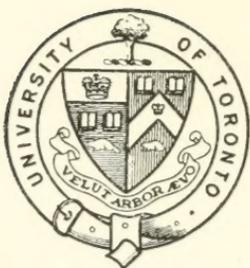


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JOURNAL
OF THE
American Veterinary Medical
111
Association

FORMERLY
AMERICAN VETERINARY REVIEW
(Original Official Organ U. S. Vet. Med. Ass'n)

EDITED AND PUBLISHED FOR
The American Veterinary Medical Association
BY
PIERRE A. FISH, ITHACA, N. Y.

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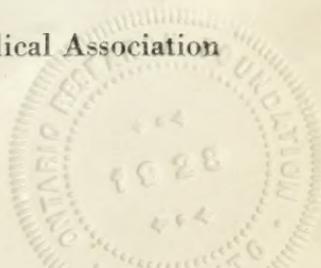
Index Volume L

NEW SERIES VOLUME III

ITHACA, N. Y.

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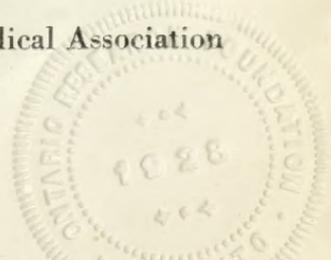
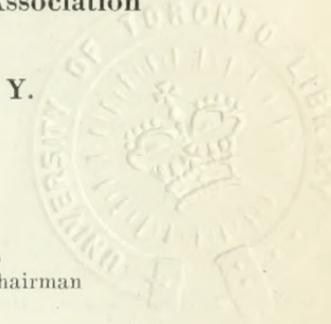
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List of Illustrations, Volume L. New Series Vol. 3

	PAGE
Shoeing Forge	125
HOG CHOLERA	
Kidney, Fig. 1.	176
Cecum, Fig. 2.	178
Heart and Lungs, Fig. 3	180
Mesenteric Glands, Fig. 4	182
Bladder, Fig. 5	184
Sick Hog, Fig. 6	185
MULTICEPS GAIGERI	
Large and Small Hooks, Fig. 1	211
Young Strobila, Fig. 2	216
Mature Segment, Fig. 3	218
Mature Segment Showing Elongation of the Vitellarium, Fig. 4.	219
INFECTIOUS ARTHRITIS	
Foal and Mare, No. 36, Fig. 1.	347
Foal and Mare, No. 36, Fig. 2.	347
Foal and Mare, No. 52, Fig. 3.	348
Foal and Mare, No. 52, Fig. 4.	348
Foal and Mare, No. 34, Fig. 5.	349
Foal and Mare, No. 34, Fig. 6.	349
Thyroid Epithelioma (Horse)	577
Ectopic Pregnancy	614
Ectopic Pregnancy	615
Intussusception—Sheep	617
ANTHRAX	
Anthrax Colonies, Fig. 1.	839
Anthrax and other Colonies, Fig. 2	839
Anthrax Bacilli from Blood Smear	842
Buzzards Feeding on a Small Carcass	843
Anthrax Wheel	845
Infectious Abortion (Bang's Disease) Figs. 1, 2, 3, 4	860
Hydrocephalic Foetus	879
Large Tumor	880
Urinary Calculi in Mare	881

Author's Index

	PAGE		PAGE
Aghion, J. E.	227	Jensen, H.	600
Alealay, S. J.	231	Jimenez, R. M.	363
Bemis, H. E.	421	Johnson, P. E.	882
Besnard, J.	362	J. R. M.	667
Besnoit,	57, 373	Kaupp, B. F.	616
Boerner, Jr., F.	732, 868	King, W. E.	168
Bolton, R. R.	876	Kinsley, A. T.	372
Buckingham, D. E.	697	Klein, L. A.	351
Buckley, J. S.	809	Koenig, F. F.	378
Cary, C. A.	823	Leibold, A. A.	614
Catala, J. V.	229, 230	Liautard, A.	5, 133, 286, 574, 670, 799
C. J. M.	665	Lothe, H.	143
Cooledge, L. H.	156	McKillip, G. B.	692
Cotton, C. E.	12	Marshall, C. J.	583
Cotton, W. E.	321	Melvin, A. D.	361
Cuille	57, 373	Mock, C. E.	68
Dalrymple, W. H.	62, 831	Mohler, J. R.	817
DeVine, J. F.	23	N. S. M.	285
Dickson, E. C.	612	P. A. F.	1, 3, 4, 129, 132, 281, 282, 419, 569, 571, 663, 797
Dorset, M.	699	Perkins, C. B.	376
Drake, R. H.	168	Potter, G. M.	295
D. V. S.	228	Reichel, J.	847
Eichhorn, A.	295	Roub, J. F.	67
Etchegoyen, F.	364	Rutherford, J. G.	92
Ferris, W. N.	79	Schroeder, E. C.	321
Ferry, N. S.	41	Shippen, L. P.	809
Frederick, H.	379	Sullivan, M. W.	731
Freeborn, S. B.	862	Traum, J.	189
Frost, J. N.	729	Turner, W. G.	594
Gallagher, B.	366, 708	U'dall, D. H.	70, 378
Giltner, W.	156	Veld, E. V.	66
Hadley, F. B.	143	Wadsworth, W. J.	47
Hadwen, S.	702	Walter, F. A.	733, 879
Hall, M. C.	214, 356, 370, 608	Washburn, H. J.	57
Hardenbergh, J. B.	331, 732, 868	Waugh, J. A.	880
Harkins, M. J.	847	White, D. S.	679
Hart, G. H.	189	Wilder, J. L.	705
Hartman, W. J.	618	Williams, W. L.	29
Henley, R. R.	699	Winchester, J. F.	223
Hermes, W. B.	862	X	880
Holford, F. D.	52		
Huddleson, I. F.	156		

Index to Volume L. New Series Volume 3.

