication (21) does he make the faintest suggestion that experimental results might be put to some practical use, and in this instance his remark pertains to serum and not to vaccines and bacterins.

Lignièrès (23) has already been mentioned in the reference relating to Hutyra and Marek's statements, and it was there suggested that as this method of vaccination consists of two vaccines of different degrees of attenuation it has nothing in common with the vaccines and bacterins on our own market. Furthermore, Lignièrès in his report (23) distinctly states that in the attenuation of his cultures the action of heat, oxygen or antiseptics gave only mediocre results.

In one of the publications of Hadley (6) he relates that his results indicate that a highly virulent culture of fowl cholera encounters resistance in a susceptible animal when this animal has been previously inoculated with an avirulent homologous culture; resistance in rabbits to ten billion times the minimum lethal dose of a very virulent culture has been artificially produced by a single large dose (3 c.c.) of the homologous culture. None other than homologous cultures produced such resistance in rabbits. Apparently Hadley (6) had in his strain No. 52, which is either avirulent or but slightly virulent, an organism endowed with a marked immunizing power.

In a subsequent paper (7) Hadley publishes some further studies of fowl cholera immunity, making further use of his strain No. 52 as a vaccine. He found this immunity thus produced to be fairly lasting.

Among some of the results reported by Hadley we find the following:

"It may be tentatively concluded from the experiment that heating to 44° C. for three hours does not attenuate culture No. 48, while heating at 63° C. and thereby killing the culture leaves it with no ability to bring about resistance when only one or two injections are given. Three injections appear to exert a greater protective influence, although this point can not be conclusively stated at this

time. With reference to culture No. 52, it is shown that heating at 41° C. did not destroy the ability of the culture to exert its protective action, while the culture killed by heating to 63° C. failed not only to produce a local reaction, but also to protect against subsequent inoculations with culture No. 48 unless three injections were given, and this requires confirmation."

"The apparent difference observed in the case of rabbits inoculated several times with the killed cultures should be studied further, but the results seem to remove this type of immunity from that commonly produced in many specific diseases by the use of 'bacterins' or bacterial vaccines, produced from virulent cultures. Further tests of the value of killed cultures in producing resistance are needed before definite conclusions can be reached."

Apparently the work of Hadley contains but little warrant to undertake fowl-cholera immunity production by the bacterin route.

Hadley continued his highly interesting and important studies and communicates his results in a later publication (8). The task he sets himself in this series of experiments is efforts to ascertain, first, the protective power of certain avirulent cultures of the fowl-cholera organism against a highly virulent culture (No. 48); second, the extent and degree of protective power exercised by a certain immunizing culture (No. 52) against twelve heretofore untested virulent strains; third, the protective power of combinations of cultures.

Hadley (3) briefly describes his results as follows:

"Among seventeen strains of the actual fowl-cholera bacteria which have now been tested for their resistance producing power toward a highly virulent culture only one (No. 52) was found which produced any resistance whatever; and this culture upon subcutaneous inoculation invariably gave perfect immunity against the most virulent culture in the laboratory collection (No. 48).

"This immunizing culture has now been tested (alone) against five other virulent strains, toward three of which it is also protective. In the other two cases it is irregularly protective.

"In the two instances in which culture (No. 52) alone failed to protect or protected irregularly, complete protection was afforded by inoculation with culture No. 52 followed after one week or more by inoculation with culture No. 48.

"In all cases in which culture 52 alone was not tested against virulent cultures (seven) the inoculation with both cultures 52 and 48 in the sequence and under the conditions stated, yielded complete immunity.

"The results obtained in the investigation thus far reported are such as to afford for the first time complete control over infection in rabbits with probably any virulent strain of the fowl-cholera bacterium. The method thus found successful for the active immuni-

zation of rabbits will now be employed, perhaps with modifications, in an attempt to produce a corresponding active immunity in birds."

About five years later Hadley completes the work projected in the last paragraph and presents in a recent paper (9) "the results of a study of the effectiveness of killed cultures in the prevention of cholera of fowls, a disease whose progress among poultry has hitherto been checked by no successful practical method of serum or vaccine treatment."

In this last paragraph this author, who certainly can not be accused of lack of power for sound thinking or of inability to estimate correctly the value of scientific evidence, sums up the present-day status of immunizing methods in the control of avian hemorrhagic septicemia.

The discovery of an avirulent or slightly virulent strain (No. 52) of a remarkable immunizing value is followed up by the author by controlling his previous hopeful results with experiments in which fowls were also used. His final conclusions are stated in the following summary:

"The present paper presents the results of attempts to immunize rabbits and fowls against infection with a virulent strain of *B. avisepticus*, by means of injections of cultures killed by heating. The results show, first, that injections with cultures of an avirulent strain (52) produced more satisfactory results in rabbits and less satisfactory results in fowls than did treatment with cultures of the virulent strain (48); second, that in the case of rabbits, the individuals that received the maximum number of inoculations or the maximum dosage were best protected; third, that in the case of fowls, those individuals that received the protective inoculations subcutaneously were slightly better protected than those that received treatment by the intraperitoneal route; fourth, that even though the inoculations with killed cultures of the avirulent or virulent type may not invariably produce immunity, such protective inoculations may produce an increased resistance to infection which manifests itself by delaying the fatal termination."

No investigator followed up by well-ordered experiments a more hopeful indication than did Hadley with his immunizing strain (No. 52), yet in the final analysis he only succeeded in delaying the fatal termination of his subjects. No experimental results show more conclusively the extreme difficulty of securing anything like a constant and dependable immunity against hemorrhagic septicemia than Hadley's, and in no instance does this author give the faintest suggestion that there is the slightest evidence of promise by vaccines or bacterins for the practical control of the diseases under consideration.

Very similar results are reported by Gallagher (4), who concludes that "no noticeable resistance is conferred to fowls by the use of killed fowl-cholera bacilli as immunizing agents."

Whether or not the work and observations reported by Manninger (25) from Hungary are indications that something substantial has been achieved by the use of his avirulent cultures subsequent development only can tell.

Two of the critics (3, 22) quote at length such conclusions of Mack and Records (24) as appear suitable for their purpose. It may therefore be considered proper to invite the reader's attention to this work and so far as fowl-cholera immunity is concerned to examine in a more or less critical manner the evidence upon which the conclusions mentioned and approved by our two critics are based. It may further be instructive to refer briefly to at least one part of Mack and Record's publication which one critic (22) who professes to review this work entirely withheld from his readers. That part refers to the attempts of Mack and Records to immunize rabbits and fowls by means of the use of bacterins. For the details of those experiments we refer the reader to the original, which, no doubt, can yet be obtained from the experiment station concerned or which can be found on the shelves of many libraries.

As in the experiments of other authors, a number of animals survived the virus injections, yet in their final summary Mack and Records state that "the injection of from one to three doses of bacterin failed to produce immunity in chickens sufficiently to enable them to withstand subsequent inoculation with virulent cultures." Why the critic (22) does not review this part of the work of Mack and Records he does not reveal. The doses of virus used by those authors certainly offered a fine morsel to one who found so much fault with the ones used by Van Es and Martin (31, 32).

After the description of their laboratory experiments Mack and Records describe their field experiments, although it appears from the text that the latter preceded the more exact laboratory experiments. In fact, they somewhat rejoice because they did not begin their work with laboratory experiments, because this would perhaps have caused them to think that the field work would be useless. Let us see if this was not the case after all.

The particulars of the field trials may be examined in the original, where the final conclusions may also be seen as well as in the reviews by the critics of the Nebraska bulletins. When we analyze

the evidence as well as the conclusions, certain very salient features can not fail to engage our attention.

The minor one is a question of diagnosis. While in the beginning of the publication it is stated that in every instance the diagnosis was established by bacteriologic methods, the records of the field outbreaks sometimes show that there were exceptions. However, the present writers are willing to assume that in all the outbreaks the authors were actually confronted with fowl cholera and not with other causes of deaths.

A more serious, in reality a fatal, objection to the acceptance of the authors' conclusions is associated with the fact that not in a single instance were the results controlled by leaving a certain number of exposed fowls untreated. It certainly seems evident that without this dependable conclusions are utterly impossible.

It is true that occasionally a few birds escaped treatment, but apparently they were lost sight of or were included when further vaccinations were undertaken. Only in one instance (flock 15) were the untreated fowls at all considered, and as they practically all survived, the authors, while claiming success for the treatment, were forced to admit that owing to this fact the outbreak was nearly spent and only the naturally more resistant birds remained. In the preceding accounts of other outbreaks no attention was called to such a possibility, in spite of the fact that in a number, half or nearly half of the flock had succumbed at a time when immunization was attempted. This alone should render the use of untreated controls quite imperative, and to this must be added the further need of controls by the fact, somewhat emphasized by the authors, that Nevada strains of *Bacterium avisepticum* possessed a comparatively low degree of virulence for chickens in laboratory tests (page 28).

Owing to the fact thus that the conclusions of Mack and Records are based entirely on uncontrolled field observations, we are forced to reject them as evidence without reserve. The value of bacterins in field outbreaks so far as their work is concerned still remains an entirely open question.

The same objection can be offered to the conclusions of Hardenbergh and Boerner (10, 11, 12), in addition to the fact that in some of their work the question of an exact verification of diagnosis was left open. As those authors, however, worked with virulent cultures only, their results have no bearing on the value of bacterins and vaccines as discussed in this paper.

Another report published by Haring (13), recently quoted, we are

told, in support of hemorrhagic septicemia bacterins, as used in sheep, reveals no mention of control animals, while in this very publication we find the following sentence in regard to their value in fowl cholera in turkeys: "In turkeys the results of an investigation of the value of autogenous bacterins in control of the disease seem to indicate that the bacterins have neither curative nor immunizing value." We were assured by our informer that this was not quoted.

Among all the publications quoted as a warrant for the use and sale of hemorrhagic septicemia vaccines and bacterins, not a one has been held before the veterinary practitioner more often than the one by Mohler and Eichhorn (26) in connection with the buffaloes of the Yellowstone National Park. Again we invite the reader to examine the evidence in the case. Mohler and Eichhorn (26) relate in their paper that during the month of December, 1911, between the 3d and the 15th of that month, 22 buffaloes of the Yellowstone National Park died of a disease which from an examination of material sent to Washington they diagnosed as hemorrhagic septicemia. They deemed vaccination advisable and prepared two vaccines by using different degrees of attenuation of their organisms, the less attenuated or second vaccine to be injected some ten days after the first one. It must here be observed again that the vaccination practiced by them has nothing in common with the so-called immunizing agents such as were tested by Van Es and Martin (31, 32). The authors then caused the buffalo herd to be vaccinated, and report that "following the vaccination, the herd was carefully observed and no immediate effects were noticed from the vaccination and up to the present time [December, 1912—V. E. and M.] there has been no indication of the recurrence of the disease among the buffaloes."

All this seems to be sufficiently clear and complete to be urged to the attention of prospective buyers of their wares by bacterin and vaccine makers and salesmen. Yet when we examine the paper closer a desire for further information grows upon us. For instance, when did this vaccination take place? How many animals died between December 15 and the time of vaccination? Were any untreated controls left in order to check the value of the treatment? Those questions are pertinent if we are to interpret results obtained, but the authors omit this detail.

Fortunately the missing links in the chain of evidence may be found in the report of the Acting Superintendent of Yellowstone

National Park (30) for the corresponding period. This official states:

"A disease attacked the herd in December just after the buffalo were taken up from the range, where they had been day herding during the summer, and 22 died before it could be stopped. The Department of Agriculture sent a veterinarian to the Park to do what he could, and after examination of specimens from the dead animals sent to that Department in Washington the disease was pronounced to be hemorrhagic septicemia, although its symptoms were at first thought to be those of blackleg.

"In June a veterinarian was sent by the Department of Agriculture, who vaccinated all of the adults of the herd with serum prepared and furnished by this Department as a protective measure.

"In addition to the 22 animals that died of disease, 2 bulls and 4 cows have died or had to be killed for various causes during the year. These, however, were of but little loss to the herd, as they were old or decrepit animals and unfit to remain in the herd."

With this supplementary evidence in our possession we are in a position to know what actually happened or was done: In the space of about twelve days, 22 animals of a herd of about 160 buffaloes succumbed to a disease diagnosed as hemorrhagic septicemia. No more animals died of this disease. Not less than six months later the adults of the herd were vaccinated against this disease, so that in the younger animals, which are stated by Mohler and Eichhorn to be especially susceptible, we may have had the desired controls. For practically one year after the last death, so far as the evidence shows, no more losses occurred in any of the animals, young or old, vaccinated or not vaccinated.

Those, then, are the actual facts upon which veterinarians and livestock owners are asked to pin their faith in the immunizing value of bacterins and vaccines against hemorrhagic septicemia.

It must be said to the credit of the authors that in their original publications they offered no conclusions and said nothing to indicate that the work was offered in support of any vaccination method.

At a later period, however, one of them (Eichhorn, 1) remarks: "For the first group (hemorrhagic septicemia) a successful vaccine is being prepared by cultivation of the organism under attenuating influences. This method has been tried out on an outbreak of hemorrhagic septicemia among the buffaloes in Yellowstone National Park." On a later occasion during the same year Eichhorn (2), again speaking on the subject of hemorrhagic septicemia vaccine, says: "Unfortunately there is not sufficient data available to offer conclusive proof that the good results obtained were due to the

administration of vaccine." Perhaps those rather contradictory remarks were merely deemed to be expedient, but they are nevertheless interesting, inasmuch as they tend to show that some doubt existed within quite recent years in one who now so valorously breaks a lance in behalf of the products under consideration.

The good results reported by veterinarians from the field are often offered as conclusive evidence of the great value of commercial bacterins and vaccines. As long as we have no assurance of an unquestionable diagnosis, as long as there is no record of untreated controls, this evidence is irrelevant and immaterial. It only shows that the substances used do no harm to the animals treated.

If practitioners of veterinary medicine are convinced that certain lesions found at autopsy are unmistakable evidence of hemorrhagic septicemia, if they are satisfied that they can differentiate those from similar lesions produced by other causes, if they are willing to accept without question the bacteriologic diagnosis made for them by firms primarily concerned with the making and sale of bacterins and vaccines, and if they are persuaded by experience or otherwise that the use of the latter is the proper remedy, they are certainly within rights of which it would be indelicate and improper for any one to question the validity. When, on the other hand, their results are brought forward as proof conclusive of certain facts, there can be no legitimate objection to having the evidence challenged.

After a critical examination of the data presented we are forced to conclude that no field or laboratory experience has as yet been presented which in an incontrovertible manner shows the dependability of vaccines and bacterins against hemorrhagic septicemia, and that all which pertains to an active immunity against this disease has as yet not been advanced beyond the purely experimental stage. Those conclusions are amply confirmed by the results published in Nebraska Bulletins 17 and 18.

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INTEREST IN IMPROVING PET STOCK

Applications to recognize the improved breeding of such stock as Belgian hares, wild ducks raised in captivity, game birds, and dogs is making it difficult for officials of the Bureau of Animal Industry to determine just where the dividing line between farm livestock and other animals, including pet stock, should be drawn in developing the "Better Sires—Better Stock" campaign. The classes in which particular efforts toward improvement by the use of purebred sires are being directed include cattle, horses, asses, swine, sheep, goats, and poultry.

A supplementary list of pet stock and miscellaneous animals is being kept, and thus far 176 such animals, all bred to purebred sires, have been listed. The predominance of interest, of course, is in the improvement of general farm livestock, of which nearly 400,000 head are now listed with the department.

CLINICAL AND CASE REPORTS

PORCINE METRITIS

By A. T. KINSLEY, *Kansas City, Mo.*

CASES of metritis have not been reported as commonly in the sow as in the cow. During the past season a condition has developed which is very similar in many respects to infectious abortion and there has been an associated metritis in a large percentage of those cases. From the intensity of the process and the associated lesions, it appears justifiable to pathologically classify porcine metritis as catarrhal, purulent and septic.

Catarrhal metritis may be acute or chronic. In some cases the lesions have been confined to the uterine mucosa and the condition would therefore be properly designated as endo-metritis. The different types of inflammation of the uterine structures in swine have not been clinically differentiated up to the present time.

Porcine metritis is usually a sequel of abortion or difficult parturition, although some cases have been observed in which parturition was apparently normal. No one specific microbial agent has been identified as the specific cause of abortion in swine. Pyogenic micrococci and streptococci, *Bacillus abortus* (Bang), representatives of the colon typhoid group are the principal microbial agents that have been isolated from the cases of metritis. *B. pyocyaneus*, *B. suispestifer* and *B. suissepticus* and some other microbial agents have been found in some cases, but were not considered to be an etiologic factor.

It is possible that the causative factor or factors that have produced such extensive abortion in sows recently, will be found to be the cause of metritis.

The principal lesions thus far observed in porcine metritis consists of congestion and tumefaction of external genitals, relaxation and dilatation of the uterine horns, the presence of variable quantities of fluid, the character of which will depend on the type of inflammation in the uterine cavity, and there are usually fragments of the placenta within the uterine horns. Catarrhal metritis is characterized by congestion and limited tumefaction of the uterine mucosa. The uterine cavity will contain a varying quantity of a mucous or muco-purulent exudate.

Purulent metritis is characterized by an intense inflammatory disturbance with an accumulation of pus in the uterine cavity. The uterine walls will be tumefied because of the extensive leucocytic infiltration. The infection and inflammatory process not infrequently extends and involves the contiguous peritoneum, producing metro-peritonitis.

Septic metritis is characterized by an intense inflammation of the uterine walls with an accompanying necrosis. The uterine cavity will contain quantities of a putrid fluid, the uterine mucosa may have sloughed or appear as a macerated, yellowish mass. There is usually thrombic formation in the uterine veins, and the Fallopian tubes and ovaries may be involved. In cases of septic metritis there is usually an involvement of the peritoneum. If the animal survives sufficiently long, metastasis and thrombic formation may occur in any part of the body.

Catarrhal metritis does not, as a rule, produce sufficiently constant symptoms to be readily identified. There will be a mucous or muco-purulent vaginal discharge, the affected animal will appear unthrifty, and there may or may not be a rise of temperature.

Purulent metritis is manifested by purulent vaginal discharge. The affected animal eats sparingly, if at all. There will be a rise of temperature. If the peritoneum is involved, the patient will evidence pain when forced to move.

Septic metritis has a sudden onset, there will be from four to six degrees rise of temperature. The animal has a tucked up appearance, there may or may not be a discharge of bloody fluid from the vagina. The patient will refuse feed, but may drink freely.

The course of metritis is variable, depending upon the intensity of the inflammatory process. The catarrhal type is usually subacute or chronic in nature. The purulent and septic types are invariably acute and the septic is usually fatal.

The treatment of metritis in sows has not been entirely satisfactory. It is difficult to apply local treatment because of the small size of the external genital opening. Thus far the most successful treatment has consisted of uterine irrigation. This treatment requires the dilatation of the vagina by means of a speculum, after which a small tube such as a horse catheter may be passed into the uterus and a dilute solution of tincture of iodine slowly and carefully injected. Some practitioners have reported splendid success by this method of treatment and the injection of one to four ounces of alcohol into the uterus, after the antiseptic solution had been re-

moved. The uterine douches should be repeated two or three times if necessary. Quinine bisulphate in 20 grain doses injected into the axillary space and repeated every twelve or twenty-four hours has been reported to be of value, particularly in cases of septic metritis.

[The JOURNAL would welcome a free discussion of this subject, which is becoming of more and more importance to the practitioner.—EDITOR.]

PULMONARY ASCARIASIS IN YOUNG PIGS¹

By H. B. RAFFENSPERGER, *Chicago, Ill.*

IN the course of a series of field investigations on the parasites of hogs in which I have been engaged during the past two years, I have seen many pronounced cases of pulmonary ascariasis, and have been able to verify the suggestion made by Ransom and Foster in 1917 on the basis of results obtained by them in experimental work that invasion of the lungs by *Ascaris* larvæ would probably often be found responsible for lung troubles among young pigs.

In this connection a recent experience is of interest. Dr. G. B. Blackman of Bloomington, Illinois, called my attention to a specimen of bronchial mucus from a young pig containing numerous *Ascaris* larvæ, sent to him for confirmation of a diagnosis made by Dr. H. R. Hornbaker of Bushnell, Illinois, in reference to a herd of pigs among which a considerable number had died following symptoms and under circumstances suggesting pulmonary ascariasis. Through the courtesy of Dr. Hornbaker I was enabled on October 8, 1920, to visit the herd in question and from this visit obtained the following information:

During the first week in September most of the fall litters were farrowed, nine sows giving birth to 87 pigs. Another sow gave birth to 15 pigs on September 21, making a total of 102, of which 9 were killed by overlying, so that there remained a net total of 93 pigs farrowed on this farm in September. The sows and pigs within two or three days after farrowing were placed in a small orchard; in fact, if I understood the owner correctly, some of the litters were farrowed in this orchard, an old shed being utilized as a farrowing pen. Earlier in the year the pigs farrowed in the spring had access to this orchard but were not confined to it. These pigs (68 shoats), after the farrowing of the fall pigs, were kept in a large pasture adjoining the orchard. In the latter part of the summer or in the autumn of 1919, the pigs that were farrowed the preceding spring were running in the orchard, and at this time were given an

¹Contribution from the Zoological Division, U. S. Bureau of Animal Industry.

anthelmintic. Concerning the results of this treatment the owner stated that worms were scattered all over the orchard. The orchard thus through its occupancy for a considerable period by wormy pigs in 1919, including the time they were undergoing anthelmintic treatment, became heavily infested with *Ascaris* eggs. The pigs farrowed in the spring of 1920 had access to this orchard during the summer but apparently because of having acquired considerable resistance to *Ascaris* infection at the age which they had attained before using the orchard pasture did not become seriously infested, at least, not so seriously as to show marked symptoms. The failure of the spring pigs of 1920 to become seriously infested may also be partly explained by the fact that the development of *Ascaris* eggs to the infectious stage is likely to proceed very slowly, especially if the heat, moisture, and oxygen necessary to incubation are deficient. Accordingly, many of the eggs left in the orchard in the late summer or autumn of 1919 probably lay dormant over winter and did not reach the infectious stage until after the spring pigs had passed the most susceptible age. By September, 1920, however, there had been plenty of opportunity for even the most slowly developing eggs to reach the infectious stage, and thus when the newly farrowed pigs were placed in the orchard, conditions were ripe for the catastrophe that followed.

On September 26, some of the young pigs in the orchard "were off," as the owner expressed it; they were affected with "thumps" and refused to come up to the trough. In a few days a number had died. Dr. Hornbaker was called and made a tentative diagnosis of *Ascaris* pneumonia. The shoats in the adjoining pasture were normal, but on the request of the owner were immunized against cholera. The lung of one of the pigs that was sent to Dr. Blackman for laboratory examination showed the presence of many *Ascaris* larvæ, 15 being counted in a few drops of mucus from one of the bronchi.

On October 8 when I visited the farm the number of young pigs in the orchard had been reduced by death to 55, only 24 of which appeared normal, the others "thumping." Two of the pigs were killed and examined post mortem. *Ascaris* larvæ were found in the lungs of both. Seven larvæ were present in one microscopic preparation made from a few drops of mucus taken from the right bronchus of the first pig killed. The contents of a small portion of the jejunum of this pig were poured upon a piece of black tar paper and diluted with water. Without the use of a lens this crude method of examination showed 22 small ascarids varying in length from 6

to 17 mm. No doubt many others were overlooked, and no doubt also more were present in the remainder of the small intestine which was not examined.

The evidence that the losses among the pigs on this farm were the result of pulmonary ascariasis is very clear from the history, symptoms, and post-mortem examinations. Such losses are of common occurrence on farms where no adequate precautions are taken against ascariasis among young pigs, though usually the percentage of loss is not so high. There was here a death loss of over 40 per cent, probably increased later, as over half of the surviving pigs at the time of my visit to the farm were showing marked symptoms of pulmonary ascariasis. In addition to the death loss there is also to be considered an indefinite loss from stunting of growth that will occur among the surviving pigs. We know that pigs recovering from an attack of pulmonary ascariasis commonly are permanently stunted and do not afterward grow properly even if placed under the most favorable conditions as to feed and care. Accordingly, the damage to his fall pig crop experienced by this farmer may be conservatively estimated at not less than 70 per cent, all of which could have been avoided by proper management.

The following plan of managing young pigs to avoid losses from *Ascaris* has given good results on the farms where it has been tested, especially in those cases in which it has been carefully followed. Farrowing pens are thoroughly cleaned. A week or ten days before farrowing sows are scrubbed to remove dirt adherent to the skin and are placed in the clean pens that have been prepared for them. The removal of dirt from the skin of the sows is considered important as such dirt picked up in wallows and long-used hog lots is liable to be heavily laden with *Ascaris* eggs in the infectious stage. It is quite possible for pigs to swallow many of these eggs while suckling. Hence the apparent importance of having the skin of the sows clean when they are placed in the farrowing pens. Ten or twelve days after farrowing, or even sooner, the sows and pigs are removed to pastures or fields that have been plowed and on which a crop has been grown since their previous occupancy by hogs. From the time they are born until after they are weaned the pigs, though exposed to the possibility of infection from the brood sows, are strictly excluded from pens, buildings, yards, fields, and pastures that have been frequented by other hogs, and hence likely to be more or less heavily contaminated with *Ascaris*. The amount of infection to which the pigs are exposed by association with the

possibly infested brood sows is not likely to be serious, as freshly deposited *Ascaris* eggs usually require several weeks at least to develop to the infectious stage, so that the risk attending the association of possibly infested sows and their pigs until the latter are weaned does not appear to be very great, especially if the animals are allowed ample range on a clean field or pasture.

The plan above outlined, though it may not always prevent slight infection, is designed to minimize the chances of serious infection during early life and until the pigs are old enough to have become fairly resistant or at least tolerant to the attacks of *Ascaris*. The severe effects often produced by this parasite upon pigs under three months of age are rarely observed among pigs that have escaped infection during the first three months of life. Even though they afterwards become infected they seldom show the marked symptoms of ascariasis so often seen among younger animals.

In conclusion, I may note that the outbreak of pulmonary ascariasis reported in this paper not only exemplifies the importance of excluding young pigs from places infested by *Ascaris* but also affords an opportunity of pointing out the importance of confining pigs during anthelmintic treatment in a place that can afterwards be thoroughly cleaned, and that at least will not be used for keeping young pigs. Whether or not in the present instance the treatment of the wormy pigs in the orchard rendered the orchard much more dangerous than it would otherwise have been, it is nevertheless obviously bad practice to allow pigs during treatment for worms or immediately afterwards to roam over a pasture that will later be used again for pigs.

CONGENITAL STENOSIS OF THE DUODENUM

By OSCAR SCHRECK, *New Haven, Conn.*

A female Dalmatian pup was apparently well until six days old, when the pup vomited blood, with some choking, coldness of the body and extremities, and paleness of all the visible mucous membranes.

This vomiting was repeated at intervals for 6 or 7 hours. The bowels did not move so far as is known. The pup at this time refused to suckle the bitch, and the owner, a breeder of dogs, gave the pup milk and port wine, as I directed over the telephone.

There was a slight improvement in suckling. On the seventh day,

vomiting of a large amount of dark brown, or chocolate colored fluid, which was quite sticky, again took place.

Death of the animal occurred on the eighth day. Autopsy showed the stomach greatly dilated, the duodenum distended and terminating abruptly just in front of the orifice of the bile duct.

Pressure brought to bear with the fingers could not force the fluid in the stomach behind this point, nor could the gas present below the stenosis be forced forward from the intestines.

In making my examination, I inserted in the rectum a long thermometer the whole length, and on taking it out it was not soiled with feces, still the pup strained frequently as if the bowels were going to move.

In the esophagus, immediately behind the cardiac orifice, was a dark, firm, thrombus in the mucous membrane, about two centimeters in length, firmly attached to the wall. This was in all probability the source of the hematemesis.

EFFECT OF DIPPING DAIRY COWS AS REGARDS MILK PRODUCTION

By FREDERICK TORRANCE

Veterinary Director General, Ottawa, Canada

DURING the dipping of cattle for the eradication of mange in the southern part of the Province of Alberta, Canada, some careful records were kept of the milk production of eighty-seven dairy cows for two days preceding and two days after dipping, and the following figures were obtained:

Total milk produced by the 87 cows: June 24, 3,128.4 pounds; June 25, 3,101.4 pounds; dip, June 26, 3,051.9 pounds; June 27, 3,113.6 pounds.

Average per cow: June 24, 35.15 pounds; June 25, 34.84 pounds; dip, June 26, 34.27 pounds; June 27, 34.98 pounds.

This shows the effect on milk production of the dipping of this dairy herd in the official lime and sulphur solution in the standard cage vat when the temperature was maintained at from 110° F. to 118° F.

It is evident that the objection of many stockmen to the dipping of milch cows is not well founded, as they can be dipped without affecting the secretion of milk to any appreciable extent.

ABSTRACTS

OBSERVATIONS CONCERNING FOOT-AND-MOUTH DISEASE. Berschey et al. Schweiz. Arch. Tierheilk., Jan., 1920. Reviewed in Rev. Gén. Méd. Vét., Nov. 15, 1920, by L. Spartz.

During the latter part of 1919 foot-and-mouth disease broke out with such severity in the canton of Fribourg that the authorities decided to effect control by slaughtering all affected and contaminated subjects. Butchers followed the veterinarians in their tours of inspection and slaughtered and dressed the animals *sur place*. After the campaign had been carried out on some fifty stables it was found that in spite of the enormous expense and drain on the cantonal budget the epizootic was gaining ground day by day.

In the course of these inspections Messrs. Berschey, father and son, found that the affection was very benign in stables where the water supply came through ordinary iron pipes, notably if the conduits were more than 20 to 30 meters long, but that the symptoms were very severe where the supply flowed through wooden, cement, ceramic or galvanized iron pipes. This rather queer observation suggested the idea that iron plays a specific role against the disease.

The Berscheyes are of the opinion that the organism should contain at least the minimum quantity of iron to assure proper action of the various physiological functions and to endow the body with adequate resistance to infections, especially foot-and-mouth disease. If the minimum content does not obtain, the symptoms are alarming, while if the organism contains the minimum or surpasses it the disease assumes a benign form.

Many practitioners do not ignore the fact that the disease is always more grave in fresh cows or those in the last days of gestation; that is to say, animals obliged to cede iron to the calf in the process of formation and reduce the iron content of their bodies to the minimum.

From this order of ideas the Berscheyes directed that three to five grams of iron sulphate be administered as a preventive during a period of four to six weeks. All the animals thus treated contracted only small vesicles, two or three the size of a pin-head, and the appetite and lactation were not altered.

The authors also treated the disease by intravenous injections of eight grams of iron sulphate in normal salt solution, but as the administration was cumbersome for rural practice, iron cacodylate

hypodermically was substituted. One gram in 50 of distilled water was the dosage. The results have been so surprising that it has been decided to extend the experimental work with this medicament.

At present they recommend that preventive doses of iron sulphate be administered to exposed animals when panzootics break out, and while not making any pretensions to scientific research as to the action of iron in this connection, they are of the opinion that the grave epizootic throughout Europe at this time is due to a lack of iron in the feeds, the iron-containing feeds having been reserved for human food. Animals were obliged to draw the iron supply from the water flowing through iron pipes, and where the amount was not sufficient the organic equilibrium was upset to a point where the feeblest of contagions were sufficient to start up serious outbreaks.

Mayr, professor in the veterinary college at Munich and editor of the *Münchener Tierärztliche Wochenschrift*, approves the conclusions of Berschey, having found as early as 1895 that the replacement of wooden conduits by iron ones had a beneficial influence in the course and the duration of foot-and-mouth disease, but gives as his opinion that it is not the mere augmentation of the iron content of the organism, but the oligodynamic power of metals upon bacteria that is the helpful influence. The term "oligodynamic function" was introduced into science by Von Nageli, a botanist of Zurich, to designate the effect of certain solutions on algæ. Stupfle, Steck and Rosenkranz, taking up the work of Von Nageli, showed that the heavy metals (copper, mercury, silver) gave an oligodynamic function to water that was apt to kill the cells of algæ, bacteria and protozoa, and that this property was retained by the water for some time after it left the flow pipe.

Mayr opines that the success of Berschey in the treatment of foot-and-mouth disease by the administration of sulphate of iron per os is due solely to the disinfection of the contents of the rumen.

According to Klein (*Deutsche Tierärztliche Wochenschrift*, May 15, 1920), the work of Berschey as regards the value of water flowing through iron pipes in the treatment of foot-and-mouth disease is worthy of being confirmed, but it seems to him that from a physiologic point of view it is premature to credit iron with a protective action, and besides the intravenous injections of the sulphate recommended are not without danger.

Bohm (*Münchener Tierärztliche Wochenschrift*, 1920, reviewed in *Schweizer Archiv*, July, 1920), referring to his previous publications

(1916), in which he presents the idea that certain relations exist between the radiations of the soil and foot-and-mouth disease, says it would be well in infected regions to study the permeability of the soil, its content of water, its strata and radioactive rocks, and the influence which flowing water in the strata known to be radioactive may exert on the lesions of the mouth and hoofs. The oligodynamic function of water flowing through iron pipes is attributed to the rays produced in the strata over which the water has flown. These rays produce "activating" transformations in water which give it the property of attenuating or of killing viruses like the rays of radium. It has been shown that the minerals like iron, copper and silver emit rays that kill bacteria, and that water, glass vessels, wadding, etc., brought into contact with radiating bodies contract radioactive properties. Radiobiologic experiments made upon mushrooms, bacteria and seed grains have demonstrated that the rays of radium, especially the ray x, annihilates germination and may even destroy the cells. The rays p and y influence also the nuclei of cells and in large doses may disorganize the plasma. According to Bohm the work of Berschey should be placed to the account of radioactivity.

Bizarre as these findings and discussions may seem, they have been so seriously discussed among the veterinarians of continental Europe that it was thought quite in order to record them in our current literature.

L. A. MERILLAT.

RECENT EXPERIMENTAL STUDIES ON THE VACCINATION OF CATTLE AGAINST TUBERCULOSIS. A Calmette and C. Guérin. *Annales de l'Institut Pasteur* (1920), Vol. XXXIV, No. 9, p. 553.

A culture of bovine tubercle bacilli repeatedly transferred on a glycerine-bile medium for a long period became avirulent for cattle, monkeys, and guinea pigs even when injected in large doses intravenously. Animals so treated showed complete immunity to a test inoculation given intravenously thirty days later. The authors instituted an experiment on November 21, 1912, in which they sought to test the duration of this immunity against natural infection. They used ten calves aged from nine to ten months, all free from tuberculosis; four of these served as controls, and the six others were injected intravenously with 20 mgs. of bovine bacilli (880 millions) from a two weeks old culture (70th transfer on bile-potato). All of these animals were placed in a stable directly behind five adult tuberculous cattle in such a manner as to favor a constant natural contamination of the bedding and feed of the experi-

mental animals. One year after beginning the experiment, three of the vaccinated calves were again injected with 20 mgs. of culture (89th transfer) and one year later two of these same animals were given a third injection of culture (113th transfer). The tuberculin test applied one year after starting the experiment showed three of the four controls and one of the vaccinated animals to be reactors; two of the vaccinated animals gave doubtful reactions. (It is known that in a certain number of cases, the presence of avirulent bacilli in the organism may produce a sensitivity to tuberculin.) Another test at eighteen months showed the same three controls reacting, but none of the vaccinated animals. A third test thirty-two months after beginning the experiment resulted in positive reactions in the three previously reacting controls and in two of the vaccinated animals (the latter had received only one injection at the outset of the experiment). On account of conditions brought on by the German occupation, the experiment was brought to a close on October 1, 1915, or about thirty-four months after its inception. All the animals were slaughtered and at autopsy the three reacting controls were all found tuberculous; the one control which had never reacted was free from tuberculosis; the two reacting vaccinated animals (vaccinated only once) were also diseased; the third test animal vaccinated but once was healthy, as were also the calf vaccinated twice, and the two animals vaccinated a third time.

In order to test the practical value of this method of vaccination, the authors believe that it would be desirable to use a larger number of cattle and continue the test through a period corresponding to the average life of the bovine. Calmette's vaccine has the merit of being non-tuberculogenic, differing in this respect from von Behring's bovovaccine and Koch and Schutz's tauruman.

L. T. GILTNER.

THE NEW GERMAN ARMY VETERINARY SERVICE. *Jour. Méd. Vét. et Zootech.* (Abst. in *Vet. Rec.*, Nov. 27, 1920, by W. R. C.)

The German "army of the realm" has been reduced to an effective of 200,000 men, and its veterinary service has been reconstituted upon new lines as follows:

The veterinary inspector is at the head of the Army Veterinary Corps.

The veterinary inspector's duty is to superintend all the services and visit the establishments in relation with the Veterinary Corps, and to occupy himself with everything connected with the equipment

of army veterinary surgeons. He is, at the same time, the Chief of the Veterinary Section of the Ministry of War.

The veterinary inspector has two sections, numbered I and II, under his orders.

Section I, placed under the direction of a Veterinary-Major, manages the conditions of service of the veterinary surgeons, the army service for contagious diseases, hygiene and statistics, and the organization of the veterinary service and the effective service.

Section II controls veterinary equipment, laboratories and veterinary depots, farrieries, infirmaries, drugs, feeding, shoeing, meat inspection, and farriers.

A third section is related to the Commissariat. It sees to materials for shoeing, slaughter, vehicles, and harness.

The schools of farriery of Berlin, Hanover, and Munich, the veterinary laboratory, and the veterinary depot, are placed under the direction of the veterinary section. The laboratory and the depot are annexed to the school of farriery of Berlin.

Each of the four groups of the army contains a divisional veterinary surgeon, with residence at Cassel, Berlin, Kolberg, and Munich.

The staff of the twenty brigades of the army contains a brigade veterinarian and a deputy. The veterinary corps of each brigade number, on an average, 13 veterinary officers.

In 1914, the veterinary corps of the army comprised 883 veterinary officers. In the army of 200,000 men there are only 342, of which 247 are in Prussia and Baden, 51 in Bavaria, 31 in Saxony, and 13 in Wurtemberg.

The importance of tick eradication is indicated by a letter from an East St. Louis stockyard firm to a county agent in Arkansas regarding a shipment of 25,000 pounds of cattle from one of the infested areas. These cattle, while in prime condition, were placed in the quarantine pen because of the locality from which they originated. The difference in location caused a reduction estimated at 35 cents per hundredweight, or \$87.50 on a single carload. Cattle of practically the same grade from an adjoining county which has been freed of ticks sold for a higher price.

Wild horses on the Colville (Wash.) Indian Reservation are being shot and eaten by stockmen, according to a statement by Grant Copeland. Small horses have become numerous, very wild, and a nuisance on the reservation, where they eat the grass and are fat.—
Pacific Homestead.

REVIEW

A NEW BOOK ON BOTANY

"PASTORAL AND AGRICULTURAL BOTANY" is the title of a text-book for the study of the injurious and useful plants of country and farm, recently published by John W. Harshberger, Ph.D., formerly Professor of Botany at the University of Pennsylvania.

The chapters on poisonous plants are of especial interest to all concerned in livestock production on grazing lands. The control of losses from poisonous plants in range animals is one of the most important and perplexing problems affecting the livestock industry. No reliable data on the aggregate losses from forage poisoning have been published, but there are numerous records on file showing fatalities as high as 50 per cent in single herds and flocks, and certainly the aggregate losses suffered by the livestock industry in this country run into the millions. The United States Department of Agriculture and State agricultural experiment stations have been studying this problem for years. Much of value has already been published, and it has been urged that veterinary colleges give more attention to this subject in the arrangement of their courses of study.

"Pastoral and Agricultural Botany" is a concise little book which presents an attractive appearance and is admirably suited in scope, arrangement and subject matter not only for use as a text-book but as a source of valuable information for veterinary practitioners and livestock owners.

Orchard and Farm says: "California leads the nation in the number of milk goats. Switzerland, with an area of only 16,000 square miles, supports about 400,000 goats. California has plenty of room greatly to increase the present number. To aid in the upbuilding of the milk-goat industry, the College of Agriculture is now offering a correspondence course on milk-goat raising."

Wisconsin Farmer says: "Now that the eradication of livestock tuberculosis has received a good start and livestock owners all over the State are expressing their approval of the campaign, we can not afford to allow it to be hampered in any way, and the State legislature can do nothing better than to make an appropriation in keeping with its importance and value."

ARMY VETERINARY SERVICE

SCHOOL OF MEAT AND DAIRY HYGIENE

The Veterinary School of Meat and Dairy Hygiene completed its first regular session on December 15. The next regular course began January 15, 1921, with the following officers in attendance:

Major Walter Fraser, Major William A. Sproule, Capt. Edward I. Cheely, Capt. Aquila Mitchell, Capt. Herbert S. Williams, First Lieut. Everett C. Conant, and Second Lieut. Oscar C. Schwalm.

The inspection of meat and dairy products and forage at time of purchase and at issue pertains to the routine duties of all veterinary officers and certain selected enlisted men. The graduate of a veterinary college today receives extensive instruction along these lines and the course at Chicago is in the nature of post graduate training, both theoretical and practical, in the special duties of the army veterinary officer. With the advantage of his professional knowledge, it has been found practicable to qualify the veterinary officer in this work by a 5 months' course of intensive training. This is of material importance in securing efficient inspections, because the examination of food supplies of animal origin is a highly specialized branch of science of which the non-professional man lacking the required basic education can never acquire more than a superficial knowledge. These inspections are essentially sanitary, being designed to protect the health of troops and from the nature of things fit in with the general sanitary work of the Medical Department.

The action of the War Department in making the veterinary service responsible for all meat and dairy inspection for the Army, as was done in 1918, is a most logical procedure. All such supplies receive a veterinary inspection when acquired at the central purchasing points and so far as personnel is available when issued and when bought locally. The limited number of veterinary officers and enlisted men available has been the only obstacle to prevent the Surgeon General from fully meeting the demands of the service and maintaining proper inspections at all stations.

All the meat used by China and the Philippines is bought in China where the Veterinary Corps has operated an inspection force for several years. Similar work is carried on in the Canal Zone.

CALLING RESERVE OFFICERS TO ACTIVE DUTY

Under the above title, War Department Circular No. 420 states:

"The War Department has authorized a sufficient number of officers of the Veterinary Reserve Corps to be called to active duty to raise the total number of officers (Regular, Emergency, and Reserve) of the Veterinary Corps to 175, the number of officers authorized by law for the Veterinary Corps. All officers of the Veterinary Reserve Corps above referred to will be relieved from active duty June 30, 1921, or prior to that time, as permanent appointments in the Veterinary Corps fill existing vacancies, the total of 175 not to be exceeded at any time."

There are at present 163 officers in the Veterinary Corps, Regular Army, in the following grades:

Colonel, 3; Lieutenant Colonel, 5; Major, 17; Captain, 29; First Lieutenant, 83; Second Lieutenant, 26.

By authority contained in War Department Circular No. 420, twelve officers of the Veterinary Reserve Corps in the following grades have been called to active duty: Captain, 2; First Lieutenant, 8; Second Lieutenant, 2.

WAR HORSE MEMORIAL

An elaborate memorial, costing \$150,000, is to be erected in London in memory of the 346,130 British horse casualties, not to speak of the million of other countries' animal losses. The Royal Society for the Prevention of Cruelty to Animals is behind this movement to commemorate the memory of these wonderful animals, which fought so valiantly on the command of their riders and drivers.

Lieutenant G. A. Handley has resigned from the Army and has moved from Fortress Monroe, Va., to Ironton, Ohio, where he will engage in general practice.