PAGE	PAGE
Abortion, Contagious, from a Practitioner's Standpoint	12
Abortion Disease, Some Facts About	321
Abortion Question, The Present Status of the	295
Abortion, the Diagnosis of Infectious, of Cattle (Bang's Disease) with Special Reference to the Intradermal Abortin Test.	487
Abscess, Lumbar. Case Report.	67
Abstracts from Recent Literature 72, 234, 380, 621, 734,	884
Actinomycosis (Human), Report of. Abstract	894
Adrenalin in Excessive Straining After Parturition, Chloride of. Abstract	757
Agglutinine from Beans, A Note on the Preparation and Use of	699
Agricultural College an Important Stepping Stone to the Veterinary School, The.	62
Anesthesia in Human Beings by Intravenous Injection of Magnesium Sulfate. Abstract	382
Aneurism of the Spermatic Cord in an Ox, Arterio-venous. Case Report	373
Anthrax, (Charbon)	831
Anthrax Among Sheep, to Prevent the Spread of. Abstract.	621
Army Veterinary Corps, An.	583
Arrhenal for the Treatment of Texas Fever, The Use of. Case Report	227
Ascites, Peritoneal, with Hydrocephalic Foetus in a Mare. Case Report	879
ASSOCIATION MEETINGS	
A.V.M.A.	
Address of Welcome	79
Attendance at Detroit Meeting	266
New Members Elected at Detroit Meeting	102
Report of the Librarian.	395
Report of the Secretary	99
Response to Address of Welcome	92
Reports of Committees	
Report of the Committee on Agricultural Education.	628
Report of Committee on Diseases	8
Report of the Committee on Emblem	265
Report of the Committee on Intelligence and Education	392
Report of the International Commission in the Control of Bovine Tuberculosis.	395
Report of the Committee on Journal	396
Report of the Committee on Legislation	391
Report of the Committee on Neerology	400
Report of the Committee on Reorganization	249
Report of the Committee on Resolutions	246
Report of the Committee on the Salmon Memorial Fund	262
Report, Second, of the Special Committee for the Detection of Glanders	747
Secretary's Office	270, 402, 633, 757, 904
British Columbia Veterinary Association Meeting	275, 651
Central Canada Veterinary Association	908
Central New York Veterinary Medical Association	654
Chicago Veterinary Society.	409
Colorado Veterinary Medical Association	930
Conference for Veterinarians at Ames, Ia.	781, 910
Conference for Veterinarians, Ithaca, N. Y.	656, 777
Florida Veterinary Medical Association	934
Genesee Valley Veterinary Medical Association	933
International Veterinary Congress, Permanent Committee of the Minutes of London Meeting	113
Iowa Veterinary Association	782, 909
Kansas Veterinary Medical Association	781, 906
Massachusetts Veterinary Association	276

PAGE	PAGE		
Michigan State Veterinary Medical Association	935	Veterinary Bacteriology. Buchanan & Murray	120
Mississippi State Veterinary Medical Association	773	Botulism, A Cause of Limber-neck in Chickens	612
Missouri Valley Veterinary Association	780	Bull as a Disseminator of Contagious Abortion, The	142
Montana State Veterinary Medical Association	779	Bull, Peculiar Injury to a. Abstract	73
New York City Veterinary Medical Association	272, 406, 911	Calculi in Kidney and Bladder of a Bitch. Abstract	244
Northwestern Ohio State Veterinary Medical Association	936	Calculi, Urinary. Case Report.	880
Ohio State Veterinary Medical Association	653	Carcinoma of Glottis in Cow. Case Report	733
Oklahoma State Veterinary Medical Association	404	Cartilaginous Quittor, A New Operation for. Abstract	740
Pennsylvania State Veterinary Medical Association	783, 905	CHRONICLES, EUROPEAN	5, 133, 286, 574, 670, 799
Practitioners' Short Course, Davis, Calif	915	Abattoir, The Modern	140
Southeastern States Veterinary Medical Association 403, 656,	769	Adenomas, Massive and Cystic.	672
Southern Tier Veterinary Medical Association	775	Amebic Dysentery in Dogs	291
Southwestern Michigan Veterinary Medical Association	909	Anemia, Etiology of Infectious	574
Tennessee Veterinary Medical Association	410	Bibliography, Report of New York State Veterinary College, Cornell University	138
U. S. Live Stock Sanitary Association	409, 633, 784	Cardiac Abnormality in a Dog	802
Vermont Veterinary Medical Association	934	Defense of the Organism by Phagocytosis	133
Virginia State Veterinary Medical Association	932	Hemianopsia	9
Virginia State Veterinary Medical Association	119	Lymphangitis, Epizootic	137, 289
Western New York Veterinary Medical Association	651	Metchnikoff, Professor	5
Wisconsin Veterinary Medical Association	782	Myelitis and Treatment, Lumbar	578
Autopyotherapy. Abstract	891	Oxalemia of Domestic Animals	799
Blackleg. Case Report	618	Relief Fund for Belgian Veterinarians	286
BOOK REVIEWS		Sand Colic	803
Lameness in the Horse. J. V. Lacroix	787	Soap in the Treatment of Wounds	807
Pathology and Differential Diagnosis of the Infectious Diseases of Animals. V. A. Moore	659	Sodoku, A New Case of	677
Pathology and Therapeutics of the Diseases of Domestic Animals. Hutyra & Marek	789	Soya Beans, The Toxicity of	286
Principles and Practice of Veterinary Medicine. David S. White	941	Swine Tuberculosis in Man, Re-inoculated to Calf	804
Sheep Diseases. E. T. Baker.	278	Tetanus and its Prevention	674
Text Book of General Bacteriology, A. Edwin O. Jordan	790	Thyroid Tumors	576
		Typhosus, Adynamic and Anemic, in American Horses	292
		Vulvo-Vaginitis in Ewes, Specific	806
		War Wounds, Microbian Flora of	670
		Clinical and Therapeutic Notes. Abstract	621
		COMMUNICATIONS	
		Alumni Notice N. Y. C. V. C.	938
		Balkan Relief Fund	280
		Benefit of Cooperation, The	658
		Brustseuche	938
		Bull as a Factor in Abortion Disease, The	785

	PAGE		PAGE
Correction	411	Fetus. The Death and Expulsion of the Immature, as a Standard for Measuring the Prevalence of Cattle Abortion.....	29
Course for Graduate Veterinarians	411	Fish Hook, A, Dog and Radiography. Abstract	893
Dioctophyme, not Dioctothyme	280	Fistula of the Withers	421
Executive Board and Dues	122	Fistulous Withers, Observations on the Treatment of	47
Modern Requirements in the Shoeing of Horses—Especially in Cities	123	Forage Poisoning. Preliminary Report of the Relation of Anaerobic Organisms to	809
Influenza and Brustseuche ...	786	Foreign Body, An Unexpected. Abstract	890
Open Cases of Tuberculosis ...	938	Fowl Cholera and Other Hemorrhagic Septicemia Immunization Experiments	708
Retained Placenta	786	Fracture of the 7th Cervical Vertebra. Abstract	245
Shoeing Forge	123	Gall Bladder in a Sheep, Double. Abstract	72
Cramp of Femoral Muscle. Abstract	73	Glanders, Experiments on the Immunization of Horses Against. Abstract	384
Dairy Inspection, Practical	52	Glanders, The Ophthalmic Test for with a Simplified Method of Procedure	41
Dental Trouble, Unsuspected. Abstract	383	Granulomatous Affection of the Horse, A. Abstract	734
Dioctophyme Renale, American Records of	370	Hemianopsia in the Horse, Inferior Horizontal. Abstract	241
Dysentery in Monkeys, Spontaneous Amebic. Abstract	893	Hemorrhagic Septicemia, Vaccination Against	868
Ectopic Pregnancy with Mummification of the Foetus in a Rabbit. Case Report	614	Hernias, Abdominal	823
EDITORIAL		Hernia, Strangulated Intestinal and Distinct Inguinal. Abstract	734
Animal Factor in Agriculture, The	571	Hernia, Umbilical. Abstract ...	243
At Home and Abroad	569	Hides, Disinfecting Imported. Abstract	884
Decision in Live Stock Sanitary Control Work, An Important	665	Hog Cholera Problem, Observations on the. Abstract	77
Diet and Abortion	282	Hog Cholera Problem, The, with Special Reference to Swine Typhoid. Abstract	75
Executive Board Meeting, The.	419	Hog Cholera with Reference to Spirochaeta Hyos, Further Studies on	168
Extra Number, The	419	Hydrophobia in Alaskan Foxes. Abstract	890
High Cost of Living and the Veterinarian, The	663	Hypoderma Bovis. Seasonal Prevalence in 1915. Abstract... ..	745
Oklahoma State Veterinary Medical Association	285	Infectious Arthritis of Foals Due to <i>B. abortus equi</i> , Vaccination against	331
Poisoning of Stock by Larkspur, The	132	Infestation of a Young Dog Through Suckling—Trypanosomiasis of Horses in Morocco. Abstract	884
Political Issue? A	3		
Resolutions Relating to the Journal, Some	1		
Service	797		
Southeastern States Veterinary Medical Association, The	281		
Thymol from Horsemint	4		
Tissue Fluid	129		
Vesicular Stomatitis, The Outbreak of	607		
Empyema of Nasal Bones in a Thoroughbred Stallion. Abstract	736		
Epidemic Among Rabbits, An—The Value of the Microscope. Case Report	230		
Epithelioma Contagiosum of Quail	366		
Exanthema in the Horse, Coital or Vesicular. Abstract	624		