Dr. Harry E. Ewing has resigned his commission in the Veterinary Corps, U. S. A., and is again located at Columbus, Ohio, in connection with the City Board of Health.

Lieutenant Theodore Schandou, formerly at Camp Dix and more recently at Fort Bliss, Texas, has resigned from the Army and is looking for a good location in Texas or New Mexico, where he will again take up the practice of his profession.

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of Fifty-seventh Annual Meeting, Columbus,
Ohio, August 23 to 27, 1920

(Continued from the January JOURNAL)

SECTION OF COLLEGE FACULTIES AND EXAMINING BOARDS

TUESDAY MORNING, AUGUST 24, 1920

THE meeting was called to order at 10 a. m. by the Chairman, Dr. Reuben Hilty, of Toledo, Ohio.

CHAIRMAN HILTY: This is the first time since I have been in this section that we have had a real program, and it ought to be a milestone in this section of the Association. The first thing on the program is the report of the Secretary, Dr. H. S. Murphey, of Ames, Iowa.

DR. MURPHEY: The report and the minutes of the last meeting were published in the JOURNAL, and I think that they will be adopted as published. I have no further report to make.

(A member moved that the report be received, which motion was seconded and carried.)

CHAIRMAN HILTY: We will now listen to the first paper on "College Training for Bureau of Animal Industry Veterinarians," by Dr. J. R. Mohler, of Washington, D. C.

(Dr. Mohler's address will appear in a later issue of the JOURNAL).

CHAIRMAN HILTY: This to me has been a wonderful paper, the most interesting one I have ever heard upon this subject. Does anyone desire to discuss the paper, or to ask any question? It seems that the Doctor has covered the subject so thoroughly that nobody cares to enter further into it.

The next paper is on the subject of "Veterinary Training from the State Board Standpoint," by Dr. C. W. Fogle, of Leipsic, Ohio.

(Dr. Fogle read his paper, which will be published in a later issue of the JOURNAL.)

CHAIRMAN HILTY: The next paper in order is one by Dr. Planz on "Training Veterinarians for General Practice," but as Dr. Planz is not here I am going to call upon Dr. Cooley, of Cleveland, to give us a few words on that subject.

DR. COOLEY: My experience on examination boards and my long experience as a practitioner may account for the remarks that I am going to make in regard to this question. The training of the

veterinarian for general practice is a question of great importance. I have been talking with the physicians at our Cleveland Academy of Medicine, and they have been laying a great deal of stress upon entrance requirements with reference to preparation for the medical profession. I have heard them say—and you can all be the judges as to whether it will ever be applicable in our profession—that when a man has his four years of high school, and then the college requirements to get into the college, and then takes up a great number of hours of medical study, he is likely to be educated away from some of the spots and locations that need medical work and men.

I don't agree with anybody in saying that we should not prepare ourselves in the best possible way, but with a lot of the schools offering what they do in reference to the preparation of students, it does seem to me that we are laying too much stress upon that condition, and then allowing the back door to be opened, and a lot of them getting through in that way.

Yesterday I was much surprised in our committee to hear it said that the London Correspondence School now had been practically deprived of Canadian help, but was receiving a revenue of upward of \$40,000 from registrations from the United States, and that the registration amounts to 2,300 students. We have a committee in this section to deal with such matters, and I understand there is a law that will take charge of that particular phase of the question.

In considering the courses of study in our veterinary colleges, consideration should be given to the proper and necessary training of practitioners. There are many men who can take up college work and stand well in the examinations but who have not been endowed with that natural ability that nature gives to some men for that kind of work. It is necessary to provide a lot of practical teaching for the good of the profession. When a man gets into the field of practice he must deal with stock owners who are supplied with a great amount of practical judgment and sense about live-stock, and he must go out ready to cope with them. My advice is that in training men for veterinary practice they should be well prepared for this phase of their work.

I can not say much to you men who are giving your time to the teaching of students in veterinary work. I feel timid in trying to advise such men as I have heard in reference to this matter.

CHAIRMAN HILTY: We are grateful to Dr. Cooley for his impromptu remarks. Does anyone care to say anything further on that subject, the training of the veterinarian for general practice?

Dr. LOWE: I was interested in Dr. Cooley's talk, and I agree practically with everything which he said. As a member of the State Board of Veterinary Examiners of New Jersey I have been wondering if the State board of the future will have as important a place as a working body as it has had in the past. It seems to me that if it is the fact that in the affairs of the colleges the A. M. V. A. is recognized, and that this Association recognizes these

students, it should be a pretty good recommendation for them to come into the State.

The men who are conducting the examinations sometimes do not know the answers that are received, and sometimes the questions that are asked by the examiners show that they, perhaps, have made some of the trouble. I have many times thought that perhaps that there was too much examining, and that a man who comes from these schools should be recognized in every State of the Union. Sometimes the men that do the examining are biased, or have their own ideas. I think they should sometimes take other views than their own. We have under our law twenty different subjects on which applicants are examined, and in many instances questions are duplicated. I think that some time in the future things will be changed a little bit.

CHAIRMAN HILTY: Has anyone else anything to say on this subject?

Dr. CHRISMAN: I have served on the examining board, and have served on other boards, and in a business way in transacting business when one of the other members was absent. The powers that be in the different States sometimes single out certain men for appointment as examiners, and these gentlemen meet in a certain city to hold the examination. The men who take it are preparing to take up the practice of the profession. These examiners try to find out in a short period—says eight to ten hours—how much these applicants know, and are disappointed to find that these men can't tell it all in that time. I wonder sometimes whether we are giving these gentlemen a fair chance for entrance into the profession. That is the question—and it is really important—whether we are giving the college graduate a real, fair chance to start in the profession.

Let us go back to the days when we came up to be examined before the State Board of Examiners. We were young and more or less excited; we were in a strange city, most likely, and we were frightened and distressed, and wished that we had never started to practice anyhow. I know that is just what happened to me. And we were told that the examinations were to be conducted by men who would make it as difficult as possible—men who would go out and "pluck" you; and we started in with fear and trembling. When I took the examination I was young and green as anybody who ever entered college. The men who were examining me were of years, 65 or along there, with long whiskers; and they got us down there in a sweat box, where we got our grinding, and I am wondering today just how much or little we knew about therapeutics, etc. We were all shaking in our boots, half scared to death. I don't think that is a good method or a sure way of finding out how much a man knows.

Isn't it a much fairer proposition to take the college diploma that we recognize in the A. M. V. A., and take that as a standard for entrance into practice, than to go before the boards? Let us think about that.

One thing that has appealed to me in regard to a four-year high-school entrance requirement for colleges is plain English. Many men who have graduated from colleges and come up to take the State board examination, and expect to practice, can not spell ordinary words, the ordinary terms that they have to use; and if you didn't know what were the questions you had given them, or what you had asked, you never would recognize them by the spelling that is given there. If a man can not spell the terms he expects to use, and that he needs through life and in the practice of his profession, he is in bad shape. We need good English, and we should impress upon them to study to use and speak good English. We should require that when they come before the examining boards.

Being for a number of years on the examining board, I have had an opportunity to observe those that come before the examining boards, and generally we find them lacking in their English, and many are not capable of framing their answers and putting them on paper.

In teaching I tell the students that language is nothing more nor less than the vehicle in which they transfer their ideas to me. If they hitch their ideas to a poor and broken-down vehicle, they can not expect them to reach me in the proper form. I think that English is one of the greatest things on which we should lay stress.

CHAIRMAN HILTY: In my experience of some eight years on the Ohio State board I have found that same thing, and I have found that the man who knows the least writes the longest paper. I always feel the greatest responsibility when I am grading a lot of papers. I ask myself, Has this young man ever had the proper training? Does he know, but is simply not able to express himself on paper? If I think he knows, I will overlook a lot of things. If I find that he has had opportunities and has not informed himself, I am going to grade his paper mighty close. I must be convinced in my mind.

Dr. HOSKINS: The Doctor has touched upon a point that ought to be brought out further. We are up against a difficulty. We know very well that the State boards have changed from year to year, because in about two-thirds of the States the appointments of members on State boards is a prerogative of the Governor. We have a minimum standard of entrance requirement, and a minimum standard for veterinary schools.

It seems to me, in view of the fact that these boards come into existence in this way, and are controlled, so far as changes are concerned, in this way, that the time has arrived when a reformation of such laws should take place, and that there should be attempted a rule that a presentation of a diploma from the school that the applicant has complied with the standards of requirements of the A. V. M. A., with the additional recognition of the A. V. M. A. as a body, that that shall define their standing for veterinary education, not medical.

I find men who come before us with a veterinary certificate based upon a high-school diploma in the State of New York who, when they come to write the papers, can not spell, their grammatical ex-

pressions are wrong, and the writing is of the poorest. It is not always that man who shows the evidences of lack of the fundamentals; but I think there is something radically wrong in many high schools in allowing these men to go out from them, because as we all know there is not a good impression of an applicant whose writing and grammar and spelling are of the poorest.

The question of the aptitude of the men, and their qualifications for entering the school, is far more defined and definite today, in my mind, than it has been for a period of twenty years, for the very reason that there is a high entrance requirement to the veterinary schools; but that has limited the number of schools. Many have gone out of existence in this country, and so, perhaps, we are not able to judge of the aptitude and qualifications of our students, especially as to the question of a preliminary education. That is true in New York in the University with which I am connected. This year they have 275 applicants for entrance in their medical school, and out of that number they have selected 150. They have begun to know the applicants from experience—those most earnest among the people who enter the State veterinary schools. We know their problems, and what it will cost. They figure that it will require an expenditure of \$600 a year for every one of the 150 men to be educated in the four years' course. On the other hand, the University will receive about \$1,100 in these four years; therefore, the University must raise \$1,300 additional to educate these men in the field of medicine.

It is not possible that the people will furnish the State with a liberal enough support for State veterinary schools, and we must go out and get the agricultural communities to give a sufficient amount of money to maintain and equip the veterinary schools properly in order that they may give this professional education which has been laid before us so splendidly by Dr. Mohler.

But there is also another side to this question—these four years of preliminary education, and two years of pre-medical course with our universities, and four years of medical course. Last year a most bitter fight resulted in New York from the necessity of asking the State for a large appropriation of money that surgical skill might be contributed to many communities in the State to which this higher education would not go. Dr. Downey stated that there were thousands of places in the State of New York, in rural communities, that have no veterinarians, but the veterinarians don't seem to want to go there. They prefer to go into the Bureau of Animal Industry, where they will receive \$1,400 or \$1,500 a year. There are many who prefer this, and enter the profession with this end in view. There are many that have entered the veterinary field in the last thirteen years.

CHAIRMAN HILTY: Is there anyone else who wishes to say anything along this line?

Dr. MOORE: I would like to say a word regarding what has been said relating to the State Board of Examiners. I would like to say this from a teacher's standpoint.

I would certainly like to see the State Examining Commission maintained. I would not like to see the State Examining Commission done away with in any way as long as I am teaching veterinary medicine. I find that we do not have all honest students to deal with, and I suspect that every teacher finds this to be true. When they get by one obstacle they think that they are practically safe; and the fact that the State Board is going into this and that subject enables you to get more men interested than you could in any other way. I have found that to be my experience, and I wouldn't like to see the State Board of Examiners abandoned. Every student should realize that after he passes through the college he is not entitled to go out and practice, but that he must have further pathological information before he can accomplish what he has started out to do. I am in favor of their continuance, and I think that all of these things are calculated to impress upon the student the necessity of hard work if he is going to accomplish what he started out to do, and if we are going to educate him.

CHAIRMAN HILTY: Is there anyone else who desires to talk on this subject?

A MEMBER: One of our members, who I understand is in good standing, is conducting a correspondence school of veterinary medicine.

Dr. MURPHEY: I am glad to have learned this morning that this matter of the correspondence school will be taken care of by the Resolutions Committee, and I think that if sufficient information can be shown to the Post Office Department that it is a fraud, it can be stopped.

Dr. HOSKINS: It utterly failed in so far as getting it stopped in Canada. The only thing they did accomplish was that they got dozens of newspapers in the country to refuse to take their advertisements. I can not say how we should direct the action, or go after the Postmaster General to do it, for the reason that the Scranton Correspondence School comes under that subject somewhat, and they felt that it was impossible to get any relief at all through the Post Office Department. Bear in mind that the Scranton School is only one in very many. Some of the medical schools today are carrying on correspondence schools on live subjects, and they are finding men who are graduates in medicine—and they are fine men—who will go into the city or State where these schools are located, and will spend two or three weeks in daily instruction, and then give them a certificate. It is a hard problem to get the Post Office Department to take action, and where to draw the line is the problem. Most of the old religious papers cut the advertisements; they won't deal with them, and say that they carry advertisements only that show honesty of intention on their face.

Dr. MURPHEY: I have a letter from Dr. McGilvray regarding this, in which he said that they had to pass a law up there which would prohibit this in Canada. It seems to me that we have won our point, which would overcome the objection that Dr. Hoskins has mentioned.

Dr. COOLEY: I also had notice from Dr. McGilvray that they have taken care of that question in Canada, and it is up to the States to take care of it here. Just what method we should operate under I don't know, but I feel that this section of the A. V. M. A. as a whole should take action on this strongly, so we will know just where we stand on this question. Dr. McGilvray has prepared his notes with reference to the matter for our consideration.

Dr. WHITE: There is one phase that Dr. Cooley did not cover. They are willing to stop doing business in Canada, provided they are not interfered with in so-called interstate trade or business in the United States.

Dr. HOOD: There is another phase. They are located in a large building, and in their advertisements they have cuts made of the building, or which show the building in which their schools or offices are located; and they try to give the impression, and really do carry the impression, that that is the school, instead of that it is only the office building and they have just two or three rooms as offices.

Dr. HILTY: Dr. White, as Chairman of the Resolutions Committee, you will see that these things are embodied?

Dr. WHITE: Yes.

CHAIRMAN HILTY: We will now go to the next paper, "The Future Training of Veterinarians Particularly for Teaching," by Dr. D. S. White, Columbus, Ohio.

Dr. WHITE: The subject assigned me I have taken merely as a text, so it will seem that some of this paper will appear absolutely irrelevant to the subject.

(Dr. White read his paper, which will be published in a later issue of the JOURNAL.)

Adjournment.

WEDNESDAY AFTERNOON, AUGUST 25, 1920

The section reassembled at 2 p. m., Chairman Hilty presiding.

CHAIRMAN HILTY: We will have a paper by Dr. George A. Dick, West Philadelphia, Pennsylvania, on "Animal Husbandry in the Veterinary Curriculum."

(Dr. Dick read his paper, which will appear in a later issue of the JOURNAL.)

CHAIRMAN HILTY: We will pass now to the paper of Dr. V. A. Moore on "The Purpose of Laboratory Work in Veterinary Colleges."

(Dr. Moore read his paper, which will be published in a later issue of the JOURNAL.)

CHAIRMAN HILTY: We will proceed to the next paper, on "The Training of Veterinarians for Research," by Dr. L. W. Goss, of Columbus, Ohio.

(Dr. Goss read his paper, which will be published in a later issue of the JOURNAL.)

CHAIRMAN HILTY: The next thing in order will be the election of officers for the next year. The arrangement heretofore has been that we shall have for one year a man from the examining boards, as chairman for the following year, or a man from the college fac-

ulty or the educational side as chairman, and the secretary from the other side. What will be your pleasure?

Dr. MURPHEY: I have been informed that there have been a number of petitions presented, an exceptional number, relative to a new section or division, one relating to the educational part and another to laboratory work. There has been a petition for a section in laboratory work. The Executive Board has full power to designate the sections, and I understand that they expect to make a recommendation to the association to pass it without qualification. I believe they propose to change the name of this section to that of Education and Research, and then that will include the laboratory workers as well as the teachers and State veterinarians. I think we should make our nominations at this time with that in view.

A MEMBER: I move that, inasmuch as we have had an unusual program presented to the section at this meeting, the present officers be continued, and that we reelect them for the coming year.

Dr. HILTY: Not at all, Doctor, so far as I am concerned, for next year for once I want to go to some Veterinary Medical Association meeting where I will have nothing absolutely to do with it.

Dr. MOORE: It seems to me that this section is, at the present time, a concrete part in the educational lines. I regret very much that the arrangement of the section has been such that the college men could not be admitted. A few years ago there was another association, a State college association, that was organized some years ago when the standards of the A. V. M. A. were not so varied as they are now, for the purpose of looking after the interests of veterinary education in the State schools. That association seems to have had a very important function to perform, and I confess for myself I do not see that it accomplished a great deal.

The college alumni are eligible to the A. V. M. A., and it seems to me that it would be just as well if that other association were disbanded. Advanced veterinary education methods should be adopted if we are to continue, and this should be centered in this section. In the meeting at New Orleans last year such action was taken, and that association has become dissolved, so to speak. This is the only section in which matters pertaining to college curricula, methods of teaching, etc., have come. I fail to see any objection to this change that Dr. Murphey has mentioned. It would offer this section a splendid opportunity. The laboratory men could have one session and the teaching or examining boards have the other session in which these topics could be presented. I should like to see some arrangement made by which some of the many real problems involved in veterinary education could be presented and discussed.

I feel that we can not accomplish much by preparing a paper as I did at the last minute. We haven't given it the time it should have. But if we could take up the question of laboratory training in veterinary colleges, the same man for a year, or half a year, and have others interested in it, doing the same thing, and discussing it and analyzing it for the purpose of putting it before us—that is what we want.

CHAIRMAN HILTY: May we have a nomination for Chairman of this section?

Dr. MOORE: I rise to nominate Dr. F. W. Chamberlain, of Lansing, Michigan.

(The nomination was seconded. It was moved, seconded and carried that the nominations close and that the Secretary be instructed to cast the unanimous ballot of the section for Dr. Chamberlain. That was done, and Dr. Chamberlain was declared elected Chairman for the coming year.)

CHAIRMAN HILTY: We will now call for nominations for Secretary.

(Drs. Lowe, Goss and Murphey were nominated.)

Dr. MURPHEY: I wish to withdraw for personal reasons. I can not accept. I thank you for the compliment, but I want to say at this time that you are indebted to these other men for the very excellent program that we have had. They have had the work of arranging the program, and being of a very lazy disposition I have no apology to make.

Dr. LOWE: I am not a candidate for any office. I wish to withdraw my name.

(The nomination of Dr. Goss was seconded, and it was moved, seconded and carried that nominations close and the Secretary be instructed to cast the unanimous ballot of the section for Dr. Goss. That was done, and Dr. Goss was declared elected Secretary for the coming year.)

Adjournment.

REPORTS OF RESIDENT SECRETARIES

COLORADO

The State of Colorado has a good, live veterinary organization, and its meeting at Fort Collins was well attended. This State Association is making every effort to cooperate with the American Veterinary Medical Association and to secure membership for the larger body. The veterinarians of Colorado are on their toes; they are a live, awake body of men, and there is no reason why all the qualified men should not be induced to join the A. V. M. A.

The U. S. Bureau of Animal Industry is still active in the control of contagious diseases, but horribly handicapped by lack of men and money. When the Bureau men are directed in such a manner as the inspector in charge at Denver directs them they are of direct benefit to the practitioner as well as to the livestock man.

There is very little cattle scab or sheep scab left in this State.

Hog cholera is well under control, but occasional outbreaks may be looked for, as well as recurrence in infected districts.

Anthrax still continues to keep the men of the southwestern part of the State on the *qui vive*.

Vesicular stomatitis is carefully investigated by the practitioner and by State and Federal men to prevent a possible mistake in diagnosis and a possible delay in controlling an outbreak of foot-

and-mouth disease. More attention is being paid to sterility. Dairy practice is looking up.

Hemorrhagic septicemia in sheep is being controlled by vaccination.

A large amount of work of an educational character is still to be done with the range man in order that he may appreciate the uses of the veterinarian in the control of losses on the range. The veterinarian in range districts should be posted on how to handle range problems in a range way.

Monte Vista, Colo.

LAWRENCE L. GLYNN.

IDAHO

Although Idaho is considerably larger than New York and Pennsylvania together, it has only 430,000 people, and much of the State is so mountainous as to be unfit for livestock grazing. The elevation ranges from 700 feet above sea level in the Snake river valley to 8,000 or 10,000 feet. The average in the northern part is about 2,500, and in the southern from 3,500 to 5,000. Traveling by railroad in Idaho is rather tedious. For example, in order for people in the northern part of the State to reach Boise, our State Capital, one must go through Washington and Oregon, or Washington and Montana, a distance of nearly 500 miles.

Idaho is the leading sheep State in the Union. Hampshires and Lincolns predominate, with many Shropshires, Rambouillets, Corriedales and Cotswolds. The swine industry was seriously crippled in 1911 to 1915 by cholera, but it is almost free from this scourge at present. The cattle business is largely range stuff, with many new herds of purebreds being started. The horse business is dwindling, due to the rapid increase of tractors.

There are about 55 graduates registered for practice, and 25 non-graduates. A number of quacks ply their trade, but these are finding more profitable lines in other occupations. Practically every town in the State has one or more graduates, and outside veterinarians who are lured west by tales of easy money should carefully investigate before deciding to locate. Commercial club literature is sometimes written by a direct descendant of the late Ananias.

The laws regulating the practice of veterinary medicine and surgery in Idaho went into effect in 1913. At the present time full information can be procured by writing the Secretary of State, Boise, Idaho. In brief, a board of examiners, composed of three graduates, give an examination on anatomy, surgery, practice of veterinary medicine, pathology, chemistry, clinical diagnosis, therapeutics, physiology, sanitary medicine, meat and milk inspection, obstetrics, dentistry, bacteriology, histology, hygiene, and if this is not enough, any other subjects the examiners may prescribe. The dates of examination are the second Tuesday of May and November, at the State Capitol, Boise. The application must be presented 15 days before examination and, for graduates, accompanied by \$5.00 and an unmounted photograph, and the applicant must be a graduate of a school recognized by the Bureau of Animal Industry.

Reciprocity may be arranged with Oregon, Washington, Nevada, Utah, Wyoming and Montana. The diploma must be presented at time of application. For nongraduates the fee is \$10. A renewal fee of \$2 must be paid before the first of July each year. This is a new wrinkle, and professional men are not taking kindly to this form of tribute.

The State veterinary department is now under a Commissioner of Agriculture, and the department is run along political lines. Veterinarians of opposing political views are not supposed to be competent. The work is largely based on fees, and much labor and ill-feeling result from this. This is due to the different laws. In Washington the rancher calls the Deputy State Veterinarian and is attended at the State's expense; in Idaho, perhaps on an adjoining farm, the rancher must pay the deputy's expense and \$8 per day.

The principal diseases among horses are some glanders, influenza, pernicious anemia, mange, digestive troubles, barb-wire cuts; in cattle, very little tuberculosis, some mange, blackleg, bloat, etc.; in hogs, rickets, too much protein diet, pneumonia, and hemorrhagic septicemia; in sheep, scabies, blackleg, hemorrhagic septicemia, digestive troubles and maggot infestation.

Much highway construction is being done, and in the near future the practitioner will be able to run his car all year. Much good work is being done along tuberculosis eradication, scab and cholera work.

Moscow, Idaho.

E. T. BAKER.

MISSOURI

As soon as I received notice of my appointment as Resident State Secretary, I issued a circular letter to every member of the Association in Missouri, urging them to make preparations to attend this meeting, and endeavored as best I could to stimulate them to activity by impressing upon them the necessity of having a strong central organization, and as well as the necessity of each one contributing not only of his money, but that it was his duty to encourage the officers and management with his presence at this meeting, and also that he was under obligations to enlarge the membership by gathering in new members to the end that all would have a part in the upbuilding of our Association and the making of a larger and better profession.

Later, a circular letter was issued to all graduates of veterinary medicine in this State, who we believe were eligible to become members, but were not members, inviting them to send in their applications at once, and endeavoring to impress upon them their duty to support the institution that must be their national representative.

I am sorry to say that my efforts have not been as successful as I had hoped. We have by far too many eligible veterinarians in Missouri that are not members of this Association, and neither is the representation of the membership from that State at this meeting what we believe it should be. It is plainly evident that this campaign must be continued and strengthened.

F. M. CAHILL.

St. Joseph, Mo.

BRAZIL

As Resident Secretary for the country of Brazil, I herewith append a few notes upon the livestock and veterinary conditions in this country.

I have just returned from the Third National Livestock Show held in Rio de Janeiro, July 4-11, mid-winter here with the sun in the north instead of south. There were some 1,300 animals exhibited, among them some very good specimens of the breeds represented, and some otherwise. There were some 50 head of horses; English, English Arab and Hackneys. Some 1,000 cattle were exhibited as follows: About 300 zebu apparently totally immune to infection of tick plasmoses, and immune largely to infestation with ticks and warbles (bernes); about 100 each of Hereford, Shorthorn, Angus, Brown Swiss and Holstein, and representatives of Red Lincoln, Devon, Limousine, Simmenthal, Red Roll, Normandy, Flemish, Mochos Polled Caraci, Jersey, Guernsey and Caracir (native breed). Some 250 swine were represented in the following order: Durocs, Poland China, Berkshire, Large Black, Canastrio (native breed). A few Lincoln and Romney Marsh sheep and a few Toggenburg and scrub goats were also shown.

There is no question that this is "a coming livestock country," largely because of its cheap grazing lands and excellent pastures practically the year round. Most of the cattle get rolling fat on pasture alone, without a mouthful of grain. The principal grasses are Catingueira or Gordura (*Melinas minutiflora*) and Jaragua (*Andropogon rufus*). Rhodes grass and others are also popular.

Armour, Swift, Wilson and others have or are contemplating packing houses here.

Naturally there is comparatively little for the private practitioner here as yet, but his day is coming.

The livestock man, however, has a number of diseases and parasites to contend with. The ones I have seen and heard most about are as follows:

Horses and mules: Strangles, glanders, osteroporosis, mal de cadeira, tetanus, forage poisoning.

Cattle: Foot-and-mouth disease, anthrax, blackleg, malignant edema, hemorrhagic septicemia, mad itch (pseudo-rabies), calf scours, tuberculosis, tick fever, berne.

Swine: Hog cholera, hemorrhagic septicemia, probably other mixed infections, *Cysticercus cellulosae*, foot-and-mouth disease.

Dogs: Distemper, rabies, bicho do pe, berne.

Fowls: Spirochetosis, hemorrhagic septicemia, roup.

All animals suffer more or less from various parasitic worms, mange, etc.

Regarding osteoporosis (cara inchada), Dr. Conreur of Rio de Janeiro recently stated that it is due to cylichnostomiasis. I met the Doctor in Rio last week and he said all cases he had autopsied were grossly infested and that when treated early with vermifuges improvement or recovery followed, hence his conclusion. I have

several cases under observation now at the Instituto de Veterinaria and hope to draw some conclusions later myself. In the States I have seen many early cases cut short by removal of the animal to another farm or region of the State.

Mal de cadeira (posterior paralysis), caused by *Trypanosoma equinum*, causes many deaths among horses and mules in some sections of the country.

Foot-and-mouth disease causes many losses in suckling calves and pigs. It also results in granulomatous growths between the digits in many adult cattle, which so interferes with walking that slaughter is most economical and humane in many cases.

Tick fever is somewhat of a disputed question here, some claiming both piroplasmiasis and anaplasmosis. Others claim the anaplasmosis only a stage in life history of former and can be readily produced artificially in normal animals by introduction of various mineral salts. Good results are claimed by many in treatment by 1 to 5 per cent solution trypanblue in 100 c.c. or 25 c.c. doses.

Berne (dermatobia) is one of the serious troubles of this country. It has a life history similar to our ox warble, but the larvæ are often in great numbers anywhere from the head to tail and back to hoof. The shoulders are usually most grossly infested. Berne in or under skin of man is not uncommon as well as in cattle and dogs, which may be of further interest.

Hog cholera perhaps exists in this country, though I have not seen any. The great distances between many herds perhaps holds it in check to a great extent. Swine plague, however, is apparently quite common.

Cysticercus cellulosae is also quite prevalent. I held an autopsy recently on a shoat that had been breathing heavily and whose shoulders were unusually prominent. I could hardly find a piece of muscle anywhere, inside or out, that was not a mass of cysts. I had never seen nor heard of such extensive infestation before.

Bicho do pe (*Sarcopsylla penetrans*) is a burrowing flea which is commonly encountered about hog pens and often found in the feet of dog and man.

The screw worms (*Sarcophaga* and *Lucilia*) are likewise serious pests, infesting all wounds, surgical and accidental, unless quite purulent.

There are or have been five veterinary schools in Brazil issuing diplomas and one giving a joint course in agriculture and veterinary medicine. The latter is at Porto Alegre and was established about 1898.

The others are at Rio de Janeiro (1905), Recife (Olinda) (1906), Bello Horizonte (1908), Sao Paulo (1920).

As near as I can get at it, there are something like 50 veterinarians in Brazil, about one-half of them graduates of the above-mentioned schools. I have solicited a few names for membership, but those asked did not see the advantages of membership if able to secure the JOURNAL. Several indicated a desire to subscribe for the JOURNAL.

Sao Paulo, Brazil.

G. A. ROBERTS.

REPORT OF TREASURER

Receipts from November 5, 1919, to August 3, 1920

1919	
November	
8	From Dr. W. H. Dalrymple, Journal Fund..... \$896.24
17	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund..... 3,679.35
December	
19	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund..... 2,259.95
1920	
January	
17	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund..... 772.25
23	From Dr. W. H. Dalrymple, Journal Fund..... 1,036.00
February	
21	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund..... 2,266.61
March	
9	From City National Bank, interest on \$7,000 for four months, A. V. M. A. Fund..... 93.33
10	From Dr. J. R. Mohler, Journal Fund..... 400.58
16	For interest on \$7,000 for four months, Journal..... 93.33
20	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund..... 700.45
April	
20	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund..... 713.46
24	From Dr. J. R. Mohler, Journal Fund..... 1,375.22
May	
20	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund..... 1,014.50
June	
10	From Dr. J. R. Mohler, Journal Fund..... 1,389.03
18	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund..... 283.68
July	
14	Interest on Liberty Bonds, Journal Fund..... 143.09
14	Interest on Liberty Bonds, A. V. M. A. Fund..... 143.09
26	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund..... 260.00
August	
3	From Dr. J. R. Mohler, Journal Fund..... 1,168.71
Total Receipts..... \$18,688.87	

EXPENDITURES

Association Fund

1919	
November	
8	N. S. Mayo, salary for October..... \$100.00
8	N. S. Mayo, office expenses for October..... 45.21
8	J. W. Griffith, expenses as resident secretary for 1916 and 1917 in Iowa..... 31.61
22	S. J. Walkley, expenses as member committee on legislation.. 22.25
22	W. Horace Hoskins, expenses as chairman committee on legis- lation..... 7.75
22	W. Horace Hoskins, expenses as secretary-treasurer Salmon Memorial Fund..... 6.01
22	J. R. Mohler, expenses as chairman Executive Board..... 28.50
22	W. M. Burson, expenses as resident secretary for Georgia..... 2.00
22	W. H. Welch, expenses as resident secretary for Illinois..... 12.00
22	Geo. H. Hart, expenses as resident secretary for California.... 3.00
December	
15	Ravenswood Press, printing..... 137.60
15	A. Eichhorn, expenses as chairman committee on abortion..... 15.30
15	N. S. Mayo, salary for November..... 100.00

December	
15 Alice Leblanc, expenses New Orleans meeting.....	44.18
15 W. G. Hollingsworth, expenses resident secretary.....	11.10
15 E. A. Knight, expenses New Orleans meeting.....	52.00
15 N. S. Mayo, expenses of self and assistant secretary to New Orleans meeting	260.36
15 N. S. Mayo, office expenses for November.....	46.51
15 M. Jacob, expenses to New Orleans meeting.....	43.25
15 H. Preston Hoskins, expenses as resident secretary for Michigan.....	22.39
15 C. P. Fitch, expenses as resident secretary for Minnesota.....	9.75
15 W. Horace Hoskins, expenses as secretary Salmon Memorial Fund for November.....	7.80
15 A. S. Cooley, expenses as chairman of section on practice.....	4.00
15 P. J. Schwartz, refund account application not accepted.....	2.50
15 F. E. Wynt, refund account application not accepted.....	2.50
15 Chas. J. Gruber, refund account application not accepted less subscription Journal	9.00
15 F. W. Schoneweg, refund account application not accepted.....	5.00
15 O. H. Basseches, refund account application not accepted.....	2.50
15 W. S. Dodge, refund account application not accepted.....	10.00
15 G. H. Atkinson, refund account application not accepted.....	10.00
15 S. A. Richardson, refund account application not accepted.....	2.50
15 C. C. Winegarden, refund account application not accepted....	9.00
15 A. C. Dunlap, refund account application not accepted.....	10.00
19 S. B. Newman & Co., Knoxville, Tenn., printing.....	31.00
19 G. H. Smith, preparing treasurer's report, etc.....	15.60
20 Ravenswood Press, printing stationery.....	19.85
20 W. D. James, refund on 1919 dues.....	3.75
20 V. A. Moore, expenses of President.....	10.48
29 Master Reporting Co., reporting meeting.....	365.00
29 C. J. Gruber, balance refund account application not accepted....	1.00
1920	
January	
10 N. S. Mayo, salary for December.....	\$100.00
10 N. S. Mayo, office expenses for December.....	122.36
19 W. Horace Hoskins, expenses as chairman committee on legislation	2.50
19 H. Preston Hoskins, floral wreath Dr. States.....	10.00
19 H. C. Simpson, expenses as resident secretary for Iowa.....	25.00
19 Ravenswood Press, printing stationery.....	41.50
19 C. H. Case, expenses as resident secretary for Ohio.....	15.00
February	
4 L. Frothingham, expenses as resident secretary for Massachusetts.....	13.51
4 C. A. Cary, traveling expenses, stationery, etc.....	129.24
4 W. A. Hilliard, expenses as resident secretary for Manitoba.....	10.55
4 N. S. Mayo, office expenses for January.....	105.34
4 N. S. Mayo, salary for January.....	100.00
14 W. Horace Hoskins, expenses as chairman committee on legislation	20.13
14 Chas. S. Chase, expenses as resident secretary for New York....	8.50
14 Ravenswood Press, printing stationery.....	19.85
14 S. J. Walkley, expenses committee on legislation.....	162.27
March	
6 City National Bank, Knoxville, Tenn., for \$7,000 worth of Liberty Bonds	6,491.80
6 N. S. Mayo, office expenses for February.....	56.00
6 N. S. Mayo, salary for February.....	100.00
13 S. J. Walkley, expenses committee on legislation.....	22.45
13 W. Horace Hoskins, expenses committee on legislation.....	8.80
13 H. H. West Co., paper and dater.....	6.00
13 L. A. Merillat, balance on typewriter.....	50.00
13 Ravenswood Press, printing.....	29.00

April		
8	Ravenswood Press, printing.....	9.50
8	Evanston Letter Service, multigraphing.....	3.44
8	N. S. Mayo, salary for March.....	100.00
8	N. S. Mayo, office expenses for March.....	60.00
10	S. J. Walkley, expenses legislative committee.....	26.71
10	W. Horace Hoskins, expenses legislative committee.....	20.45
10	H. H. West Co., typewriter supplies.....	10.60
10	C. A. Cary, expenses attending meetings.....	53.15
24	Ravenswood Press, printing.....	12.50
24	Evanston Letter Service, multigraphing.....	3.02
May		
17	Ravenswood Press, printing stationery.....	104.85
17	N. S. Mayo, salary for April.....	100.00
17	N. S. Mayo, office expenses for April.....	64.31
17	W. Horace Hoskins, expenses as secretary-treasurer Salmon Memorial Fund.....	7.00
17	L. E. Day, expenses education committee.....	41.39
17	Schiller the Florist, flowers for Dr. Grange.....	4.75
June		
1	S. J. Walkley, expenses legislative committee.....	\$19.10
1	H. D. Bergman, expenses inspecting St. Joseph Veterinary College.....	19.80
1	H. H. West Co., typewriter supplies.....	6.00
1	N. S. Mayo, salary for May.....	100.00
1	N. S. Mayo, office expenses for May.....	42.88
15	J. H. Murry, stenographer to Dr. Cary.....	30.00
15	Evanston Letter Service, multigraphing.....	3.67
19	W. E. Muldoon, printing.....	8.75
July		
12	Robt. Graham, attending meeting committee on abortion.....	43.02
12	Ward Giltner, attending meeting committee on abortion.....	28.80
12	Ravenswood Press, printing.....	9.75
12	N. S. Mayo, office expenses for June.....	54.65
12	N. S. Mayo, salary for June.....	100.00
12	Gaut-Ogden Co., office supplies.....	2.80
12	Union Publishing Co., printing stationery.....	10.75
12	C. P. Fitch, attending meeting committee on abortion.....	82.93
12	S. J. Walkley, expenses legislative committee.....	26.00
August		
4	H. D. Bergman, expenses resident secretary for Iowa.....	13.75
4	B. T. Simms, expenses inspecting Veterinary College.....	53.58
4	J. F. DeVine, expenses committee on abortion.....	58.00
4	J. P. Turner, expenses legislative committee.....	29.94
4	L. E. Day, expenses committee intelligence and education.....	18.80
4	Ravenswood Press.....	8.00
		\$10,564.69

EXPENDITURES

1919		
Journal Fund		
November		
5	Miss Byrne Monget, salary for October.....	\$60.00
14	W. H. Dalrymple, salary for October.....	125.00
14	J. K. Roumain, office rent for October.....	35.00
14	Baton Rouge Repair Works, addressograph repairs.....	70.75
14	Ramires-Jones Printing Co., printing and mailing November issue of Journal.....	816.84
28	Addressograph Co., stencils.....	5.37
December		
19	J. K. Roumain, office rent for November.....	35.00

December	
10 Miss Byrne Monget, salary for December.....	60.00
19 W. H. Dalrymple, salary for November.....	125.00
19 Ramires-Jones Printing Co., printing and mailing December issue of Journal.....	877.38
1920	
January	
10 W. H. Dalrymple, salary for December.....	125.00
10 Miss Byrne Monget, salary for December.....	60.00
10 Addressograph Co., stencils.....	7.90
12 W. H. Dalrymple, to reimburse him for additional salary to Miss Monget for six months (July to December).....	150.00
12 Miss Byrne Monget, expenses A. V. M. A. meeting.....	27.20
12 J. K. Roumain, office rent for December.....	35.00
February	
4 L. E. Mire, packing and preparing Journal equipment for shipment.....	62.50
14 Baton Rouge Repair Works, repairs to addressograph and typewriter.....	18.50
March	
6 W. H. Dalrymple, telegrams.....	2.44
6 J. R. Mohler, salary for December and January.....	350.00
15 City National Bank, Knoxville, Tenn., for \$7,000 worth of Canadian Bonds.....	6,619.78
17 Andrew B. Graham Co., printing January and February Journal.....	2,188.99
April	
8 Andrew B. Graham Co., printing March Journal.....	1,133.20
10 I. M. Pickens, assisting in editing Journal.....	45.00
10 M. W. Kling, assisting in Journal office work.....	45.00
10 Addressograph Co., March account.....	5.80
April	
10 Gibson Bros, printing stationery.....	\$58.00
24 J. R. Mohler, February and March salary.....	350.00
27 A. B. Graham Co., printing April Journal.....	1,188.68
May	
17 I. M. Pickens, assisting in editing Journal.....	45.00
17 M. W. Kling, assisting in Journal office work.....	45.00
17 Gibson Bros., buying and printing envelopes.....	41.25
17 Addressograph Co., stencils.....	4.41
June	
1 J. R. Mohler, April and May salary.....	350.00
15 Gibson Bros., buying and printing envelopes.....	134.50
15 A. B. Graham Co., printing May Journal.....	1,294.99
19 Addressograph Co., stencils.....	6.88
19 I. M. Pickens, assisting in editing Journal.....	45.00
19 M. W. Kling, assisting in Journal office work.....	45.00
July	
12 A. B. Graham Co., printing June Journal.....	1,442.70
12 Addressograph Co., stencils.....	3.11
12 Gibson Bros., printing envelopes.....	5.75
12 I. M. Pickens, assisting in editing Journal.....	45.00
12 M. W. Kling, assisting in Journal office work.....	45.00
	\$18,176.92

Knoxville, Tenn., August 3, 1920.

Dr. M. Jacob, Treasurer,
American Veterinary Medical Association,
Knoxville, Tennessee.

Dear Sir:

We enclose herewith cancelled checks and statements of the balance as of this date in the following accounts:

American Veterinary Medical Association.....	\$3,173.19
Journal Fund	1,693.62
Relief Fund	693.48

Yours truly,

THE CITY NATIONAL BANK,

By R. E. MOONEY, Vice-Pres.

RECAPITULATION

Bank balances at beginning of period.....	\$17,391.74
Plus amount on time deposit (Relief Fund).....	1,000.00
	<hr/>
	\$18,391.74
Less checks cashed during period which were issued and included in previous report	960.79
	<hr/>
	\$17,430.95
Receipts during period covered by this report.....	18,688.87
	<hr/>
	\$36,119.82
Less expenditures during period.....	28,741.61
	<hr/>
Balance on hand.....	\$7,378.21
Total bonds on hand.....	*18,984.78
	<hr/>
Grand total	\$26,362.99

Association Fund

Bank balance at beginning.....	\$7,364.03
Less old checks cashed.....	19.80
	<hr/>
	\$7,344.23
Receipts during period.....	6,211.57
	<hr/>
Total	\$13,555.80
Expenditures during period.....	10,564.69
	<hr/>
Balance	\$2,991.11
Bank balance	\$3,173.19
Outstanding checks	182.08
	<hr/>
	\$2,991.11

Journal Fund

Bank balance at beginning.....	\$8,334.23
Less old checks cashed.....	940.99
	<hr/>
	\$7,393.24
Receipts during period.....	12,477.30
	<hr/>
Total	\$19,870.54
Expenditures during period.....	18,176.92
	<hr/>
Bank balance	\$1,693.62
Balance	\$1,693.62

Relief Fund

Bank balance.....	\$693.48
(No receipts or expenditures)	
Plus amount on time deposits.....	2,000.00
	<hr/>
	\$2,693.48

*Purchase price.

Balance to credit of A. V. M. A. Fund.....	\$2,991.11		
Plus total amount of bonds on hand.....	9,515.00		\$12,506.11
<hr/>			
Balance to credit of Journal Fund.....	\$1,693.62		
Plus total amount of bonds on hand.....	9,469.78		11,163.40
<hr/>			
Balance to credit of Relief Fund.....			2,693.48
<hr/>			
Total balance cash and bonds on hand.....			\$26,362.99
<hr/>			
Bond Recapitulation			
Canadian Bonds, Par....	\$3,000.00	Purchase price.....	\$3,023.20
Liberty Bonds, Par.....	7,000.00	Purchase price.....	6,491.80
	<hr/>		<hr/>
	\$10,000.00		\$9,515.00*
<hr/>			
Liberty Bonds, Par.....	\$3,000.00	Purchase price.....	\$2,850.00
Canadian Bonds, Par....	7,000.00	Purchase price.....	6,619.78
	<hr/>		<hr/>
	\$10,000.00		\$9,469.78†

* Association Fund. † Journal Fund.

NEW EXECUTIVE BOARD MEMBER

The following is the result of the ballot for member of the Executive Board of the A. V. M. A. from the Fifth District:

C. E. Cotton, 221; W. T. Spencer, 93; C. H. Stange, 58; W. F. Crewe, 38; C. P. Fitch, 23; irregular and unsigned votes not counted, 5.

It is probable that a few more votes will be received from the Philippine Islands, but these can not change the result materially.