PAGE	PAGE
Intestinal Affection Due to Peculiar Mechanical Causes. Abstract	625
Intussusception of Small Intestine of a Cow. Case Report	729
Intussusception of the Intestine of the Sheep. Case Report	616
Joint Ill in Foals. Abstract	384
Lesson, A. Case Report	228
Liver Lesions in Fowl Cholera. Case Report	732
Lost Opportunities	679
Luxation of the Flexor Pedis Perforatus Tendon in a Dog. Abstract	240
Mallein Ophthalmic Reaction Sources of Error in the. Abstract	738
Melano-Sarcoma in the Dog. Abstract	894
Methods of Serum Preparation, A Comparison of the "Defibrinated" and "Oxalate", as Applied to Hemorrhagic Septicemia and Anthrax. Abstract	886
Milk in Bovine Infectious Abortion, A Study of the	157
Milk Supply in Pennsylvania, What Can Be Done to Improve the	350
Miscellaneous. 126, 565, 662, 793.	944
Myasis in Horses, A Lesion of Intestinal. Abstract	387
Myo-Pericarditis, Purulent. Case Report	68
NECROLOGY	
Boyd, J. A.	411
Coates, William John	660
Crandall, H. B.	943
Johnson, Levi E.	792
Knisely, D. O.	943
Roswell, William Louis	126
Tempany, John	792
Nephritis in a Dog, Chronic Indurative. Abstract	78
Oesophageal Spasms in Colts. Case Report	876
Onchocercosis in South America Bovine. Abstract	386
Operation for Penetrating Street Nail. Modification of the Technique of the. Abstract	254
Ovariectomy Operation on the Bitch and Cat, A Suggestion in Connection with. Case Report	379
Papilloma in the Bladder of a Mare. Abstract	239
Paracentesis Abdominis. Abstract	622
Parasitic Diseases, The Medicinal Treatment of—An Undeveloped Field of Veterinary Medicine	608
Parturition Cases with Decomposition of the Fetus. Abstract	73
Pelvic Fracture. Abstract	891
Perforation of the Abdominal Wall with Prolapse of the Intestine. Abstract	73
Pharmacology. Teaching	600
Physical Examination of Dairy Cows, The	705
Pigmented Fat in Hogs, Histological Examination of. Abstract	72
Pneumonia, Caseous, in a Pig. Abstract	742
Pododermatitis Suppurative Resulting from a Split Shoe Nail. Abstract	736
Poisoning with Solanum Dulcamara? Bittersweet. Case Report	378
Poisoning with Strychnine. Abstract	383
Prepubian Tendon of a Cow, Rupture of the. Case Report	731
PROCEEDINGS OF THE A.V.M.A.	
Members A.V.M.A.	514
PROCEEDINGS OF THE A.V.M.A.	
Committees 1916-17	511
Constitution and By-Laws of the A.V.M.A.	495
Directory of Members of the A.V.M.A.	512
Fellows A.V.M.A.	512
Honorary Members A.V.M.A.	512
Meetings of the A.V.M.A.	508
Officers 1916-17	511
Presidents A.V.M.A.	509
Secretaries A.V.M.A.	510
Prolapse of the Uterus Caused by a Foreign Body. Abstract	623
Pulmonary Strongylosis.	862
Pyemic Meningitis and Pneumonia from Castration and Docking Lambs. Case Report.	70
Rabies. Abstract	887, 889
Relations of the Lower Animals to Human Disease, On Certain. Abstract	387
Rupture of Auricle in a Mare. Abstract	73
Sanitary Milk, The Relation of Stable Air to. Abstract	237
Sanitary Precautions in Cattle Practice, Some Advantages of	23