The delay in reporting the results of the voting in the Fifth District is due to the time necessary to get returns from the Islands. Under favorable conditions sixty days are required to get mail to the Philippines and a reply. N. S. MAYO, *Secretary.*

Dr. I. Nakanishi has given up his practice at Cabinet, Idaho, to accept a position in the Serum Laboratory at Fusan, Korea, Japan.

Dr. W. J. R. Fowler, of Toronto, Canada, is reported to be seriously ill. His many friends on both sides of the line hope for his prompt recovery.

Semi-Weekly Farm News announces the existence of glanders in Texas. The State veterinary surgeon, after a 24-hour observation of 19 horses, found 8 positive cases. The bodies were burned.

OTHER MEETINGS

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

The regular monthly meeting of Veterinary Medical Association of New York City was held in the lecture room of Carnegie Laboratory, New York City, on Wednesday evening, November 3, with President MacKellar in the chair.

The minutes of the October meeting were read and approved.

Dr. John F. DeVine gave a splendid report of the B. A. I. Conference on Tuberculosis at Philadelphia, October 11-13. This was a meeting of State and Federal employes, engaged in coöperative tuberculosis eradication work, cattle breeders and veterinary practitioners, held in Leonard Pearson Hall at the University of Pennsylvania. Dr. DeVine reported the conference a success from every viewpoint, as the program was well arranged to get the ideas of those who were interested in the work.

There was a good discussion on Dr. DeVine's report.

Dr. William J. McKinney gave an address on the present conditions in Ireland.

The Doctor made an extensive tour of Ireland during the summer. He said political conditions were fully as bad as reported in the newspapers. Industrial Ireland is prosperous, crops excellent and poverty practically unknown outside of the large centers. The Doctor visited the local veterinarians, rode around the country with them on their rounds, where he witnessed a number of unusual operations and cases which he reported interestingly.

Dr. I. E. Altman was unanimously elected as a member of the Association.

Dr. Berns, of the Program Committee, said Dr. Gannett would present a paper at the December meeting on "The Value of Tenotomy of the Perforans Tendon in Cases of Vaginitis of the Hock and Navicular Bursitis."

Dr. R. W. Gannett reported an interesting case of a bitch very heavy in whelp with labor pains intermittent. The Doctor made an examination and gave an ampule of pituitin at 2 p. m. The next morning she was in about the same condition. He then gave two ampules of pituitin during the day and she whelped nine live puppies.

No further business appearing, the meeting adjourned.

J. ELLIOTT CRAWFORD, *Secretary.*

SOUTHEASTERN MICHIGAN VETERINARY MEDICAL ASSOCIATION

A very enjoyable meeting of the association was held at the Detroit Board of Commerce, Wednesday afternoon and evening, November 17, 1920. Dinner was served at 6 o'clock and this feature undoubtedly was responsible for the large attendance.

Dr. Judson Black, of Richmond, Michigan, addressed the association on the "Present Status of the Horse Breeding Industry in Michigan." Dr. Black's work on the Stallion Registration Board keeps him in close touch with the trend of horse breeding and his address proved highly interesting. There has been a marked falling off in the breeding of all kinds of horses in Michigan, and this is most felt in the scarcity of good draft animals, especially well-matched pairs. Dr. Black spoke of the most excellent work being done by the Horse Association of America and urged all veterinarians to help the work along, especially by carrying information to their clients.

Another very interesting statement made by Dr. Black was to the effect that the Province of Ontario had recently enacted some legislation which meant the end of the veterinary correspondence school located at London, Ontario. This fake institution has mulcted thousands of dollars from the unwary and uninformed in all States of the Union, has caused all kinds of trouble for many State veterinary examining boards, and has always conducted its business in such a way that it was practically impossible to get evidence that could be used for the purpose of having the Post Office Department issue a fraud order, forbidding the use of the mails.

Dr. H. H. Sparhawk, Chief Veterinarian, Food Inspection Division, Detroit Board of Health, addressed the members on the proposed municipal meat inspection ordinance now under consideration by the City Council. This ordinance is exceptionally well drawn up, and if passed without alterations, will give to Detroit a system of municipal meat inspection better than any now in force in any large city in the United States. A committee of three members of the association was appointed to cooperate with Dr. Sparhawk and the Board of Health, in urging and securing the passage of the ordinance.

Dr. O. A. Taylor, a member of the veterinary faculty at East Lansing, was present and told of conditions at the college this year. As was the case with practically all veterinary colleges this year, there was a marked falling off in the enrollment. The surprising

part of this, so far as the Michigan Agricultural College was concerned, was that the small enrollment followed what was considered to be a normal number of inquiries concerning the veterinary course, during the months prior to the opening of college.

The meeting adjourned, to meet again in January.

H. PRESTON HOSKINS, *Secretary*.

CENTRAL NEW YORK VETERINARY MEDICAL ASSOCIATION

THE eleventh semi-annual meeting of the C. N. Y. Veterinary Medical Association was held in Syracuse, November 18, 1920.

The meeting opened with a clinic at the infirmary of Dr. A. J. Pendergast.

The following cases were operated upon:

Bay Gelding—Dr. J. H. Stack's case of ulcerated teeth; Surgeons, Drs. Knapp & Knapp.

Bay Gelding—Dr. Dooling's case of ulcerated teeth; Surgeons, Drs. Ide and Knapp.

Bay Gelding—Dr. Sullivan's case of ulcerated teeth; Surgeons, Drs. Currie and Stack. (In the two last mentioned cases it was necessary to trephine and punch the teeth out.)

Bay Gelding—Complete ankylosis of the ankle joint; animal was destroyed.

Bay Gelding—Dr. Stack's case of quittor; Surgeons, Drs. Stack and Currie.

This completed the clinic, so the meeting adjourned to the St. Cloud Hotel, where the regular meeting was called to order by the President, Dr. A. J. Tuxill.

Roll call showed the following members present:

Drs. W. G. Hollingworth, W. B. Switzer, F. E. York, J. A. Pendergast, J. M. Currie, A. J. Tuxill, E. E. Dooling, Frank Morrow, C. R. Baldwin, W. M. Pendergast, Almond H. Ide, J. H. Hewett, W. M. Sullivan, J. H. Stack, W. M. Long, D. A. Boardman, W. M. Thompson, J. B. Knapp, D. M. Hoyt, F. E. Hoyt, F. N. Burk, Otto Faust.

Moved and carried that the minutes as read be accepted and placed on file.

Under the head of applications for membership, the following names were presented:

Dr. R. E. Davis, Clinton, and Dr. V. M. Becker, Ilion, and they were duly elected.

Moved and carried that the President have full charge of the clinic at time of meetings and that this be brought up in connection with revising the by-laws.

It was thought best to call the next meeting during the second week in June and that the matter of changing the time of meeting as set forth in by-laws be acted upon at the proper time.

Dr. J. B. Knapp read a very interesting paper on Milk Fever, which was followed by a very thorough discussion and many phases of this very common disease were brought out.

Dr. Otto Faust told of one case where he inflated the udder 16 times three hours apart, stripping the udder out each time before injecting fresh oxygen, and the cow made a good recovery.

Dr. Currie gave a very interesting account of a case of foreign bodies in the stomach.

Dr. D. M. Hoyt presented a paper on Malignant Catarrhal Fever of Cattle.

Dr. Hoyt's paper was well discussed, after which the matter of "quacks" bringing patients to be operated on at the clinic was brought up and thoroughly gone over.

On account of the failure of the committee to procure a cow, Dr. Ide was asked to bring his outfit and demonstrate his cattle throwing harness and the suspension bandaging of the udder at the June meeting.

The last half hour was given to a general discussion of various subjects, after which a motion was made, seconded and carried to adjourn.

W. B. SWITZER, *Secretary*.

Dr. Hal C. Simpson, for many years the indefatigable secretary of the Missouri Valley Veterinary Medical Association, has removed from Denison, Iowa, to the balmy climate of Pomona, Calif.

Dr. W. J. Butler, State Veterinarian of Montana, has an interesting article on the "Dairy Law Enforcement in its Relation to Tuberculosis," in the Bulletin of the Department of Health of his State, for September-October, 1920.

In his report as State Veterinarian, which has just been issued, Dr. Butler calls attention to the fact that infectious and contagious diseases among livestock in Montana are less prevalent than at any time since the establishment of his department.

COMMUNICATIONS

FOOT-AND-MOUTH DISEASE IN INDIA

TO THE EDITOR:

Dear Sir: On page 7 of your valuable JOURNAL for October, 1920, under head foot-and-mouth disease research, the statement from a special cable from London is reproduced, stating that Indian cattle are not subject to foot-and-mouth disease.

As a matter of fact the disease is rampant from Cape Comorin to Peshawar, and is practically always with us. It attacks young stock on this farm regularly twice a year. What troubled the 1912 commission in India was the mild type of the disease generally met with, not its absence. Imported cattle and sheep suffer much more severely than indigenous animals. I have seen very severe cases and many deaths in imported Australian Merino sheep.

Continual contact with the disease may have rendered indigenous stock more resistant.

R. BRANFORD, *I. C. V. D.*,

Superintendent Government Cattle Farm.

Hissar, India.

A WONDERFUL OPPORTUNITY

TO THE EDITOR:

The JOURNAL as a rule does not boost speculative stocks or enterprises, but the following opens such wonderful possibilities for veterinarians to invest their accumulated surplus that I have determined to "let the cat out of the bag" and give all the brethren an equal opportunity.

Further information regarding this investment can probably be obtained from Drs. McNeil, Tom Smith, or the Lowe brothers, all wealthy New Jersey speculators.

Yours, very truly,

J. P. TURNER.

MAIN OFFICE OF THE

CAT HOUSING CORPORATION OF N. J.

MY DEAR DR. TURNER:

Knowing that you are interested in and open for an investment in a good live business proposition, I take the pleasure of presenting to you what seems to me to be a most excellent business proposition and in which no doubt you will take a lively interest. Please advise

me the amount of stock you wish to subscribe toward forming a company for the exploitation of this wonderful idea.

The object of this company is to operate a large cat ranch in Newark, N. J.—the abandoned Ford Shipbuilding plant near Newark can be purchased cheaply.

The corporation shall be known as the Cat Housing Corporation of New Jersey. The amount of capital stock shall be \$50,000, all of which shall be common stock.

To start with we will collect about 100,000 cats—each cat will average about 12 kittens a year. The skins will sell for about 10 cents per skin for the white ones and 75 cents for the black ones. We will have about 12,000,000 skins to sell at an average of 42 cents, making the revenue about \$500,000 per annum.

A man can skin about 50 cats per day. He will charge \$4 per day for his labor. It will take about 80 men plus 10 per cent for indirect overhead to operate the ranch, therefore the profit will be about \$350,000 clear.

We will feed the cats on rats, and we will start a rat ranch adjoining the cat ranch. The rats will multiply four times as fast as the cats, and if we start with 100,000 rats we will have four rats for each cat a day, which is plenty.

We will feed the cats on rats and in turn we will feed the rats on the stripped carcasses of the cats, thus giving each rat one-fourth of a cat.

It will be seen by these statistics that the business will be self-acting and automatic. The cats will eat the rats and the rats will eat the cats and we will get the skins.

Awaiting your prompt reply, we beg to remain,

Yours very truly,

THE CATARAT COMPANY.

“In order to make possible the continuance of the cow-testing association in Josephine County, Oregon, the chamber of commerce at Medford recently voted \$200 to carry on the work. It is proposed to make the county a purebred Jersey center.”—*Western Farmer*.

Dr. Grant B. Munger, of Cedar Rapids, Iowa, reports that his city has recently passed a fine milk ordinance for the control of the sale of pure milk and its by-products. The community became greatly exercised as a result of certain disclosures regarding the quality of its milk supply, and this admirable milk ordinance was the direct result.

NECROLOGY

IT is with deep regret that we announce the death of Dr. Edward Wallis Hoare, F. R. C. V. S., at his residence, Clover Hill Court, Ireland, which occurred on November 26 at the age of 57 years, following a prolonged illness. Dr. Hoare studied veterinary medicine at McGill University, Montreal, where he graduated before returning to his native country of Ireland. Later he entered the New Veterinary College, Edinburgh, receiving a diploma of M. R. C. V. S. in 1886 and F. R. C. V. S. in 1892. He was a most indefatigable worker and contributed extensively to our veterinary literature. His most notable works, however, are "Veterinary Therapeutics," which has reached three editions and is one of the most useful practitioner's small reference books, and his ambitious "System of Veterinary Medicine," consisting of two large volumes, which is a landmark in the history of our professional literature in the English language.

Dr. Hoare was an ardent student, a keen and observant clinician, and a skillful, lucid writer, few veterinarians of this generation having done so much to raise the general standard of the veterinary practitioner.

He was lecturer in veterinary hygiene, University College, Cork, formerly Examiner in Anatomy, Royal College of Veterinary Surgeons, and late External Examiner in Veterinary Toxicology, Jurisprudence and Sanitary Law, University of Liverpool.

He was a member of many societies and was also an honorary member of the A. V. M. A. He leaves a family of one son and five daughters with his widow to mourn his loss.

Dr. George N. Suits of Paterson, N. J., died on December 28, 1920, of acute peritoneal tuberculosis. Dr. Suits was born in Oneida County, N. Y., on October 6, 1888, and spent his boyhood on his father's farm. He attended the local High School and graduated from the Grand Rapids Veterinary College in 1913. He engaged in active practice until 1917, when he was appointed in the Bureau of Animal Industry. He became a member of the A. V. M. A. in 1918. Dr. Suits was a likable man, of excellent habits, and officially he was everything that could be desired. He leaves a wife but no children.

MISCELLANEOUS

FARM SENTIMENT NOW FAVORS HORSE USE

GEORGE N. WILBER, an Ohio farmer and livestock grower, addressing the Chicago Association of Commerce, claims that farmers are bearing more of the burden of present business depression than any other class; that they are between the upper and nether millstones—the upper one of high-priced necessities, the lower one of low-priced or totally unsalable farm products. “Farmers in Nebraska and Iowa are reported to be using corn for fuel, and why not,” says he, “since corn is cheaper and productive of more heat?”

Farm motive power, especially, which can be grown at home on the farm in the form of draft horses and mules, which uses staple farm products of corn, oats and hay instead of calling for gas at 30 cents a gulp, is again making a big hit with the producers. Mr. H. M. Justice, an auctioneer working through Kansas in sections where the truck and tractor salesmen have formerly been received with open arms, reports that nowadays good grade draft mares bring \$450 per pair as three-year-olds, while tractors, used two seasons and originally costing \$2,000, have brought but \$100 each and not wanted at that price. Evidently both the original cost and upkeep are counting in the farm sales now.

I. D. O'Donnell, president of the Federal Farm Loan Board, in his district near Billings, Mont., gives the reason. He says: “Tractor operators cannot grow dollar wheat, even on the cheapest Montana lands. It is only when wheat is \$2 a bushel that life is possible to them at all. I have the costs on some 98 farms using tractors in our State who cannot grow wheat under \$1.88 to save their lives. Plowing with horses costs me \$1.75 per acre. If I hire a team and driver, it costs me \$3 per acre; if I hire a tractor and driver, it costs me \$5 per acre; but even that is cheaper than I would guarantee to do it with a tractor for myself. I have owned three tractors of various sizes and tried them out on my 640-acre farm, but have now discarded all of them. I know that with five horses on a two-bottom gang plow I can outwork any three-bottom tractor in a season. At first it will look as though the horses were going to be left miles behind, but at the season's end they have not only caught up but actually surpassed the tractor in total work done.

“In emergency work and at such times as during the war, when we felt we must raise crops no matter what the cost, we used tractors.

Most of the men in our section have gone back to horses except for short times in the rush season."

Aber Brothers, farming in partnership near Sheridan, Wyo., corroborate this statement. They say: "We use our tractor only for belt power, for after three seasons' trial we find by actual comparison that we can put teams of five mules in the field on a two-bottom gang plow and do more work with such outfits than with a tractor on a two-bottom, and very much cheaper. The farmers in this community have their eyes pretty well open to the great difference in cost and are now depending almost exclusively on good heavy draft teams of horses and mules."

The Oliver Plow Company, of South Bend, Ind., reports an increase of 300 per cent in sales of horse-drawn implements. In city markets, horses are still in demand, being less affected by the general drop in prices than other types of motive power. General economies are being forced on city transportation users as well, which point to the advisability of horse use, according to current reports received by the Horse Association of America.

Kansas Farmer and Mail and Breeze says of bull associations: "By means of an organization of this kind it is possible to get a higher class of animals and one that will give much better results than a cheaper and poorer type of animal."

President White has appointed Dr. Leonard W. Goss of Columbus, Ohio, to be representative of the A. V. M. A. in the National Research Council. This council has headquarters at 1701 Massachusetts Avenue, Washington, D. C.

Hon. Perry Mayo, father of Secretary N. S. Mayo, died of apoplexy on January 5. Mr. Mayo was eighty-one years old. He had been a resident of Michigan practically all his life and had taken an active part in agricultural organizations and in State politics. He was also a veteran of the Civil War.

Canned whale meat, which resembles lean beef, is beginning to appear on American markets. One whale will turn out about 80,000 pounds of meat.—*Oklahoma Farmer*.

JOURNAL

OF THE

American Veterinary Medical Association

FORMERLY AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

J. R. MOHLER, Editor, Washington, D. C.

D. S. WHITE, President, Columbus, Ohio. N. S. MAYO, Secretary, Chicago, Ill.
M. JACOB, Treasurer, Knoxville, Tenn.

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J. A. KIERNAN, 4th District; C. E. COTTON, 5th District; R. A.
ARCHIBALD, 6th District; A. T. KINSLEY, Member at Large

Sub-Committee on Journal

A. T. KINSLEY

S. E. BENNETT

J. A. KIERNAN

The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

Reprints should be ordered in advance. A circular of prices will be sent upon application.

VOL. LVIII, N. S. VOL. 11

MARCH, 1921

No. 6

A PETITION IN BANKRUPTCY

In the accompanying illustration there is an easily understood and important lesson, namely, that nature eventually puts an extinguisher on anything that has outlived usefulness. Four of the animals shown here—the dodo, the dinosaur, the plesiosaurus and the mammoth—belong to an age long past, and the causes of their extinction are summed up in one word—"bankrupt."

But the animal in the center of the picture, the scrub bull, is of our own times. No effort of the imagination is needed to picture the scrub; no veil of time hides him from our sight; and there is no place for poetry or romance in the recital of his history. There may be room for speculation, interesting if not profitable, about the mammoth, as to what manner of creature he was and what his uses were, when he roamed the earth. But no roseate tinge adds beauty to the scrub. He is touched only by cold, stern, and unlovely facts. And some of them are these:

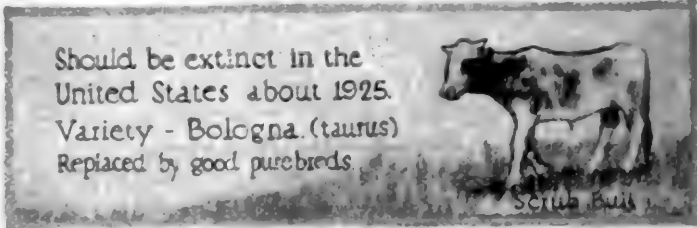
The scrub bull is wholly lacking in the qualities necessary for the production of high-class stock, and he is grossly inefficient at a time when the highest efficiency is needed.

Such are the short and simple annals of the American scrub bull.

But the future looks bright. Hundreds of intelligent farmers

BANKRUPTS OF NATURE

They couldn't stand competition
or meet human requirements.



Useless Animals in Time Become Extinct
Have you any of these on your farm ?

'Better Sires - Better Stock'



and stockmen are already at work in coöperation with their States and the Government in its "Better Sires—Better Stock" campaign to eliminate not only scrub bulls but all scrub sires from American herds. The day of the purebred sire is at hand, and his coming means instant and steady improvement in livestock conditions in America. There are difficulties to be overcome, but the American stockman is equal to the task. Before many years it will be said of the scrub sire, as it is now said of the dinosaur and the mammoth, that it became extinct because it was one of "nature's bankrupts and could not meet human requirements." And all veterinarians who have pride in American progress and leadership will do what they can to make the saying literally true.

WHAT CONSTITUTES A SURGEON?

The *Journal of the American Medical Association* cites a medico-legal case in which the Springfield, Mo., Court of Appeals says that the word "surgeon," unqualified, in the mind of the ordinary individual, means one possessed of such knowledge of the human body, and such other knowledge as the laws of our land require, and possessed of such skill in the use of instruments, that he may be expected with reason to correct or relieve some unnatural condition of the human body. The court does not think that the mass of mankind would connect the idea of a veterinarian with the word "surgeon," as that word is generally used. In the case before the court, an accident insurance policy provided, among other things, that the insurer, the defendant, would be liable in the event that a legally qualified physician or surgeon, while holding a necropsy or performing a surgical operation, actually cut or wounded himself, and by reason of such cutting or wounding and simultaneously therewith was inoculated with poison. The insured was a veterinarian, who, while vaccinating some hogs and while endeavoring to slit the ear of one to show that it had been treated, accidentally cut his finger, from which blood poisoning resulted, causing his death. The plaintiff, who was the beneficiary under the policy, contended that the insured was a "surgeon," and that the operation which he was performing when injured was a "surgical operation," as those terms were used in this provision of the policy. The court, however, holds otherwise and reverses a judgment that was obtained by the plaintiff against the defendant insurer.

RINDERPEST CAUSING HAVOC

Readers of recent news articles reporting the destruction of cattle in European countries by cattle plague are making inquiry regarding the nature of this disease.

It is not strange that cattle plague, known in veterinary literature as rinderpest, should be unfamiliar to those interested in our livestock industry, as fortunately, it never has appeared in the United States.

As the name signifies, it is a veritable cattle plague. Prior to the great world war, it had been driven back from Europe, but today it is ravaging the herds of several of the European countries which were involved in the recent war, although the Belgians appear to have eradicated it from their country. In this respect history is repeating itself, for extension of the disease into Europe from Asia in previous years has been associated with the great wars; cattle, accompanying troops having acted as disseminators of the infection. Thus, if for no other reason, we may credit the reports that the Bolshevik army, by driving diseased cattle ahead of their forces, has spread rinderpest among the cattle of Poland to such an extent that it threatens almost complete destruction of Polish herds.

The symptoms of rinderpest are fairly characteristic. However certain appearances which are observed in one epizootic may be absent in another. Among the first signs, however, is a very high fever. Repeated chills may be observed. The animal manifests great debility. The head droops and rests on some object for support. The hair stands on end and the muzzle is dry. In dairy cows the secretion of milk diminished very rapidly. The back is arched, and the four legs are brought together under the body. As the disease progresses, the mucous membranes become reddened; diarrhea soon sets in, and the discharges become fetid, viscid and streaked with blood. Coughing is a common symptom and ulcers, or erosions, may appear in the mouth followed by sloughing. There may also be sloughing of the skin in various portions of the body. In severe cases, which are the most common in the susceptible cattle of western Europe, death ensues four to seven days after the first appearance of the disease and is preceded by great emaciation and debility.

What are the possibilities of rinderpest being introduced into the United States? While the disease may be spread by the raw products of affected animals, in most instances it is disseminated by infected animals, in the ordinary traffic with cattle. Cattle are highly susceptible to the disease. Sheep, goats, deer, and camels are also sus-

ceptible. None of these animals can be imported into the United States from countries across seas without a permit from the Secretary of Agriculture, and permits are not issued for importations from countries in which rinderpest exists. This eliminates the chief source of danger.

Under regulations issued jointly by the Department of Agriculture and the Treasury Department, importation into the United States of any animal by-products taken or removed from animals affected with anthrax, foot-and-mouth disease, or rinderpest is prohibited. Hides of neat cattle, calfskins, buffalo hides, sheepskins, goatskins, and deerskins offered for entry into the United States must be subjected to disinfection in an approved manner, unless it can be shown that rinderpest does not exist in the locality where the shipment originated. Thus every possible effort is being made to protect the livestock of the United States from cattle plague of the old world.

OFFICIAL ROUTE TO DENVER

After consultation with President White, the Chicago, Burlington and Quincy has been selected as the official route from Chicago to Denver, to the meeting of the A. V. M. A. September 5 to 9, 1921.

The advantage of having an official route is that it will enable the members that are going from the east to go on the same train from Chicago to Denver. The Burlington is one of the best routes to Denver and gave the association excellent service in 1915 on the trip to San Francisco.

If one hundred and twenty-one passengers can be secured for this trip, a special train will be run from Chicago.

A NEW VETERINARY COLLEGE PROPOSED

The Minnesota Veterinary Medical Association at the Austin meeting last July, memorialized the University Board of Regents to establish a Veterinary College at University Farm. Again at the annual meeting in January, 1921, the resolution committee reported a resolution that received the unanimous support of the association for the legislative committee to use all its resources to further this matter.

In view of these facts, a bill has been introduced into the State Senate known as Senate File 162, to create a Veterinary College at the University.

BOVINE COCCIDIOSIS IN BRITISH COLUMBIA, WITH A DESCRIPTION OF THE PARASITE, *EIMERIA* *CANADENSIS* SP. N.¹

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COCCIDIOSIS of cattle has been reported from a number of European countries and from several parts of the Tropics. In America definite reports of its occurrence appear to be confined to the States of Washington (Schultz, 1915), New Jersey (Smith and Graybill, 1917), Pennsylvania (Lentz, 1918) and New York (Way and Hagan, 1920). Schultz does not describe the coccidium seen in his cases, neither does Lentz nor Way and Hagan; but judging from the description given by Smith and Graybill it would appear that the same organism is not responsible for all cases of coccidiosis in cattle. This phase of the matter will be considered when the coccidium found in British Columbia cattle is under discussion.

The term coccidiosis does not necessarily imply infection by the genus *Coccidium* (more correctly *Eimeria*), this being only one of a large number of genera grouped under the order *Coccididea*; it is, however, the genus of the greatest economic importance.

The life cycle of these parasites is digenetic, and may be briefly stated as follows: Infection takes place through the ingestion by a suitable host of highly resistant oöcysts which are passed with the feces of an affected animal. Through the action of the intestinal juices (chiefly the pancreatic) the oöcyst wall dissolves and a number of sporozoites are liberated. Each sporozoite penetrates an epithelial cell and gives rise to a number of merozoites. A single merozoite invades a cell and emerges again as a number of merozoites; this may be repeated for several generations (schizogony). Suitable conditions supervening, a merozoite now invades a cell and gives rise to either a single female gamete or a number of male gametes (gametogony). After conjugation of a male and female gamete an oöcyst is formed inside of which spore and sporozoite formation goes on (sporogony).

The classification of the coccidia is based chiefly on the number of spores found in each oöcyst and the number of sporozoites found in each spore.

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

HISTORY

Four outbreaks have been known to occur in British Columbia, three being in the Kamloops district and one near Clinton. In addition, it seems probable that a few isolated cases treated by Dr. George of Kamloops were coccidial in nature, and that another ranch suffered loss in the Clinton district. No connection could be traced between the four outbreaks, which occurred in different years and from approximately 20 to 60 miles apart. It may be noted that these cases appeared in winter, and that the winter climate of the dry belt of British Columbia is by no means mild. At the time of the first outbreak the temperature was about 30° below zero, and 40° below during the fourth. No explanation can be offered as to why the disease should be more prevalent in the winter season, beyond the supposition that the necessary moisture for oöcyst development is not available until the first snowfall.

Outbreak No. 1.—Occurred in February, 1917, in a bunch of 430 head, about 66 per cent of which were under 3 years of age. Fully 100 were affected and 28 died. Only two definitely known to be over 3 years of age were affected, one of which succumbed. This outbreak is of particular interest as it was complicated by a mycosis which not only affected the intestinal tract but in some cases was generalized, even the spleen showing hyphæ. The mycelium was septate and tended to grow in the intestine in the form of clubs about 29 microns long by 3 microns at its widest end. In the spleen, liver, etc., it assumed the same shape but was not so large. The presence of this fungus was so general that it was not for some time after the trouble had abated that coccidia were found to be implicated, this being largely due to failure to examine the rectum. Some 3-year-old alfalfa in poor condition was suspected as being the cause of the mycosis, but unfortunately all efforts to cultivate the fungus were unavailing. The implicated hay was afterwards sold and fed to stock without bad results, which would tend to show that coccidia were the primary cause of the trouble. No opportunity was afforded to show a recurrence of the disease, as during the summer the owner sold all his cattle and bought sheep. The mortality in this outbreak would have undoubtedly been higher but for the fact that the feed was changed and the animals were moved to new ground each time they were fed.

Outbreak No. 2.—Occurred in January, 1918, in a herd of 1,500 head, the disease, however, being confined to three corrals containing 575 animals. Five hundred of those concerned were under one

year of age. Owing to the size of the herd it is difficult to state exactly the number affected, but 40 would be a conservative estimate. The first case was noticed on January 3, after the animals had been on their winter feeding grounds four weeks. At least two bulls rising 3 were affected, but the majority were calves about 10 months of age. Eleven deaths occurred, four of which were in yearlings, the balance being younger. Treatment, which was instituted on the 14th, proved most effective, only one calf dying after that date. The infected ground was ploughed, and no recurrence of the trouble has been reported.

Outbreak No. 3.—Occurred in March, 1919, in a herd of 108 head, 57 of which were under one year of age. Eight calves from 4 to 6 months of age affected, five of which died. Treatment as in the previous outbreak was recommended but was not used owing to influenza breaking out among the ranch employees at that time. Isolation and a change of feed were the only preventive measures adopted, but sick calves were attended to by local veterinarian.

Outbreak No. 4.—Was reported in the latter part of January, 1920, although the owner had lost two cattle before Christmas. Total herd, 160. The disease, however, was confined to a band of 50, all over one year of age with the one exception of a 7-months calf which had been kept separate from the main bunch of calves and from the band in question. About 16 out of the 50 visibly affected; six deaths (counting the two in December), one yearling, two two-year-olds, two three-year-olds, and one cow. This outbreak is interesting as the disease was confined (with the exception of one calf) to older animals. The calves were kept about half a mile from the older cattle, but it is surprising that infection was not carried to them via hay wagons, etc. Treatment as recommended in outbreak No. 2 was instituted; shortly after it was started one more case was seen; no more deaths occurred, and after two weeks' treatment the animals appeared healthy.

SYMPTOMS

Diarrhea, prior to which there may be constipation with mucus on the feces and even a little blood. Once diarrhea is established the characteristic feature is the presence of blood clots of various sizes mixed with mucus and small pieces of epithelium. A fetid odor is usually noted. The blood loss may be very heavy, and in the cases complicated by mycosis blood literally streamed from those affected. Diarrhea is usually of only a few days' duration, but even after its cessation the feces may be coated with mucus and contain

a little blood. In two experimentally infected animals blood was passed continuously for seven days, and in one of these could be noticed as late as the 218th day after having been first noticed.

In chronic cases the feces show that the food is not being properly assimilated, and the animals become emaciated and anemic. Straining may be so severe as to cause prolapse of the rectum. Symptoms of colic are absent, but grinding of the teeth has been noticed. In severe cases the appetite is affected and emaciation is rapid.

The majority show very little, if any, fever. The highest temperature recorded was in an experimentally affected animal, viz, 103.7. It is possible that higher temperatures may occur, but in the majority of cases such are undoubtedly due to secondary invasion. Before death the temperature may be subnormal.

A prominent feature in these cases was that with one possible exception all fatal cases were preceded by fits. Death occurs in from 8 to 24 hours after first showing fits, the animal dying in convulsions. Fatal cases usually die in from two to five days after the first symptoms are noticed.

The fits mentioned (which are no doubt due to cerebral anemia) occur at varying intervals; one cow was observed to have three when being driven a distance of 50 yards. They appear to be induced when the animal is disturbed, and may be described as follows: The animal appears frightened, staggers, may brace itself by resting the head on the ground with the front legs widely spread, falls over, and froths a little at the mouth; in a little more or less (usually less) than a minute it gets up and acts as if nothing had happened.

Only one animal is definitely known to have recovered after having had one of these fits.

Death may occur when the diarrhea is abating.

INCUBATION

Assuming incubation to mean the time elapsing between infection and the first appearance of blood or oöcysts in the feces, this has been found experimentally to be about 14 days.

DIAGNOSIS

Under the heading of diagnosis it will be necessary to consider several statements made by Schultz in his articles on coccidiosis in the March, 1916, and September, 1918, numbers of the JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.

In the first-mentioned article, in which it is inferred that coccidiosis and rinderpest are synonymous, after describing several ex-

periments that took place in the Philippines with rinderpest blood, we find the statement: "The experiments described above show that coccidiosis can readily be transmitted by blood inoculations * * *." In these animals which subsequently showed coccidia in their feces, it can be assumed that they harbored such parasites prior to injection, and that the coccidia remained more or less latent until the animal's resistance was broken down by an attack of rinderpest. Negative results were obtained at Agassiz when blood from coccidia-infected cattle was injected subcutaneously or intrajugularly (see under "Experiments"). The high temperatures (up to 107°) described by Schultz in the initial stages of coccidiosis do not coincide with any cases seen in British Columbia. In my opinion when high temperatures exist they are due to secondary invasion. No coccidia have been found in discharges from the eyes or nose as recorded by Schultz.

Great stress is laid by Schultz on the presence in fecal matter of schizogonic forms. No such forms have been identified by me in such matter. In this connection it is significant to note that Smith and Graybill were unable to find any schizonts or merozoites in slides submitted to them by Schultz, only desquamated epithelium being found, notwithstanding the fact that schizogonic forms were supposed to be present.

The diagnostic agent *par excellence* is the oöcyst, yet we find the following statement is made: "The fertile, encapsulated forms that alone can infect pastures or cause the disease in susceptible animals are not formed in animals that perish, but in those that recover." This is certainly not in accordance with our experience in British Columbia, not only in connection with coccidiosis of cattle, but also of rabbits and fowl.

Finally, in so far as Schultz's articles are concerned, it is stated that "red dysentery in cattle is caused by *Coccidium oviforme*." While there may be several species of coccidia parasitic in the bovine, *C. oviforme* is not one of them. This coccidium, more correctly known as *Eimeria stiedae*, is the common coccidium of the rabbit and is not infective for cattle.

A definite diagnosis is not possible without recourse to the microscope. The hemorrhagic diarrhea, usually following a period of constipation, rapid emaciation, lack of high temperatures, and convulsions, would suggest the disease.

When coccidia could not be detected readily in the feces the following method was used: Feces were diluted with an equal quantity of water, strained through a fine wire screen and then through

several thicknesses of cheesecloth; if necessary this was repeated a second time; the resulting mixture was then centrifuged for several minutes, the excess of fluid poured off and the residue examined. The oöcysts can be seen nicely with a dry high-power objective, but for preference a 2-inch ocular and an oil immersion lens were used. They should be examined in a moist condition and without recourse to staining.

During the course of the work three different species of flagellates and an ameba were seen. In one animal, a calf, two specimens of a *Balantidium* were noticed; these measured 126 by 89.5 microns. The author is not aware that any species of *Balantidium* have been reported heretofore as occurring in bovines. The cystic forms of flagellates, eggs of small worms, certain fungi, yeast cells, and other debris can cause a great deal of trouble to the uninitiated.

AUTOPSY

In the majority of cases the rectum shows the greatest changes; its mucosa is swollen, corrugated, hemorrhagic and covered with mucus. In severe cases it may be edematous. The contents are soft and contain blood, mucus and shreds of epithelium. The large intestines may show some inflammatory changes, but to a much lesser extent than the rectum. The small intestines show a catarrhal inflammation, and may, especially in young animals, be hemorrhagic. Some congestion may be seen around the ileo-cecal valve and the pyloric end of the abomasum. Occasionally the mucous membrane of the abomasum shows eroded areas. Necrotic processes due to a secondary invasion may upon rare occasions be seen in the large intestines, and small pin-point yellowish spots may occur in the small intestines.

The mesenteric lymphatics are swollen, but seldom show any hemorrhages. The spleen usually has a dry, bloodless appearance, and the other organs appear normal; the lungs and kidneys may, however, show some congestion.

The crypts of Lieberkuhn are the chief seat of the coccidia, but the intertubular tissue is also invaded. All the cells in a tubule may be affected while neighboring tubules remain healthy. Even when the rectum is extensively invaded it may be difficult to find any coccidia in the small intestines; however, in the youngest animals the small intestine is found to be affected to a greater extent than the large, the greatest changes being found in the ileum. No invasion of the lymphatic glands was seen, neither were any coccidia found in the abomasum.

The blood shows poikilocytosis and some polychromasia, but a polynuclear leucocytosis as reported by Meyer and Crocker and by Fantham in birds was not seen. A count of four affected cattle was as follows: Total monos, 72.12; polys, 21.33; eosins, 6.41; mast, 0.12.

The parasite invariably destroys its host cell completely, but does not appear to have any deleterious action on neighboring cells.

TREATMENT

Treatment as outlined in the various text-books is not applicable to an extensive outbreak or to range animals. Such being the case, it was decided to try the following: Sulphate of iron 2 parts, sulphur 2 parts, salt 6 parts. Of this mixture 50 pounds was fed with 100 pounds of linseed oil-cake meal to 100 head per day. This was placed in troughs to which the animals had free access. The results obtained were most gratifying (see Outbreaks Nos. 2 and 4). Medication should be continued for two weeks.

Of other treatments recently recommended may be mentioned the use of thymol, 10 to 15 grams daily, by Sanlorenzo in Italy. It meets with the usual objection, however, that of being unsatisfactory when dealing with range animals. The author has not tried thymol on cattle, but has used it on fowl, but with only partial success.

Dobell (1919) in his article on "The Coccidia of Man" says: "No method of treatment has yet been discovered which will get rid of an *Isospora* infection, or, for that matter, of any coccidial infection in any animal."

In the face of such a statement no specific value can be attributed to the somewhat empirical mixture used. The fact remains, however, that good results followed its use, and the author has no hesitancy in recommending it for coccidiosis of cattle.

Owing to the self-limitation of the disease many cases recover spontaneously. However, there can be no doubt that if an animal can be helped over the acute stage its chance of recovery is enhanced. Such a necessary fillip appears to have been supplied by the use of the linseed-meal mixture mentioned above.

Sick animals should be isolated so that proper disposal can be made of their feces, as the oöcysts are highly resistant. Some kept under unsatisfactory conditions in this laboratory were infective for 13 months, and Fantham has shown that the oöcysts of *Eimeria avium* are infective for 2 years after being passed. The use of ordinary antiseptics is useless, lime being probably the best and most

convenient agent for their destruction. Infected pastures should be treated with some form of lime and then deeply ploughed.

PATHOGENESIS

On one ranch prior to my visit the carcasses of the dead cattle were fed to the hogs, of which there were quite a number. These hogs ate practically everything but the bones. The amount of oöcysts ingested must have been enormous, but none of the hogs showed the slightest indisposition. (It is possible that in this instance none of the oöcysts ingested had developed sporozoites and therefore they were non-infective; the fact is, however, given for what it is worth.)

A band of horses had the run of an infected yard, also three sheep; in addition a sheep was kept in the same yard as two experimentally infected animals. None of these showed any symptoms. Chickens were allowed the run of an infected yard, and guinea-pigs, rabbits, white rats and fowls were dosed with infective material, with negative results.

The coccidium therefore is evidently not infective for horses, pigs, sheep, rabbits, guinea-pigs, white rats and domestic fowls, but produces dysentery in cattle of all ages (experimental animals from 1 month to an aged cow, and in the field from 4 months to an aged cow). Younger animals suffer the most and death often results. Three-year-old animals have, however, been known to succumb, and in one instance an aged cow died.

EXPERIMENTS

January 16, 1918, two guinea-pigs and three rats were fed the rectal mucosa from a coccidia-infected calf, with negative results.

Calf 1.—January 18, 1918, injected 1.5 c.c. of citrated blood from a case of coccidiosis into the jugular of a 10-months calf, also 2.5 c.c. subcutaneously into a 3-year-old heifer (heifer 2). Beyond a slight rise in temperature the results were negative. February 7, 1918, calf 1 was drenched with approximately three-quarters of an ounce of infected feces collected January 14. February 21, 14 days after drenching, blood was passed with the feces, and a large number of oöcysts were found. This animal passed blood for seven days. No blood was noticed in the feces after that date, but the incessant wet weather and pressure of other work prevented a definite record being kept. The temperature varied from 101 to 103.4. On August 12 this calf was killed, as it had become emaciated and anemic, but no coccidia were found on autopsy.

Heifer 2.—March 12, 1918, drenched with about 1 ounce of feces passed by calf 1 on or about March 9. On the 21st mucus was seen on the dung, also on the 24th. On the 27th, the fifteenth day, blood was noticed and was passed for seven days. The temperature varied from 101 to 102.4. Blood was also seen on April 23 and 24 and on May 5, also August 10, September 5 and October 31. The last date when an oöcyst was found was August 10, this being the only time that an oöcyst containing fully developed sporocysts was found in fresh feces in any animal examined. This animal subsequently made an uneventful recovery.

Calf 3.—This calf, aged 3 months, was placed on August 9 in the yard in which Nos. 1 and 2 were confined when ill. On September 6 coccidia were found in the feces; on the 8th diarrhea was marked, on the 9th the animal looked very weak, temperature 103.4; on the 14th, temperature 103.7. The first visible blood was not seen until the 16th. On the 20th the temperature was 103, but the following day was 101.4. The calf being very weak and emaciated, it was killed. This animal became infected naturally, after being exposed two weeks. The case was very much complicated by an ameba.

Cow 4.—Owing to the apparent resistance of older cattle, it was decided to try an experiment on such an animal. On April 11, 1919, an aged cow was given a heavy dose of oöcysts in which sporozoite development was general, and on April 21 a similar dose was given. On May 2 a little blood was passed and oöcysts were found. On May 4 was dosed again. No more blood was noticed on the feces, and the animal appeared normal.

Calf 5.—Age about 1 month. On September 3 was given about 1 c.c. of centrifuged feces collected March 21, 1919, in which very few oöcysts showed sporozoites. On the 9th another small dose was given. On the 13th mucus was noticed on the feces. On the 17th a little blood was seen, but no oöcysts were found, although it is probable that a prolonged search would have demonstrated their presence, as on the following day they were found in abundance. Diarrhea showed on the 19th, but only lasted for a couple of days. On the 28th blood and oöcysts were found. Given another small drench with but few sporozoites. October 3, oöcysts and blood were seen under the microscope. A few oöcysts and a little blood were noticed between that date and the 16th, when it was decided to kill the animal, as specimens of the intestine were desired before the disease reached its height. The temperature remained normal.

The initial dose (and subsequent doses) used on this calf was so poor in sporozoites that it was feared that clinical symptoms might not result; however, blood was noticed on the fourteenth day, thus confirming the incubation period seen in calf 1 and heifer 2. This was the youngest animal seen affected, and was especially interesting on account of the heavier infection of the small intestines as compared with older animals.

Calf 6.—In order to check the heavy infestation of the small intestine noticed in calf 5, a 5½-months-old calf was dosed January 12, 1920, with ¼ c.c. of centrifuged feces from calf 5. On the 26th, 14 days after drenching, diarrhea was not evident, but the feces were softer and contained a little blood and a number of oöcysts. On the 28th the dung was still softer but there was no true diarrhea. Given another ¼ c.c. dose. The dung subsequently showed the presence of blood and mucus and contained oöcysts but remained fairly firm. On February 7 was killed; lesions were not so marked as in the preceding calf, no doubt due to the smallness of the infecting dose, but were confined to the small intestine, the chief lesions being in the upper part of the ileum.

Rabbits 1 and 2.—In view of the statements of some authors that *Eimeria stiedae* of the rabbit and *E. zurni* of cattle (which at that time it was presumed was the coccidium involved) were identical, on March 8, 1918, two rabbits were given a drench of 2 c.c. of a highly concentrated culture of oöcysts. In this dose sporozoite formation was well advanced, but the animals suffered no ill effects whatever. It may be mentioned that Guillebeau, Zublin, and recently Galli-Valerio failed to infect the rabbit with *E. zurni*. Conversely, a cow and a calf were allowed to eat hay that had been used as bedding for coccidia-infested rabbits, with negative results.

Cockerels 1-4.—Were fed cattle coccidia with negative results.

THE PARASITE

The Oöcyst and Its Development

The shape varies; spherical, elliptical and ovoid forms are seen, and upon rare occasions ovoid cysts may show a slight flattening at the smaller end or may be slightly concave. In adult animals about 45 per cent are spherical, but in very young calves spherical forms are rare. The larger oöcysts are always ovoid or elliptical. The smaller cysts apparently show a tendency to become spherical in course of time, e. g., in some feces two years old it was difficult to find any but spherical oöcysts.

All cysts are circular on cross section. The wall is double contoured and varies in tint from colorless to a light muddy brown. In ovoid oöcysts the wall tends to diminish slightly in thickness toward the narrow pole. No evidence of a micropyle was seen.

Early in the disease the oöcysts appear to be larger, and in very young calves they are usually elliptical in shape.

About 250 oöcysts were measured. They varied in size from 11.6 to 43.1 microns in length and from 11.6 to 27.8 microns in width. The average size of 210 oöcysts was 17.4 by 15 microns for animals over four months of age, cysts exceeding 20.7 by 17.6 microns being very scarce. In calves about 6 weeks of age it is not uncommon to find oöcysts 33 by 24 microns.

The forms usually seen in fresh feces are those in which the cytoplasm either completely fills the cyst, is beginning to contract, or has contracted into a circular mass (figs. 1-4). The early form is made up of finer granules than those that show contraction of the cytoplasm. The granules are highly refractile. Occasionally ameoboid movement of the granules is seen, and in one instance such movement (which was very active) was watched for 20 minutes without the cell coming to rest. (It is interesting to note that a similar condition was kept under observation in a coccidium of the rabbit for 20 hours. The nucleus is sometimes visible.

The commonest fecal form is that in which the protoplasm has contracted into a circular mass, usually at the middle or toward the broader end of the cyst. It is composed of coarse, highly refractile granules. The nucleus is sometimes visible.

The next stage is that in which the granules separate and collect into four bunches forming the sporoblasts (figs. 5, 6). There is no *Restkörper* left behind in sporoblast formation. The sporoblast secretes a homogeneous membrane, the sporocyst, in which it becomes enveloped (fig. 7). This membrane may show acute angles. The sporocysts become ellipsoidal (fig. 9), and are circular on cross section. At first containing refractile granules, they become homogeneous and appear to have a number of vacuoles in them (fig. 10). The sporocyst becomes pointed at one end and a large vacuole or body appears in the broad end; the protoplasm contains well-marked granules (fig. 11). The vacuolated body moves toward the center and divides; each half then moves toward the opposite pole (fig. 12). The sporocyst now commences to divide longitudinally to form the sporozoites (fig. 13); the single contoured membrane of the spore is thickened into a minute cap at the smaller pole

(Stieda's plate). There are two sporozoites in the spore and a *Restkörper* composed of refractile granules. The *Restkörper* usually lies between the sporozoites but may be scattered; it is relatively larger in the smaller oöcysts. The line separating the sporozoites tends to run diagonally across the spore, this being more marked in the smaller cysts. The sporozoites are broad at one end and taper toward the other; the nucleus lies in or near the broad end; they lie with their broad ends at opposite poles of the spore, and with their *Restkörper* completely fill the spore. In one instance they were seen to be no longer lying *tête-bêche* but had twisted until both lay with their narrow ends pointing toward the smaller pole (fig. 15); in this position they did not completely fill the spore, a large vacuole appearing in the broad end.

Several sporocysts were measured in the oöcyst. They varied in length from 6.6 to 19.9 microns and in breadth from 4.5 to 8.3 microns.

Development.—That the sporozoites may mature rapidly under favorable conditions is evidenced by the infection of an animal dosed with feces that had been passed three days (experimental heifer 2).

Upon one occasion an oöcyst was found that contained fully developed spores in feces that certainly were not more than 24 hours old, and which were probably passed less than 12 hours. Sporoblast formation may be seen in feces 24 hours old but is rare.

The most favorable conditions (temperature, moisture, oxygen) governing the maturation of the sporozoites have not been determined. When kept in the laboratory and supplied with moisture complete development has not occurred in less than eight days, and may be delayed for weeks or months if too much or too little moisture is supplied.

Some centrifuged feces kept in a centrifuge tube and supplied with a little moisture at very irregular intervals show after 13 months some oöcysts that are still infective, some that have never developed, and a large number that contain gas bubbles, indicating degeneration. Fantham has shown that the oöcysts of *Eimeria avium* may be infective after two years, and it seems highly probable that the species under consideration may be infective for that length of time when kept under natural conditions.

The Parasite in the Tissues

The sporozoites, judging from the size of the spores, undoubtedly vary a great deal in size. Only two have been seen in sections;

they measured approximately 10.7 by 2.4 microns. They differ from the very similar merozoites in the nucleus, which does not show a karyosome, is comparatively a little smaller, and is eccentrically located (fig. 16).

The trophozoite.—Uninuclear schizonts are scarce in sections. Those seen measured from 5.8 to 8.3 microns in length by 4.9 to 7.4 microns in width. They are roundish or elliptical in outline, their cytoplasm is alveolar, and the nucleus is usually eccentrically placed, is relatively large and contains a karyosome (fig. 17).

Schizont (figs. 18-23).—The nucleus of the trophozoite divides, the number of nuclei produced varying greatly in number; forms containing as few as six have been seen, up to those in which the number could not be counted. At first the nuclei are minute spots; soon a light is seen around them which gradually grows until it elongates to form the body of the future merozoite; at the same time the nucleus increases slightly in size and when the merozoites are well advanced shows a well marked karyosome. Schizonts have been seen measuring from 8.3 by 8.3 to 61.4 by 49.8 microns.

Upon one occasion, in experimental calf 3, a minute yellowish spot in the small intestine was placed under a cover slip and examined, slight pressure having been exerted on the cover slip; this proved to be a schizont containing merozoites that were evidently fully developed, as evidenced by a slow but distinct movement of their posterior end, and which were arranged into approximately thirty bunches, each bunch being composed of merozoites which radiated in all directions from a common center, with their posterior (furthest from nucleus) end toward the outside. Under the conditions mentioned this mass measured approximately 282 by 207 microns. One or two other spots of apparently similar nature were seen in this intestine, and efforts were made to secure sections, but unfortunately, owing to the lack of a microtome of the rotary type, they were lost. Such schizonts have been repeatedly looked for since but have never been seen.

While in the unique schizont mentioned above the merozoites were arranged in a stellate form, in the schizont usually found they do not seem to follow any definite form, but rather might be likened to a lot of fish thrown into a basket (see fig. 22). The schizont may be circular in outline or elliptical and is sometimes comparatively irregular. There is no cell membrane; this statement, in fact, applies to all forms of the parasite outside of later stages of the macrogametocyte and the oöcyst with its spores.

The merozoites are about 10 microns long by 2.9 microns wide, but are subject to slight variation. Their cytoplasm is finely granular, and their nucleus contains a well-marked karyosome and is located well toward the broader end (fig. 24).

Microgametocyte.—Uninuclear microgametocytes appear to be very scarce in sections. They are elliptical in shape; their cytoplasm is not alveolar and is distinctly smoother in appearance than that of uninuclear schizonts; the nucleus is eccentrically located and consists of a karyosome surrounded by a halo which may not be very distinct. They measure about 3.3 by 4.9 microns (fig. 25). The nucleus then breaks up into minute granules and forms a fine chromidial network (figs. 26, 27) which may be more or less vacuolated; minute spots will next be seen which show a tendency to collect into bunches (fig. 28). In this, however, there is considerable variation, some showing the spots evenly distributed and others at the periphery. The next stage shows minute loops with a central hollow (fig. 29); the loop gradually becomes more open (figs. 30, 31) and shows a slight thickening toward one end. At a later stage the loop has disappeared, the microgametes being bow shaped and showing a slight thickening toward their middle; they stain intensely with basic dyes (figs. 32, 33, 34). They may be arranged in the cell in three different ways—around the periphery in a well-marked band, completely filling the cell, or in a reticular manner without any definite arrangement. When fully developed the microgametocyte shows an enormous variation in size; they may be 8.3 by 11.6 microns, or may be so large as almost to fill the field of an immersion lens. The largest one measured was 116.2 by 132.8 microns. As with the schizonts, the largest forms were found in the youngest animals.

The microgamete (fig. 35) measures approximately 0.55 by 2.75 microns. While it undoubtedly possesses flagellæ, these could not be seen.

The macrogametocyte.—The young form may be distinguished from uninuclear schizonts or microgametocytes by its rounder shape; its relatively large nucleus is eccentrically located and contains a karyosome. The smallest seen measured 3.3 by 3.3 microns (fig. 36). At an early stage metachromatic granules are seen, and the chromosomes have unravelled from the nuclear network (fig. 37). This has been noticed in a cell measuring 8.3 by 6.6 microns. The macrogametocyte continues to grow and become loaded with chromatoid and plastinoid granules (fig. 38). If the nucleus can be

seen at this time it will be noticed that it has lost its rounded shape and that it contains a number of chromidial threads (fig. 39).

The lighter staining plastinoid granules move to the periphery, and the chromatoid form a more or less irregular circle around the nucleus (fig. 40). Owing to the deep-staining chromatoid granules the nuclear changes are often obscured; this, together with the smallness of the parasite and the optical equipment available, does not allow the karyokinetic figures to be described in detail.

The nucleus then shows as a chromidial network surrounding the karyosome (fig. 42). Fertilization then takes place, but unfortunately was not observed; however, one cell was found in which the microgamete had gained access to the female pronucleus (fig. 43). The nucleus now undergoes several changes (figs. 44, 45, 46, 47), and then becomes temporarily resolved into chromidia (figs. 48, 49), from which is formed by concentration of the scattered granules (figs. 50, 51, 52) another complete nucleus (fig. 53).

Shortly after fertilization the cell begins to show a thin membrane, apparently formed from the plastinoid granules. The wall appears to form slowly. According to Fantham, in *Eimeria avium* the inner wall of the chitinoid membrane is formed by the chromatoid granules. In the species under consideration I am not at all sure that this is the case. In figure 53 a cyst can be seen with well-developed walls, yet the chromatoid granules are still visible within the cyst. At a later stage, as, for instance, in figure 54, they are no longer in evidence but have apparently broken up to form the fine granules seen in early oöcysts.

The zygote nucleus has only been noticed to be dividing three times in sections, as by this time the cysts are usually in the lumen of the intestine.

Occasionally degenerated oöcysts are seen in sections; they occur as empty shells or show crumpled walls and represent parasites that can not be discharged outward. They occur in intertubular tissue.

CONCLUSIONS

The endogenous cycle of *Eimeria zurni* does not appear to have been worked out; any comparisons therefore must be based largely on the oöcysts.

Gray, quoting Montgomery on the oöcysts of *E. zurni*, mentions a micropyle. Galli-Valerio says: "In some forms there is a micropyle, the protoplasm filling all the cavity. These forms represent recently fertilized macrogametes." This does not correspond with

our species, no micropyle being present, the macrogamete being fertilized before its wall is in evidence.

Judging from Smith and Graybill's article, Zublin describes *E. zurni* similarly to a species seen by them, i. e.: "There is no *Restkörper* left behind in the formation of the sporoblasts. There is no *Restkörper* in the spore."

In the British Columbia species, a residum occurs in the spore. According to Montgomery in Gray's article, the merozoites are arranged in the epithelial cells like the quarters of an orange. While there is at times a suggestion of this in our species, as a general rule their arrangement in the cell is irregular.

Galli-Valerio mentions that Guillebeau gave coccidia to three young calves to eat, and noticed fever and diarrhea in them after three weeks. With us the incubation period is only two weeks, the fever is either absent or only slight.

The foregoing covers the main differences noted between the British Columbia species and *E. zurni*. Owing to the fact that the endogenous cycle of the latter has not been ascertained, points of comparison are necessarily limited.

Smith and Graybill have recently described a coccidium found by them in young calves in New Jersey. They found two varieties of oöcysts, one small and corresponding to *E. zurni*, the other larger and corresponding to ours, except that ours shows a much greater variation in size. It is possible that they were dealing with two species, but they were unable to distinguish any differences in the endogenous cycle.

Many differences can be seen between our species and that described by them. Our merozoites are not banana shaped bodies, but taper slowly toward one end and acutely to the other, and their nucleus is not central but is distinctly toward one pole. While our schizonts may be as small as Smith and Graybill's, we also get forms five times as large. This also applies to the microgametocytes, but in this instance they may be more than ten times as large, and show a much greater variation in contour and in the arrangement of the future microgametes.

Evidence of active multiplication of coccidia in cattle older than three months was not noted by Smith and Graybill, and in such calves the seat of the disease was the large intestine. In British Columbia animals of all ages are affected, and while the large intestine suffers most in adult animals, in calves of three months or so the small intestine is most heavily involved.

It is believed that a coccidium different from any previously described has been found in British Columbia cattle, which it is proposed to call *Eimeria canadensis*.

SUMMARY

A dysentery due to coccidia has been seen affecting range cattle of all ages in British Columbia. It occurs in the dry interior of the province and usually in the winter.

Out of 165 visibly affected animals 50 died (30 per cent). Young animals suffer the most severely. Fatal cases die usually in from two to five days after showing symptoms, and within 24 hours of death are subject to fits of not more than a minute's duration, death being in convulsions. The principal lesions are confined to the rectum of older animals and to the small intestine of young calves.

The following treatment was found effective in controlling the disease: Fifty pounds of a mixture consisting of sulphur 2 parts, sulphate of iron 2 parts, salt 6 parts, was mixed with 100 pounds of linseed oil-cake meal, and was fed in troughs to 100 head per day for two weeks.

The coccidium responsible shows several differences from available accounts of *Eimeria zurni*, and also differs from the coccidia of New Jersey calves reported by Smith and Graybill of the Rockefeller Institute. The name *Eimeria canadensis* is proposed.

Symptoms develop in fourteen days after the ingestion of infective oöcysts. It is apparently only pathogenic for cattle. Oöcysts may be infective within three days of being passed, and have been infective after thirteen months when kept under adverse conditions in the laboratory.

Infected ground should be treated with some form of lime and then deeply ploughed.

ACKNOWLEDGMENTS

I am indebted to Drs. George and Paxton of Kamloops for specimens and for information regarding outbreaks of the disease, and to Drs. Hutchinson and Cameron, Professors of Biology at the Universities of British Columbia and Saskatchewan respectively, for assistance on several occasions. To Dr. F. Torrance, Veterinary Director General, Ottawa, I owe thanks for his interest in this investigation, and for the opportunity to carry it through to a satisfactory conclusion.

ADDENDUM

A 6-months calf was recently (August 17) found to be affected

at Agassiz, B. C. Whether the coccidium responsible is the same as that found in the dry interior or not, it is impossible to say without further study.

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EXPLANATION OF PLATES

All drawings were made by Mr. C. W. Young under the direction of the author. They have been drawn free-hand and on the same scale throughout, one-sixteenth of an inch being approximately equal to 1.66 microns. A Bausch & Lomb 1/12 lens with a 5X ocular was used, giving a magnification of 475 diameters. The drawings are uniformly slightly larger than when seen under the microscope, on account of the difficulty of reproduction at the magnification mentioned. Unless otherwise stated, Mallory's methylene blue and eosin stain was used. Measurements given refer to the parasite drawn, and are not necessarily average measurements.

PLATE 1

Exogenous forms (oöcysts), not stained

- Figs. 1 and 2.—No. 2 is the commonest early form, the oöcyst with a concavity being comparatively scarce. At this stage the cyst is filled with very fine granules. The nucleus is sometimes visible. Size 16.6 by 13.2 microns.
- Fig. 3.—The cytoplasm is beginning to contract and the granules are coarser. Size 16.6 by 13.2 microns.
- Fig. 4.—A common form seen in feces, the cytoplasm being contracted into a circular mass. The nucleus is sometimes visible. Size 17.4 by 17.4 microns.
- Fig. 5.—Granules breaking up into bunches prior to sporoblast formation. Size 17.4 by 17.4 microns.
- Fig. 6.—Sporoblast formation. Size 17.4 by 17.4 microns.
- Fig. 7.—Sporocysts forming. In many instances they show quite acute angles. Size 16.6 by 16.6 microns.
- Figs. 8 and 9.—Sporocysts. Size 18.2 by 16.6 and 16.6 by 16.6 microns.
- Fig. 10.—Vacuoles appearing in a homogeneous cyst. Size 28.2 by 19.9 microns.
- Fig. 11.—Cyst showing a large vacuolated body in the sporocyst. Size 31.5 by 26.5 microns.
- Fig. 12.—The large vacuole has divided into two, each of which move to opposite poles. Size 30.7 by 24.9 microns.
- Fig. 13.—Oöcyst nearing maturity. The sporocysts show a slight thickening at one end, and a longitudinal division. The sporozoite nucleus is visible. Size 33.2 by 24.9 microns.
- Fig. 14.—One of the smaller oöcysts (16.6 by 16.6 microns) at a somewhat earlier stage than the preceding figure. The sporocyst residuum is more marked than is often the case, and the sporocysts have not assumed their final shape, i. e., pointed toward one end.
- Fig. 15.—Mature cyst (32.3 by 24.9 microns). Sporocysts show a residuum of round, highly refractile granules, a thickened cap or Stieda's plate at the narrow pole, and contain two sporozoites. In one spore it will be noticed that the sporozoites have twisted until they are both pointing in the same direction, and that a vacuole is left in the broad end of the spore.

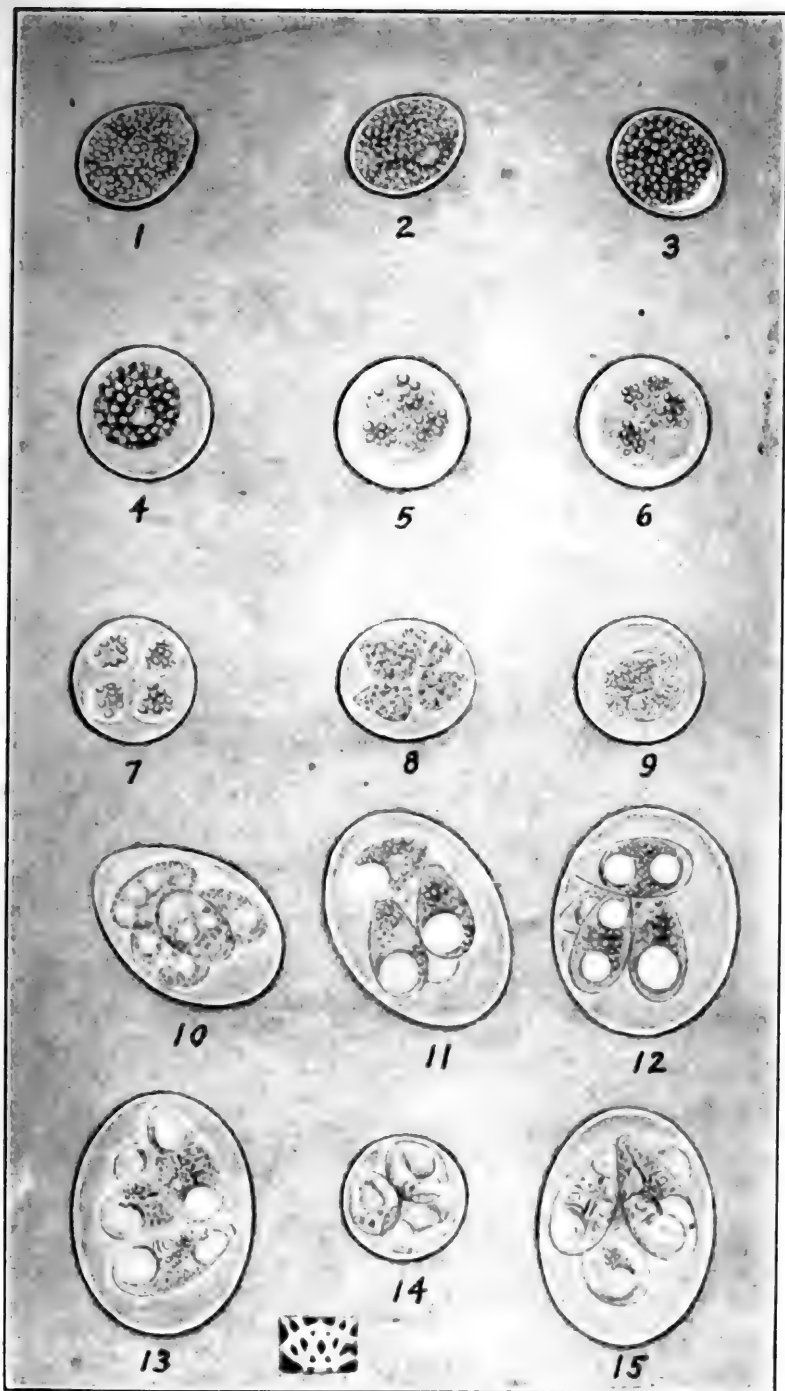


Plate 1.—Exogenous Forms (Oocysts) of *Eimeria Canadensis*

PLATE 2

Endogenous forms, from ileum unless otherwise stated.

- Fig. 16.—Sporozoite from rectum. Size 10.7 by 2.4 microns. Iron-hematoxylin.
- Fig. 17.—Tropozoite (5.9 by 3.3 microns), showing a vesicular cytoplasm and a relatively large nucleus with a karyosome.
- Fig. 18.—Young schizont (10.7 by 10.7 microns). The nucleus is dividing and the cytoplasm is more irregular.
- Fig. 19.—Schizont (36.5 by 34.86 microns), showing numerous nuclei which are beginning to show a light space around them.
- Fig. 20.—Schizont (9.9 by 9.9 microns) a little further advanced than No. 19.
- Fig. 21.—Schizont (26.5 by 26.5 microns), a somewhat uncommon form. The light space around the nuclei will elongate to form the body of the future merozoite.
- Fig. 22.—Schizont (43.1 by 24.9 microns) in which the merozoites are forming. Notice the way in which they lie.
- Fig. 23.—Schizont from rectum (14.9 by 13.2 microns). Merozoites further advanced; their nucleus shows a light space (karyosome), which has been drawn a little too large. Phosphotungstic acid hematoxylin.
- Fig. 24.—Merozoites from rectum, about 10 by 2.9 microns. The nucleus is located toward one end, and contains a well-marked karyosome. Their cytoplasm is very finely granular. Giemsa.
- Fig. 25.—Uninuclear microgametocyte (4.9 by 3.3 microns). Rare in sections. Cytoplasm smooth in appearance compared with the trophozoite. The halo around the nucleus may not be well defined.
- Fig. 26.—Microgametocyte (9.9 by 6.6 microns). The nucleus is breaking up, and the cytoplasm has lost its smooth appearance.
- Fig. 27.—Microgametocyte (26.5 by 24.9 microns). Shows a very fine spotting. The finely reticular cytoplasm is somewhat vacuolated.
- Fig. 28.—Microgametocyte (33.2 by 33.2 microns). Spots more marked, also vacuolated spaces. The latter vary in number and position. Instead of six as shown in the figure there may be thirty or more.
- Fig. 29.—Microgametocyte (12.4 by 5.8 microns) from rectum. Spots relatively large, as the gametes are curved on themselves.
- Fig. 30.—Microgametocyte (11.6 by 8.3 microns) from rectum. Giemsa.
- Fig. 31.—Similar to the preceding, size 33.2 by 33.2 microns. Gametes in the form of loops or half curved.
- Fig. 32.—Microgametocyte (41.5 by 41.5 microns) with gametes arranged in a band around the periphery.
- Fig. 33.—Similar stage to the preceding, but is completely filled with gametes. Size 33.2 by 26.5 microns.

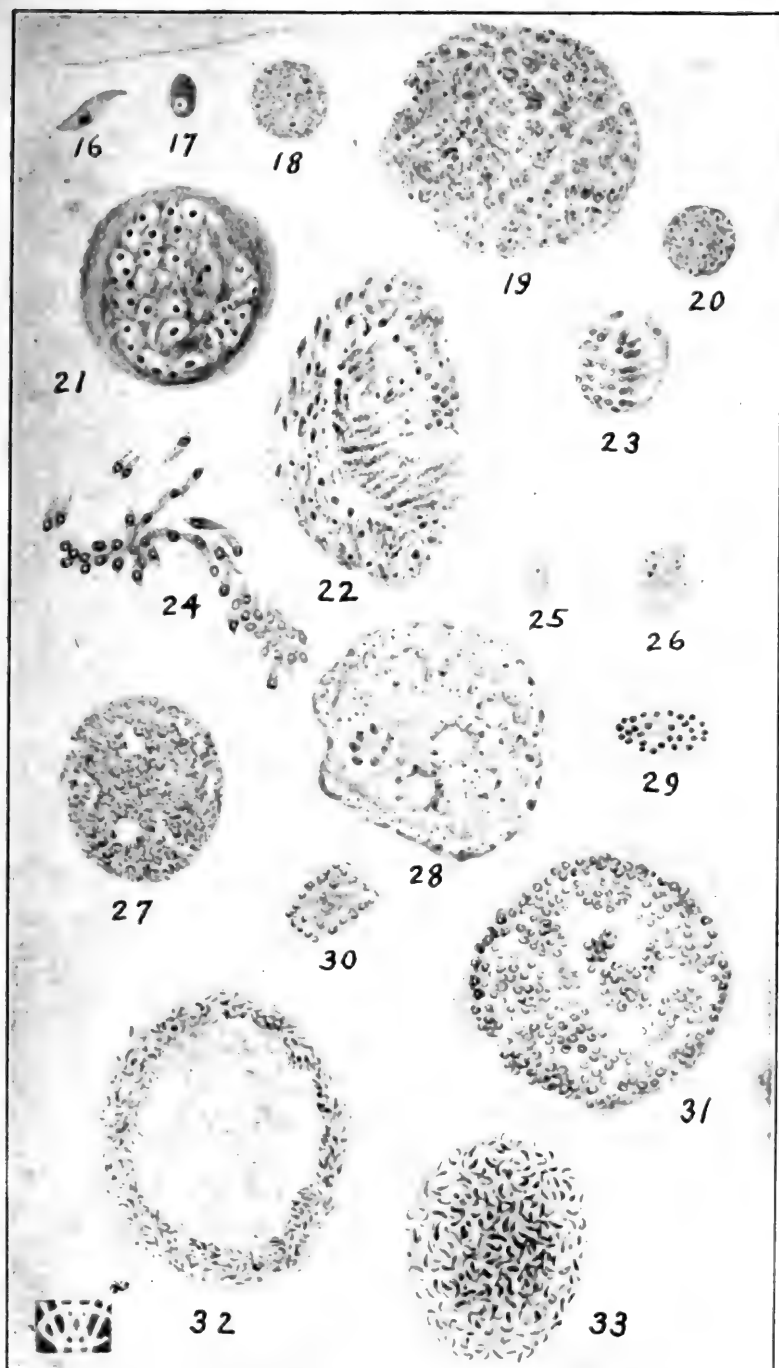


Plate 2.—Endogenous Forms of *Eimeria Canadensis*

PLATE 3

Endogenous forms, from ileum unless otherwise stated

- Fig. 34.—Similar stage to the two preceding figures, but the gametes are arranged in a reticular manner. Such cells may assume any shape, but are usually irregular circles. Size of upper part 39.8 by 33.2 microns, of lower part 66.4 by 36.5 microns.
- Fig. 35.—Microgametes, about 2.75 by 0.55 microns.
- Fig. 36.—Young macrogametocyte (3.3 by 3.3 microns), usually round.
- Fig. 37.—Young macrogametocyte (9.6 by 9.6 microns) showing meta-chromatic granules, and in which the chromosomes have unravelled themselves from the nuclear network.
- Fig. 38.—Macrogametocyte with granules of reserve food material. Size 12.4 by 9.9 microns. Iron hematoxylin and Van Gieson.
- Fig. 39.—Macrogametocyte (13.2 by 13.3 microns) in which the nucleus is losing its rounded shape and in which a number of fine chromidial threads are visible.
- Fig. 40.—Macrogametocyte (19 by 14.9 microns) in which the lighter staining plastinoid granules are going to the periphery. Iron hematoxylin and Van Gieson.
- Fig. 41.—A deply stained macrogametocyte (18.2 by 16.6 microns) at approximately the same stage as the preceding figure. Iron hematoxylin and Van Gieson.
- Fig. 42.—Macrogametocyte (24.9 by 19.9 microns) in which the karyosome is surrounded by fine chromidial threads, presumably prior to fertilization.
- Fig. 43.—A microgamete has gained access to the pronucleus of the macrogamete. Iron hematoxylin and Van Gieson. Size 18.6 by 14.9 microns.
- Fig. 44.—Fertilized macrogametocyte (21.5 by 16.6 microns).
- Fig. 45.—Fertilized macrogametocyte (18.2 by 13.9 microns) in which the chromosomes are arranged in the form of a spindle.
- Fig. 46.—Shows another arrangement of the chromosomes. Iron hematoxylin and Van Gieson. Size 21.5 by 16.6 microns.
- Fig. 47.—A not uncommon form of the macrogamete. At this stage the cyst wall is beginning to show quite plainly. Size 21.5 by 18.2 microns.
- Fig. 48.—Macrogamete in which the chromosomes are distributed along the length of the cell. Size 19.9 by 13.2 microns.
- Fig. 49.—Macrogamete in which the chromosomes are beginning to come together (23.4 by 19.9 microns).
- Fig. 50.—Macrogamete in which the chromosomes are in a compact bunch. The plastinoid granules have almost disappeared and the cyst wall is well marked. Size 24.5 by 21.5 microns.
- Fig. 51.—The chromosomes are in a more or less irregular circle. Size 18.2 by 16.6 microns.

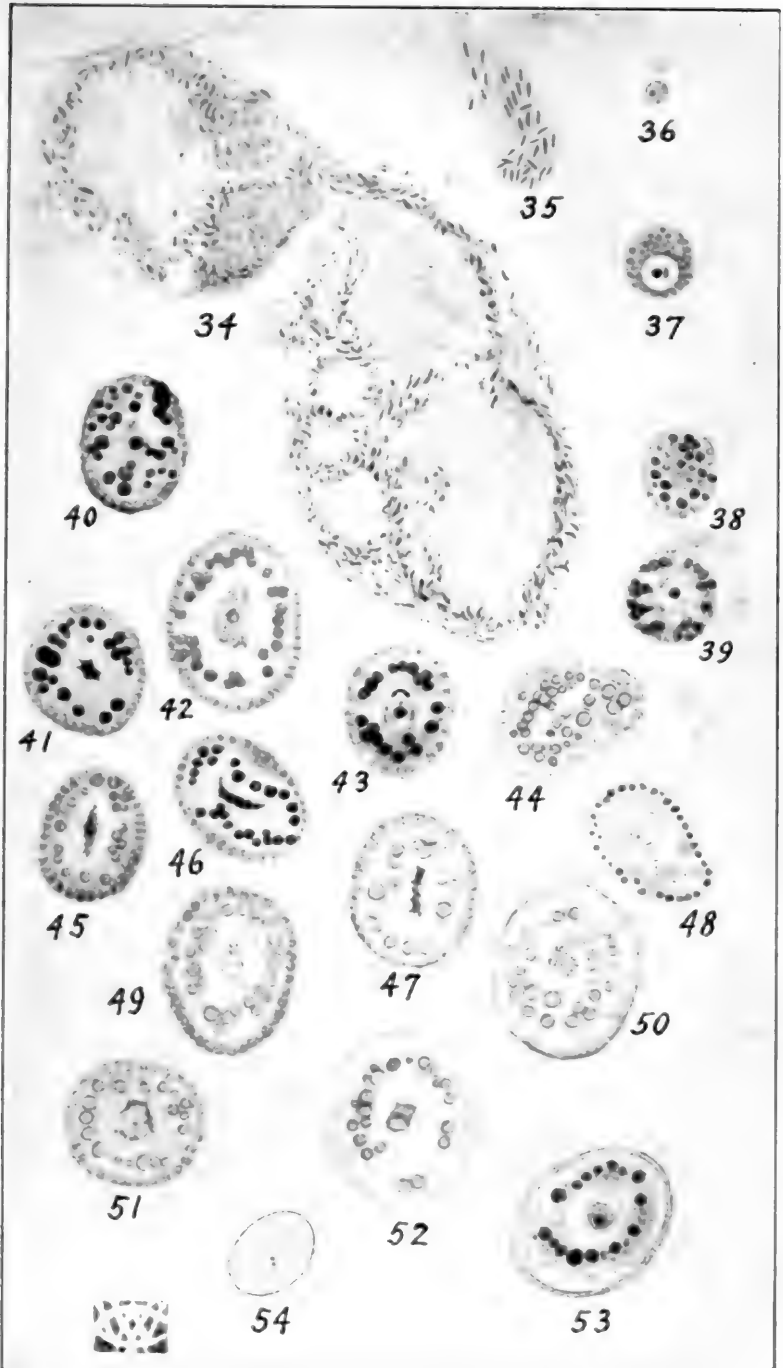


Plate 3.—Endogenous Forms of *Eimeria Canadensis*

Fig. 52.—Macrogamete that shows the zygote nucleus in process of formation. Size 24.9 by 21.5 microns.

Fig. 53.—Oöcyst showing its double wall; the chromatoid granules are still in evidence; the nucleus shows a karyosome. Iron hematoxylin and Van Gieson. Size 24.9 by 19.9 microns.

Fig. 54.—Small oöcyst from rectum (14.9 by 9.9 microns) in which the zygote nucleus is beginning to divide to form the sporoblasts. The chromatoid granules have disappeared and the cyst is filled with fine granules. Giemsa.

NOTE.—It is possible that some of the figures showing the karyokinetic changes are misplaced, if so, the author would be glad to receive information as to their correct position.

DISCUSSION

CHAIRMAN DAY: Dr. Hagan has agreed to enter into the discussion of this very important paper.

DR. HAGAN: I am sorry to say I wrote to Dr. Hoskins that I would discuss the paper and then forgot about it until now. In New York we have not made much study of coccidiosis. There are two sizes of coccidia. Ours are nearly spherical and of the smaller type. In connection with the disease there is not much known about the condition. Some practitioners have seen this condition for a number of years. I know one case of an aged cow in which lesions appeared as Dr. Bruce has explained in his paper. There were some in the large intestines, but they seemed to be mostly in the small intestines. Some say they are found in the large intestines only. From the viewpoint of diagnosis it is important to remember that the lesions are not confined to the large intestines.

DR. BIRCH: I think I understood Dr. Bruce to say he found the temperature low. I think I have always found it high.

DR. BRUCE: I think, Doctor, you have in mind Dr. Schultz's paper. I have taken a number of temperature records. We follow a rule in British Columbia. Dr. Schultz, however, describes temperatures up to 107. I have never seen the temperature higher than 103.7. I believe many of the high temperatures are due to the second infection of the disease.

A MEMBER: The first case we had we didn't know what it was at the time. In that case the animal did carry a high temperature. The pure coccidiosis does not carry a high temperature. The temperature was not raised at all or if so, very slightly.

DR. CONNAWAY: I suspect we have more of the trouble than we think. I make the suggestion to the practitioners here to send samples to a State laboratory for examination. I recall a case of dysentery that occurred in our dairy. I happened to have a test tube and ran it up into the few words is the chance for the students in animal industry. I know the rectum and found forms as represented in the lantern slides here. I feel confident that we had that disease to contend with. We stopped it by a mixture of turpentine, camphor and oil. But in the larger field the treatment recommended by Dr. Bruce would be more adequate.

THE TREATMENT OF JOINT-ILL IN FOALS WITH THE DAM'S BLOOD

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Sweden*

THE etiology of joint-ill in foals has been, as is well known, much discussed during the last twenty years. From the investigations of several bacteriologists we now know pretty clearly the different kinds of bacteria found in cases of joint-ill. But the question as to how foals are infected has not yet been satisfactorily answered. From their investigations of the carcasses of foals bacteriologists have concluded that infection takes place through the navel and that these cases should be regarded as common wound infections with pyo-septicemia as a result. On this point the reader should consult the articles written by Ostertag, Vâth, M'Fadyean and Edwards, Adersen, Magnusson and others. On the other hand, stud veterinary surgeons especially, such as Sohnle, Bernhardt, Mieckley, Mann and others, and also bacteriologists such as Schofield and others, have shown that the foal is already infected within the uterus. It has been observed that not only the foals of a certain dam die year after year, but even the foals of other dams in the same stud contract the disease. Cases have also been met with where the same morbid agent was found in the womb of the dam as that found in the joints of a foal which had died of joint-ill (Sohnle). It has also been proved that joint-ill stands in intimate relation to infectious abortion in mares (Schofield and others).

For my part, I am of the opinion that the dam is the most common carrier of the joint-ill virus, and that she is frequently affected with an endometritis and infects the foal already in the uterus or at birth. It is also possible that the mare carries the virus in her intestines, as was pointed out by Magnusson, and infects the foal after birth either through the mouth or through the navel. Even the milk of the dam has been suspected of being the cause of infecting the foal. But on the other hand it can not be denied that cases of common wound infection through the navel occur.

When a mare does not suffer from the infection she is supposed to carry antibodies against it. Sohnle was the first to point this out. On this question he writes (*Zeitschrift für Gestütskunde*, 1910, part 11) that the new-born also inherits such antibodies and this ex-

plains why the foal does not contract the disease before a lapse of ten days or more. He writes also that he believes that the serum of the dam could be used as a prophylactic on the foal, while it would add to the opsonian power of the foal's blood. However, he has never tried this method and no one has tested his theory. But Sohnle, in treating cases of joint-ill, has only used serum from a serum horse treated with cultures from foals which had died of joint-ill.

I have gone further than Sohnle and in *Svensk Veterinärtidskrift*, 1915, part 5, recommended the use of the serum from the dam for the treatment of joint-ill. In the following year, 1916, I published an article in the *Berliner Tierärztliche Wochenschrift*, part 12. Since then articles have been published with reference to the very good results of this method of treatment, as will be seen below, and many practitioners have also informed me of many cases in which they used this method with excellent results.

But in order to be able to use the serum from the dam there must be at least one day's delay, and therefore I have recommended the method of injecting the blood of the dam direct. For this purpose the method of R. Lewisohn (*Münchener Medizinische Wochenschrift*, 1915) is the most simple. Lewisohn adds neutral sodium citrate to the blood in the proportion of 2 per 1,000. By this means coagulation of the blood of man and dogs is prevented for a period of 24 hours, but, from my own observations, there is no coagulation at all in the blood of horses. Thus, prepared blood can be injected intravenously without any danger, and it is also easily resorbed after subcutaneous application. This method was used by Lewisohn for the purpose of blood transfusion after numerous bleedings or in cases of anemia as a consequence of septicemia.

The technic in using this method of treating joint-ill is the following:

Instruments, such as bleeding needles, knife, syringe, and bottle or vessel for catching the blood, should be boiled, but care should be taken that the water used for this purpose does not contain a high percentage of lime, as the blood will then coagulate in spite of the addition of sodium citrate. In such cases distilled water should be used, or else the water should be boiled once before being used for the instruments, or more citrate should be added to the blood. Solution of sodium citrate, 1 to 50, is poured into the bottle or vessel which is to be used for catching the blood, and then shaken so that

the walls of the vessel are moistened. Care should be taken that the blood does not foam, because foaming blood coagulates easily. During the bleeding the blood must be shaken or stirred gently so as to mix it with the citrate. One gram of sodium citrate is sufficient for 500 c.c. of blood, and this much, or a little less, is the quantity generally used as a dose.

Blood treated in this manner can be injected either subcutaneously or intravenously. When injecting subcutaneously the quantity of blood is divided so that 50 or 100 c.c. is injected at each place. The best places for injection are the sides of the neck and of the chest. For subcutaneous injection it is not necessary to mix the blood with the citrate; as a matter of fact it is even possible to inject the blood direct. A needle is put into the dam's vein and another needle subcutaneously into the foal. By means of a large syringe, warmed by hot water, 50 or 100 c.c. of blood is taken out of the dam's vein and rapidly injected into the foal. Then the needle in the foal is inserted at another point and a new quantity injected. This method of injecting without the addition of citrate was first used by Meyer for this purpose; otherwise it has been used in auto-transfusing blood.

When injecting intravenously it is advisable to add the citrate, and to add it as described here, otherwise thrombosis is to be feared. The blood should be kept at body temperature, which can easily be done by placing the bottle or vessel containing the blood into a vessel at this or a little higher temperature. The injection can be made either with a syringe or through a funnel, but in every case it must be made *slowly* and without any great pressure, otherwise there is a danger of the foal getting an acute dilatation of the heart.

It is natural that the earlier the foal is treated the better the result to be expected. In a case of intravenous injection one may, of course, expect that the foal will recover earlier than if the injection had been made subcutaneously; but it still remains to be investigated whether it is not advisable to inject simultaneously 200 or 300 c.c. intravenously and the same quantity subcutaneously. The subcutaneously injected blood is less rapidly resorbed and is thus effective for a longer period of time.

Some cases have been reported where an anaphylaxis resulted from the injection. This can be prevented by pinching the India-rubber tube for a few minutes after injecting 20 or 25 c.c. of the blood or serum, after which the remainder is injected. Thus Lieblisch, among others, has prevented an anaphylaxis.

From the results of this treatment with the blood or serum from the dam the following cases may be mentioned:

1. Purebred foal, four days old; joint-ill with swollen left elbow joint and lameness. Temperature 40° C. (104° F.). On the third day of its illness the foal was given subcutaneously 140 c.c. of serum from the dam. In two days the fever disappeared, the foal recovered and became quite well. In the preceding year a foal of the same mare had died of joint-ill. The foal was treated by Battalion Veterinarian Breide, Helsingborg, Sweden.

2. Foal eight days old. Had been ill for two days, having some fever and swollen joints. It was given 300 c.c. of the dam's serum subcutaneously. In two days it recovered and after that was quite sound.

3. A seven-days-old purebred foal. Symptoms like case 2, but having also a navel abscess. On the third day 300 c.c. of serum from the dam was injected subcutaneously. The abscess was opened and after two days the foal was apparently sound, the swelling of the joints disappearing gradually.

4. Foal a week old; lying down, unable to get up; knee and hock joints swollen. Apparently there was no hope of recovery, but nevertheless it was injected with 350 c.c. of the dam's blood subcutaneously. The next day a pronounced improvement was noticed so that the foal was able to get up, and after fourteen days the swelling of the joints had disappeared.

5. Foal (age not communicated) had been ill for five days with great general systemic disturbances and purulent, affected joints. It was treated subcutaneously with 1,000 c.c. of the dam's blood, but died on the tenth day. Postmortem examination showed general pyemia.

Cases 2 to 5 were treated by District Veterinarian J. Andersson, Marifred, Sweden.

6. Halfbred foal, three days old, was ill with a temperature of 39° C. (102.2° F.) and having swollen joints. On the third day of its illness it was treated with 300 c.c. of the dam's serum intravenously. The following day there was a good improvement, and on the next day the foal had no fever and after a week's time the swelling of the joints disappeared.

This case was treated by Veterinarian O. Sten, Malmö, Sweden.