	PAGE		PAGE
Sarcoma, Subcutaneous. Abstract	887	Triples in Calves. Abstract...	740
Septicemia Pluriformis Ovis, Vaccination of Sheep Against the Disease. Abstract	244	Tubercular Milk Cow, The—A Common or Public Nuisance..	223
Septic Sore Throat, A Bacteriological Study of an Epidemic of. Abstract	238	Tuberculin Test, Intradermal Palpebral	57
Shipping Fever as Met with in a Large City Practice	692	Tuberculin Testing, The Combined and Follow-up Systems of	189
Shipping Fever in Horses	817	Tuberculosis Bacillus in Sparrows and Chickens, Fate of Mammalian. Abstract.	623
Shipping Fever from the Army Standpoint	594	Tuberculosis, Further Studies of Biological Methods for the Diagnosis of. Abstract	239
Spleen, Inflammation of the, in a Cow. Abstract	74	Tuberculosis of the Dog, Especially in its Relation to Tuberculosis of Man. Abstract	627
Stagers in Horses Caused by the Ingestion of <i>Pteris aquilina</i> , the Common Bracken, So-called Stomatitis. Infectious. Case Report	882	Tuberculosis of the Vesicula Seminalis, Efferent Canals and Urethra in a Steer. Abstract.	626
Strangles, Anasarca and Influenza by Intravenous Injection of Phenol and Guaiacol, Treatment of. Abstract	380	Tuberculosis Lesions, An Uncommon. Abstract	626
Strangles, Treatment of. Abstract	742	Tumor, A Large. Case Report..	880
Strangulation, Intestinal, in a Horse. Abstract	744	Umbilical Abscess Discharging by the Vulva. Abstract	622
Stricture of the Esophagus in a Cow, a Case of. Abstract...	74	Uniform Regulations Feasible Among the Different American Countries for the Prevention of the Introduction and Dissemination of Diseases Among Animals? Are	361
Sugar, Treatment of Wounds with. Abstract	238	Unsoundness, An Unsuspected. Abstract	744
Surgical Injuries of the Foot in Horses, a Contribution to the Study of the Treatment with Sugar. Abstract	887	Unusual Case, An. Case Report.	376
Taenioid Cestodes of the Dog, Cat and Some Related Carnivores. A Synoptical Key to the Adult	356	U. S. Army Against the Allies in Buying its Animals, The	697
Tapeworm <i>Multiceps Gaigeri</i> from the Dog, A New and Economically Important	214	Veterinarians, The German Crown Prince Praises, the. Abstract.	624
Tetanus During Lactation in a Mare. Case Report	66	Veterinary Work in a Lumber Camp. Case Report	231
Texas Fever, The Injury Caused to the Dairy Industry in Porto Rico by. Case Report	229	White Scours (Dysentery Neonatorum) in Calves, Tabulated Recommendation for Methods of Control of. Case Report...	372
Therapeutics, Phenicated and Guaiacol. Abstract	885	Wound of the Lungs—Recovery. Abstract	742

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PIERRE A. FISH, Editor

ITHACA, N. Y.

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OCTOBER, 1916.

No. 1.

Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary L. A. Merrillat, 1827 Wabash Ave., Chicago, Ill. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

EDITOR'S NOTE:—Some indulgence must be asked because of seeming negligence. Shortly after our return from the Detroit meeting, we were placed in quarantine because of Poliomyelitis in our family. We have been beside troubled waters. Although we have much to be thankful for, there have been times when we have been mentally and physically unfit for work. For any delay and errors of omission or commission, of which we may have been guilty, we hope for as much charity as the circumstances deserve.

P. A. F.

SOME RESOLUTIONS RELATING TO THE JOURNAL

We are publishing herewith resolutions relative to the *Journal*, passed by the American Veterinary Medical Association at Detroit, which we believe will be of interest to our readers:

“It is recommended that the association subscribe for the *Journal* at the regular membership rate for the honorary members.

That the business proceedings of the association together with the constitution and list of members be printed in a supplementary number of the *Journal*.

That when an article is accepted for publication in the *Journal*, the author be notified and 50 reprints will be furnished free of

charge, should he express a desire to have them. Additional copies at the regular rate.

That papers presented at the meetings of the American Veterinary Medical Association are the property of the association; provided, however, that the reports by state and federal employees may be accepted with the understanding that when possible arrangements be made with the editor to publish them first.

That the reports of special and standing committees should be reserved for publication in the *Journal*.*

That the Committee on *Journal* should have discretionary power to reject papers or to permit their publication through other channels."

In order to secure second class mail privileges, a publication must have a "legitimate list of subscribers." In the case of our association this means that a portion of the dues of each member must be paid for his subscription. The honorary members pay no dues and the first resolution is a provision for furnishing them with the *Journal* in compliance with the postal regulations.

The plan of publishing the business proceedings of the association in installments, as during the past year, has its inconveniences. Frequently some of the most important business is done at the close of the meeting and, following the proper sequence, its publication naturally comes late. The papers and reports, with their discussions, will appear in the *Journal* as before. It is believed the new plan will facilitate matters and that the advantage of having the purely business proceedings in compact and convenient form at a reasonably early date, is obvious.

In the matter of reprints to those who contribute articles, it is desirable that these be requested when the manuscript is sent in. It should also be stated whether or not more than the fifty, without charge, are desired and whether there shall be covers. Additional numbers and covers will be charged for. The editor simply acts as an agent in the matter. He will transmit requests to the printer, who will send bills for the extras and to him the payments should be made.

P. A. F.

*It was voted that this should not include the committee on resolutions, as it was deemed wise that the resolutions of the association should have early and general publicity.

A POLITICAL ISSUE?

For some time past comments have appeared in the daily papers relative to the appointment of a veterinarian as the head of the U. S. Geodetic Survey. Discussion has centered upon the veterinary end of it. The "horse doctor" has been referred to in terms of ridicule. If a physician or lawyer, otherwise qualified, had been appointed it is quite likely no criticism would have resulted.

The attack has been made quite as much, or more, upon the veterinary profession as upon the appointee. We do not see anything in a veterinary training that would qualify a person for such a position. On the other hand, if a person is qualified, we do not see why the fact that he may have taken a veterinary course as a part of his educational training, should disqualify him.

The veterinary profession deserves more than ridicule. It has, perhaps, been slow of development in this country; but it is progressing. It has to do with more than the sick horse. There are problems associated with sanitation and epizootics, which are concerned not merely with animals, but human health and public welfare. It requires education to meet these problems, and they are being met. Probably nothing would seem so far-fetched as a relationship between the building of the Panama Canal and veterinary science. That such a possible relationship may exist was pointed out by Dr. V. A. Moore in an address delivered at the California exposition last year. He called attention to the fact that Dr. Theobald Smith, working in the interest of veterinary science, discovered that the causative agent of Texas fever in cattle was harbored by the cattle tick. This fundamental discovery, we believe, facilitated the later discoveries that mosquitoes transmit the organisms of malaria and yellow fever. Sanitation was enriched and its application, by this work, much facilitated. The building of the Panama Canal was quite as much a problem of situation as it was of engineering. The canal had been attempted before and failed with the loss of many lives and millions of dollars. One, and perhaps the chief, factor in the failure was the lack of knowledge of sanitary precautions in those earlier years. The enlargement of the boundaries of our knowledge, from Dr. Smith's basic discovery, has brought success, where, years ago, failure was inevitable.

The thoughtful will recognize and appreciate the efforts of the veterinarians to master the problems that confront them; the thoughtless—may ridicule. We hold no brief for the defense of the present head of the Geodetic Survey; but we do hold a brief for the defense of the veterinary profession and we resent unjust slurs cast upon it. There is nothing so difficult to overcome as prejudice and while this may have been justified to some extent in the past, there is less and less reason for it as time goes on. The veterinary profession is making good,—and ridicule does not advance it.

It has been stated that the appointee is a veterinarian by virtue of his having taken a course in a "Veterinary Correspondence School." If this is true the veterinary profession is not eager to claim him. Correspondence Schools are not considered capable of turning out good veterinarians any more than such schools are capable of turning out good physicians, preachers or lawyers. It has, however, been denied that he was ever a veterinarian, but is a gentleman of education and refinement. Perhaps this imputation is the unkindest of all. Why cannot a veterinarian be a gentleman of education and refinement?

P. A. F.

THYMOL FROM HORSEMINT

Investigations by the U. S. Department of Agriculture have shown that the production of thymol from horsemint may be a fairly profitable undertaking in this country. Thymol is extensively used in medicine and forms the basis of a number of important pharmaceutical compounds. Thymol was formerly imported from northern Europe where it was manufactured from Ajowan seed grown in northern India. Because of the war importations have fallen from 18000 pounds in 1914 to a little above 2000 pounds in 1915. This deficit, it is believed, can, to some extent, be supplied at home.

Horsemint is found wild on light sandy soils from Southern New York to Florida and westward to Wisconsin, Kansas and Texas. Experiments in its cultivation indicate that the plants can be improved by selection to a point where their use for the commercial production of thymol seems warranted. Investigations indicate that distillation of the improved plants will average

about 20 pounds of oil per acre from the first year plantings. Subsequent yields should be around 30 pounds per acre. The phenol content of this oil may be assumed at about 70%, almost all of which is thymol. For the first year there should be a yield of a little less than 13 pounds of thymol and in subsequent years a little less than 20 pounds. The average price of thymol for a number of years has been about \$2.00 per pound. The gross returns per acre from a horsemint plantation may be estimated at about \$25.72 for the first year and \$38.58 for subsequent years. Considering the cost of production, the profit does not seem great, but a dearth in this important medicinal agent and the possibilities of its production at home warrants careful consideration and further investigation in this important matter.

P. A. F.

EUROPEAN CHRONICLES

Bois Jerome, August, 1916.

PROFESSOR METCHNIKOFF.—The daily press, medical journals and the veterinary journals are all, in their capacity, paying a due tribute to the memory of this illustrious scientist, who has just died in a modest room at the Pasteur Hospital. Although circumstances and distance force me to announce the death of the sub-director of Pasteur Institute at this late hour, I may be allowed to reproduce from one of the best obituaries I have read, that of Prof. Roger of the *Presse Medicale*.

“A great and learned man has disappeared:—a great mind has passed away. By the importance of his discoveries and the originality of his theories, Metchnikoff occupies a prominent place amongst those who have enlarged the field of our knowledge and opened to our doctrines new perspectives. Some of his theories may be discussed. His work on phagocytosis is a magnificent edifice that nothing will ever destroy. It insures for his name an everlasting glory.

“Born in 1845 near Kharkof in Russia, Metchnikoff received a very complete scientific education and in 1870 was made professor of Zoology at Odessa.

“He then gave all his active attention to works of embryology and zoology and it was while following his researches on inferior animals that he was brought to the discovery that was to have such

a great influence on the progress of biology and medicine. While observing unicellular organisms and studying their means of defense against parasites, he had the impression that he had under his eyes the prototype of a general process. It was then that he undertook his investigations on daphnes, small crustaceans, whose transparency is such that under the microscope, one can follow in them the battle going on with invading microbes. He also worked on mammalia, and then, not by a fortunate turn of destiny, not by one of the hazards of chance which often serve men of science, but by deep and progressive study Metchnikoff starting from the simplest living structures to the most complex, arrived at the conception of phagocytosis:

“To him, this discovery belongs entirely. Before his researches, diapedesis was known. It was known that leucocytes were able to pass out of the blood vessels, travel through tissues and incorporate foreign substances including microbes. No one had understood the protecting function of the migrating cells nor suspected the existence of intra-cellular digestion. Metchnikoff raised the curtain which concealed one of the most important processes of biology, he has described the different stages of the fight between the invading agent and the invaded organism, he has founded the cellular theory of immunity.