7. Foal, ten days old, was ill with swollen left stifle joint. On the fifth day of the illness it was injected with 400 c.c. of the dam's serum and the joint was treated with iodine solution. Following this there was an obvious improvement, but about sixteen days later the left shoulder joint was swollen. Four days later it was treated anew with 400 c.c. of serum, but without any result. The foal was killed eleven days after the last injection.

8. An eight-days-old foal with lameness and swollen left hock joint. There was an improvement without any treatment, but in fourteen days the foal had a relapse, the disease having affected

more joints. A treatment with 400 c.c. of the dam's blood had no result.

9. Foal, three days old, showed constipation. There was an evident improvement, but after four days both stifle joints were swollen. Two days later the foal was treated with 400 c.c. of serum from the dam, but without any result.

Cases 7 to 9 were treated by Veterinarian Vedel, Eslöv, Sweden.

10. Eighteen-hours-old foal; had been uneasy soon after birth; could not get up without assistance, and had no appetite. Temperature 39.8° C. (103.6° F.). Great depression, sunken eyes, low head. The navel was apparently sound. The foal was not lame but could not move. It was treated with 300 c.c. of blood from the mare intravenously and the same quantity subcutaneously. On the following day there was an improvement; after four days the foal could get up, and it ultimately recovered.

11. A three-weeks-old foal had been lame in the left hind leg for five days. The hock joint was swollen. The owner thought that the dam had trodden on the foal, but when the lameness and the swelling kept increasing the veterinary surgeon was called. At this time the right hock joint and the left knee were swollen and also the navel. The temperature was 39° C. (102.2° F.). The navel was treated with iodine and the foal was given 600 c.c. of the dam's blood intravenously. The lameness and the swelling now diminished gradually. In fourteen days the swelling of the knee had disappeared, but the hock joint was still swollen and sore. A further injection of 600 c.c. was given intravenously. In a month the lameness had entirely disappeared but there was still a little swelling of the hock joint.

12. Foal, belonging to the same owner as in case 11, became lame a few days after birth. The temperature was 40.1° C. (104.2° F.). The foal had no appetite and had great difficulty in getting up, the left hock joint being swollen and sore and it was very lame. It was treated with 800 c.c. of the dam's blood intravenously. Eight days later the foal had entirely recovered.

13. This foal had general disturbances at birth; suffered from depression; was incapable of getting up; and could hardly stand after being helped up. When examined twelve hours later its temperature was 40° C. (104° F.). It breathed rapidly and had no appetite. The left foreleg was lame and the knee swollen. The eyes were sunken and the head hanging. The navel was also swollen. Treatment: The navel was disinfected and 600 c.c. of the dam's blood was given intravenously. The following day the foal began sucking and on the third day it was able to get up without any assistance. The lameness disappeared, but after a month's time there was still a swelling.

14. Two-days-old foal. Had been uneasy since birth, desiring mostly to lie down. Very little appetite. Temperature 39.6° C. (103.3° F.). The vicinity of the navel, for about the size of a dinner plate, was swollen and the navel itself suppurating. There was

no lameness. Treatment: The belly was covered with Burow's solution and 200 c.c. of the dam's blood injected intravenously. The following day another injection was given, this time 300 c.c. This was done because on the first day there was a coagulation of the blood, thereby diminishing the useful quantity of serum. The water used in boiling was very rich in lime. The foal recovered completely.

15. This foal had been lame for three days. One hock joint was swollen. The swelling and the lameness increased and the foal was able to get up only with great difficulty; in fact, it had to be assisted. The temperature was 39.5° C. (103.1° F.). The treatment consisted of 500 c.c. of the dam's blood intravenously. During the next few days there was a little improvement, but some days later the foal again became uneasy. In fourteen days the veterinary surgeon was again called in, and he found that the swelling still persisted and that the foal could not stand. He gave subcutaneously and intramuscularly 200 c.c. of serum against anasarca (Jensen's). Three weeks later, according to the owner's statement, the foal had recovered.

Cases 10 to 15 were treated by Veterinarian Karlén, Sala, Sweden.

16. Three-days-old foal was ill with swollen right hock joint, general disturbances and depression. It had much difficulty in moving. In a week the region of the left knee was also swollen. The veterinary surgeon was now called. The temperature was 40° C. (104° F.). As treatment, 600 c.c. of the dam's blood was given subcutaneously. The result was a slow improvement. The foal got a better appetite, could get up without assistance, but the swelling of the joints persisted. About five weeks later when the veterinarian was again called he found that the swelling of the hock had diminished but that of the knee was still the same. He now observed a fluctuation which he did not notice the first time. There was a suppuration in the sheath of the extensor tendon. This was opened and 400 c.c. of the dam's blood was given subcutaneously. The foal gradually recovered, and when inspected at the age of 5 months was found to be quite sound, but it still had an enlargement of the hock joint. This case was reported by Veterinarian Erik Andersson, Arboga, Sweden.

17. This foal became ill when eight days old. Three days later the veterinary surgeon was called. The first symptoms were a swelling of the left hock joint and of the loin. The foal was treated with the mare's blood (quantity not mentioned). Three days later an abscess appeared at the site of each swelling. Result, death.

18. Foal, two and a half weeks old, had a large abscess on one thigh and a phlegmonous swelling about one elbow joint. The abscess was opened and blood from the dam (quantity not mentioned) was injected into the foal. Three days later an abscess appeared also on the elbow, which was opened. Result, death after two days.

19. Foal (age not mentioned) had a swelling of one hock joint. There were no general disturbances. Treated with the dam's blood (quantity not mentioned) and recovered.

Cases 17 to 19 were treated by Läns (County) Veterinarian O. Nilsson, Kristianstad, Sweden.

20. Foal three weeks old, having a temperature of 39.4° C. (102.9° F.) and unable to get up without assistance. Both hock joints were swollen and sore. The sheaths of the back tendons at the fetlocks of both the forelegs were inflamed; on the left leg the sheath had burst, discharging synovia mixed with pus. The foal was treated with 300 c.c. of the dam's blood subcutaneously. Result, recovery after three weeks.

21. Foal, fourteen days of age, having a temperature of 39.5° C. (103.1° F.), was lying down and no appetite. Both hock joints and knees were swollen. Treated by injection of 300 c.c. of the dam's blood subcutaneously. Result, recovery.

22. Foal, five weeks old, had been ill three days with lameness and swollen right hock joint. The temperature was then 40.1° C. (104.2° F.) and the foal was unable to get up, both the hock joints and the left knee being swollen and sore. Treatment, 100 c.c. of the dam's serum intravenously and 200 subcutaneously. After three days the foal could get up without assistance. A swelling which remained disappeared after being treated with "jodvasogen."

23. Foal, seven days old, had been ill for three days. Temperature 39.3° C. (102.7° F.). Hock joints swollen and foal lying down unable to get up and would not suck. Treatment, 350 c.c. of the dam's blood given subcutaneously. Result, death on the third day.

24. Foal, three weeks old. (Time of illness not mentioned.) Temperature 40.1° C. (104.2° F.). Swollen hock joints and foal lying down. Treatment, 300 c.c. of the dam's serum subcutaneously. The foal recovered.

25. A three-weeks-old foal. Had been ill three days and was lame. Temperature 39.8° C. (103.6° F.). It could not rise, the right hock joint and left knee being swollen. Treatment, 500 c.c. of the dam's blood intravenously. In a week the foal could get up without any help but was still lame and its hock joint was swollen. Then 100 c.c. anasarca serum was injected subcutaneously and a local treatment with iodine was made. In a week's time the lameness had disappeared, but the foal now had rickets and was treated with phosphorus. Result, complete recovery.

Cases 20 to 25 were treated by District Veterinarian Ralf Bergmann, Fjärdhundra, Sweden.

26. Purebred foal, five days old, had been ill for one day with general disturbances. Had a temperature of 39.5° C. (103.1° F.) and a swollen right hock joint. On the next day, there being a little increase in the fever, the foal was treated with 300 c. c. of the dam's serum intravenously. In four days the foal recovered but the hock was still swollen. This swelling diminished by de-

grees, but did not entirely disappear until a year later. The dam had not been pregnant the two preceding years owing to endometritis. This case was treated by Veterinarian A. Forén, Norrköping, Sweden.

27. A foal, four days of age, ill, with a temperature of 38.9° C. (102° F.). It had general disturbances, sunken eyes, a difficulty in getting up, diarrhea and rapid respiration. On the following day 500 c.c. of the dam's blood was given intravenously. In some days the forelegs were swollen, but the swelling disappeared. Then the hind legs began to swell instead. There were no abscesses. The foal, now being very weak, was killed. This was the seventh time for the mare to foal; the first four foals lived, the fifth was aborted, the sixth lived, and the seventh was the one described above.

28. Five-days-old foal. Had been uneasy and the next day its breathing was rapid and temperature 39.3° C. (102.7° F.), pulse 168. Treatment, 500 c.c. of the dam's blood intravenously. Result, recovery.

29. Foal, a fortnight old, showed a lameness of the right foreleg. The elbow joint was sore. Its temperature was 39.2° C. (102.6° F.). After three days there was a general stiffness, the foal's back being now bowed. There was also a swelling of the right forearm. Treatment, 500 c.c. of the dam's blood intravenously. The stiffness increased, the swelling disappeared, but returned later. There were no abscesses. The general disturbance having increased, the foal was killed.

Cases 27 to 29 were treated by District Veterinarian J. Ekelund, Fjugesta, Sweden. Ekelund says that he regrets that he did not repeat the treatment. The non-formation of pus proves that, in the successful cases, the treatment had an influence on the disease.

30. A foal eight days of age had a swelling of the right elbow joint. At first this was treated with a local application, but as there was no improvement the foal was injected with 300 c.c. of the dam's serum subcutaneously. In a week's time the foal had entirely recovered.

31. A foal belonging to the same owner as in the preceding case. The owner neglected to call the veterinarian until the foal (age and particulars not mentioned) had many abscesses and suppurating polyarthritis. A treatment with the dam's blood subcutaneously was tried but without any good result.

Cases 30 and 31 were treated by District Veterinarian O. Hultén, Mariefred, Sweden.

32. A foal, three weeks old, was ill, having a swollen left hock joint. After two or three days the foal could not stand. There were also general disturbances and the fever was now 40.4° C. (104.7° F.) A swelling of the stifle joint of the left leg was less marked and not observed by the owner. Treatment, 300 c.c. of the dam's blood intravenously. There was some trouble with this injection owing to a partial coagulation of the blood, the water used

having a high content of lime. The swollen joints were also treated with iodine. After two days the swelling of the joints had evidently diminished and the temperature had decreased to 39.5° C. (103.1° F.), but the right hock joint had now swollen a little. In eight days all the swellings had disappeared except a little on the left hock joint, and the temperature had further decreased to 38.9° C. (102° F.). In a month the foal had entirely recovered.

This case was treated by District Veterinarian O. Carléns, Marieholm, Sweden.

Without mentioning the symptoms in detail, the following cases have also been reported:

District Veterinarian D. Bergman, Balsta, Sweden, treated 8 cases of joint-ill. In 6 cases the foals recovered, while in the other 2 the foals died. One of the latter cases was unsuccessful owing to the injected quantity of blood having been too little.

District Veterinarian W. Callmänder, Lyckeby, treated one case. The foal was injected intravenously with the dam's serum and recovered.

District Veterinarian D. Bjurström, Grästorp, Sweden, treated 3 cases, in which 2 of the foals recovered while 1 died. The latter was treated too late.

All the cases mentioned above were reported to me by letter by the veterinary surgeons who treated them. One of my colleagues, District Veterinarian Hultén, Mariefred, has also tried to treat foals preventively. In one case a dam had lost her foals three years in succession. In the fourth year the foal was inoculated with the dam's blood subcutaneously on the day after it was born and it escaped the disease.

On a large Swedish estate many cases of joint-ill had occurred during the preceding three years. In the first year 1 foal died. In the second year 5 foals were born of which 1 died. In the third year 11 foals were born, and 1 was aborted. Three became ill, one of which died, while the other 2 recovered after having been treated with antistreptococcus serum from the laboratory of the Agricultural Society at Malmö, Sweden (Chief, Dr. H. Magnusson). One of the foals is said to have been only slightly affected, the other moderately so. In the fourth year 10 foals were born, all of which were treated preventively with serum from the dams. None became affected with the disease.

In the German literature on the subject of joint-ill during the last few years many authors have written of cases where the foals were treated with the dam's serum.

Mann (*Zeitschrift für Veterinärkunde*, part 3, 1917) was chief of a camp for pregnant mares, where he had many occasions to treat

cases of joint-ill. He mentions that he was not able to obtain any good results by using the common methods of treatment and he therefore tried the dam's serum. At first the results were not good but when he began to treat the cases at an early stage of the disease he succeeded in saving a very great percentage of the foals. Out of 22 foals thus treated 19 recovered. He used a dose of 300 c.c. intravenously. He also treated 12 foals with serum from the dam as a preventive means. Two of the foals became ill but recovered very easily.

Korring (*Zeitschrift für Veterinärkunde*, part 9, 1917) was chief of a camp of 400 pregnant mares where he had frequent occasion to treat cases of joint-ill. He does not mention the number of cases but states that he injected the foals two days in succession with 300 c.c. of the dam's serum. In some cases he even injected, always intravenously, a third time. All the foals recovered. Korring is of opinion, based on the results he has obtained, that this most dangerous of all foal diseases—joint-ill—can be treated with serum from the dam with good and permanent results.

Sonnenberg (*Zeitschrift für Veterinärkunde*, part 10, 1917) had the care of 108 pregnant mares. Forty-three of the mares aborted, while the others gave birth to well-developed foals. Among the latter there was quite a number of cases of joint-ill. Thirty-nine foals had fever and of these 24 also had swellings of one or more joints. After the third outbreak of joint-ill all the foals were treated preventively with serum from their dams. Of the foals thus treated many were ill later and were again inoculated with the serum, but of the 65 foals treated only 4 died, all of these from thrombosis. Two foals died on the day after the treatment, the third died on the twenty-fourth day and the fourth foal on the sixty-seventh day. The first two had thrombosis of jugular vein; the other two had infarcts of the lungs. Sonnenberg thinks that this method has its greatest value as a means of prevention. It is not certain that a foal treated preventively will not be affected later on, but if it does, it will not be seriously ill. On the other hand it takes quite a long time to cure a foal not preventively treated.

Lieblich (*Zeitschrift für Veterinärkunde*, part 4, 1918) is of the opinion that there are two quite different kinds of joint-ill in foals. He believes that the one kind is an infection through the navel with purulent processes and metastatic abscesses in the lungs and the liver, and less frequently disease of the joints. If any of the joints are affected there is, as a rule, a purulent inflammation with

abscesses around the joint. This illness can be prevented by carefully treating the umbilicus with iodine solution soon after the foal is born and continuing the treatment 3 times daily for the following ten days. Lieblisch also believes that good results have been obtained by giving the dam 10 grams iod. calic. per day. Thus the foal gets iodine with the milk, and this is said to have a good influence on the power of the foals to react against an infection of the navel.

The other kind of joint-ill Lieblisch believes to be a pre-natal infection, or an infection at birth. In his opinion this is the most common kind. Here synovitis is the rule. There is seldom any formation of pus in the joints; usually there is only a serous or sero-fibrinous infiltration in or around the joints and tendon sheaths. The clinical symptoms are the usual ones with general disturbances: Loss of appetite, rapid breathing, fever, and swollen joints and tendon sheaths, etc. In cases of this kind Lieblisch has obtained excellent results by treating the foal with the dam's serum. He reports 20 cases treated in this way. In 15 cases the foals were saved while in 5 the foals died. Four of the foals which did not recover were treated too late, and one was first treated preventively and again curatively on the second and third day after it had become ill. Lieblisch describes very minutely all the cases treated. Many of the foals had been very seriously ill. As a rule the serum was injected intravenously. In some cases he noticed that the foal, after the injection, showed symptoms of anaphylaxis. One foal, injected preventively, died in a few minutes after the treatment owing to apnœa. Lieblisch recommends the injection to be made with an interval of some minutes. At first he injects a small quantity, 20 or 25 c.c., then stops the flow by pinching the India-rubber tube for a minute or so, and the injecting can then be continued without any danger. The quantity of serum used by Lieblisch was 300 or 350 c.c.

John (*Zeitschrift für Veterinärkunde*, 1918, part 12) mentions two cases of lameness. The first was a nine-weeks-old foal with a swollen and sore hock joint, general disturbances and high fever (40° C., 104° F.). The foal was treated with 450 c.c. of the dam's serum intravenously. Result, complete recovery. In the second case the foal was ten weeks old and had had a suppurating affection of the coronet joint of the right hind leg for six days. By this time the left elbow joint had also been attacked. There were great general disturbances and the foal was unable to rise. It was treated with 450 c.c. of the dam's serum intravenously. The foal improved by degrees and in eight days it had entirely recovered.

Meyer (*Deutsche Tierärztliche Wochenschrift*, 1920, part 5) has treated six cases of joint-ill in foals with the dam's blood subcutaneously. In two of the cases the umbilicus was affected. In all the cases the diagnosis was quite positive. Two of them were of a very serious kind. In the first the foal was 17 days old and had been ill for two days. There were very great general disturbances and the temperature was 40.6° C. (105.1° F.). Both knees and three fetlock joints were swollen. Treatment, 400 c.c. of the dam's blood subcutaneously, but without any addition of citrate. In 36 hours the foal had entirely recovered. The second serious case was a long-standing one. The foal was 19 days old and had been affected with a swollen hock joint for six days, and the last two days the other hock joint and fetlock joints had also been swollen. There was a lameness and the foal had great difficulty in moving about. It was treated with 300 c.c. of the dam's blood subcutaneously. After five days the foal was able to run around the dam, and it gradually recovered completely.

Mieckley (*Zeitschrift für Gestützkunde*, 1913, part 10) has treated 20 cases of joint-ill with the dam's serum or blood. In 15 cases he obtained good results, but in 5 cases the foals died. The last 10 cases were treated with the dam's blood. All the foals in these cases recovered. The quantity used was 400 c.c., and it was injected intravenously.

Out of the 157 cases mentioned above 127 cases were treated with success while in 30 the foals died. Still it may be assumed that some of the unsuccessful cases could have been saved if the treatment had taken place at an earlier stage of the disease or if sufficient quantities of serum had been administered or the treatment repeated.

Of course it can never be imagined that in cases of joint-ill all the foals can be cured by this method, even if they are treated at an early stage of the disease. It is a well-known fact that all animals have not the same possibility of producing antibodies. In cases of infectious abortion in mares it has been shown, for example, by Glanders (*Deutsche Tierärztliche Wochenschrift*, part 21, 1920) that the serum of a mare which has aborted may not agglutinate the bacteria cultivated from the carcass of her own fetus. It has also been found many times that not all serum horses are well adapted for producing powerful serum. Thus it is not astonishing if the dam should not have antibodies enough to save her foal in a case of joint-ill. Besides, it may have been a common navel infection.

The ideal method of treating joint-ill in foals, as in cases of other infectious diseases, is, of course, to have a good serum produced by ordinary serum horses, but so long as this is lacking the method of treatment with the dam's blood or serum seems to be well worth trying.

SIZE OF MARE AFFECTS VALUE OF COLT

In urging stockmen to use dams of good size and quality a Missouri farmer contributes his experiences to an inquiry on the cause of runty livestock recently conducted by the Government. "A farmer or breeder," he writes "can not expect good results from breeding an undersized mare. A \$200 mare will produce \$200 to \$300 colts, while a dwarfed, undersized, imperfectly limbed and muscled mare will produce a \$50 colt that will not pay for its keep. My colts from 1,100 to 1,200 pound mares have been selling for \$150 when 15 months old. Colts are a farmer's delight if he will use his brains in the selection of good brood mares and breed to none but scientifically selected stallions with a record for good colts."

HEAVY LOSS OF HORSES

He was sitting on the curb, looking at his car, and as we passed by he greeted us so pleasantly that we must perforce stop and exchange a word with him, though he was a stranger.

"Car trouble?" we asked, idiotically.

"Lossa trouble," he acquiesced. "Gotta forty-horse power car there. An' thirty-nine o' them poor hosses is dead. Terrible eek—eek—eek—" he seemed unable to get any further, and he hiccupped.

"Terrible economic loss?" we suggested.

"Nope. Terrible eek-wine mortality!" he succeeded, triumphantly. "I had some o' this here, now, good-natural alcohol," he went on. "An' I'd otta've give some of it to the engine. But I drank it. An' now I only got one hoss left."

He seemed about to weep, so we left him.—*Cleveland Plain Dealer*.

The English scheme for licensing Thoroughbred stallions has now been in effect a year. During this time 193 stallions were examined and 10 refused licenses on account of ringbone, spavin, and other troubles.—*National Stockman and Farmer*.

THE BACTERIAL CONTENT OF THE GENITAL TRACT OF CATTLE, AND ITS RELATION TO CALF INFECTION¹

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ALTHOUGH the diseases of the genital organs of cattle have been investigated periodically for the last twenty years, no systematic bacteriological study of the entire female genital tract has been made. Valuable work has been done on the uterus alone and on the ovaries alone, but very little correlated material can be found in the literature of the subject. Some research has been carried out in comparing the flora of the pregnant uterus with that of the intestinal tracts of fetuses and calves. Work has been done also on the flora of the vagina. It is unnecessary to give a detailed history of this work, because what has been done as regards these diseases, which strike at the root of the reproductivity of domestic animals, is familiar to every one interested in the matter.

In 1904 Denzler (1), working at Stuttgart, did considerable work on the bacteria commonly found in the vaginae and also some bacteriological work on the entire genital tract. He records staphylococci, streptococci, and organisms from the colon-aerogenes group.

In 1919 Giltner and Bandeen (2) compared the bacterial findings from ten puerperal uteri with those from the meconia of calves from the same uteri. They say:

“Thirty-four organisms were isolated from the vaginae and twenty-four from the uteri. There were fifty-two different organisms isolated, only five of which occurred in both uterus and vagina. There were no two cows which showed an identical flora in either uterus or vagina, and there was very little similarity in the bacterial flora of any two cows, although they were all on the same premises. * * *

“Of the organisms found there were, of the four genera according to Migula: Bacterium, 22; Bacillus, 3; Micrococcus, 11; Streptococcus, 4.”

There is an immense amount of work involved in an investigation of this kind, and it requires a long period of time. In my own work I have tried to determine four things: First, what organisms, if any, normally live in the organs comprising the female genital tract of cattle? Second, at what age of the animal do the organisms enter the genital canal? Third, what relationship exists between these microorganisms and the pathological changes associated with them?

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

Fourth, what effect is produced by these organisms on the fetus in the pregnant uterus or on the calf after birth?

In order to simplify the work, all the animals have been divided into six groups. Group I represents fetuses either aborted or removed from pregnant uteri. Group II is made up of calves from 1 to 20 days old. Group III comprises animals ranging in age from 3 to 12 weeks. The fourth group is virgin heifers; the fifth is non-pregnant cows, and the sixth is comprised of pregnant cows. More work has been done on Group V than on the other groups because of the greater ease with which the non-gravid tract is obtained.

The genital tracts of 114 animals have been cultured to date. Not all of these animals were normal. The tracts were collected from many different herds and abattoirs. Thirty-three came from animals that were slaughtered because they were non-breeders. The largest number coming from a single herd was 12, all of which were slaughtered because of sterility. Many of the other animals were reactors or beef cattle. The virgin heifers were shipped from the Middle West and slaughtered for beef. The group of 29 fetuses was made up of 13 females, 13 males, and 3 the sex of which could not be determined macroscopically because of their small size. One of these small fetuses was mummified. Fifteen of the fetuses were abortions, and 14 were removed from pregnant uteri, one of the latter being removed in a case of torsion of the uterus.

Cultures were made from the ovaries, oviducts, right and left uterine apices, body of the uterus, cervix, and in most cases from the vaginal folds around the external os uteri. At least four cultures, two aerobic and two anaerobic, were made from each. Not less than forty cultures were made from each tract except in the case of the smaller animals where the oviducts were so diminutive that it was practically impossible to culture them. In such cases the oviduct and ovary on the same side were crushed together and cultures made from the entire mass of crushed tissue. The testicles and epididymes of the male fetuses were crushed in Rosenow's tissue crusher and cultured. The alimentary tracts of the fetuses, including rumen, abomasum, small and large intestines, and meconium from rectum, were cultured. The heart's blood, lungs, spleen, liver and occasionally other parts of the fetus were cultured.

The technic of this work has been described in a former paper (3), but the essential points are as follows: The tract is removed from the animal carefully, placed on a sterile towel, and brought to the laboratory. In many cases, if the animal is small, the entire

animal is brought into the laboratory and posted there. Work done in the laboratory in this manner gives the best results.

After trying out many kinds of media, I have found that glucose-glycerin agar with a little sterile serum or defibrinated blood is the best medium to use. A large amount of the material to be inoculated is always placed in each tube. Sterile pipettes are employed in cases where there are fluids. Where there is no fluid, pieces of tissue are torn out with sterile forceps and transplanted on the medium. In order to obtain partial oxygen tension, in which the cultures from the genital organs seem to develop best, the cotton stoppers are either covered with sealing-wax or the tubes are placed in large jars with ground glass stoppers. An alcohol lamp is set in the jar and lighted; vaseline is smeared over the ground surface of the cover. The tubes are placed in the jar and the cover fitted on. The flame burns only until the oxygen has been consumed. The latter method is fairly satisfactory, but I have obtained better results with the sealing-wax, although this involves more work.

All cultures are incubated at 37° C. Examination is made practically every twenty-four hours, and as soon as a growth appears the tube is removed and the culture identified if possible. The contents of the uterus, unless it was empty, and also the fetal fluids contained in the alimentary tracts of fetuses, are injected into guinea-pigs. Other material suspected of being infected with *Bacterium abortus* is ground up with sterile saline solution and likewise injected into guinea-pigs. In three to four weeks the pigs are slaughtered according to Smillie's method of isolating *Bacterium abortus* from infected tissues (4).

A sample of blood is collected from most of the animals and set with *Bacterium abortus* antigen to see if the serum will agglutinate the antigen.

The results of this bacteriological investigation have been extremely interesting. The cultures from the genital tracts of the 26 male and female fetuses were uniformly negative, with the exception of the uterus of fetus No. 10, from which a Gram-negative short rod was recovered. Its morphology was similar to that of *Bacterium abortus*, and it agglutinated positive abortion serum in dilutions as high as 1 to 200. This case was of especial interest because *Bacterium abortus* was not recovered from any other organ in this prematurely expelled fetus. A *Staphylococcus albus* was recovered from the lungs.

Five aborted fetuses and 5 fetuses removed from pregnant uteri failed to give any bacterial growth from the various tissues cultured.

Three aborted fetuses showed pure cultures of *Bacterium abortus* from organs other than the genital organs. Three of the fetuses obtained from gravid uteri gave cultures of *Bacterium abortus* and streptococci. One of these fetuses was the mummified fetus, No. 20. Streptococci were recovered from tissues from 5 abortions and from 5 fetuses removed from pregnant uteri. Occasionally a staphylococcus or a member of the colon-aerogenes group was recovered with the streptococcus, but I did not find in this group a colon organism unless the fetus had lived for a short time. There was one exception—a fetus, No. 23, that was removed from a pregnant uterus in an abattoir. The cecum from this calf gave pure cultures of a 2-sugar colon. Fetus No. 18, which was expelled 42 days after the cow was bred, and fetus No. 19, which was only 2 cm. long, gave pure cultures of streptococci.

The cultures from the genital organs of the 6 calves were uniformly negative, with the exception of calf No. 6, which gave a pure culture of a streptococcus from the body and apices of the uterus and also from the folds of the vagina around the external os uteri.

The cultures from four tracts of the 11 veal calves were negative. A short Gram-negative rod, with morphology similar to that of *Bacterium abortus*, was recovered in pure culture from the uterine cavities of veal calves Nos. 1 and 10. One culture was agglutinated by positive abortion serum at 1 to 500 and the other in dilutions of 1 to 200. An apparently identical organism was found in pure culture in the udders of Nos. 9 and 10. Staphylococci were recovered from the oviducts of two of these calves, Nos. 1 and 3. The ovaries gave pure cultures of streptococci in two cases and of staphylococci in three cases. From the ovary of one calf a *Staphylococcus aureus* and a streptococcus were recovered. The mucus from the anterior part of the vagina in one case gave a pure culture of streptococcus, while the remainder of the tract was negative.

The genital organs of the group of virgin heifers were, on the whole, almost entirely free from bacteria. Cultures from 5 of the 6 animals were negative throughout. One heifer, No. 2, gave a pure culture of a streptococcus from the uterine apices and both tubes.

Group V, in which I have included 56 non-pregnant animals, is of marked interest. I will mention first the bacteriological results obtained from the 12 sterile cows slaughtered in one herd. These cows varied greatly in age, four or five being heifers that had never conceived. All had been regularly doused and otherwise treated for sterility for many months. All of the organisms isolated from

these animals come in the group of cocci. The majority were streptococci coming chiefly from the oviducts and ovaries. Occasionally a pure culture of a streptococcus was recovered from the anterior portion of the vagina, the cervix or the uterine apices. In a few cases a staphylococcus was recovered in pure culture from various organs of the genital canal, but usually a streptococcus was recovered with it.

The remaining 21 sterile cows were collected from various herds. All of these were slaughtered after being condemned for incurable sterility. All had received treatment of various sorts for sterility. For the most part the bacteriological findings were similar to those of the first-mentioned group of 12 sterile cows. The predominating organisms were cocci, chief among them being the streptococcus. Staphylococci and occasionally a sarcina were recovered, but in nearly every case these were mixed with the streptococcus. In the oviduct of one cow a paracolon organism was found, and in a case of hydrosalpinx an organism from the colon-aerogenes group was isolated in pure culture.

The remaining 23 cows, slaughtered for various reasons, showed fewer bacteria in the anterior parts of the genital canal, namely, oviducts and ovaries, than the same organs of the non-breeders showed. The anterior part of the vagina, cervix and uterus yielded more bacteria than did the same organs of the non-breeders. This may be accounted for by the fact that the non-breeders had been doused, while the majority of the others had not received any attention. *Bacillus pyogenes* and *Bacillus aerogenes capsulatus* were recovered respectively from two cases of pyometra, but in each case a streptococcus was mixed with the organisms named. *Pseudomonas pyocyaneus* was recovered from the uterus of one cow. *Bacterium abortus* was found in the udder of one heifer that had never conceived. The Bang organism was obtained also from the cervix and uterine cavity of an abattoir cow that had been suffering from a severe granular vaginitis and cervicitis. In one or two cases a spore-bearing rod was recovered from the cervix, and a Gram-positive bacterium, which I was unable to identify, from an ovary. Only 6 tracts of the 56 animals were found free from bacteria. Two of these tracts were from non-breeders. The genital tracts of the other 4 were apparently normal with the exception of one ovary in a heifer, which contained a large hematoma.

Group VI is composed of pregnant animals. Two of the 6 animals yielded no bacteria in cultures. Two gave pure cultures of streptococci from the uterine cavities. A pure culture of *Bacterium*

abortus was recovered from the fetal fluids of No. 5, and a Gram-negative rod, resembling *Bacterium abortus* in every respect except that it was not agglutinated by positive abortion serum, was recovered from the uterus of No. 6.

DISCUSSION AND SUMMARY

Streptococci have been isolated from 138 different parts, staphylococci from 78, *Bacterium abortus* from 29, organisms of the colon-aerogenes group from 4, *Bacillus aerogenes capsulatus* from 3, *Bacillus pyogenes* from 3, sarcina from 3, *Pseudomonas pyocyaneus* from 1, and saccharomyces from 1.

From these data it seems that the genital tracts of cattle should normally be free from bacteria. The results obtained from the younger animals seem to support this theory, although microorganisms are sometimes found in their genital organs. The genital tract of a fetus or young calf is almost completely filled with a very viscid, tough, clear mucus. In adults there is less of this mucus except at the estrual period. Denzler (1) states that this secretion has a marked bactericidal action. He injected cultures of various live organisms into the vaginæ of calves and of pregnant and non-pregnant cows. At intervals after doing this he collected some of the vaginal secretion and cultured it. He found that after a certain number of hours he was unable to recover in cultures the organisms which he had injected into the vaginæ. He concludes as follows: "The vaginæ of calves, non-pregnant and pregnant cattle possess the power of cleansing themselves." He goes on to state that the vaginal secretion is a barrier against invading organisms.

There is no doubt that some bacteria enter the upper genital canal per vaginam, but it does not seem incredible that some microorganisms enter the genital organs from a hematogenic source. The literature concerned with human gynecology cites many instances where the streptococcus has been carried to the genital organs from other infected areas by the blood.

The genital tract of the adult cow, on the whole, does not seem to be teeming with living bacteria. As a rule only a few colonies have been noted on most of the cultures, or perhaps a meager growth. This is especially true of the streptococcus which has been recovered so many times. It may be due to the artificial medium upon which it is grown. The biological characteristics of the many cultures of streptococci isolated in the laboratory have been quite uniform. They are short, oval streptococci, producing green zones when grown on blood plates. Occasionally a hemolytic streptococcus has

been recovered, but this is rarely found unless associated with a pyogenic condition.

Streptococcus viridans was found in the oviducts of non-breeders. Clinical examination revealed the oviducts to be normal, and after the tract was removed no abnormality of the tubes could be seen until microscopical sections were made and studied. Then it was found that the lumen was completely closed, being filled with connective tissue and blood vessels. In many cases where the tube appeared normal macroscopically, histological sections revealed complete destruction of the mucosa. Whether the streptococcus is the chief offender as regards these conditions can not be wholly proven from the amount of work that has so far been done, but it is associated with them and should be incriminated. Very few cattle have been available for testing out the pathogenicity of this organism. A few calves were used, but the work has not progressed far enough to report upon at this time. If the streptococcus does not cause any trouble, it has remarkable power to withstand the normal bactericidal action of tissues and secretions from the genital canal.

I have not called an organism *Bacterium abortus* until I have injected it into guinea pigs to see if it produced the characteristic lesions, made antigens from the cultures and checked them against positive abortion serum and worked out its biological and staining characteristics.

The recovering of *Bacterium abortus* in the uterus of one aborted fetus and from the udders of two veal calves and one sterile 4-year-old heifer interests me. The length of time this organism persists in the genital organs has been reported to be comparatively short. What interpretation may be placed upon these findings can not be stated at this time. I think that a thorough bacteriological study of the udder should be carried out in connection with that of the uterus, oviducts and ovaries. I have tried to do this, but have failed, in many instances, to obtain the udder in a fit condition to culture.

The most striking fact is the rarity with which organisms from the colon-aerogenes group have been recovered. These are easy organisms to cultivate and if they had been present they would have been found. Except for cultures isolated from the intestinal tracts of calves and fetuses that lived for a short time, I have obtained only 4 cultures of these organisms out of 260. Three were recovered from oviducts and one from the cecum of an aborted fetus. If calves suffer from intra-uterine infections, it seems hardly probable that this group of organisms can cause much trouble. Even if calves are caught on disinfected or sterile pieces of canvas and kept in a

surgically clean environment, they will develop intestinal disturbances—pneumonia, or whatever form the disease happens to be taking in that particular herd. I have tried, with many cultures, to produce these symptoms in young calves, but have failed in every attempt. In three recent outbreaks of these infections in calves I was unable to isolate the colon organism if the calves were killed and cultured a short time before death seemed evident, or even immediately after death. I inserted a sterile soft rubber horse catheter into the rumen and siphoned out some of the contents as soon as the calf was dropped. The material so obtained yielded a streptococcus. The meconium and blood cultures and the placenta from the dam gave the same organism. In these herds cultures from calves that were expelled dead gave an organism identical with that recovered from living calves.

There is one type of calf infection that is apparently due to unclean food and insanitary surroundings. It is easily controlled by adopting sanitary methods and by disinfecting the navel cord. There is also a chronic type in which the calves do not thrive from 3 to 6 weeks. They may develop pneumonia or die from chronic intestinal disturbances. I believe that the organisms from the colon-aerogenes group play a part in these two types of infection, but I do not consider them the primary causative agent.

It seems as if there must be some unknown factor at work in producing these morbid conditions in the reproductive organs of cattle and in the life of the new-born calf. I can not see very much etiological relation between these conditions and the majority of the organisms isolated. The work is being continued and it is hoped that further research will throw more light on some of these problems.

I am indebted to Dr. H. L. Gilman for the pathological work on the oviducts.

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OBSERVATIONS ON THE EGGS OF *DICTYOCAULUS FILARIA*¹

By HOWARD CRAWLEY, *Philadelphia, Pa.*

CURTICE (1) states that the eggs of *Dictyocaulus filaria* (which he designates as *Strongylus filaria*) are ellipsoid and measure 75 to 120 microns long by 45 to 82 wide. On his Plate XXXIV are shown four figures of the eggs. Of these, figure 11-d, which shows an embryo coiled up into a figure 8 and completely filling the shell, is entirely accurate.

Railliet (2) agrees with Curtice in saying that the eggs are ellipsoidal, and gives their dimensions as 112 to 135 microns long by 52 to 67 microns wide. He states that when laid they contain a living embryo the movements of which continually cause deformations of the thin shell. This same author also published five figures of the egg, two of which show it containing an embryo. But these figures are not accurate, since they give the impression that the embryo only partly fills the shell.

Neumann (3) lists this worm (p. 494) as *Strongylus filaria* and on page 495 copies Railliet's figures.

Neveu-Lemaire (4) gives two figures of the egg, also copies of those published by Railliet, and the descriptions and dimensions which he publishes are also the same as those of Railliet.

Combining the data given by the authors, the eggs of this nematode are ellipsoidal, measure 75 to 135 microns long by 45 to 82 microns wide, and the shell yields to the movements of the motile embryo.

The observations to be herein described are based on specimens of this worm taken from the lung of a sheep, No. 10646 of the series of specimens received at the Laboratory of the State Bureau of Animal Industry. This animal was received alive, and died while under observation, but while the lungs were obviously affected by the presence of the worms, it was not possible to say that these were the cause of death, since both stomach and nodular worms were also present. The worms taken from the bronchi were placed in 4 per cent formalin and kept in this preservative.

It is desired to state at the outset that the measurements and descriptions are valid for this particular lot of eggs but not necessarily valid for all eggs of *Dictyocaulus filaria*. This reservation is made because certain observations made in the State Laboratory

¹ Contribution from the Bureau of Animal Industry of the Pennsylvania Department of Agriculture, New Series No. 1.

indicate that there is a tendency for the ova of a particular nematode from one particular host to differ somewhat in size from those of this same nematode from another host. A paper giving data in support of this statement is in preparation.

To prepare them for study the worms were taken from the formaldehyde solution and transferred for a day or two to a medium composed of alcohol and glycerine. They were then mounted on slides in a medium the formula of which is: Carbolic acid, 1 part; lactic acid, 1 part; glycerine, 1 part; water, 2 parts. The effects of this are to clean up the opacity of the worms and thus render them easy to study.

In mounting the worms some of them became broken, with the result that the uterus was forced outside of the worm and a certain number of the eggs became free on the slide. In addition it necessarily happened that in transferring the worms to the preservative there was transferred with them a certain amount of the bronchial mucus, and this contained eggs. It thus came about that in the mounts some of the eggs lay free on the slide, while others were still contained in the uterus, whether this lay in an intact worm or had been forced out of its proper position. This point is emphasized because it has certain significance.

Perhaps the next interesting feature which was brought out with regard to these eggs is that their cross section is not round but elliptical. This was not suspected at first, and 100 eggs were measured as they came, partly those free on the slide, and partly those still within the uterus. These measurements gave the following results: Average, 125 by 73 microns; longest egg, 135 microns; shortest, 110 microns; broadest, 85 microns; narrowest, 57 microns. These figures agree with those already published with regard to the maximum length and width, but not with regard to the minimum. Thus Curtice's minimum figures are 75 microns for the length and 45 microns for the breadth. None of the eggs in the material examined by me were so small as this, and it is permissible to suppose that they refer to the eggs of some other nematode present in the material studied by Curtice.

As seen by the figures published, there are two different ways in which the embryo appears to be arranged in the egg. In the one case it tends to present an appearance which suggests a figure 8, or perhaps better, a pretzel (figs 1, 2, 3, 4). In others (figs. 5 and 6) the appearance is of a worm folded once or twice with one of the segments more or less concealing the others. It is entirely evident

that if the embryo in the former condition were tilted through 90 degrees it would present the appearance of the latter.

It is also to be noted that those eggs in which the embryo presents the appearance of the figure 8 or pretzel are broader than the others. The next step taken, therefore, was to measure two sets of 20 eggs each, the one set composed of eggs such as are shown in figures 1 to 4, the other set of eggs agreeing with figures 5 and 6. For convenience the former may be designated as measured "on face," the latter as "on edge." These two sets of measurements gave—

	Eggs on face	Eggs on edge
Average	125x77	125x60
Longest egg.....	133	133
Shortest egg.....	120	118
Broadest egg.....	82	68
Narrowest egg.....	72	53

The lengths are identical, while there is a great variation in the width, the broadest egg measured on edge being narrower than the narrowest of those measured on face.

In order to confirm the fact that the eggs actually do have an elliptical cross section, and not that they fell into groups both with circular cross sections but one with greater diameters than the other, selected eggs were forced to roll in the mount by moving the cover-glass with a needle. In such cases it was noted that the breadth varied as the egg rolled, and in all cases it was greater when the egg (as determined by the aspect of the embryo) was viewed on face than on edge. In one case observed, the breadth of a selected egg changed from 74 to 66 microns, a difference of 8 microns. This is less than the difference of 14 microns given in the table, but the observations are difficult, the egg tending to come quickly to rest on one of the flat sides.

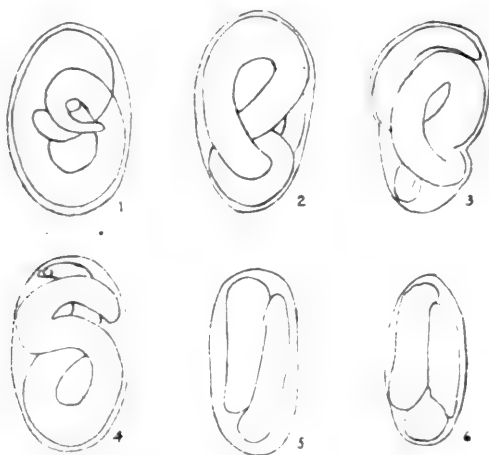
It is also to be noted that nearly all of the eggs lying free on the slide presented the appearance shown in figures 1 to 4. This is obviously merely a matter of physics; a flattened object when free to move will come to lie on one of its flat sides. But in the uterus the eggs, owing to the fact that they are very closely packed together, are not free to assume such a position; therefore it is in the uterus that the apparently narrower eggs are to be looked for, such as are shown in figures 5 and 6.

Amongst the lot of 100 eggs mentioned above, it was noted at the time the measurements were made that 6 were in either the morula or gastrula stage. These were in all cases narrow, the broadest being only 68 microns wide. In consequence 10 other eggs, either

prior to or in the course of segmentation, were measured with the following results: Average, 119 by 63 microns; longest, 131 microns; shortest, 104 microns; broadest, 68 microns; narrowest 57 microns.

The average length is here a little less than that of the eggs containing embryos. The breadth corresponds to that of the eggs measured on edge. It was not possible to make accurate determinations, but the assumption is that in those eggs the cross section is round.

What apparently happens is as follows: As the embryo evolves itself out of the gastrula, its transverse growth is greater in one plane than it is in the other, so that, as already stated, the embryo assumes the form of a pretzel. It thus presses upon the inner wall



Eggs of *Dictyocaulus Filaria*

of the shell in two opposite directions, and the shell yields to this pressure and is permanently held in an asymmetrical form by the embryo which it contains. The somewhat greater length of the eggs containing embryos over those in earlier stages of evolution is probably to be accounted for in the same way.