“Following his discovery, he found that leucocytes have not the monopoly of phagocytosis. Some fixed cells have the same privilege. This he proved in studying, with Soudakewitseh, the absorption of the spirillae of recurrent fever by the endothelial cells of the spleen. Again he has demonstrated that phagocytes are able to envelop and digest some cells of the organism, and that they intervene constantly in physiological and pathological processes and serve to remove old and diseased elements.

“Such discoveries could not be accepted without protest. It is customary for original ideas to stimulate critics and excite contradictory experiments. The study of immunity was again taken up generally and by experimenting on animals, vaccinated against infection, it was observed that their serum acquired the property of killing or injuring microbes: phagocytes were no longer the fighting defenses of the organism, their duty was merely to pick up the dead.

“Then began a great polemic between the advocates and the adversaries of phagocytosis: the humoral presented itself against the cellular theory of immunity.

Metchnikoff published then a series of experiments, the purpose of which was to reduce the part played by the fluids. He showed, for instance, that microbes protected against phagocytes, by blotting paper, would develop easily, notwithstanding their imbibition by the fluids of the organism. Aqueous humor, free from leucocytes, allows the growth of bacteria, which proliferate until the migratory cells arrive.

“Metchnikoff’s mind was too elevated to suppose that human ideas were definitive. He understood that fluids had a great part to play in the mechanism of immunity and he then undertook new studies. In 1891 he confirmed, with the vibrio, the discovery of agglutination, confirmed two years after. He then studied carefully the alexins, and demonstrated that the protective substance of the serum came from the leucocytes. The humoral theory of immunity was then subordinate to the cellular theory, it was but a consequence of phagocytosis.

“Metchnikoff had demonstrated in phagocytes the presence of tryptins. He designated them under the name of cytases and admitted two varieties; the macro- and the microcytases. The first is in the lymphoid organs, they easily digest red cells but with difficulty the microbes. The second is in the polynuclear leucocytes and the cells of the bone marrow. They easily digest microbes but red cells with difficulty. They are little diffusible, they pass in the blood only after destruction of the phagocytic elements. They then constitute the cytolytic substance, alexin or complement. For the specific substances which are found in the serum of immunized animals, they come from the macrophages and contrary to the cytases are easily excreted by the cells. It is also to the leucocytes that Metchnikoff attributed the production of anti-toxins, and opsonins, which he attributed to substances and stimuli which develop in the presence of infecting microbes.

“We have dwelt on this part of the work of Metchnikoff to show that he not only had the merit of realizing a great discovery, but has succeeded in erecting a solid monument, which may be improved in its details, but will, however, remain permanent and cannot be destroyed.

“The importance of phagocytosis must not make one forget the other works of Metchnikoff, which would be sufficient to illuminate the name of any learned man. Unable to mention them all, we will mention only a few at random: his observations on the rami-

fication and development of the avian tuberculous bacillus, interesting observations which have contributed to the consideration of this parasite as a fungus. With Roux and Salimpeni, he published an interesting paper on anticholera serum. With Roux he has kept up researches on the inoculability of syphilis in monkeys and on the prophylaxis of that disease. Recently he has published with Besredka papers on experimental typhoid fever and vaccination with sensitized viruses. We have also his works on cytotoxins, on antibodies and the numerous publications on the intestinal flora. During the last epidemic of cholera, he demonstrated that the saprophyte bacteria of the intestines play an important part in resistance to the disease and that the intestinal flora can explain the immunity of the inhabitants of some regions.

“It is principally to the study of the putrid poisons of the large intestine that Metchnikoff gave his attention during late years. He has demonstrated the detrimental influence of the various cells of the organism and has endeavored to connect them with the development of arterio-sclerosis. He was persuaded that the poisons of the large intestine had much to do in the genesis of the alterations attributed to old age. He imagined that one could prolong his life beyond the usual limit in preventing intestinal putrefaction. Those ideas caused him to publish two works on philosophy of great interest. By the study of biologic problems, Metchnikoff developed peculiar views. One of his fancies was that by proper diet one could control and arrest the progress of old age by fighting the intestinal microbes by the ingestion of specific ferments. By the use of fermented milk, which formed the principal basis of his diet, he was convinced that the final day of payment could be put off—and yet he died comparatively young.”

His death will cause great sorrow to all who are interested in biology. In Russia and in France principally. Yes, all over the world.

Since 1887 he lived in Paris, he worked at the Institut Pasteur of which he was the second director. It was in France that he realized his great work, and the Noebel prize that was given to him in 1908 was an acknowledgement of the appreciation and esteem with which his works were considered by all.

A long series of publications from him can be found in the pages of the *Annales de L'Institut Pasteur* and two attractive and instructive books are also due to him, *Lectures on the Comparative*

Pathology of Inflammation (Lecons sur la Pathologie comparée de l'inflammation) and *Immunity in Infectious Diseases* (L'immunité dans les maladies infectieuses.)