The quotation from Railliet shows that the shell yields to the movements of the embryo. I was not able to repeat this observation, since in the material at my disposal the embryos were not motile. But in a great many eggs it is easy to see that the shell has yielded to pressure from the embryo, it being more or less bulged out where a portion of the embryo has come into close contact with it (fig. 3).

Ignoring irregularities produced in this way, the fundamental form of the eggs viewed on face is elliptical. At times, however, there is a tendency to assume a more or less ovoid shape (fig. 2), and in such cases one side may be less convex than the other, at times almost flat. The eggs seen on edge are sometimes ellipsoidal, but also sometimes sub-cylindrical; that is, elements with straight or nearly straight sides and rounded ends.

The shell shows a double contour, the outer boundary sharper and more distinct than the inner. It is about $1\frac{1}{2}$ to 2 microns thick, as closely as is possible to measure it.

SUMMARY

1. The eggs of *Dictyocaulus filaria* average 125 microns long, the extremes of those containing embryos being 135 and 110 microns.
2. They are not symmetrical, the cross section being an ellipse and not a circle. The average of the longer diameter is 77 microns, the extremes being 82 and 72 microns. The average of the shorter diameter is 60 microns, the extremes being 68 and 53 microns.
3. The outline, viewed from one of the flat sides, is fundamentally elliptical, at times somewhat ovoid. Viewed on edge it is elliptical or sub-cylindrical.

EXPLANATION OF FIGURES

Fig. 1.—Figure 8 or pretzel appearance. Typical of many eggs. Actual size of this egg, 129 by 85 microns.

Fig. 2.—Much as figure 1. Egg slightly oval. Actual size 133 by 80 microns.

Fig. 3.—Shows distortion of shell by pressure of the contained embryo. Actual size 131 by 80 microns.

Fig. 4.—Ellipsoidal egg. Actual size 133 by 80 microns.

Fig. 5.—Egg seen on edge. Actual size 127 by 62 microns.

Fig. 6.—Egg seen on edge.

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The cackle of a hen when she lays an egg, says a scientist, is akin to laughter. And with some of the eggs we have met we can easily guess what the hen was laughing at.—*London Punch*.

ANIMAL HUSBANDRY IN THE VETERINARY CURRICULUM¹

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ANIMAL husbandry in the veterinary curriculum is a subject that deserves much more attention than it has received. The more one studies this subject the more its importance will be appreciated.

There is a general belief among our leading veterinarians and livestock men that the veterinarian of the future will be a broad-minded animal specialist. He will be what Dr. Leonard Pearson was pleased to term an "animal engineer." He will not only be well trained in the subjects of veterinary medicine but he will also be a trained animal husbandman. Such a man would be an important asset to any farming community and should occupy a place of considerable importance and responsibility. He would be able to speak to the stockman in his own language and render him valuable service in handling livestock problems. If he is not capable of doing this he will often find himself in disagreeable situations.

That was the experience of a veterinarian known to the writer. When this man graduated from a veterinary school, although he had had the average farm boy's experience, he found that his knowledge was too limited to be of value in the promotion of agriculture. He was located in a section where all the farm animals were scrubs or grades and the people were anxious for someone to tell them how to improve their livestock and practice better farm methods. At first he missed many excellent opportunities for helping these people. He knew but little about the production of horses, therefore, when a group of his prospective clients wanted to buy a purebred stallion to use in the community, he had no clear idea of what type or breed to recommend, where the most desirable animal could be purchased, or what price should be paid for it. A firm of importers sent a representative to his community with a horse to sell. The veterinarian was unable to judge whether the animal had the proper quality, conformation, etc. The horse was sold for much more than it was worth to this group of enthusiastic but credulous farmers who were willing to put up the money. They, like most companies of this sort, lost all they put in it, and the horse industry in that vicinity was given a serious blow from which it has never recovered.

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

Later certain farmers in his territory desired to improve their stock of dairy cows. They made a serious mistake because the veterinarian was not conversant with the principles of breeding. He encouraged them to buy heifers which were to be bred to a close relative. It happened that some unfavorable genetic factor in the make-up of these animals was brought to the surface by inbreeding. This resulted in a complete failure and gave the purebred a bad reputation. A man familiar with the principles of breeding would never have made such a mistake. He would realize that the constructive breeder would consider such a mating a hazardous experiment. In both cases an excellent opportunity was offered this veterinarian to have rendered his clientele valuable services which might have resulted in a permanent improvement of the livestock in his community and at the same time establish for himself an enviable reputation.

The modern veterinarian is expected to have the right kind of knowledge on such subjects. Too many are deficient in the principles of breeding, feeding, judging, etc. We should have expert knowledge of the things mentioned and be acquainted with the breed history of our domesticated animals and the best families in each breed. We should also know the types and breed characteristics. A man once said, "If a veterinarian should look over the fence and remark that a certain Poland China sow was a pretty good Berkshire, it would probably shake his client's confidence in his ability as an animal physician."

In addition one should know the principles of horsemanship, have a knowledge of the various bits and their functions, and of saddles, seats and harness; how to dress animals for the show-ring and how to show them. Such subjects as soils and maintenance of soil fertility, care, management and feeding of livestock, construction and ventilation of farm buildings, should also be a part of a veterinarian's education. If one hopes to measure up to the maximum requirements of the times he should take a thorough course in animal husbandry. Such course should be considered one of the important parts of the veterinary curriculum.

There should be the closest coöperation between the veterinarian and the county farm agent. The county agent handles the problems of the farmers in a general way. He can not visit all farms and get into close contact with every farmer. His field is too large to permit such detailed attention. The veterinarian comes into more intimate contact with the farmer. It will be mutually helpful to the veteri-

narian and the county agent if they cooperate fully in their work.

The following statement made by Wayne Dinsmore, former Secretary of the Percheron Society of America and now Secretary of the Horse Association of America, indicates how the stockmen of the country feel on this subject. He says:

"I am frankly of the opinion that veterinarians need this work as much as animal husbandry students in the regular agricultural colleges do; for long experience has satisfied me that veterinarians oftentimes do themselves great harm through lack of knowledge of recognized breeds and types of horses and through their inability to judge intelligently of the relative merits of two horses when viewed from the standpoint of practical horsemen. It is regrettable, but none the less true, that horsemen generally consider veterinarians, as a class, very poor judges of horses, whereas they should be particularly well qualified if they are to do justice to their profession. To sum the matter up in a nutshell, in my judgment veterinarians should have the most rigorous, exhaustive training in animal husbandry work, particularly in horse judging and in feeding and management of horses of all types; but the work should be thorough or not given at all, for a little knowledge is a dangerous thing, and a veterinarian who has had a smattering of judging work is the most obnoxious man among horsemen that can well be imagined. You may well emphasize also that it takes time and persistent study of large numbers of animals to develop men into satisfactory horse judges. They must study the best types of each class and each breed and by persistent study of the ideal learn to recognize inferior types at a glance, but there is no short road to learning in this particular line. The great fault with nearly all of the veterinary schools that give any work in horse judging is that they attempt to give in three months the work that the agricultural colleges take three years to cover."

What has been said by Mr. Dinsmore indicates the need and demand for a comprehensive animal husbandry course in the veterinary curriculum.

At the University of Pennsylvania we feel that we have been devoting sufficient time to all animal husbandry subjects, except practical judging, and we have just added another two hours per week for one year, so we hope for better results in that branch in the future. The work is given as follows:

The students begin studying animal husbandry the second semester of the first year. The first subject is equitation. Dr. Gay's "Productive Horse Husbandry" is used as a text-book with two one-hour recitations per week for eight weeks. We study the requirements of a good stall, construction and management of stables, care and management of the breeding stock, horsemanship,

bits and biting, riding and driving, seats and saddles, the classification and construction of vehicles, transportation and showing. Then the practical work begins. The students are taught how to splice rope, tie a few useful knots, and make three types of rope halters. Work in fitting bridles, halters, collars and harness is given next. After this they are taught how to approach a horse, lead, show him and measure his height; how he should be cleaned and feet and legs cared for, and how to decorate mane and tail for the show ring. We conclude this part of the work with a horse show. Each student is required to clean, decorate and show a horse. A prominent horse breeder acts as judge and a prize is given to the student winning first place. The students are then required to take five riding lessons at one of the best riding academies in Philadelphia. How to handle sheep in the show ring and set them up on their rumps is also taught in this course.

Market types and classes is the subject taught the first semester of the second year. Prof. Vaughan's book is used, with two one-hour recitations per week, and one afternoon per week is devoted to practical judging at the Philadelphia livestock yards. Two one-hour recitations per week, second semester, is devoted to the study of the origin, history, development, breed characteristics and economic importance of the breeds of horses, cattle, sheep and swine. Prof. Plumb's book is used as the text. Practical judging of breeds is done on near-by farms one afternoon each week.

Feeds is the next subject considered. Two one-hour periods the first semester, third year, are devoted to this work. At this time the study of the origin, classification and characteristics of our soils and the maintenance of soil fertility is introduced. This is given in the form of lectures and demonstrations. Following this we use Henry and Morrison's "Feeds and Feeding" and have recitations on the classification of feedstuffs, their production and preparation. The following semester two hours per week are devoted to feeding, which includes the economic production of horsepower, beef, milk, mutton, wool, poultry, eggs and by-products, also the care and management of the herd and flock. This work is given in the form of lectures and recitations.

Breeding is studied next, two lectures per week, fourth year, first semester, on the history, principles and practice of breeding livestock. A general course in genetics is given as a basis for this work.

One afternoon per week, for twelve weeks, fourth semester, is used for visits to stock farms in near proximity to Philadelphia, for

advanced judging of types and breeds of horses, cattle, sheep and swine. This affords our students an opportunity to see some of the best specimens of many breeds, the most modern farm buildings and their equipment, and a chance to observe the manner in which they are cared for.

There are several ways in which veterinarians who have had no training in animal husbandry can become proficient animal engineers. They can read such papers as the *Breeder's Gazette*, *Hoard's Dairyman* and the *National Stockman and Farmer*, and attend county fairs and large livestock shows like the International Livestock Show and the National Dairy Show. They can organize boys' and girls' calf and pig clubs or local livestock associations or cow-testing associations. By starting organizations of this kind, interest in livestock would be stimulated in the community and the veterinarian would learn a great deal about animal husbandry.

The following books could be studied and a broad knowledge of the subject gained:

Origin and Influence of the Thoroughbred Horse, by Ridgeway.

Types and Breeds of Farm Animals, by Plumb.

Productive Horse Husbandry, by Gay.

Types and Market Classes of Livestock, by Vaughan.

Feeds and Feeding, by Henry and Morrison.

Farm Management, by Warren.

Physical Basis of Heredity, by T. H. Morgan.

Genetics in Relation to Agriculture, by Babcock and Clausen.

Soils and their Properties, by Lyon, Fippin and Buckman.

DISCUSSION

CHAIRMAN HILTY: This is a paper that should be discussed. I am going to ask Dr. Hoskins to open the discussion.

DR. HOSKINS: This is a very interesting paper, the most interesting of the kind I have heard. When we look back to the days when Dr. Hilty and some others of us were in the veterinary schools, animal husbandry and industry were almost absent from the curriculum. Today it is of paramount importance in our veterinary schools, for the reason that veterinary medicine is the service of the domestic animals that furnish our great food supply, while we here in our meeting are constantly being reminded that the place of the veterinarian and the place of veterinary medicine is closely allied to agriculture.

Being connected with a school located in a large city, during the last three years, and coming in contact with a great many men in that State, from the lowest to the highest walks of life, it has been almost tragic to realize how little the average man in the other professions knows of the value of the veterinarian and of veterinary medicine. The problems of

food and raiment are far more difficult in the large cities than they are in the country, and from this I have sensed the reason that our veterinary schools are not adequately supported and equipped. It is because of the paucity of knowledge of the large mass of the people, and those of the higher walks of life in the large cities. These problems come with greater intensity to the larger population in our larger cities. So that we must get the legislative bodies to work, and we must make our needs and wants known, and educate these people as to our wants and needs and our place in civilization.

Speaking of the veterinary schools, I am aware that most of those and also the agricultural schools have been struggling the greater part of their life-times. When you think that in the great Empire State of New York, with its millions and millions of people and twelve millions of acres of farm lands, 40 per cent of the tenants farming, more farm mortgages than any State in New England and the Middle States, that these ten millions of people are spending so small a sum of money upon the problems of economic veterinary medicine, spending much less in veterinary culture and police control work than many much smaller States, and some with less than a million inhabitants within their borders, it gives one some conception of how little is known of the value of veterinary medicine by the great majority of these ten millions of people.

The proposition made today by the Committee on Intelligence and Education, which I discussed at some length with two members of that committee, relates to a campaign to educate the people to realize how absolutely they are dependent for food and clothing upon economic veterinary medicine. Many of the men who go into our legislative bodies are from the larger cities and towns; they do not know what economic veterinary medicine stands for, and are perfectly indifferent to the appeals of those engaged in agriculture for relief from the great economic losses that they suffer. It is very timely indeed that all of the schools, within the first and second year particularly, be given a course in animal husbandry and industry.

There is another reason. With the high requirements of our schools 90 per cent of the future students will be young men between the ages of 17 and 22, and a goodly proportion will not come from the farm; they will come from the high schools of the cities and towns. So we are not going to have as large a proportion of the student body with the aptitude for the profession that we have had in the preceding years in the organization's history. A large percentage of the student body in my day were young men from the farm, from the rural communities, whose lives had been, up to the time of their entrance into the veterinary school, associated with animal industry in some form.

New York State loses many domestic animals, and the losses amount to from five to ten millions of dollars a year. I told members of the Legislature in Albany last year that if that were the problem of a great corporation that had a loss of over ten millions of dollars a year, they would put in somebody at a salary of \$25,000 a year to solve those problems. They are problems to the man on the farm, and they are problems to the people in congested centers, for the reason that the cost of these losses to the individual falls upon the shoulders of the consumer.

DR. GLOVER: I have listened with much interest to the remarks of the essayist and Dr. Hoskins. I agree with the remarks and think their truth should be appreciated. The question is, How are we going to do this? Frankly, I don't see how we are going to get the time for these subjects in the schools. We have all the semesters filled, and we would have to take the time that is now devoted to major subjects of veterinary medicine. Our students are in college primarily to learn the science of veterinary medicine, and there are just so many hours devoted to it, and at present we don't feel that we are getting enough time.

I fully realize where the veterinary profession is weak. I know personally of qualified veterinarians who have gone to some places to practice and have not had the work, and have been obliged to pull up stakes and leave. Why? Because other men who were there knew how to handle the farmers, and the college men did not. We talk about a lack of professional information, and we seem to be inclined to try to force an issue. We want to force the farmer to appreciate the value and importance of the educated veterinarian. We are getting the cart before the horse. It seems to me that whenever the time comes that we can produce a graduate veterinarian who can render the service that will be appreciated, we will find professional recognition will come, and that the demand for veterinarians will increase, and we will not need to run advertisements in our farm journals in order to interest the farmers in the veterinary question. We have got to get at this thing from the right end. And the question is, How are we going to do it?

The other suggestion is that these veterinarians should be broad-minded men, representative men, able to meet the classes of people who are interested in something besides the doctor business. I think you will agree with me that many veterinarians come out from the colleges thoroughly imbued with the one idea that they have to doctor, that they are doctors; but I believe that the veterinarian should cultivate the social side and not only the side of the practitioner. A man who practices veterinary medicine must be a mixer, must have an education, must be able to go to a farm and make himself agreeable. A veterinarian, when he goes to a farm, should be liked, he should be welcome, and he should know that if he wants to get on the good side of the farmer he must pay some attention to the man's livestock, and he must pay respectful attention to the man's wife—but not too much; and if he wants to get the good favor of the wife he must notice the children; and if he wants to get in the good graces of the children he must notice their pets and toys.

These things may seem foolish and absurd, but they are not. It is all in the line of food for thought. I know a man who located in a small town in Wyoming. He was in good standing and seemed to be successful, but when he met the farmers on the road he gave them a respectful bow; he had not been brought up to know the farmer and the farmer's wife and children and their pets. But finally another veterinarian came there and he soon knew everybody, and made it a point to make himself agreeable and pleasant; and the first fellow stayed only about three months.

What can we do as educators to imbue our students with the importance of being broad-minded fellows, and to know something other than the science of the doctor's business? I think that is the important thing for us to consider; and I would advise you to devote no more time to animal husbandry than the four years' course in veterinary medicine, for we can not at the present time do it.

DR. MURPHEY: There are some other results which have been brought out in this paper regarding the course of animal husbandry that I think should be emphasized a little more. This discussion has been illuminating on some points. We do not give the amount of attention that we should to feeds and feeding. The internal diseases are found to be of more importance on account of the character of the feeds than anything else. Individual feeding has passed.

One of our problems is to get a little more time in the curriculum. You know the President of the Association says there is too much time devoted to the academic; that we should take out some of the old courses; that if we would do that we would get the time for these extras. I find in therapeutics we get some of the histology. We use that in order to tell the students how to destroy parasites. We have to tell them about the histology so that they will understand the pathology, and they take up pathology so that they will understand the diseases.

One of the things that pleased me more than I am able to tell in a few words is the chance for the students in animal industry. I know that as a student I did not get interested in the things which I was told about animal industry.

In Ohio the head of the Bureau of Animal Husbandry work is a veterinarian. You all know well of the lectures carried on by Dr. Gay, the animal husbandry man, and at the University of Pennsylvania the veterinary students are presided over by an animal husbandry graduate who is also a veterinarian. This work could be done in all departments when it is at all possible, with all subjects that touch on veterinary science, or more particularly when you can get a good veterinarian. I think that we can rest assured that some of the men interested in animal industry will work a reform, without teaching misconception, and with much advantage to the veterinary student. I think this has been a good paper, and many good things have been brought out on this topic.

A writer in *Holstein Friesian Register* says "The Chinese have never had a dairy breed of cows, and only recently have begun to 'cultivate the practice of using that most valuable food for children (milk) through the use of tinned milk from Europe and America.'"

"Humboldt County, Calif., has a milk-goat association, which has negotiated for the services of a cheesemaker from the Alps. They will shortly commence the manufacture of goat-milk cheese, and, if a market be established, goat-milk butter. The butter from goat milk is said to be higher in vitamins, as it is not necessarily pasteurized."

THE RESPONSIBILITY CONFRONTING THE VETERINARY PROFESSION¹

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THE protection of a ten billion dollar livestock industry in the United States from the devastation of disease and from an inestimable loss of animal life and valuable property in an industry which supplies material for food and clothing for more than one hundred millions of people besides the food and clothing exported to foreign lands; the economic, industrial, commercial and financial considerations involved; the safeguarding of human health and life from infection and infestation of animal origin, to say nothing of humane considerations connected with the alleviation of animal suffering and prevention of cruelty, and other outstanding features of veterinary work, do not by any means constitute the full responsibility resting upon the veterinary profession.

A new rôle and a new responsibility have come to this noble calling, if we would lift it to still higher levels of service and achievement. The demand of the hour is for a greater production and conservation of every kind, but before we can have food and clothing, animals must be bred, reared, fed, grown and converted into suitable form for the use of mankind. It is not simply the propagation of livestock on a larger scale that is needed, but a more intelligent application of the principles of veterinary science to breeding problems, to the end that a better, a more plentiful, a more economic, a more nutritious, as well as a more healthful food supply may be available. The principles of veterinary science must be applied not only to breeding operations, but also to furnishing a balanced ration, providing proper rearing and general management of livestock. It is absolutely impossible for animal husbandry and industry to reach its highest state of development and attain maximum economy and efficiency without the potential aid of veterinary science in the whole realm of animal breeding and rearing, as well as livestock management in general, including transportation problems, exhibition of livestock, judging livestock, marketing and all other branches of the animal industry.

Such knowledge is now sought and appreciated by agriculturists, breeders, stockmen, feeders and dairymen to a greater extent than

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ever before; largely because agriculture is rapidly being placed upon a scientific basis through the instrumentality of the State agricultural colleges, experiment stations, the Federal Government, extension work, the activities of the trained county agent, and last, but not least, the establishment of agricultural departments in rural public high schools. All this is bound to lead to an appreciation, recognition and demand for the services of the trained veterinarian unheard of in the past.

Do not let us lose sight of the fact that with all its splendid achievements the veterinary profession is only in its infancy in this country. The opportunities for the adequately trained veterinarian will increase with the advancement of agriculture and the further development of animal industry, but the incompetent practitioner will not be tolerated by scientific agriculturists and breeders. It seems to me that it is unreasonable for a veterinarian located in a country district to expect to meet with a large degree of professional success if in addition to being in hearty sympathy with the agricultural extension movement he does not coöperate in full accord and harmony with the county agent in all his activities for the welfare of the community.

It is indeed a great privilege I have today in being permitted to address my colleagues of the American Veterinary Medical Association on a subject of such paramount importance to humanity as the improvement of animal husbandry, and the production of such essentials as human food and clothing. Never in the history of man has there been such a momentous responsibility upon the veterinary profession as there is at the present moment, a responsibility which, even if we would, can not be escaped; and therefore it behooves us to consider some of the larger problems that confront us. This Association has a great constructive work ahead of it, which, by reason of the character and ideals of its membership, will undoubtedly be performed in the interest of agriculture, industry and commerce, and its direction and leadership I feel sure will be hailed with satisfaction by all who have a broad conception and a wide vision of the demands of the future.

One of the first essentials is for the A. V. M. A. to make certain that the average veterinarian himself has a deep appreciation as to the fundamental and far-reaching importance of the science to animal husbandry, human life, prosperity and happiness.

I am in favor of this Association taking steps for the enlightenment of the public mind as to the character and the indispensability

of veterinary science in economic and efficient agriculture and as to the extent to which the urban as well as the suburban population is dependent upon the veterinarian for the enjoyment of health and the pleasures of life. A greater value of livestock and a more intense agriculture will increase the demand for the services of the veterinarian at a better remuneration. We can not reasonably expect the public to support the advancement of the profession unless it has a comprehensive conception of the character and scope of its activities and the vital importance of such activities to organized society, prosperity and the conservation of human health and life. What proportion of the people in any large city realize how dependent they are upon the veterinarian for sound and wholesome food? The value of our science to man in the production and conservation of human food alone justifies a most generous support of the profession, and I take it that it is a part of our job, the job of the A. V. M. A., if you please, to see to it that the general public is no longer left in ignorance as to its vital work and high purpose.

The status of law, medicine, theology, engineering, and perhaps some of the other professions, seems to be pretty well established in the public mind, and it would be almost an insult to the intelligence of the ordinary citizen to undertake to explain to him the standing and importance of these respective professions; but when it comes to the veterinary profession, what conception has the public as to its vital and far-reaching importance concerning the prosperity and welfare of the people? Do they know how dependent they are upon veterinary science? Does the urban population know that the veterinarian, in a very real sense, is the guardian of its health? Does the banker realize that the veterinarian is not only safeguarding, but applying the principles of veterinary science to the advantage and upbuilding of one of the greatest industries—that of the animal industry—which is an important factor in the greater possibilities of the banking business? Does the average person of education and refinement realize the nobility of the veterinary profession, and that he could not continue to possess comfort, health and happiness in the degree that he enjoys them if it were not for the achievements of veterinary science? I fear that the answer to these and like interrogatives would be in the negative; so I feel that it is the imperative duty of the A. V. M. A. to see to it that the public mind is no longer left in ignorance of a profession of such fundamental and far-reaching importance as that of veterinary science.

Necessity for prevention, as well as for the treatment of diseases of animals, is tending to make veterinarians the constructive leaders

in all matters pertaining to the health of livestock, since the losses from disease constitute the main hindrance to animal industry and the increase in the value of cattle, sheep, swine and poultry, while the cost of meat and dairy products are emphasizing the importance of the conservation of livestock. Our profession faces a responsibility which must be fairly and squarely met, if progress commensurate with the value of the science to humanity is to be made. This responsibility can not be discharged merely by the treatment of animal diseases therapeutically, or by preventive medicine as ordinarily understood and practiced, nor by the adoption of sanitary measures, eradication work, quarantine, police control or any other measure or activity along the line of checking, suppressing, curing or exterminating disease. The larger work of the veterinarian in the future will not be the treatment of disease, or even the enforcement of preventive measures, in the ordinary acceptance of that term; but his best energies will be expended in coöperation with breeders and growers of livestock in the upbuilding of a larger and better animal husbandry and industry, perpetuating the fertility of the soil; his work will be developed and maintained in accord and harmony with physiological laws under favorable conditions of the health, transportation and management of the livestock industry, so conducted that diseases which now occasion the loss of tens of millions annually will not occur at all, much less be disseminated from flocks or herds for thousands of miles from State to State and from one nation to another through the facilities of modern transportation.

In order to be more specific, I am going to divide veterinarians into five groups or classes:

1. Research workers and teachers.
2. Practitioners—those who treat disease therapeutically, by serum therapy or otherwise.
3. Sanitarians and official veterinarians—those who prevent disease by sanitary measures and those who are engaged in eradication and control work.
4. Army men.
5. Animal engineers—those whose training in the basic sciences of biology, chemistry and knowledge of animal husbandry enables them to make application of their knowledge of plant and animal life to the improvement, development and maintenance of superior breeds, types and classes of domestic animals in harmony with the laws of physiology and health for specific purposes, such as the production of meat, milk, wool and work.

Better livestock, bred and reared with greater vitality and productiveness, capable of adapting themselves to climatic and feeding conditions, with a natural immunity and with an inherent resistance to infection and disease, should be the objective of the veterinarian; and it seems to me that herein lies the foundation upon which a more efficient and economical animal husbandry is to be projected.

The necessity and advantages of the services of the first four groups of veterinarians are to a great extent obvious and generally admitted, and therefore, for the purposes of the present discussion, I shall confine myself more particularly to the fundamental importance of the work of the fifth group in the upbuilding of an animal husbandry and industry that will obviate heavy losses and unwarranted expenses because of our tendency to deal with effect instead of with cause.

Owners realize the necessity of proper treatment and care of livestock in sickness; the public recognize the importance of the control and extermination of infectious, contagious and parasitic diseases. Prophylaxis, preventive medicine and sanitation seem to be uppermost in the scientific as well as in the lay mind; and right here perhaps the greatest responsibility confronts the veterinary profession, for if the physical laws of animal life were more closely studied and a more intelligent application made of them in the breeding, rearing, management and general operations of the animal industry, such a transformation could and would be brought about as would supersede much of the dealing with effect, which in reality is what is being done in our control and eradication work. The responsibility for leadership and direction in projecting this constructive undertaking rests upon the A. V. M. A. Where it has not already been done, veterinary instruction and research should be provided for in medical and agricultural colleges and experiment stations. Through county agents and local organizations, extension work in agriculture offers an excellent opportunity for veterinarians to cooperate more effectually with farmers for the advancement and development of agriculture in harmony with the physiological laws of plant and animal life.

While preventive medicine owes an incalculable debt to sanitary science, the latter has its limitations, for if neutralization and sterilization were carried to the extreme no plant or animal life could exist. The veterinarian, through the sciences of biology and chemistry, has opened an avenue which can not fail to lead to wonderful results concerning the laws governing all physical life. Indefensible is the indiscriminate destruction of bacteria and microörganic life,

because it has been found that certain varieties are the causative agents of certain specific diseases in man and beast.

Is a wholesale slaughter or sterilization of microörganic life necessary or justifiable? In so doing, may we not be interfering with the processes of life? Have we any more warrant in continuing to pursue such a course than our forebears would have been justified in exterminating all the beasts of the field because in their wild state some of them were dangerous to man? Does not the fact that certain bacteria that are pathogenic to certain species and under certain conditions are not so to other species and under other conditions suggest possibilities of regulation and control?

All plant and animal life, including bacteria and microörganisms, have a specific function to perform in nature's economy, and the rational and scientific thing to do is to increase our knowledge of the conditions of existence so that we may be able to regulate, control and utilize microörganic life for the benefit of mankind, as wild beasts have been transformed into domestic animals which now provide material for our food and clothing, thereby materially contributing to our prosperity, comfort and happiness.

The fact that bacteria are builders as well as destroyers in vegetable and animal substances, in organic and inorganic materials, either in the presence or absence of air, may make possible advancement of the greatest advantage to soil fertility and animal husbandry, thus demonstrating their beneficence. The veterinarian will ever be interested in progress along this line of investigation. Science has demonstrated that some of the varieties of bacteria regarded as harmful and dangerous may be so regulated and controlled as to perform nature's function without causing disease or death, and thus aid, instead of retarding, animal husbandry and industry and the production and conservation of a larger and better supply of human food.

If my conception and perspective are right the profession is going to be lifted to higher levels of service and achievement. The impending demands, however, require of our veterinary colleges an education and training of students that will more adequately and abundantly prepare them to undertake the work of animal engineers in this larger constructive work of the profession. The responsibility of leadership in the movement rests with this Association.

Experience has demonstrated that the whole course of secondary and higher education needs to be so reconstructed that its main ob-

ject shall be to impart the power to observe accurately, think clearly, interpret correctly and reason independently and logically. The development of the power of logical interpretation is even more important than the mere acquisition of known facts. The graduate whose head is simply a storehouse of facts may be better prepared to take a State board examination, but his real, practical, available knowledge is not to be compared with that of the fellow whose brain has acquired the precious faculty of correct observation and interpretation.

Obsolete systems and methods of teaching should be abandoned, and all unnecessary subjects eliminated from the curriculum, which must be so reconstructed that it will enable the student to acquire a more thorough knowledge of normal life and the conditions necessary for the development of a more perfect animal husbandry and industry. The introduction of pathogenesis to the veterinary student *before* he understands livestock in health is "putting the cart before the horse." A more thorough training in chemistry, biology and other basic sciences is essential. Research, investigation, experimentation, scientific exposition and demonstration are of fundamental importance, and should supersede philosophical reasoning and dogmatic instruction.

A period of pupilage with a successful practitioner prior to application for matriculation gives a prospective student an opportunity of seeing how a practice is conducted and of learning many practical things, and it has the further advantage of affording a ready means of keeping him from taking up veterinary medicine if it should happen that he does not possess the natural aptitude, or if he should conclude that he does not care for livestock and the practice of veterinary medicine. If a young man is not adapted for the profession, he should be stopped at time of matriculation, or soon thereafter, and not allowed to pursue a course of education only to be rejected by an examining board or to make a failure of his life work, when if he had prepared himself for the profession or occupation that he was suited for he undoubtedly would make a decided success.

There was a time when a pupilage was considered all that was necessary, but such a preparation would hardly be considered adequate at the present time for one who would become a veterinarian in the broad sense of the term. I consider that this Association has taken an important step in advance in the establishment of a high-school or academic education as a prerequisite to matriculation, but

in addition natural aptitude for the profession is essential to a high degree of efficiency. Give me the boys raised on the farm who take an intelligent interest in cattle, sheep, swine, poultry, dogs and horses. I have been much interested in learning of the provision made in 1916 by Congress for aiding the States in establishing agricultural departments in rural public high schools, and that this instruction is imparted in the class-room and on the farm. The boy keeps records of feed, labor and other expenses on a bunch of fattening hogs, sows and pigs, beef cattle or dairy cattle. He forms habits of industry, regularity in the care of livestock, and of accuracy in keeping accounts; best of all, he forms *habits of close observation* of methods and results. In his four years of high school he forms permanent habits. A high-school graduate possessing such a training would make an ideal student of veterinary science.

We have arrived at a critical period in our educational and professional progress. A number of private institutions, as you are aware, have closed their doors, which I fear may have a tendency to hasten the multiplying of weak State schools, insufficiently supported, poorly equipped, with inexperienced teachers, which would mean a serious menace to the profession's advancement. We have enough veterinary colleges in America to take care of the whole situation. There are, however, two things much needed. One is more men, the other is better training for the fitting of these men to undertake the larger constructive problems now confronting the profession. The falling off in attendance in the veterinary colleges is remarkable, and if a change in this does not soon occur there will be a dearth of veterinarians in the land that will materially handicap all advancement. This Association might well give publicity relative to the splendid services the veterinary schools are rendering the country and the opportunities that are awaiting trained men.

I would readjust the course of instruction in the veterinary colleges so that students would spend part of their time during the junior year at least working in stockyards, on stock farms, on dairy farms, and other places connected with the business of the animal industry within easy reach of the college, where they would be engaged in caring for the several classes of livestock, and be brought in close touch with the practical operations of the various branches of the industry; the students to be paid current wages for the periods in which they work on these farms and other establishments. Probably they would be able to earn sufficient money to pay their expenses during these periods, so that the experience, if not actually

profitable, will at least not be a financial burden. This would tend to bring the college and its students into closer relations with veterinary work before they graduate. The need for such relations has been increasingly evident in the past few years. The object of such coördination is manifold: To stimulate interest in class-room work, to keep the teaching staff well informed of the needs of animal husbandry and industry and how to train veterinarians to meet them, to give the students more intimate knowledge of livestock and the problems which they have to meet after they graduate, and to give them an opportunity to discover how intricate and interesting these living animal machines are and to what extent scientific knowledge may be used in the animal industry. Another object of this plan would be to stimulate the interest of breeders and livestock men themselves in the adaptation to their special needs of education in veterinary science.

A plan of this kind has recently been inaugurated in the schools of engineering of some of the universities, and if it can be made efficient in making engineers it certainly ought to offer features of advantage in the training of veterinarians. This, or some similar plan, may have merit that will warrant this Association giving its support and encouragement.

THE NEED FOR EDUCATION

A boost for a higher standard of veterinary education has been received by the Bureau of Animal Industry from a New England correspondent, who writes as follows:

"GENTLEMEN: This is regards to Veterany pracace I wil cugest to yo how That death rat is Co large in anamels This large popla-tion the les it cst you & i that evry man that hasent Past exymation should Be mad to This will cave meney Anemels lives Meney animels die Because he dont No what perthology Means Cant make dignois Co the aninemels Dies

"Yours truly

"Did yo think of it Before rite"

It is evident that the writer had in mind the need for knowledge of pathology and diagnosis rather than for better education in English. His ingenuity in inventing four new ways to spell "animals" is praiseworthy.

THE COOPERATIVE TUBERCULOSIS CAMPAIGN IN PENNSYLVANIA¹

By T. E. MUNCE

State Veterinarian, Harrisburg, Pa.

I CONSIDER it an unusual honor to have the privilege of appearing before this assemblage, which is unique in character, as Director of the Bureau of Animal Industry of the great State of Pennsylvania. I am proud to be surrounded by such highly qualified, enthusiastic, earnest and loyal co-workers as comprise the Pennsylvania Bureau force. I am proud of the fact that Pennsylvania continues to have the whole-hearted support and complete cooperation of the approximately 1,000 practicing veterinarians of the State. Without the confidence and loyal support of the practicing veterinarians, who, as to ability, rank second to no other State in the Union, we as State or you as Federal officials could accomplish little.

I am proud to know that the breeders and others interested in agriculture and livestock whom we serve in our State appear to have confidence in the Department of Agriculture, from Secretary Rasmussen down the line, and that our citizens are as much concerned about animal diseases and are just as desirous as are we veterinarians to have healthy livestock.

I am proud to know that the United States Department of Agriculture, through the Federal Bureau of Animal Industry, has placed its strong arm around us and is not only assisting but is actually performing a large share of the work of eradicating tuberculosis in Pennsylvania. I am proud of the fact that we have representing the Federal Bureau of Animal Industry in Pennsylvania that four-square, tactful and liberal-minded man, Dr. P. E. Quinn. Pennsylvania is fortunate in having Dr. Quinn as its Federal representative, and we are of the opinion that the Federal Government is equally fortunate in having Quinn to so ably represent it. We are equally appreciative to the Federal officials for the excellent men assigned to assist Dr. Quinn.

Lastly, I am proud of the fact that the Federal officials selected the great Keystone State and this famous old city and institution of

¹ Presented at the Tuberculosis Eradication Conference, Philadelphia, Pa., October 11-13, 1920.

learning as the place for holding this conference. We are all deeply appreciative to them for so honoring Pennsylvania.

This conference, as the chairman has told us, has been called to discuss the work of eradicating tuberculosis and has invited a full, free and open discussion of every phase of the subject. I want to congratulate you, Mr. Chairman, for coming into our midst and displaying such a spirit of open-mindedness and throwing wide open, as it were, the gates of the conference, which makes all feel free to enter into the discussion and to exchange ideas. I hope that every one will take advantage of his invitation.

I note that the program provides for a number of ten-minute talks, which is an excellent thing, and I am sorry provision could not be made for five-minute talks by every one present. I hope, Mr. Chairman, that before this conference adjourns each person in attendance shall have thought aloud for five minutes. I make this suggestion knowing that every last one from Pennsylvania, be he affiliated with the State or Federal Bureau, general practitioner or breeder, has good ideas on the subject of tuberculosis and can tell us something worth while and which we ought to know if they only thought so and would do it.

Provision has been made on the program for reporting the progress of the tuberculosis eradication work in Pennsylvania, so that I will not go into that subject. I want to take advantage of this opportunity, however, to express publicly my appreciation of Dr. Bruner as Director of the Division of Tuberculosis Eradication, and all others connected with the Bureau, for the great work they are doing and the splendid results they are accomplishing in eradicating tuberculosis in Pennsylvania. Whatever credit is due in this respect belongs to these men.

The Federal Government and every State is naturally anxious to make as good a showing as possible in eradication work. There is, and very properly so, a more or less friendly rivalry between the States as to the results obtained. But I want to say at this time that Pennsylvania will in the future, as in the past, strive for quality in its work, rather than volume. We shall continue to employ the more conservative methods for tuberculin testing our cattle and leave it for those who prefer speed over permanency to use the new and least tried methods.

Since the work of eradicating tuberculosis under the officially accredited plan was inaugurated the tuberculin test seems to have occupied the center of the stage and we have been hearing little or

nothing about prevention. I am satisfied that not enough thought is being given the matter of prevention. More attention will have to be given this important phase of the subject, if we are to permanently eradicate tuberculosis. The tuberculin test and removal of diseased animals will not be sufficient. Pennsylvania is, as you will be told, paying close attention to sanitation as well as to the care of calves and maturing young stock which are to become the cows and bulls of tomorrow. Remember, that to have sound fruit it is necessary to spray the buds and blossoms.

We prefer to add but a few herds to the accredited list each year and keep them accredited rather than work for a big showing by testing hundreds of herds annually, issuing many accredited certificates and then have to remove them from the list on account of subsequent reactors as the result of faulty methods. Those who want to follow the policy that brings the most applause may do so, but we in Pennsylvania aim to work for the years to come, not alone for today.

With respect to the best means and methods for eradicating tuberculosis Pennsylvania enters this conference with an open mind. Our mind is made up on but one thing, and that is to do the job before us the very best we know, that is consistent with safety, but we are "dead set" against being influenced or carried away by visionary ideas and unproven theories.

This getting together of the various agencies concerned in the eradication work ought to sharpen our interest in the work. Each State is confronted with problems peculiarly its own, just as are the various sections of the United States and each will have to solve its problems in accordance with local conditions, yet keep well within the prescribed plan. If this getting together accomplishes nothing more than the creation of a closer and more sympathetic relationship between the Federal and State officials, practicing veterinarians and breeders, the time and money expended in coming here will have been well spent.

The Federal officials, from Dr. Mohler down, deserve great credit for what they are doing and should be given the fullest measure of support. If any of us, for selfish reasons, have been withholding even to the slightest degree any assistance or encouragement from Dr. Mohler and his associates, I trust that this getting together will bring about a better understanding and closer relationship.

I would like to submit for your attention and consideration the following suggestions:

1. That in view of the fact there are more herds under supervision than can be promptly taken care of by regularly employed agents of the Bureau, and owing to the increase in applications from owners for herd tests under the accredited plan, we are of the opinion that much of the work now being done by Federal and State agents could be carried on by practicing veterinarians, which would be, to use a popular phrase, to "speed up" the work, and we recommend that in the future more recognition be given the practicing veterinarians.

2. That there be a more uniform interpretation of the accredited plan throughout the United States.

3. That steps be taken to bring about a more uniform method for applying and interpreting the various tuberculin tests.

4. That in so far as is practicable, the form of contract or agreement between the owner and Bureaus be made more uniform.

5. That provision be made in the accredited plan whereby future amendments to the plan will automatically apply to existing contracts, thus doing away with the necessity of entering into new agreements or contracts with owners whose herds are already under supervision.

6. That more attention be given to preventive measures.

7. That full value up to a prescribed amount be paid for both native and interstate reactors which on autopsy show no visible lesions.

8. That the practice of slaughtering all reactors is robbing the country of many of our choicest animals, which should be preserved to perpetuate valuable blood lines, and a greater united effort should be made to establish more Bang herds on separate farms for keeping such animals.

9. That the accredited plan be amended as follows:

Section 4. Change "one reactor" to "two per cent" or some other percentage basis to be agreed upon.

Section 12. To specify the number of tests, if any, herds should be required to pass to become accredited after disposal of the reacting bull.

I assure you that we of Pennsylvania approach this conference in a spirit of cordiality and with the desire to be open-minded and fair. Moreover, we pledge fullest measure of support and coöperation to every organization, individual or interest engaged or concerned in tuberculosis eradication, to the end that this devastating disease may be speedily and permanently eliminated.

In closing I want to convey to you a message from our distinguished Secretary of Agriculture, Mr. Rasmussen, who, previous to hearing about this conference, arranged an important appointment. Secretary Rasmussen has asked me to say to you who hail from beyond our borders that he bids you a most cordial welcome to Pennsylvania and that he regrets exceedingly his inability to be with you in person. He hopes that your stay here will be both pleasant and profitable and adds that those who enter beneath the great keystone arch of Pennsylvania do not come too soon or stay too long.

The Health Department of Billings, Mont., is seeking a trained dairy inspector, and also a laboratory technician experienced in the bacteriological examination of milk and dairy products.

During the week ending December 5, 1920, there were 448 cases of foot-and-mouth disease reported in Denmark, making a total of 3815 cases during the present outbreak.

National Stockman and Farmer commenting on the tuberculosis-free county of Barron, Wisconsin, says "There are other counties which might profit, as this one will, by tackling the tuberculosis problem in time."

An American who has gone to South America to study the Short-horn situation writes in *Breeder's Gazette*, "Foot-and-mouth disease was in every herd that I saw. They take it down there as a matter of course. It is a big drawback, but it has been there for years, and they make the best of it. A big majority of infected cattle get well. It is hard on cows about to calve."

The American Dairy Cattle Co. is a nonprofit-sharing corporation incorporated under the laws of Illinois, to help the German people "to replenish their source of milk at the earliest possible date," and to help the German farmers to buy feedstuffs in the United States. The economic conditions of Germany demand that a cow must produce at least 7,250 pounds of milk and 250 of fat. Great care will be taken to secure cattle that will come up to this standard.—*Farm Journal*.

ADMINISTRATION OF THE MEAT INSPECTION LAW BY THE BUREAU OF ANIMAL INDUSTRY DURING THE WAR¹

By W. N. NEIL

United States Bureau of Animal Industry, Chicago, Ill.

THE writer of necessity must confine himself to the activities at the Chicago station, in his consideration of the subject relating to the administration of the meat-inspection law and the conduct of the meat-inspection service during the period of the late war, because his work and the scope of his observations were limited to that station. However, it is presumed that the conditions at the Chicago station were very similar in every respect to all stations at which Federal meat inspection was maintained.

It was at once recognized that greater demands than ever before known were to be made upon the service and that there would be a withdrawal of men from the personnel of the meat-inspection force in order to supply men in other lines of duty, but it was apparent that in spite of these handicaps the meat-inspection service must be maintained at the highest degree of efficiency.

Early in the period of war the demands on our force for trained and experienced employees in the meat-inspection service were felt. Many of the employees, both veterinary inspectors and lay inspectors, prompted by a spirit of patriotism, volunteered for military service. That the service was being rapidly depleted of men essential to efficient meat inspection soon became an established fact, and for this reason the higher officials of the Department of Agriculture and of the Bureau of Animal Industry arranged to request exemption for employees called to military duty under the conscription act, in instances when it was felt that their services were essential to the meat-inspection service and when the individuals desired such exemption; but in no instance was an employee urged to request exemption from military duty against his own wishes.

In addition to the loss of employees because of having been called to the service of their country in other lines of patriotic duty, many of the meat-inspection employees left the Bureau service to accept employment in other lines of work paying more lucrative salaries.

Covering the period from April, 1917, to November, 1918, the labor turnover on the Chicago force amounted to 208 employees,

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

which was approximately 45 per cent of the working force. Necessarily these vacancies had to be filled by new employees, and such employees must be trained in the work. The vacancies were largely filled by employees appointed for a temporary period. Failing to find a sufficient number of competent men who were willing to accept temporary appointment, it was found necessary to recommend many women for appointment as assistants in meat inspection. By carefully selecting from the women applicants those best fitted for the work, it was found to be a very satisfactory means of renewing the depleted forces, and, with all due credit to these war workers, I must say they rendered, in most instances, very efficient service in many departments of the packing establishments.

Demands were made on the meat-inspection service by the Army and the Navy for inspectors especially efficient in the inspection of meat food products, who could be assigned to special and important work in inspection of meat at camps or barracks. These requests were met in all instances, and the employees so assigned deported themselves in a way to reflect credit upon the meat-inspection service.

Because of extended volume in the packing industry resulting from the needs of our own country and the allied countries, the duties of the meat-inspection employees were correspondingly increased, and they were required to perform more work and to remain on duty for longer hours, and this, for the most part, without additional compensation.

The principal function of the meat-inspection forces was to insure that no unsound, unwholesome or adulterated meats went forward from establishments operating under Federal inspection, and especially meats being prepared for Army and Navy uses, as it was thought possible that enemy agents might find employment in the larger establishments and secretly add dangerous substances to military supplies.

To preclude any opportunity for occurrences of this character, it was not only our practice to exercise closer vigilance over the various operations, but, in order to ascertain if any poisonous substances might have been added to the products, samples were collected from each lot of meat prepared for use by military forces, for laboratory analysis. In no instance was it found that any poisonous or other harmful substance had been placed in the meat.

It was also necessary that we cooperate in every way to permit the packing plants to operate to their greatest capacity, which meant that some departments operated both night and day. This emer-

gency was met, as were others, by requiring extra duty from the employees of the Bureau.

Generally speaking, the specifications under which meat was prepared as stipulated in the contracts for military supplies was not considered as a part of the duties of the employees of this Bureau, as this was looked after by special inspectors assigned to such work by the proper military organization. However, we in the meat inspection service felt it our duty and responsibility to make all inspections as required by the Bureau regulations.

Another very important duty assumed by the Meat Inspection Division was the conservation of meat food products, i. e., to direct from channels of inedible products and to direct into channels of edible products certain products which could properly, and which should rightfully, be saved for food purposes, but which up to that time had found their way into channels of inedible products. To carry out this project, without permitting abuses or wrong practices, required close supervision on the part of Bureau employees and added largely to their duties. However, they felt rewarded in that they were instrumental in increasing in a legitimate manner the supply of meat food products. The efforts put forth along this line were quite fruitful and resulted in the conservation of many thousands of pounds of edible products. It is, of course, needless to say that our efforts were appreciated by the management of the establishments, and they gave us their coöperation along these lines as well as in other lines of our official duties.

Following the signing of the armistice this service, as well as other lines of business, had to pass through the period of reconstruction by gradually filling the places of the temporary appointees. This was accomplished partly by reinstating the employees as they returned from military service and partly by filling places with employees who had successfully passed civil-service examination. The rehabilitation of the force was accomplished without serious interference with the service and without injustice being worked to anyone.

In a general summary I wish to state that the employees of the Bureau loyally met the increased demands made upon them. The high standard of efficiency of the meat-inspection service was maintained. Of all the millions of pounds of meat prepared for the use of the Army and the Navy, by establishments operating under Federal inspection, there was no case shown where unwholesome, unsound or adulterated products were furnished. For this achievement, under the great pressure of excessive demands and the anxiety

caused by added responsibilities placed upon them, the employees of the meat-inspection service feel justly proud, and I believe they are in no wise egotistic in feeling they performed their full patriotic duty.

Dr. G. W. Rosenberger, who has been an employe of the Bureau for the past fourteen years and since March 1, 1920, has been assigned to the position of Inspector in Charge of tick eradication in the State of Arkansas, resigned from the Bureau at the close of February 28, 1921, and has accepted a position with the State Department of Agriculture, Sacramento, Calif.

Col. W. G. Turner, Veterinary Corps, United States Army, who was recently detailed to the Surgeon General's Office, Washington, D. C., has now been ordered to Department Headquarters, Manila, Philippine Islands.

Dr. Gerald Rich and Dr. Clarence E. Bley, both graduates of the Veterinary Department of the University of Pennsylvania, have recently located at Augusta, Ga., to engage in general veterinary practice.

Dr. Charles W. Boyd, who formerly represented the Pennsylvania Bureau of Animal Industry, has resigned to enter private practice at Sewickley, Pa.

Dr. S. E. Young is a full-time veterinarian at the John A. Bell farms at Coraopolis, Pa.

Dr. John W. Adams, Professor of Surgery at the Veterinary School of the University of Pennsylvania, has resigned as Chairman of the University Council on Athletics. Dr. Adams gave unsparingly of his time and strength to this position and much real progress was made as a result of his judicial temperament, aided by his vast athletic experience, some of which was acquired as the captain and center of one of Penn's most famous football teams.

Dr. Claude M. McFarland, formerly located at Fort Worth, Texas, as vice-president of the Purity Serum Co., has moved to Kansas City, Mo., where he is associated with the Sihler Serum Co., as sales manager.

CLINICAL AND CASE REPORTS

VACCINATION FOR BLACKLEG IN SHEEP

By HOWARD WELCH, *Montana Experiment Station, Bozeman, Montana,* and HADLEIGH MARSH, *Livestock Sanitary Board Laboratories, Helena, Montana*

There was reported from the Montana Livestock Sanitary Board Laboratories in the JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION for December, 1919, an outbreak of blackleg in sheep, in which between 30 and 40 yearling bucks were lost out of a band of 270. The diagnosis was confirmed by laboratory examination, and the cultures have been carried for a year, during which time they have run true to form in every way. These cultures have been used in a number of experiments, and have been identical in all reactions with blackleg cultures recovered from cattle.

While blackleg is probably of rare occurrence in sheep, the fact that in this case a very considerable loss of purebred bucks was sustained due to blackleg brought up the question as to whether the blackleg vaccines in ordinary use for cattle would protect sheep. We find in the literature references to experimental immunization of sheep with various immunizing agents by Scheibel, Kitt, Foth, and Grassberger and Schattenfroh. Cave, in England, in 1905, vaccinated 318 sheep with vaccines of the attenuated virus type which were in use for cattle. He concluded that none of the vaccines available at that time were entirely satisfactory for sheep, as a considerable percentage of sheep died as a direct result of vaccination. We have not seen any record of tests on sheep using the immunizing agents employed for cattle in the United States at the present time. Therefore we decided to run a test of this kind in order to be able to advise as to the efficacy of blackleg vaccine for sheep, in case the disease should again appear. The immunizing agent used in this experiment was the natural aggressin.

Six yearling sheep, weighing approximately 100 pounds each, were obtained for the experiment. On August 14 four of these sheep were vaccinated with a commercial blackleg aggressin. The dose used was 3 c.c. After an interval of 20 days the four vaccinated sheep and the two controls were inoculated with a blackleg virus. The virus used was made by suspending 20 grams of finely ground dried muscle from a calf dead of blackleg in 100 c.c. of physiological

salt solution and filtering through a thin film of cotton. Five cubic centimeters of this material was injected into the muscle of the thigh of each sheep.

The original intention had been to use as virus the strain recovered from sheep, but we had not yet developed a standard method of preparing the virus from a culture, and therefore decided to use a muscle virus to make the test comparable with other published tests. As we had no muscle virus of the sheep strain on hand, we used the cattle strain. From the practical standpoint this might be of more value than a test with the sheep strain, since any infection occurring in sheep would probably be from a strain which had developed in cattle, due to the fact that blackleg is very prevalent in cattle and rare in sheep.

The inoculation with virus was made at 12:30 p. m., September 3. The next morning at 8:30 o'clock one of the controls was down.



Controls Twenty Hours After Inoculation

He could stand, but would not unless forced to it, and he was not eating. There was a marked edematous swelling of the inoculated leg. Control sheep No. 2 showed some swelling in the inoculated leg and was very lame, but quite active. The vaccinated sheep were all active and feeding normally, but were slightly lame, although there was no perceptible swelling.

At 6.00 p. m. control No. 1 was down and very sick. The inoculated leg was greatly enlarged by the edematous swelling, and the skin was discolored, with bloody serum exuding in places. At 8.20 p. m. this sheep was dead, and No. 2 was very sick.

At 8.30 a. m. September 5 the second control was still alive but unable to stand. The inoculated leg was very much enlarged and discolored. His temperature was 106.4 degrees. He was destroyed, and postmortem examination was made on both sheep. The char-

acteristic local lesions of blackleg were found in both sheep, practically the whole musculature of the thigh being dark and spongy.

The four vaccinated sheep appeared perfectly normal on the morning of the second day after inoculation. All lameness had disappeared.

The results of this experiment were very clear cut, as all four vaccinated sheep remained normal, while the two controls developed typical blackleg. The experiment shows that the natural aggrassin in 3 c.c. doses will protect sheep against inoculation with a fatal dose of blackleg virus.

THE X-RAY AS DIAGNOSTIC AGENT IN THE HORSE

By H. MEADE HAMILTON, *Muncie, Ind.*

Patient: Denmore, bay pacing mare, 4 years old, weight 900 pounds.

History: Injured in a race, July 17, 1920; shipped from Ohio to Muncie, arriving July 24.

Symptoms: Severe lameness in left hind leg, swelling slight between fetlock and hoof. Great pain on pressure, slight crepitation, but no displacement.

Diagnosis: Fracture, but unable to determine exact nature of same. X-ray examination revealed (as per picture) a complete longitudinal fracture of the os suffraginus. (X-rayed by Dr. B. R. Kirklin.)

Treatment: Absolute rest. Secure bandaging leg from foot to hock, but not immobilizing same, as I was afraid if leg was made rigid ankylosis might occur; therefore enough support was given by snug bandages to retain parts in place. The animal was very careful and took excellent care of injured leg; could lie down and get up without touching foot to ground, thereby aiding repair to a great extent.



Fracture of Os Suffraginus as shown by X-Ray

In October the mare was taken to the country and turned out, and on December 13 was absolutely sound as far as lameness was concerned and with slight enlargement of the region involved, and slight deviation of foot, from ankle down, outward from natural contour. No visible involvement of the movements of either joint. This mare will be trained and raced the coming season.

INTERESTING CASE OF PANCREATIC GLYCOSURIA

By G. E. JORGENSON

Assistant State Veterinarian, Clermont, Iowa

The patient, a four-year-old black mare, was brought to my office May 14 for treatment. The history revealed that it had been ill with influenza four months prior to the present affliction, from which it had recovered after running an atypical course. The present illness consisted of marked progressive emaciation, together with a transitory lameness in all four legs and an ulcer the size of a silver dollar on the left half of the mammary gland. The history and present symptoms made it certain to me that the animal was suffering from some obscure disease (I rather suspected anemia of leucemia), hence I requested that the animal be left with me for further observation and thorough clinical and laboratory examination, which accordingly the owner consented to. The results of this examination follows:

Clinical—Temperature 99.5; respiration 19; pulse 51 and irregular (tachycardia arhythmia). Peristalsis normal. Auscultation of the lungs negative. Auscultation of the heart revealed a marked systolic murmur, and as the animal was poorly nourished, percussion showed considerable enlargement of the heart.

Laboratory—Smears from nose showed the usual bacterial flora. Smears from the ulcer gave similar results. Nothing positively pathogenic. Mallein, ophthalmic, negative. Urine, albumen negative. Smears showed a few epithelial cells but no casts or blood cells. Test for albumoses positive. Specific gravity 1056. Test for sugar positive. No quantitative test attempted. Dragendorf's test showed bilirubin present. Blood—Erythrocytes, 6,400,000; marked poikilocytosis and macrocytosis; lipemia present; leucocytes, 14,000, with preponderance of polymorphonuclear cells.

Conclusion.—The history, the positive test for albumoses and the bile pigments in the urine would lead to the supposition that a metastatic abscess was or had been present in the liver. The presence of

sugar in the urine and fat in the blood would point to diabetes mellitus. That was my diagnosis, and inasmuch as it would be practically impossible to put a horse on a sugar-free diet, the treatment was discouraged and a fatal prognosis given. I asked for the opportunity of making an autopsy. The owner was unwilling to kill the animal, but promised to advise me as soon as it died. This it did on July 23, and the autopsy was made the same day and revealed the following: Lungs, chronic bronchitis and somewhat congested. The balance of the respiratory tract was apparently normal. The heart was enlarged and showed lesions of an old endocarditis involving the valves in particular. The spleen contained a well-capsulated abscess, the contents of which were inspissated and partially absorbed. The stomach and intestines were normal with the exception of a marked congestion and ulceration of the diverticulum duodeni involving in particular the hepatic duct. The liver showed a series of interesting pathology. The entire right lobe had undergone an atrophic sclerosis and contained the remnants of a large abscess almost completely absorbed. The middle lobe was congested, while the left lobe appeared normal. The entire hepatic duct was congested and contained two small ulcers from which streptococci and colon bacilli were isolated. The hepatic vessels, especially the hepatic artery and the portal vein, appeared to be dilated. The pancreas had undergone an extensive degenerative process of a colloidal variety and appeared to have been the seat of several minute abscesses. The duct was somewhat thickened by congestion. The kidneys both showed lesions of a slight interstitial nephritis. The balance of the organs including the brain and cord, outside of showing evidence of a long wasting illness, were normal.

Conclusions of my diagnosis made antemortem remained unchanged, except as it concerned the cause of the glycosuria, which the autopsy showed be of a pancreatic variety due to degenerative processes brought on by an atypical infection in the form of influenza.

TECHNIQUE FOR TREATMENT OF ATRESIA OF TEATS OF COWS

By J. P. TURNER, *Washington, D. C.*

THE following technique, while not original, has been used quite successfully by the writer for several years.

It is especially useful in those cases involving the end of the teat; as the stricture approaches the base of the teat, the prognosis is not so good, but in all cases more depends on the cleanliness of the

operation and the subsequent care of the teat than any other feature.

The cow is secured, usually in an end stanchion, in order to limit movement. The tail is tied to a surcingle and the udder and teats are thoroughly scrubbed with soap and warm water, and the teat needing the operation is soaked in a cup of gasoline or a small amount of ether.

An antikicking strap is applied securely above both hocks and a nose lead applied. Nervous cows can be further secured by using a two-inch by four-inch plank as a squeeze. The operator's hands should be absolutely clean and just prior to operation the teat should be immersed in a small cup of 1-1000 bichloride of mercury solution and then iodine is applied to the end of the teat. The modern teat splitter (not the old, dirty, sliding type) is pushed into the teat opening by securely holding the teat with one hand and making two incisions at right angles if the end of the teat is nearly closed. In some cases the "Hug" teat reamer is used, especially if the atresia is caused by a wart-like growth.

The teat is immersed in a cup of 1-1000 bichloride of mercury solution after the atresia is opened. The teat is thoroughly dried with absorbent cotton, and electrician's tape (Grimshaw's) is wound around it firmly but not tight enough to twist the teat. After the teat has been spiralled with two thicknesses of the tape, extending one inch from the apex to the base of the teat, a piece of electrician's tape about five inches long is doubled and a hole cut about half an inch from the end. This folded piece is now applied to the taped teat perpendicularly and is firmly bandaged by two or three rolls of the electrician's tape, allowing the end having the perforation to project nearly to the end of the teat.

A ring-end metal teat plug to which has been attached a piece of tape is now removed from a salt-mouth bottle containing four ounces of colored commercial alcohol and introduced into the teat, being tied to the projecting piece of electrician's tape.

The cow is released, the tail being kept tied to a surcingle for several days. Clean bedding is very necessary.

Two quarts of 1-1000 bichloride of mercury solution is left with the attendant with directions to pour a small quantity into a clean cup and soak the teat in it prior to removing the teat plug and subsequent to milking and replacing the teat plug, which should be kept in the bottle of alcohol while the cow is being milked. The attendant is given instructions advising milking the three sound teats, then applying the antikicking strap and washing the udder if dirty and always his hands prior to handling the teat.

It is believed that the use of the bichloride solution for soaking the teat and the use of the salt-mouth bottle of commercial alcohol in which to insert the teat plug, instead of laying it on a dirty ledge of the barn, greatly assists in preventing infection.

The attendant is advised to milk the cow first and not to touch the teat plug with his hands save at the ringed end. The use of the teat plug is indicated for a week to ten days.

INTUSSUSCEPTION OF THE POSTERIOR PART OF THE SMALL INTESTINES OF A BUFF PLYMOUTH ROCK CHICK

By B. F. KAUPP, *West Raleigh, N. C.*

Intussusception or invagination of the bowel has frequently been observed and reported in cattle and in horses and occasionally in



Invagination of Bowel of Four-Weeks Old Buff Plymouth Rock Chick. (1) Juncture of Small and Large Intestines; (2) Point of Invagination; (3) Anus

other animals. Intussusception of the intestines of the sheep was reported by the author in the *JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION*, January, 1917. This condition in mammals is said to be accompanied by symptoms of colic, especially

in the bovine and equine species. Irregular and excessive peristalsis, according to Dollar, may cause several feet of the small intestine to become intussuscepted.

The subject of the present report is in a four-weeks-old Buff Plymouth Rock chick. The first symptom noticed was a slight diarrhea, later a fleshlike substance protruding through the anal opening. There were no symptoms analogous to colic in the horse or ox; in fact, chickens do not manifest such symptoms. In a few days the chick died.

At autopsy all organs appeared normal except at a distance of about $1\frac{1}{2}$ inches in front of the juncture of the small and large intestines. In the illustration 1 shows the junction of the small and large intestines, at which point may be seen the right and left ceca given off. At 2 will be noted the point of commencement of invagination, the small intestines completely telescoping until a portion of the bowel protruded through the anal opening. This is a distance of about $3\frac{1}{2}$ inches from the point where the invagination began. The upper wall of the intestines are laid open so that the invaginated bowel is in plain view.

MILK FEVER¹

By J. B. KNAPP, *Cortland, N. Y.*

IN presenting this paper to the members of the Central New York Veterinary Medical Association I do not claim to have discovered anything new, nor to have done more than any practitioner would have done. The case I am about to describe was somewhat different from any that I had ever encountered before, and I thought it might at least be interesting to some of you.

Some little time ago I received a telephone call to come quite a distance from home—something like 18 miles—to see a sick cow. I responded to the call and reached the place about 10 a. m. The patient was a large grade Holstein cow, about 9 or 10 years of age. Upon inquiring from the owner I found the cow had calved just seven days previous to my visit and up to the evening before had to all appearances been perfectly well.

The cow lay on a dirty cement floor with no bedding, was unable to arise, and continually pounded her head on the cement floor. Her temperature was somewhat below normal—about 98.8° —her pulse somewhere, as near as I could get it, about 65.

¹ Presented at the meeting of the Central New York Veterinary Medical Association, Syracuse, November 18, 1920.

Asked as to her chances for recovery, I gave a guarded prognosis. I told the owner that the symptoms indicated milk fever, but that the length of time that had elapsed since she calved rendered my diagnosis uncertain.

After watching the patient for a short time and not knowing what else to do, I proceeded to inflate her udder, after which I gave her $\frac{1}{2}$ grain of strychnine hypodermically. I then packed straw around and under her as best I could and made her as comfortable as possible.

In a short time she quieted down and I began to think my diagnosis was correct. It was, however, about four hours before there was any noticeable improvement, and the cow did not regain her feet until the following day, after which she made an uneventful recovery.

In reviewing the history of this case there were some things that to me appeared quite unusual. I never before have had a case of milk fever that occurred seven days after calving. I can, I think, recall having two cases previous to parturition, one the day before and the other three or four days before.

The slowness with which the animal recovered was also somewhat strange to me. In my experience in such cases, from three to five hours, and many times much less, will find the animal on her feet.

I would not like to close this paper without making mention of the marked improvement that has taken place in the treatment of milk fever in the last 18 years. When I graduated from Cornell in 1902 I wrote my thesis on milk fever, or, more scientifically speaking, parturient paresis. A large per cent of our patients at that time died and the prognosis was always bad. Now, if one can reach the patient before she dies there is nothing more simple to treat than milk fever, and the disease which has killed millions and millions of dollars worth of cattle in this country is no longer to be dreaded by the veterinarian.

UNUSUAL LOCATION OF ŒSTRUS EQUI

By A. E. CAMERON,

*Pathologist, Lethbridge Laboratory of the Health of Animals
Branch, Canada*

IN carrying out a postmortem, December 12, 1920, on a horse which had been artificially infected with dourine, two bots were found attached to the external surface of the stomach wall, near the

point of entrance of the esophagus. The area where these two larvæ were located showed inflammation, over about two inches square, with formation of fibrous tissue. They were firmly adhered and there was no break in the stomach wall.

Internally about 100 bots were attached around the esophageal opening; the food contents were entirely liquid. A considerable difference in the development of the larvæ in the stomach was noticed, and numerous eggs remained on the forelegs, in the usual location.

There would appear to be no doubt that these two parasites had been located outside the stomach wall some time, as the horse was killed in a moribund condition and the postmortem was proceeded with at once.

TO DENVER BY MOTOR

Dr. W. E. Muldoon, Resident Secretary for Kansas, reports that he is doing everything possible to stimulate interest in the A. V. M. A. in that State and hopes to have a goodly number of applicants lined up before the next meeting. He further states that at the annual meeting of the Kansas Veterinary Medical Association held at Salina, Jan. 4 and 5, a committee was appointed consisting of himself, H. M. Graefe of Topeka, and A. H. Gish of El Dorado, to arrange for the Kansas veterinarians to make the trip to Denver by auto. It is their idea to leave Kansas City and go through on schedule time over a definite well-known trail picking up the various members at regular stops. He writes: "We intend to show the world that the Kansas veterinarians, like everything else from this State, are a real live bunch."

It is gratifying to note that the better-sires campaign * * * is meeting with marked success. * * * A movement of this kind, once it is started and the sires show the effect they have upon their offspring, is bound to grow, even of its own accord. But the Government will keep up the work and there is no telling how many additional thousands of men will switch from scrub and grade to purebred sires next year.—*Iowa Homestead.*

ABSTRACTS

AN EXPERIMENTAL STUDY OF ECHINACEA THERAPY. James F. Couch and Leigh T. Giltner. Jour. Agl. Res., vol. 20 (1920), no 1, p. 63.

Various preparations of echinacea—namely, the “Specific Medicine Echinacea,” the fluid extract echinacea, and the “Subculoyd Inula and Echinacea”—were studied as remedies in several types of infectious and allied diseases, both acute and chronic, in guinea-pigs. In both tetanus and botulism produced by the administration of bacterial toxin the course of the disease was not modified by the echinacea. In septicemia produced by injection of a culture of *Bacillus bovisepiticus* and in anthrax produced by injection of *B. anthracis* the results indicated that echinacea had no influence. In poisoning by the venom of the rattlesnake produced by injection of a solution of the dry venom the echinacea preparations were without curative effect. In the chronic diseases, tuberculosis produced by injection of a human strain of the bacillus and trypanosomiasis produced by injection of *Trypanosoma equiperdum*, the remedy was administered over an extended period of time without apparently influencing the course of these diseases. Definite evidence of organic effects from the echinacea itself was not obtained.

SIMULTANEOUS VACCINATION OF SHEEP AGAINST SHEEP POX (VARIOLA OVINA) AND ANTHRAX. Charles Dubois. Revue Générale de Médecine Vétérinaire, vol. xxix (1920), p. 483.

Sheep were obtained from an establishment where neither pox nor anthrax had ever occurred and where vaccination against these diseases had not been practiced. The two year old animals used were susceptible to both diseases. The anthrax vaccines and sensitized pox vaccine were obtained from the Pasteur Institute of Algiers and Paris.

Sheep were vaccinated on the same day with pox vaccine and the first anthrax vaccine by subcutaneous injection; the second anthrax vaccination was made 11 days after the first.

The animals were shown to be immune to both diseases by suitable inoculation with pox virus and anthrax culture; controls succumbed. The serums of the simultaneously vaccinated animals showed antibodies to both diseases by the complement fixation test. A sheep, having the pox in “confluent, grave” form was allowed to

run free with the experimental animals for several weeks, without any of the vaccinated animals contracting the disease.

W. N. BERG.

MEAT POISONING IN HOLLAND. K. Hoefnagel. *Zeitschr. f. Fleisch u. Milchhyg.* (1920), XXX, No. 21, p. 282.

Three outbreaks of meat poisoning are cited in which rather large numbers of people were affected. In the first instance seventy people living in Schagen were made ill. The clinical picture was that of a severe gastroenteritis with persistent diarrhea which lasted three or four days. All the patients got well after eight to fourteen days. The source of the infection was traced to flesh from an emergency slaughtered horse. The animal was reported by the owner as being weak and debilitated; no mention was made of diarrhea symptoms. At autopsy no lesions aside from some adhesions between the liver and colon were detected. Bacteriologic examination of some of the meat which had been seized after the people were taken sick revealed the presence of paratyphoid bacilli.

The second epidemic occurred in Laren and many people became sick, the symptoms being like those of the Schagen outbreak. The meat causing the illness was obtained from a cow reported to have been an emergency slaughter case. Laboratory examination of the meat determined the presence of paratyphoid organisms.

The third outbreak occurred in a family of seven people who had eaten beef alleged to have originated from a dead animal. There were symptoms of vomiting and diarrhea. In the beef as well as in the stools of the patients paratyphoid bacilli were found.

L. T. GILTNER.

SOME CASES OF MEAT POISONING. R. Lorenz. *Ibidem* (1920), XXX, No. 21, p. 283.

In Stuhm sixty persons became ill after eating meat and sausage derived from a sick cow. The animal had made an easy delivery and the next day passed the afterbirth. According to the statement of the butcher the uterus contained a large quantity of foul smelling fluid. The meat inspector who was called after the animal had been slaughtered found nothing but a slight inflammation of the uterus and passed the carcass for food. Only persons who ate the liver and blood sausage and the flesh in an uncooked condition became sick. The symptoms set in within twelve hours

after eating the flesh and sausage. They consisted in profuse diarrhea and marked debility. No disturbance of vision was observed. Eating the cooked or roasted meat of the cow caused no illness.

L. T. GILTNER.

ACETONURIA IN DOMESTICATED ANIMALS (Horse, Cattle, Dog).

Gustav Sinn. *Archiv für Wissenschaftliche und Praktische Tierheilkunde*. Vol. 42, 1916, pp. 322-367.

The author discusses in detail the following: (A) Detection of acetone in urine qualitatively and quantitatively by several methods; (B) detection of diacetic acid (aceto-acetic acid) in urine; (C) qualitative and quantitative estimation of oxybutyric acid in urine; (D) the clinical significance of acetone bodies in the urine. Figures are summarized in 5 tables showing the author's results with normal and pathological urines. Conclusions are: 1. Acetone is regularly found in normal urine of horses and cattle. 2. The amount is 0.38-3.86 mgs. per liter of horse urine; 0.2-2.4 mgs. per liter of cattle urine. There are at present no dependable methods for acetone estimation in dog's urine. Rowold's results for acetone in dog's urine are questionable. The urine of tuberculous cattle contains no increased amount of acetone. During fever, horse urine contains increased acetone, up to 17 mgs. per liter.

W. N. BERG.

THIRTY-FOUR CASES OF ANTHRAX IN NEW YORK CITY. S. Dana Hubbard and William Jacobson. *Monthly Bulletin, N. Y. C. Health Department*, November, 1920, pp. 249-266.

This bulletin is practically devoted to a discussion of 34 cases of human anthrax which occurred in New York City during the two years, 1919-1920. The Sanitary Code requires that all cases of anthrax be reported to the Department of Health within 24 hours. As soon as the cases described were reported they were visited personally by a member of the department. The authors point out the increased prevalence of anthrax and give details of each case with a summarizing table and several statistical tables (the small number of total cases renders deductions therefrom uncertain). The cases occurred in persons from 14 to 79 years of age; all but two were males; 11 died; the fatal cases terminating usually within eight days; parts affected were in order; face, neck, both face and neck, and wrist and hands. Bacteriological findings for anthrax were positive in 31 cases, negative in two, and not determined in another. The clinical findings are summarized. The study tends to show that

those receiving anti-anthrax serum (20 out of 26) recovered as against recovery of only three out of eight who did not or in whom the method of treatment was not recorded. Occupational causes were as follows: Shaving (using new shaving brushes) 17 cases; manufacture of brushes, five cases; trucking (exposure to hides and skins), eight cases; millinery (hair cloth and hair braid), one case; house cleaning (with hair brush), one case; and unknown, two cases.

Dr. H. A. Burton has purchased the hospital and equipment of Dr. H. F. Stovall of Arcadia, Louisiana, and has moved from Ruston to begin practice at Arcadia.

Dr. L. A. McGibeny, a graduate of the Grand Rapids Veterinary College in 1918, has sold his practice at Ewart, Michigan, to Dr. B. Brunink, his classmate at college. Dr. McGibeny will return to Belmont, New York.

Secretary Mayo spent several days in Connecticut during January, where he delivered one address before the Connecticut State Dairy-men's Association and another on the "Farm as a Home" before the Connecticut Agricultural Society.

The production of anti-hog-cholera serum and hog-cholera virus during 1920 under United States Government license was as follows: Ordinary serum, 350,395,925 c.c.; clear serum, 39,832,984 c.c.; total serum, 390,228,909 c.c.; ordinary virus, 21,993,035 c.c.; clear virus, 450,343 c.c.; total "simultaneous" virus, 22,443,378; hyper-immunizing virus, 87,338,709 c.c.

"Argentina, which has had trouble with foot-and-mouth disease for some time, is apparently making an effort to clean up. Importations of livestock from Spain and Germany, in both of which countries the disease exists, have been forbidden."—*Orange Judd Farmer*.

The Literary Digest calls attention to the following sentence which occurs in a special article in *The Saturday Evening Post* and which carries a meaning that was probably not intended by the author: "His name is Andrews, and he is a trapper of predatory animals in the Federal employ."

ARMY VETERINARY SERVICE

To the Editor:

Please let me say amen to the comments of M. C. H. upon Dr. Woods' contribution, appearing in the January number of the JOURNAL. It is well known that some of the best veterinarians in the United States were found "incompetent" (?) overseas and sent home; others equally good went over as 2d lieutenants, served twenty months or more, returned and were discharged as 2d lieutenants, while men of no renown were made majors. All of which proves nothing for or against the profession. A Mr. Baynes is now touring the country giving illustrated lectures on "Animals in War" and he tells his audience that the American Army Veterinary Corps over there, was fifty years behind the times.

If that be true, it is also true that at no time has a veterinarian been at the head of the Corps. I most heartily agree that we will never really know if our wings are strong enough to hold us up and carry us forward abreast of the times and to function like other military organizations, unless we strike boldly out with such wings as we have. Strange, indeed, if in all this great country there can not be found the proper veterinary timber to head and administer our Army Veterinary Corps.

FREDERIC M. PERRY.

Major-General S. J. Blenkinsop, K. C. B., Director-General of the Army Veterinary Service for Great Britain, in a recent letter requests that his thanks and appreciation be expressed to the President of the American Veterinary Medical Association and all the members for the marked distinction that they have placed upon him by electing him to honorary membership.

Major-General Sir Frederick Smith, K. C. M. G., C. B., formerly Director-General of the British Army Veterinary service, has also written and expresses a desire to thank the Association and the officers for their kindness in electing him an honorary member of the American Veterinary Medical Association.

Honorary Member Col. J. J. Aitkin writes from Bombay, India, as follows:

"I cannot express how very greatly I appreciate the honor your Association has done me, but trust you will convey to them this, my very inadequate message of thanks."

ASSOCIATION NEWS

VETERINARY MEDICAL ASSOCIATION OF N. Y. CITY

The regular monthly meeting of the association was held in the lecture room of Carnegie Laboratory, New York City, on Wednesday evening, December 1, 1920.

President MacKellar presided. The minutes of the November meeting were read and approved.

Dr. Ray W. Gannett, Brooklyn, New York, read an interesting and original paper on "The Value of Tenotomy of the Perforans Tendon in Cases of Vaginitis of the Hock and Navicular Bursitis."

Dr. Gannett said he wished to give Dr. Bemis the credit of being the originator of this operation. It consists in making a longitudinal incision through the skin and sheath of the tendon on the inner face of the hock, for a distance varying from two to four inches, according to conditions. Considerable purulent synovia usually escapes. The synovial cavity is cleaned with antiseptics. The fore finger of the left hand is passed into the wound and under the tendon from its anterior surface. In other words, the finger is placed between the bones of the hock joint and the tendon. The probe pointed bistoury is then passed beneath the tendon, being guided by the finger, and the tendon is carefully severed. The wound may be somewhat enlarged to insure drainage. The sheath cavity is carefully disinfected and the wound packed with absorbent cotton, saturated with Dakin's solution and bandaged. The after care consists in the usual treatment for open wounds. The horse as a rule is fit to work in about four weeks after the operation.

The doctor said of seven cases operated on, six have made serviceable recoveries. During last winter, Drs. Risley and Gannett operated on three apparently hopeless cases of open and infected navicular bursa, due to deep punctured nail wounds. Drainage and antiseptic treatment of the foot were continued. In addition tenotomy of the flexor pedis perforans tendon was performed in each horse. Two of the cases continued to grow worse and were destroyed. The third case made a remarkable recovery. The temperature dropped from 105° to 102°, excessive pain and lameness ceased at once and appetite improved. In four weeks the horse was returned to work slightly lame on a trot.

This paper brought out a good discussion by Drs. Berns, Clayton, Blair and MacKellar.

This being the annual meeting the reports of all committees and election of officers were in order. The accounts of the Secretary and Treasurer having been audited by the Auditing Committee, he reported a balance in the treasury of \$122.97. This report was regularly accepted. The election of officers for the ensuing year then took place and resulted as follows:

Dr. Robt. S. MacKellar was unanimously reelected President.

Dr. Edward A. Durner was unanimously elected Vice President.

Dr. J. E. Crawford was reelected Secretary-Treasurer.

From those nominated as Censors, the following were elected: C. E. Clayton, Chairman; Reid Blair, Geo. H. Berns, Wm. H. Hoskins, Bruce Blair.

Dr. Chas E. Clayton reported the case of a fracture of the os pedis. The show horse, "The Wasp," was being driven from the stable to the show ring at the last Brockton Show, when he stepped on an unexploded bomb, which went off, causing a very severe lameness. Dr. Clayton was sent for but the horse died during the night before he arrived. The Doctor removed the foot and on dissection he found the os pedis fractured into three parts.

The application for membership of Louis J. Camuti, New York City, was read by the Secretary. Dr. Gannett said he did not believe the applicant had passed the State Board. It was regularly moved, seconded and carried that the application be laid on the table. No further business appearing the meeting adjourned.

J. ELLIOTT CRAWFORD, *Secretary*.

GEORGIA VETERINARY MEDICAL ASSOCIATION

On December 8, our State meeting convened at the Veterinary Division of the Georgia State College of Agriculture. None of the officers of the association being present, Dr. William M. Burson was selected as presiding officer for the sessions and Dr. A. G. G. Richardson was requested to act as Secretary.

Dr. Burson introduced President Andrew M. Soule of the State College, whose address of welcome was given in a characteristically able and hearty manner. President Soule spoke of the friendly feeling and attitude which he had always maintained for the veterinary profession and of the many efforts he had made to better veterinary education in Georgia. He also gave us very valuable information in regard to the present world situation and communicated to us all an optimistic feeling in regard to the outlook for the future. His address was warmly received.

Dr. Richardson added a few words of welcome in the name of the faculty of the Veterinary Division. Owing to the absence of Dr. J. M. Sutton the response to the addresses of welcome was made in a very pleasing manner by Dr. W. B. Carlisle of Montezuma, Georgia.

A very able paper on a practitioner's experience in treating animals suffering from attacks of "southern canine plague" was read by Dr. Carlisle. The paper created a good deal of interesting discussion.

The meeting then moved to the barn, where, under the direction of Professor M. P. Jarnigan, many hogs and dairy cows were judged. The results showed a marked diversity of opinion among the visiting veterinarians as to the proper placing of the animals and brought out instructive explanations as to the proper placing of the animals in accordance with the teachings of animal husbandry.

First on the program on the second day was the "Question Box." Several questions of interest and importance were presented. Answers were made by Drs. Bahnsen, Richardson, Carlisle and Burson. Dr. R. O. Suddath presented a paper on "Experience in Cow Practice and Other Effervescences." This paper was rich in every-day practical advice, interspersed with bubbling "effervescences" and the members were highly and pleasingly entertained thereby. Dr. W. A. Downs presented an instructive paper entitled "Breaks Following Serum Treatment." The discussion brought out by this paper was the most extensive one of the meeting. Drs. Persells, Titus, Carlisle, Jago, Heyde, Bahnsen, Richardson, Coffman, Burkhardt, Handly, Trumbo and Wright participated in the discussion.

On motion of Dr. Bahnsen the association requested Dr. Richardson to enlarge upon an idea he presented in this discussion and to prepare a paper thereon for presentation at the meeting of the Southeastern Veterinary Medical Association at Spartanburg, South Carolina, January, 1921.

Dr. W. M. MacKellar presented a paper on "Conditions Under Which Herds Can Be Tuberculosis-Free Accredited in Georgia." Dr. MacKellar's paper was extremely well prepared and full of instructive information. It was accorded a hearty appreciation by the members. Dr. Richardson presented a brief paper on "The Status of Veterinary Education." The paper was well received and Drs. Bahnsen, MacKellar and Wright participated in the discussion which followed. The meeting adjourned to the dining hall in

the main building, where a bountiful feast was spread for us through courtesy and kindness of the Board of Trustees and the Faculty of the Georgia State College of Agriculture. The concentrated attention given to this item of the meeting fully attested the appreciation on the part of the members of the bounty and quality of the feast.

Thirteen new members were elected to membership in the association, viz.: G. A. H. Edmiston, A. J. Titus, N. J. Ayers, J. H. Moore, A. G. G. Richardson, W. E. Stroud, M. King, H. E. Englehardt, J. I. Hendley, R. J. Heyde, E. L. Jarvis, H. V. Persells and P. T. Connolly. The names of Drs. J. W. Salter and A. G. G. Richardson were presented to the association for recommendation to the Governor for appointment to the vacancy existing in the State Board of Veterinary Examiners. As the result of the votes cast Dr. Richardson was the selection of the association.

Nominations for President, Drs. William M. Burson and B. E. Carlisle; Vice-President, Dr. A. L. Hirleman; Secretary-Treasurer, Dr. P. F. Bahnsen; in the ensuing balloting Dr. B. E. Carlisle was elected President.

On motion, the Acting Secretary was instructed to cast the unanimous vote of the association for Dr. A. L. Hirleman for Vice-President and for Dr. P. F. Bahnsen for Secretary-Treasurer. This being done, Drs. Hirleman and Bahnsen were declared duly elected for 1921.

Next on the program was the selection of the next meeting place. Athens and Macon were both suggested, and on a standing vote of the members present, Macon was selected. The meeting will be called between the dates of September 17 and 30, 1921.

The incoming Secretary-Treasurer was instructed to express in writing the appreciation of and the thanks for the dinner given the association.

The incoming Secretary-Treasurer was instructed to spread upon the minutes of the association and forward copy to Mrs. C. A. Downey, Waycross, Georgia, resolutions of respect and sympathy in her bereavement.

A. G. G. RICHARDSON, *Acting Secretary.*

NEBRASKA VETERINARY MEDICAL ASSOCIATION

Our annual meeting was held in Grand Island, Nebraska, December 15 and 16, 1920, and was in many respects the most successful in the history of this association, there being on an average about

two hundred in attendance during both days. A worth-while deviation from the regular routine was in the form of a banquet the evening of the first day, the program being of general interest to livestock breeders in particular. Many representative breeders from different parts of the State were present and some took an active part in the program. In addition to the speaking, a short motion picture show was put on. Two reels, one on hog cholera and the proper manner of vaccinating and the other on tuberculosis in the dairy herd, were received with a great deal of interest and appreciation. Special songs were sung, in which nearly everyone present took part. The evening program was concluded with a dance which lasted from about ten-thirty until midnight.

Many members expressed themselves as having received a great deal of good from the clinic which was held during the afternoon of the first day. The only participant in this event from out of the State was Dr. G. H. Jungerman of Kansas City, who very ably demonstrated his methods of treating sterility in cattle and delivered a very instructive lecture in connection with his work. The other operators were well-known practitioners in the State.

The entire second day was devoted to the scientific part of the program, the presentation of papers and general discussions. By holding the clinic the first day, which was an experiment, it was possible to continue the program without interruption the second day and kept the members in attendance at the one place until all the program had been completed. This proved so satisfactory that we expect to continue the same plan next year. The round table method of handling subjects of general importance is proving more popular with us every year. The one conducted at this meeting by Dr. Kinsley on "Swine Practice," in which nearly every one present took part, was certainly well worth while.

At the business session thirty-one new members were taken in and the following officers were elected for the coming year:

Dr. P. Philipson, Holbrook, President; Dr. George A. Young, Syracuse, Vice-President; Dr. Carl J. Norden, Lincoln, Secretary-Treasurer. After considerable discussion, Omaha was selected as the place for the next meeting; Kearney and Lincoln being the other cities which extended invitations.

Resolutions were adopted thanking the speakers from outside of the association who so kindly assisted in the program; also expressing appreciation of the work of the local committee and the very generous manner in which the Grand Island Chamber of Commerce

contributed toward making this meeting a success. The resolutions of general interest which were adopted recommended that increased appropriation be made by the State Legislature so as to make it possible to pay indemnity for all classes of cattle which react to the tuberculin test; also that the distribution, sale and administration of tuberculin be controlled.

These resolutions were introduced largely at the request of prominent breeders in the State, and from the attitude of the more important livestock and farm associations in this State, we feel very sure that they are along the right line, and that they will in all probability be enacted in some form during this session of the Legislature.

A very important part of the program at this meeting was an exhaustive exhibit relating to bovine tuberculosis and a more limited one on hog cholera, put on by the Nebraska Bureau of Animal Industry. This exhibit consisted of fresh pathological specimens, permanent mounted specimens and large pictures in colors and illustrated charts properly arranged on large easels. All except the fresh specimens were secured from the U. S. B. A. I. at Washington. This exhibit was thrown open to the general public. The high schools and various clubs were advised of this exhibit and a large number availed themselves of this opportunity to see it. The results were most gratifying, at least so far as could be ascertained from the expressions of many of those who visited the display.

CARL J. NORDEN, *Secretary.*

DEHEMA (IND.) VETERINARY MEDICAL ASSOCIATION

The Dehema Veterinary Medical Association (the association is composed of veterinarians of Delaware, Henry and Madison Counties, Indiana) held its monthly meeting at Dr. Hamilton's Veterinary Hospital, Muncie, Ind., Dec. 15, with a good attendance.

The following officers were elected for the ensuing year: Dr. C. M. Weber, Oakville, President; Dr. C. C. Allen, Selma, Vice President; Dr. R. E. Kepner, New Castle, Vice President; Dr. H. A. Smith, Anderson, Vice President; Dr. H. Meade Hamilton, Muncie, reelected Secretary and Treasurer.

Drs. H. A. Smith and F. A. Moore were appointed on the program committee for the next meeting, the subject being "Swine Diseases."

The meeting adjourned to meet on Feb. 16, 1921, after a general discussion of the following topics: Important Veterinary Legisla-

tion, Indiana State Veterinary Medical Association, Serum Production, Distribution and Use, and the Enforcement of Veterinary Practice Act.

H. MEADE HAMILTON, *Secretary*.

PHILADELPHIA VETERINARY CLUB

A regular meeting of the Philadelphia Veterinary Club was held at the University of Pennsylvania, School of Veterinary Medicine, Tuesday evening, December 21. About thirty members were present. Dr. T. E. Munce, State Veterinarian of Pennsylvania, was the principal speaker. He gave an interesting and instructive talk on the subject of tuberculosis eradication work as being conducted by the State and Federal Governments. The balance of the evening was devoted to a general discussion of this subject. Many questions were asked concerning the various phases of the work and especially in reference to the large number of no lesion cases found in posting animals that have shown well marked reactions to a tuberculin test.

Preceding each club meeting scientific addresses are presented following which there is a general discussion by the men engaged or interested in research work. So far this year there have been four of these lectures given. First was given by Dr. M. J. Harkins on "Immunization against Blackleg." Second by Dr. D. H. Bergey on the "Relation of Streptococci to Diseases of Man and Animals." Third by Dr. J. A. Kolmer on the "Relation of Anaphylaxis Reaction." Fourth by Dr. Paul Lewis on "Tuberculosis with Special Reference to the Complement Fixation Test."

These papers have been followed by lively discussions and have not only been of great interest and benefit to the laboratory men but are well enjoyed by our practitioners.

This section of our program is handled entirely by members of the club engaged in research or laboratory work. An arrangement of this sort has been very successful in bringing in closer contact the practicing veterinarians with the laboratory.

C. S. ROCKWELL, *Secretary*.

MASSACHUSETTS VETERINARY ASSOCIATION

The regular monthly meeting of the Massachusetts Veterinary Association was held at the New American House, Boston, December 22. Dr. A. S. Cleaves acted as chairman. The name of Roy S. Youmans, Methuen, Mass., graduate of New York State Veterinary College, 1914, was acted upon and he was admitted to membership.

Chairman Cleaves, in a few well-directed remarks, introduced Dr.

Edward A. Cahill, Director of the Pitman-Moore Biological Laboratories, Indianapolis, Indiana, who read a paper on "Modern Biologics." This paper proved to be of exceeding value to the members present.

After completion of the paper, lunch was served, after which the members entered into a general discussion of the diseases in which modern biologics are employed. Dr. Cahill showed his familiarity with conditions of this kind by entering very thoroughly into the discussion of each disease. A rising vote of thanks was extended to Dr. Cahill.

HARRIE W. PEIRCE, *Secretary*.

VETERINARY PRACTITIONERS' WEEK, DAVIS, CALIF.

The Annual Short Course for Veterinarians was held at the University Farm, Davis, Calif., under the name of Veterinary Practitioners' Week. The attendance was over 100 and a large percentage of this number was in attendance during the entire week.

The week opened on January 3 with an address of welcome by Dr. C. M. Haring in which he brought out the position that the Veterinary Division of the University of California has been in during the past 10 years. He indicated the great strides of progress that the veterinary profession has made during this period. The earnest coöperation of his Department has surely been deeply appreciated by the practitioners of the State, for without their coöperation and assistance the Annual Short Course which has been held at Davis for the past four years would have been impossible.

Dr. A. T. Kinsley was the first speaker on the literary program and discussed swine management. Other speakers and their subjects were as follows:

Feeding Hogs, J. I. Thompson; Organization and Functions of the State Department of Agriculture, J. P. Iverson; Diagnosis of Swine Diseases, A. T. Kinsley; Foreign Bodies and Impactions of Rumen, J. L. Tyler; Mammitis, J. F. McKenna; Obstetrics, Charles Rey; Judging Sows, E. H. Hughes; Hog Cholera Serum and Its Use, M. Dorset; The Pure Food Law in Relation to Stock Foods and Tonics, C. H. McCharles; Plants Poisonous to Livestock, P. B. Kennedy; Parasitic Diseases of Swine, A. T. Kinsley; Filterable Viruses, M. Dorset; Judging Boars, E. H. Hughes; Diseases of Suckling Pigs, A. T. Kinsley; Infectious Abortion in Swine, F. M. Hayes; Botulism, K. F. Meyer and J. C. Geiger; Judging Beef Cattle, Dairy Cattle and Sheep, R. F. Miller, W. E. Thomson, J. F. Wilson; Proposed Tuberculosis Legislation, J. P. Iverson; Some Conclusions

Drawn from Tuberculin Testing Under the Pure Milk Law, J. Frey; Coöperative Tuberculosis Eradication in Nevada, Edward Records and N. E. Nielson; Complications Associated with Infectious Abortion, L. R. Vawter and Stephen Lockett; Tuberculins, M. Dorset; Rabies, F. L. Kelley; Disinfection and Disinfectants, M. Dorset; Infectious Necrotic Enteritis, A. T. Kinsley; clinic on local and general anesthesia applicable to field cases and demonstration of nerve blocking for dental anesthesia, by J. F. McKenna, H. Phipps and others.

The meeting closed Friday evening, January 7, with a unanimous vote of thanks being extended to Drs. Dorset and Kinsley and to all those contributing to the program and success of the course. On behalf of the veterinarians of the State and those in attendance, Dr. McKenna voiced the appreciative sentiments of the practitioners to the Veterinary Division of the University of California for making it possible to hold such a practitioners' week. Among the veterinarians who traveled a considerable distance to be able to attend this meeting was Dr. Cyril Golding, Kauai, Hawaii. Dr. Golding was formerly a prominent California practitioner, a member of the California State Veterinary Medical Association and a member of the San Joaquin Valley Veterinary Medical Association. Until four years ago, when he left for the Islands, he took an active part in all veterinary affairs of this State. Dr. Golding has charge of the Territorial work on the Island of Kauai, some 90 miles from Honolulu. During the outbreak of anthrax on that Island several years ago he had personal supervision of the work of its eradication.

Dr. Roy Smith of Oregon, was in attendance and there were also a number of Nevada practitioners present.

Major R. Vans Agnew, U. S. Army, now located in San Francisco, was in attendance on the last day and spoke on Army matters pertaining to the veterinarian.

Expressions were heard on all sides from those in attendance that this meeting was one of the most successful short courses for veterinarians ever held in the State. **WILLIAM P. JACKSON,**

Resident Secretary.

WASHINGTON STATE COLLEGE POST-GRADUATE COURSE

The annual Post-Graduate Course for Veterinarians was held at Pullman, Wash., on January 10 to 14, 1921.

This year's course was the best ever held in the West, not only

from point of attendance (there being about forty veterinarians present), but on account of the prominent men of the profession who were on the program.

Veterinarians were present from Washington, Idaho, Oregon, Montana and British Columbia.

This year the course was given under the auspices of the Veterinary Societies of Washington and Oregon and the State College of Washington. No fee is charged, but that does not mean that the men responsible for the success of the school spared any pains in making the meeting a beneficial one.

Prominent among the men secured to lecture was Dr. A. T. Kinsley of Kansas City, who is acknowledged to be one of our leading authorities on diseases of swine.

The social side of the meeting was well taken care of. On Tuesday evening there was an Alpha Psi initiation. On Wednesday evening those in attendance were entertained at a banquet at which talks were made by Dr. Holland, President of the Washington State College, Dr. S. B. Nelson and representatives of the different States. Those on the program besides Dr. Kinsley were Dr. Lytle, State Veterinarian of Oregon; Dr. P. G. McIntosh of Yakima, Wash.; Dr. B. T. Simms of the Oregon Agricultural College, Dr. Phillips of Mount Vernon, Wash.; Dr. W. L. Johnson of Puyallup, Wash.; Dr. W. G. Moorehouse, Salem, Oreg., and Drs. E. E. Wegner, Otto Menig, H. Beckman, S. L. Brown and J. W. Kalkus of the Washington State College Faculty.

Two afternoons were taken up with a clinic. This was in charge of Drs. McIntosh, Moorehouse and Beckman, who performed several interesting operations. Dr. Simms gave several demonstrations of handling the genital organs in the treatment of sterility. Dr. Lytle gave an interesting lecture on diseases of sheep.

Every one present said before leaving that he would be back again next year, as the course was one that no practitioner could afford to miss.

Dr. E. E. Wegner is to be congratulated on the capable manner in which he arranged the program and for the selection of the men chosen to participate as lecturers. The expenses are borne by the State College of Washington.

Others present were Drs. H. J. Keown, Anson Knight and J. C. Miller of Victoria, B. C.; Drs. H. C. Luce, A. J. Powell and C. H. Seagraves of Idaho; Dr. A. D. Knowles of Montana; Drs. E. R. Derflinger, R. C. Myline and Norman Neilson of Oregon; Drs. J.

H. Bailey, T. A. Elliott, J. R. Fuller, A. R. Galbraith, R. L. Gilham, E. C. Harter, W. A. Jaquiss, J. H. McCoy, L. C. Pelton, C. A. Strandberg, J. J. Stratton, J. Trotter, P. T. Tweed, W. Wilson and J. H. Woodside of Washington.

A. R. GALBRAITH, *Resident Secretary.*

MAINE VETERINARY MEDICAL ASSOCIATION

The first quarterly meeting of the Maine Veterinary Medical Association was held at the Augusta House, Augusta, Me., on January 12. During the morning the members attended sessions of the State Legislature. The business meeting was held at 2 p. m. Twenty-one members answered to roll call. Officers of the association for the ensuing year were elected as follows: President, Dr. W. H. Lynch, Augusta; Vice-President, Dr. C. F. Davis, Rumford Falls; Secretary-Treasurer, Dr. P. R. Baird, Waterville.

A Legislative Committee, composed of Drs. L. S. Cleaves, C. L. Davis, C. F. Dwinal, A. Joly, M. E. Maddocks, and W. H. Lynch, were elected and instructed to frame and introduce a bill in the legislature changing our present law so it will read "Only graduates of veterinary colleges approved by the B. A. I. are eligible to examination of Maine State Board of Veterinary Examiners." The literary program follows: Dr. C. F. Davis, Mastitis of the Cow; Dr. A. J. Neal, A Case Report; Dr. C. W. Purcell, Immunity to Tuberculin; Dr. P. R. Baird, Mineral Deficiency.

Discussion of these papers followed until a late hour. After voting to meet in Bangor, April 13, the meeting was adjourned.

P. R. BAIRD, *Secretary.*

OKLAHOMA VETERINARY MEDICAL ASSOCIATION

The midwinter session of the association was held at the Lee-Huckins Hotel at Oklahoma City, on Jan. 11 and 12. The meeting was called to order and presided over during the session by Dr. T. O. Booth, in lieu of President C. H. Anthony, who was slightly indisposed and out of voice.

Dr. J. S. Grove delivered the welcoming address in which he very fittingly called attention to the good work in the field during the past year by both practicing and official veterinarians in the suppression and control of contagious diseases of livestock. Response was made by Dr. C. C. Hisel, who, it was evident, voiced the sentiment of the seventy-five members present that all felt it was good

to be there. Dr. Hisel also took occasion to stress the effective contagious-disease control work done during the past season.

Dr. C. H. Stam, Chandler, Okla., read an interesting paper on the use of rectal injection of normal saline solution in the treatment of milk fever. An interesting and instructive address on "Sterility in Cattle" was delivered by Dr. G. F. Jungerman, Kansas City, Mo., which brought out general discussion. "Traumatic Pericarditis and Reticulomitis" was handled by Dr. H. A. Roscoe in a manner indicating the speaker's familiarity with his subject.

Dr. H. M. Graefe, Topeka, Kans., interested the veterinarians and furnished much food for thought on the subject of "The Veterinarian an Asset to His Community." Dr. Joe H. Bux, Little Rock, Ark., presented a highly interesting paper on "Anthrax Control in Arkansas." This paper was of peculiar interest on account of the widespread outbreak of this disease in Oklahoma and several adjoining States the past summer. Discussion followed by Drs. E. V. Robinett and L. G. Cloud, State Veterinarians of Oklahoma and Texas, respectively, and by other veterinarians who assisted in suppressing that disease in Oklahoma.

"Parasitic Diseases of Sheep" was Dr. J. E. Guberlet's subject. The Doctor is connected with the A. & M. College at Stillwater, and his paper shows he has done work which is of great value to the practicing veterinarian and sheep raiser, and promises to contribute materially to make Dr. Nelson's slogan, "A Million Sheep in Oklahoma in 1923," come true.

An enjoyable feature of the session was the semi-annual banquet Tuesday night at the Skirvin Hotel. Plates were set for 115 members, their wives and friends. The toastmaster, Dr. John W. Choate, formerly a practicing veterinarian and now the head of the Choate Oil Corporation, made himself famous as a toastmaster by his appropriate introductory remarks.

Dr. Fred Eagle, who, for a number of years has manifested a keen interest in the welfare of the association, was on hand at the eating and was first to respond to a toast. In his remarks he gave the veterinarian some well-received advice on "Service." Harry Blake, President of the Shorthorn Association of Oklahoma, made some complimentary remarks about the good the veterinarian had done and is doing along various lines, especially at this time, by the office of the State Veterinarian in coöperation with the Bureau of Animal Industry, in the accredited herd work.

A feature of the banquet was the presence of a considerable num-

ber of prominent members of the Legislature, now in session. Some were inclined to believe horse meat had been served, but all agreed it was good at that. Most legislators present thought they saw symptoms of the veterinarian wanting special legislation, therefore were very circumspect in their remarks. However, the one lone lady legislator, Hon. Mrs. Lamar Looney, threw off all restraint, and said that if the veterinarians present were a fair representation of the personnel of the profession, she not only would be for any legislation they would ask for, but would be present at the next and subsequent banquets if someone would get word to her of the time and place.

Already popular with the graduated veterinarian, Hon. J. A. Whitehurst, President of the State Board of Agriculture, made himself the ideal head of his Department by an address replete with eloquence, expressive of his appreciation of the support his administration had received from association members, and suggesting for them still larger fields of usefulness to State and society.

The music for the occasion was furnished by Mrs. F. Martin Hill and daughter, and Mrs. Ben Dobkins.

L. J. ALLEN, *Resident Secretary*.

VETERINARY MEDICAL ASSOCIATION OF N. J.

This association held its annual meeting at the Trenton House, Trenton, N. J., on Thursday, January 13, 1921, at which time the following officers were re-elected for the ensuing year:

Dr. Robert E. Mosedale, President, Bernardsville; Dr. H. H. Bair, First Vice-President, Freehold; Dr. J. W. Haffer, Second Vice-President, Paterson; Dr. R. W. Butterworth, Secretary; Paterson; Dr. James McDonough, Treasurer, Montclair.

The next meeting will be held July 14, 1921, at Asbury Park, N. J.

R. W. BUTTERWORTH, *Secretary*.

CONFERENCE FOR VETERINARIANS AT AMES, IOWA

The Sixth Annual Conference for veterinarians, one of the series of Practitioners' Short Courses, was held at Ames, Iowa, January 17 and 18, 1921.

The following program was carried out in detail:

Monday afternoon session: Assembly and registration; "Tuberculosis and Other Diseases of Chickens, Including Demonstrations of Tuberculin Test," Dr. L. Van Es, University of Nebraska; demon-

stration of technique of tuberculin tests in cattle and swine; "Discussion of Factors Influencing Tests," Dr. H. W. Turner, Pennsylvania State Bureau of Animal Industry, Harrisburg, Pa.. Evening session: Address of Welcome, President R. A. Pearson, Iowa State College; Preparation of Tuberculins, Dr. A. Eichhorn, New York City.

Tuesday morning session: Interpretation of Tests Previously Made on Cattle and Hogs, Dr. H. W. Turner and Dr. C. H. Covault; observation of results of tests by all present, followed by general discussion of methods and results, discussion led by Dr. C. E. Cotton, State Veterinarian of Minnesota and Dr. Peter Malcolm, State Veterinarian of Iowa.

Afternoon session: Postmortem lesions shown by animals used in tests and general discussion of relative value of various tests.

Four principal factors contributed to the success of this meeting:

1. Through coöperation with the State Veterinarian and his workers and the State representative of the Bureau of Animal Industry in connection with the work on tuberculosis control, ten cattle which had previously reacted to one or more of the tuberculin tests were secured for the demonstration on cattle. Ten hogs were selected by the use of the test by Dr. W. E. Simonson and twenty-four chickens were selected on clinical evidence.

One goat also known to be a reactor which had been sent to the Research Department by Dr. Golden for further study was also used. It reacted to the ophthalmic and subcutaneous tests and showed lesions in mediastinal glands, lungs, liver and spleen.

Each animal was carefully identified and numbered. A placard bearing the record of the first test and the herd history was placed in front of each animal. The various tests were then applied at the proper time so that they would be ready to observe and interpret on the day of the demonstration. A large chart was prepared giving the temperature of those given the subcutaneous test.

2. The facilities for handling the demonstration contributed very greatly to its success. All of the preparation was done in the Veterinary Hospital and all of the meetings were held in the abattoir of the Agricultural Division. This building is provided with a pit for the animals on one side of which is a large amphitheater and on the opposite side is a modern killing place where the animals were taken for slaughter and post mortem following the interpretation of the tests and were ready for observation of lesions on scheduled time. The B. A. I. provided an inspector who made the usual packing-house inspections for the disposition of the carcasses which was an added point of interest to the audience.

3. For the speakers we were fortunate in securing Dr. L. Van Es, of Lincoln, Nebraska, and Dr. H. W. Turner of Harrisburg, Pa., who had had years of experience in the actual work and who knew how to bring out the valuable points in testing. The discussion was led by Dr. C. E. Cotton and Dr. Peter Malcolm. Their remarks naturally led to an explanation of the State laws and the work on tuberculosis control. At the evening meeting President Pearson gave the audience some new ideas of the work of the college and of the importance of the work of the veterinary profession now and of the greater work in the future. Dr. Eichhorn ably presented the subject of the "Preparation of Tuberculins."

4. The last point offered as an evidence of the success of the meeting is the fact that it was attended by about 300 of the veterinarians of the State. They came early and stayed until the last demonstration revealed the lesions in the goat after which special cars took them bodily to Des Moines for the State association meeting.

H. E. BEMIS, *Chairman.*

IOWA VETERINARY ASSOCIATION

The thirty-third annual meeting of the Iowa Veterinary Association was by special arrangement made a cooperative session with the Sixth Annual Conference for veterinarians arranged by the Veterinary Division of Iowa State College, the conference being one of a series of Practitioners' Short Courses provided by the Iowa State College through special legislative appropriation for the purpose. The two meetings were scheduled for the dates of January 17, 18, 19 and 20, the program of the first two days being held at the college in Ames and the last two days at the Hotel Savery in Des Moines.

The interest of the Iowa veterinarians in the meetings may best be shown by the attendance, approximately 300 veterinarians being present. Marked interest was shown in all sessions of the program. At the close of the Practitioners' Conference at Ames, a special inter-urban train was provided to carry the veterinarians to Des Moines, where a two-day session of the Iowa Veterinary Association opened at 9 o'clock on Wednesday morning.

Following the address of President S. K. Hazlet of Oelwein, Dr. H. W. Turner of the Pennsylvania State Bureau of Animal Industry gave a very interesting discussion on "Tuberculosis Control," using charts to illustrate various points. Dr. R. M. Morten's reports on "Gohn Sachs Bacillary Infection in Swine," which followed, brought

forth considerable discussion relative to practical skin disinfection and the proper technique in the use of various biological products.

On Wednesday afternoon, Dr. Robert Graham of the University of Illinois, gave a very interesting discussion, illustrated by lantern slides, on the subject of "Botulism in the Domestic Animals." Dr. Graham's talk was much appreciated and brought out very interesting discussion. A series of very interesting papers on surgical topics was presented by the various members of the Committee on Surgery. Dr. W. F. Guard of Ames, Chairman of the Committee, presented an interesting paper on "Umbilical Hernias in Swine" presenting his technique, and data compiled from reports received from a hundred or more veterinarians, as to the most successful methods of operating on this condition. Dr. N. A. Kippen of Independence discussed "Surgical Treatment of Traumatic Pericarditis," which was followed by a paper on "Dystokia in Sows" by Dr. C. E. Juhl of Osage, in which methods of delivery other than the Cesarean operation were emphasized. Dr. John Patterson of Hedrick presented an excellent paper on "Treatment of Extensive Burns and the Regenerating of Skin over Granulating Wounds." Dr. Patterson discussed his experiences in the handling of burns of varying degrees in cattle following a fire on a farm in which a large number of very valuable purebred animals were severely burned. A paper entitled "Fractures" was presented by Dr. M. E. Dicken of Washington.

Drs. J. H. Lynch of Fonda and K. W. Stouder of Ames, representing the Committee on Sanitation, discussed problems relative to sanitation, Dr. Lynch emphasizing the matter of proper disinfection of farm buildings and Dr. Stouder that of the value of proper ventilation as a means of disease control.

Thursday forenoon was devoted almost entirely to a business session including reports of the Committee on Legislation by Dr. Peter Malcolm, State Veterinarian, and the Committee on Veterinary Fees by Dr. H. B. Treman of Rockwell City. Following the report of the Executive Committee, sixty new applications for membership were favorably acted upon, which gives the Iowa Association a total active membership of 512. The Secretary-Treasurer's report showed the Association to be in excellent financial condition. The following officers were elected for the new year: President, A. Kaderabek, Fort Dodge; First Vice President, E. A. Buxton, Vinton; Second Vice President, C. W. Anderson, Jewell; Secretary-Treasurer, H. D. Bergman, Ames (reelected); Member of Executive Board, A. L. Wood, Hampton.

Following the business session the day was devoted to papers and discussions as follows:

"Strongyloidosis in Horses" was discussed by Dr. C. H. Covault of Ames, who emphasized the fact that this condition is quite prevalent in Iowa, and discussed the lines of treatment which have seemed most successful. Dr. H. E. Pinkerton of Fort Dodge discussed "Observations on Diseases of Swine."

The Committee on Therapeutics presented the following interesting papers: "The Physiological Action of Pharmaceutical Agents as Determined by Experimental Study," E. R. Steel, Grundy Center; "Therapeutics of the Diseases of Suckling Pigs," H. A. McIntire, Maquoketa; "Treatment of the Common Stomach and Bowel Diseases of Cattle," O. N. Schultz, Latimer; "Therapeutics of the Digestive Tract of the Horse," A. J. Treman, Lake City.

The subject of "Azoturia" was handled in an interesting way by Dr. N. R. Allen of Perry, Dr. Allen emphasizing certain points relative to the proper nursing and symptomatic treatment of this disease. Dr. A. I. Kulp of Adel discussed "Hemorrhagic Septicemia" from the standpoint of the practitioner in the field, emphasizing some of the difficulties encountered by the practitioner in attempting to diagnose and recommend satisfactory means of coping with the disease. Dr. A. Eichhorn of New York City discussed this disease from the laboratory standpoint, including a brief discussion of the various biological products which have been recommended in its control.

No evening sessions were scheduled during the meeting, the evenings being left open for class and group reunions, committee meetings and recreation in general. The open evenings were apparently appreciated and resulted in excellent attendance and good attention during the day sessions.

H. D. BERGMAN, *Secretary*.

THE NEVADA STATE VETERINARY ASSOCIATION

The third annual meeting of the Nevada State Veterinary Association was held on January 20, 1921, at Reno, Nevada.

Dr. Robert Dill, the president, presided. The afternoon session in the Agricultural Building of the University was devoted to business and addresses by Dr. J. Traum of the University of California on "Some Problems in Tuberculosis Control," followed by Dr. Fred Wood of the Cutter Laboratories on "Immunization against Anthrax and Blackleg." The evening session was held at the Riverside Hotel where after a banquet further discussion of the topics of the afternoon was thoroughly enjoyed.

Election of officers for the ensuing year resulted in the election of Dr. George E. Bamberger, of Reno, for president; Dr. Lyman R. Vawter, of the State Experiment Station for vice-president, and Dr. S. Lockett for secretary-treasurer.

During the meeting a resolution approving the Lehlbach Reclassification Bill (H. R. No. 15225) was unanimously passed with instructions to the secretary to place same in the hands of all the Congressional delegates from the State of Nevada. In addition each member promised to do all in his power by individual effort to further the interests of the measure.

Two days later the secretary was able to make an appeal for the bill before the Nevada State Farm Bureau which enthusiastically responded by formulating an appropriate resolution in favor of the same.

S. LOCKETT, Secretary.

NECROLOGY

Dr. O. G. Whitestone of Huntington, Indiana, died on October 22, 1920, of chronic heart trouble. Dr. Whitestone was a graduate of the Ontario Veterinary College in 1890, and was admitted to the A. V. M. A. in 1904.

The many friends of Colonel H. E. Bemis will learn with deep sorrow of the death of Mrs. Bemis on December 4, as a result of intestinal obstruction, complicated by heart failure. Mrs. Bemis was deeply interested in charitable work as well as college affairs. Her kindness and hospitality to veterinarians visiting Ames were noteworthy and she will be greatly missed in the college life on account of such genuine cordiality and thoughtfulness of the pleasure and comfort of others. A very kindly sympathy goes to our colleague in his bereavement.

Petaluma Weekly Poultry Journal remarks that the Bureau of Chemistry, Department of Agriculture of Pennsylvania, after an investigation, learned that a Mexico City firm is supplying dried flies for feeding purposes and practically control the export of this insect. The flies are those frequenting aquatic or low, marshy places. The paper adds: "There does not appear to be any reason why these dried flies can not be used to advantage in poultry feeding."

MISCELLANEOUS

GENERAL GORGAS LAUDED

Latin America, Great Britain and France joined with the United States on January 16, in paying tribute to the memory of the late Major Gen. William Crawford Gorgas, former Surgeon General of the United States Army, staunch friend of the Army veterinarian, honorary member of the A. V. M. A., and leader in the successful fight against yellow fever, who died in London last July.

Secretaries Baker and Daniels, Major Gen. Peter C. Harris, Ambassador Jusserand of France, Major Gen. H. K. Bethell, military attaché of the British embassy; Ambassador Pezet of Peru, Minister de Cespedes of Cuba, Minister Elizalde of Ecuador, Chargé d'Affaires Lefevre of Panama and Director General Rowe of the Pan-American Union participated in memorial services in honor of General Gorgas held at the Pan-American Union Building, in Washington, D. C.

The services were under the auspices of the Southern Society of Washington, which thereby honored the memory of a son of the South.

Secretary Baker declared the former Surgeon General of the Army had made the building of the Panama Canal possible and had "saved its construction from being marred by having along its banks the graves of tens of thousands of victims to the pestilence of the jungle, which for ages had imposed the sentence of death upon those who sought to join the two oceans."

General Gorgas' claim to true greatness, Ambassador Jusserand declared, lies in the fact that he gave himself to "world service without thought of fame or self-distinction." General Bethell, speaking for the country in which General Gorgas died, said: "His is the glory of the savior, not the destroyer. Panama is his memorial and his monument."

Panama as a nation paid its tribute through J. E. Lefevre, who declared that the proposed Gorgas Tropical Institute for Research, which may be established by the government of Panama as a tribute to the services of General Gorgas, would be both "a temple to science and a shrine to the great sanitarian."

Minister de Cespedes said the memory of General Gorgas is cherished by the Cuban people, and his name is revered like that

republic's own national heroes and liberators. Minister Elizalde delivered a tribute of appreciation on behalf of Ecuador.

Ambassador Pezet expressed the "undying" gratitude of Peru for the sanitation work done that country under General Gorgas' direction, declaring his death was a particularly severe loss to his nation, as the general had planned to go there to extend and complete the work begun.

THE EWE-NECKED MARE

You have read of the wonderful one-horse shay,
And the deacon who drove on that memorable day;
But little was said of the ewe-necked mare,
The important part of the whole affair.

The deacon got this mare in a swap
With a stranger down at the blacksmith shop.
She was "warranted sound in wind and limb;
Gentle, young, and to go like sin."

He had owned this mare for about a day,
When she ate her fill of musty hay.
Not quite full up—the rest, alas,
Like a toy balloon, was mostly gas.

The deacon led the mare out in the sun
And watched her flanks with an "I dew vum";
The deep, moist grunt with each expiration
Was the cause of his painful exclamation.

He hitched the mare and started off,
But was dreadfully nervous for fear she'd cough.
The mare was willing, but had to stop
To get her breath; she *couldn't* trot.

The old mare coughed! The shay was dust!
As the poet said, every piece had bust.
But it wasn't piled in a neat little mound,
'Twas scattered like ashes all over the ground.

This story is true of the one-horse shay
And the ewe-necked mare that Sabbath day.
If it hadn't been for the heaves, you bet
That sturdy old shay'd been running yet.

N. S. MAYO.

LIVESTOCK ON FARMS AND RANCHES

Nearly ten million less head of livestock were on farms and ranches in the United States on January 1, 1921, than a year preceding. Horses decreased about 602,000 head, or 2.9 per cent; mules decreased 42,000, or 0.8 per cent; milk cows decreased, 298,000, or 1.3 per cent; other cattle decreased 1,880,000, or 4.2 per cent; swine decreased 5,078,000, or 7.1 per cent, and sheep decreased 2,047,000, or 4.3 per cent.

The total numbers on farms and ranches are estimated as follows: Horses, 20,183,000; mules, 4,999,000; milk cows, 23,321,000; other cattle, 42,870,000; swine 66,649,000, and sheep, 45,067,000.

The total value of livestock has declined \$2,271,576,000, or 26.7 per cent during the year; that is, from a total of \$8,507,145,000 on January 1, 1920, to \$6,235,569,000 on January 1, 1921. This decline is due partly to the reduction in numbers, but more to the lower value per head.

Horses, with a value of \$82.45 per head, as compared with \$94.42 a year ago, are lower than they have been since 1906. The total value of horses is estimated at \$1,664,166,000, which is \$298,337,000, or 15.3 per cent less than a year ago.

Mules have declined in price relatively more than have horses, due, probably, to the depression in the cotton States, where mules are largely used. The January 1 price, \$115.72, is the lowest value since 1916, whereas the value a year ago, \$147.07 was the highest on record. The total value of mules is \$578,473,000, a reduction of \$162,927,000, or 22 per cent as compared with a year ago.

Milk cows have declined 24.8 per cent in value per head, from \$85.11 to \$63.97, and in total value have declined \$518,226,000, or 25.8 per cent, from \$2,010,128,000 to \$1,491,900,000. Other cattle have declined 27.3 per cent in value per head, from \$43.22 to \$31.41; and in total value have declined \$587,520,000, or 30.4 per cent, from \$1,934,185,000 to \$1,346,665,000. All cattle have thus declined \$1,105,748,000, or 28 per cent, from \$3,944,313,000 to \$1,934,185,000.

Swine have decreased in value per head 31.7 per cent, from \$19.01 to \$12.99; and in the total value have declined \$497,636,000, or 36.6 per cent, from \$1,363,269,000 to \$865,633,000.

Sheep have decreased in value per head 39.1 per cent, from \$10.52 to \$6.41, and in total value have declined \$206,928,000, or 41.8 per cent, from \$495,660,000 to \$288,732,000.

LIVESTOCK PROBLEMS IN ARGENTINA

The following letter received from a friend in Argentina, who manages a large estancia, gives an interesting account of some problems connected with the livestock industry of that country and the method of meeting them:

"In animals, anthrax in cattle was formerly one of the most difficult problems we had to contend with, but now by using the different serums and vaccines we are well protected. I have used double anthrax vaccine with excellent result. All animals raised on the place are vaccinated and all animals purchased are also vaccinated. I was formerly manager of an estancia of 40,000 acres, of which I had 30,000 acres under alfalfa, carrying from twelve to fourteen thousand head of stock. The mortality from anthrax was only about three per thousand after they had been vaccinated.

"Foot and mouth disease is our one big trouble and it seems to be getting worse. On the alfalfa pasture the mortality was from two to four per cent, but it left four or five per cent cripples and these had to be slaughtered or sold. The worse part of it is that it puts the animals back a month and stops the movement of livestock. Any animals suffering slightly from tuberculosis get worse and the amount of net loss is hard to estimate. The disease appears erratically but nearly always in the spring (September and October). Last year was the worst I have ever observed. It struck all livestock within eight days, but from start to finish we were clear in thirty-five days with very few losses. Many animals, however, did not come back to normal for ten months. This year we are having a mild attack, mostly among calves and yearlings, jumping from one animal to another since the first of September. If it keeps on into November flies will be thick then and will attack their feet. I think our loss will be from six to ten per cent, as it is very difficult to treat these cases. Up to the present we have found no satisfactory treatment for this disease. Our animals are semi-wild and it is necessary to rope and throw them to apply any treatment and as they have a high fever the treatment usually does more damage than good.

"Among swine, anthrax, cholera, and what we call 'small-pox' are the most serious diseases. The pox attacks young pigs from six to ten weeks old. Veterinarians do not seem to be familiar with this disease. The young pigs huddle together and are very drowsy. Some lice will be found on them back of the ears and behind the fore-legs. The pigs break out with small eruptions around the eyes and mouth. They have a high fever and fall away rapidly in flesh. Out of a litter of eight or nine, four or five will be saved but they are put back in growth at least two months. The sows appear in good health and there are no eruptions on the teats. I try to prevent the disease by dipping in cresylic acid dips, 1 to 80. This destroys the lice and assists somewhat, but it must be done every ten days. It is important not to keep many sows together in a pad

dock. When the disease gets started it is hard to check. Sows that farrow in the pasture nearly always escape the disease. Last autumn I turned my pregnant sows into a 30-acre field of corn yielding about 60 bushels per acre, and got 400 strong young pigs, but some of the litters had the disease. Another man near here, who has a herd of three to four thousand young pigs, keeps a sharp eye out for this disease and when found destroys them. This man and I work on the same general lines, using no hog houses and little or no shelter, preferring to raise them in open pastures mostly on alfalfa. I sow rape, oats and barley for winter feed so my hogs always have some legumes.

"Anthrax in swine does not trouble me much, but it is bad in other places and I think it is often confused with hog cholera.

"I know nothing about hog cholera, but it is what I am most afraid of because of the ravages that it has caused in the United States. I went to see some outbreaks on some estancias not far away where the disease practically wiped out the herd, but I am not satisfied that the disease is hog cholera. The swine industry is just starting in this country, and in my humble opinion it is going to develop rapidly, for my experience shows me that we can raise a kilo (2 1/5 pounds) of pork easier than in any other civilized country in the world. The packing companies are also putting up plants that will handle four times as many hogs as they can buy today. In the last three months there has been a boom in price. It is now 80 to 95 cents per kilo, live weight. Our dollar is worth 44 cents, United States gold. In the last two years I have fed and marketed 2,500 hogs. My loss in mature pigs of 50 kilos has not been 3 per cent. In shipping to market I only had one dead animal and two that had to be carted on arrival. This illustrates our excellent railway service in shipping.

"One of the difficulties in using dips in this country is the character of the water that varies from sour, and brackish to salt, hard and soft, and it is essential to have a dip that will mix well with any of these."

N. S. MAYO.

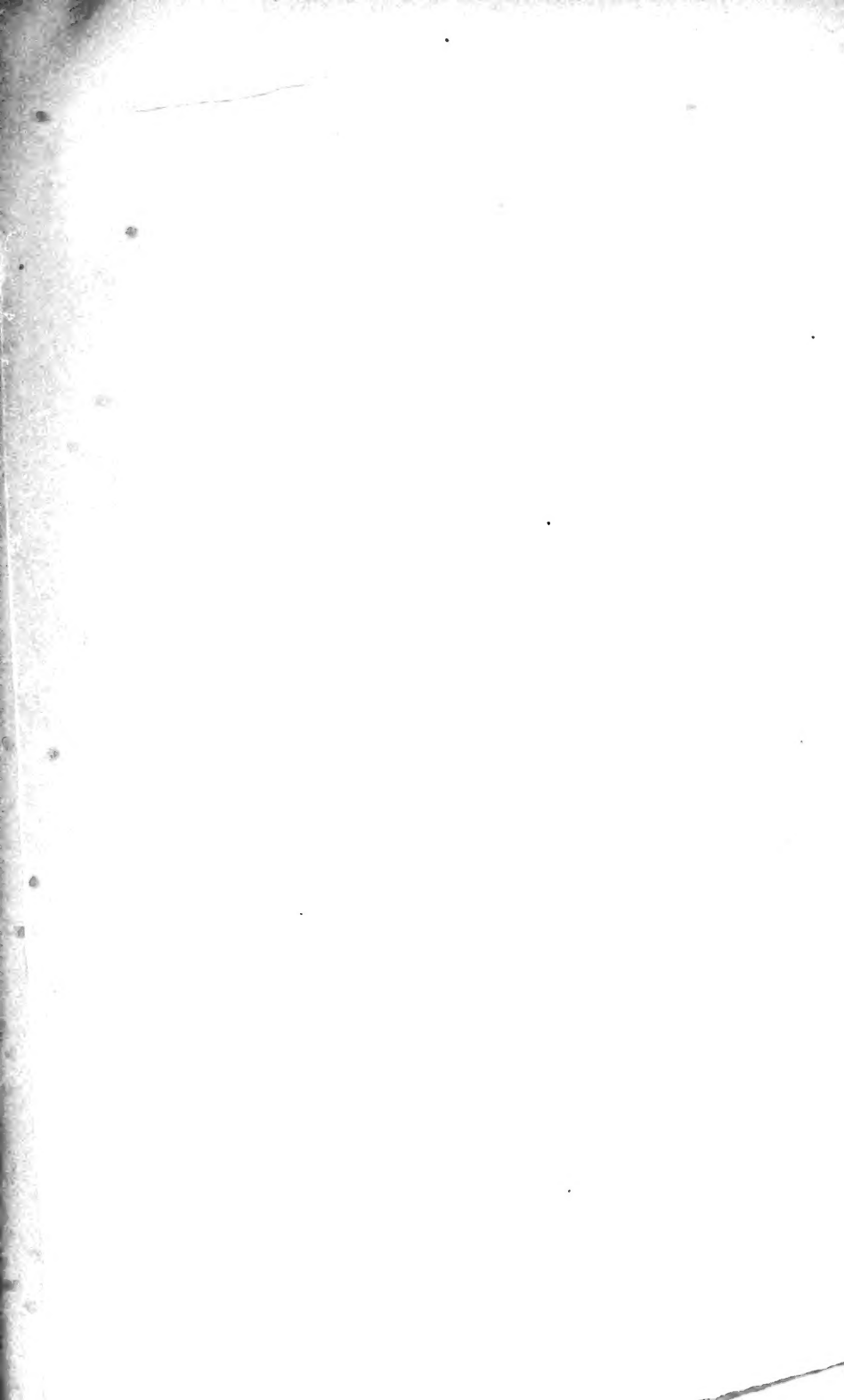
CLINICAL DIAGNOSIS OF TUBERCULOSIS

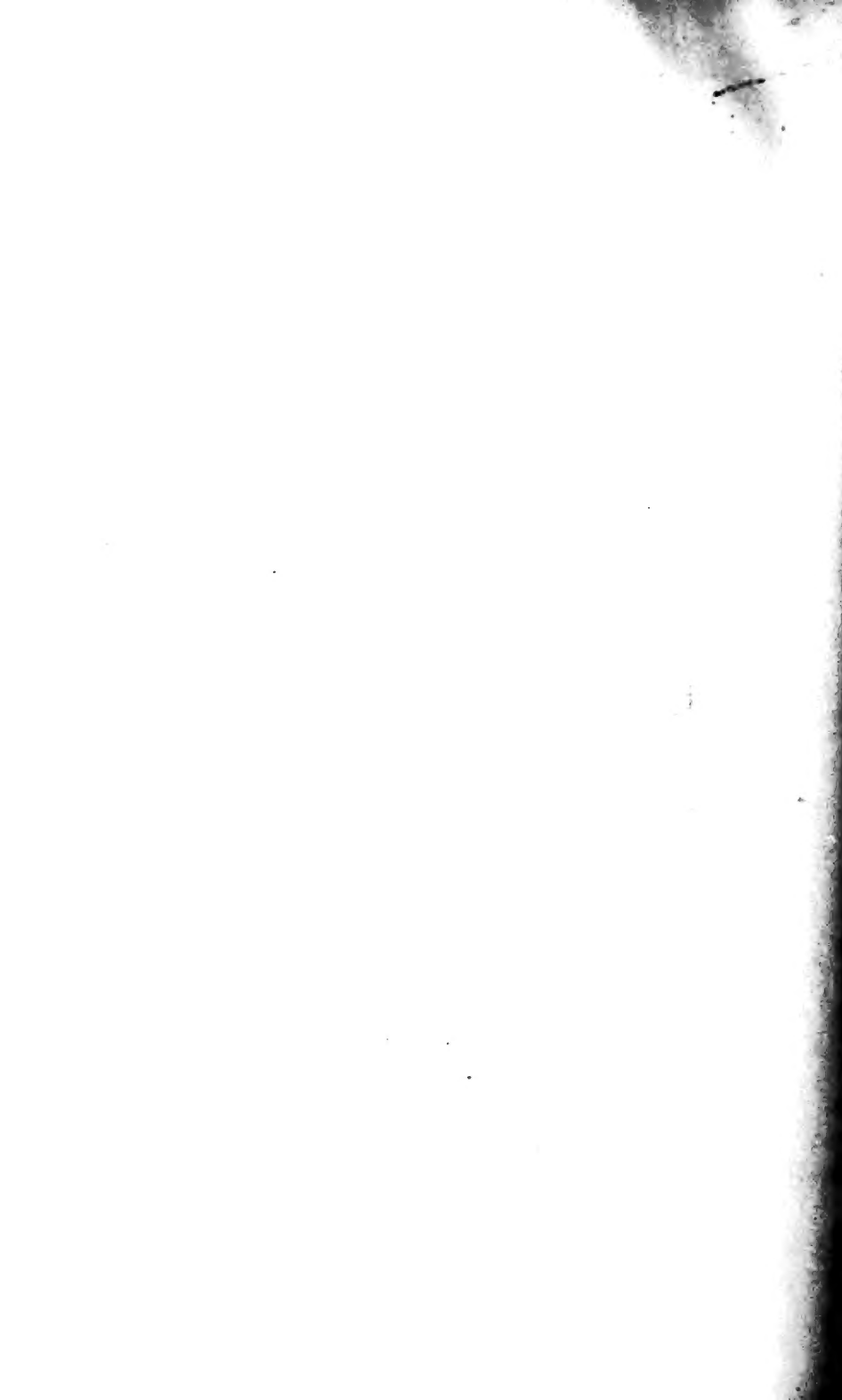
Physicians everywhere recognize the difficulties in diagnosing the early stages of tuberculosis. The difficulty had been stated 400 years ago by Machiavelli, "In its beginnings the disease is easy to cure but difficult to recognize, but when it continues unrecognized and untreated it becomes easy to recognize but difficult to cure."

The JOURNAL regrets to learn that the publishers of *The Veterinary Review* are reluctantly compelled to suspend publication of their periodical, owing to the present high cost of production.









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