HEMIANOPSIA.—Under this name or again HEMIANOPIA or HEMIOPIA is designated in ophthalmology the suppression of the lower visual field and the absence of perception of the objects seen, reproduced upon the superior half of the retina. Individuals who suffer from hemianopia see only the objects that are situated above the horizontal plane which would pass through the center of the pupil.

This affection is not very common even in man, but possibly less so in veterinary practice. Major Veterinary P. Vauthrin writes in the *Revue Generale* that, as far as he knows, it has never been recorded in French veterinary literature. He has had the opportunity to observe one case and he gives a very interesting description of the manifestations presented by his patient, an American light draught gelding of six years, which, had been doing service at the front for several months.

He was reported as refusing to eat or drink and walked with difficulty. He moved indeed as a horse threatened with hemoglobinuria, staggering and suddenly dropping now and then on one or the other of his hind legs.

Six quarts of blood were taken from him and a purgative given. The horse was then taken to his stall close by, where a new series of peculiar symptoms could be observed.

The animal carried his head elevated, his features were anxious, the fore legs were raised more than necessary when in motion. He seemed to feel his way. He stumbled at the slightest obstacle and was ready to fall. Walking toward a watering trough, he did not see it, but stopped only when he touched it. Yet he remained there, without drinking, until he was made to dip his lips into the water.

He saw what was at the height of his eyes, he did not stumble against the wall, he lowered his head when passing under a door. A threatening gesture, close to his head did not frighten him as long as it did not go beyond the level of the lower palpebral border, but the approach of the finger in front of the eye made him react to avoid it.

When in the stable, where there was no hay rack, he did not pick up the hay that lay in front of him, but he endeavored to take hold of it when it was brought on a level with his eyes, even when it was kept at some distance from him. The sense of smell was insufficient. There was no psychical blindness, that is to say loss of memory of visual views, as the sight of hay, the door of a stable, a drinking pail. These were sufficient for him to recognize them.

His behavior was the same for oats as for hay. He did not touch what lay in front of him on the ground, but ate them as soon as they were brought to him or when his head was pulled down to the ground where the oats were. In order to eat he assumed a peculiar position. It was characteristic. He twisted and bent his neck so as to give his head a very oblique direction from forward backwards and from above below in such a way that the line of the face was nearly horizontal, the nose resting between the forefeet, behind which he endeavored to seize the food which was spread under his eyes.

The prehension of oats and bran was more difficult. The ration was placed in a moveable manger, a little narrow and quite long so that he could have one extremity under the eye while he ate at the other. He then rested heavily the inferior third of his face in the bottom of the small manger and in that position ate as long as the depth of the grain reached the height of his mouth. When this depth diminished, so that only the face and nostril remained in it, the horse kept moving his lips in the air for a long time before he could understand that by raising his head slightly he could secure that which he could not see.

The examination of the eyes was rather negative. They were clear, well opened and presented nothing abnormal, except a little injection of the conjunctiva and a slight elliptical dilation of the pupils. The pupil elliptical in form, was equally open in both eyes. Direct and consensual reflexes were preserved. The humors were transparent, the papilla healthy and the tapetum without lesion.

All these manifestations lasted for two days. Then they gradually diminished. The peculiar manner of taking the food was the first to disappear. After the 6th day the animal was well and has remained so since.

Major Vauthrin closes his interesting description with a few remarks on the diagnosis.

Without doubt very rare, in our domestic animals, hemianopia will easily pass unnoticed on account of the absence of subjective information and of ophthalmic lesions and one will have to depend much on careful study of the symptoms, the peculiarities of the attitudes assumed by the patient, and upon the exploration of the visual field.

In relation to the pathology of the affection, the supposition of a temporary congestion is indicated by the manifestations of paralysis, and by the relief that followed the removal of blood in this present case it is possible and proper for this congestion to be taken into consideration, as a cause.

A. LIAUTARD.

Dr. Harry W. Graybill, George Washington Veterinary College, 1911, formerly of the Zoological Division, Bureau of Animal Industry, has recently received temporary appointment as research parasitologist and will be employed under the direction of Dr. Marion Ines in connection with the federal investigations being conducted by the Bureau relative to the treatment of live stock for external parasites. His previous experience in this class of work will especially fit him for such investigations. He resigned from the Bureau about two years ago to engage in research work for the American Smelting and Refining Company upon the question of the effects of smelter waste on the health of live stock. He recently severed his connection with that company and his services are temporarily available for the investigation mentioned.

Dr. Harry F. Kern, Colorado Agricultural College Veterinary Department, 1911, has recently received an appointment on the tick eradication force of the Bureau in the State of Georgia by transfer from the Philippine Islands. This transfer was arranged in the early part of the year, but, owing to the character of the work upon which he was engaged in the Islands, the Bureau of Agriculture requested that his transfer be held up for a few months until that work could be completed.

CONTAGIOUS ABORTION FROM A PRACTITIONER'S STANDPOINT*

CHAS. E. COTTON, V.M.D., Minneapolis, Minn.

It seems presumptuous in me, and I shall not undertake to enlighten the members of this association with any new theories on contagious abortion, as we have papers today by men and scientists who are recognized throughout the world as authorities on this subject.

I shall attempt to give only a brief review of the subject from a practical standpoint.

The practitioner's position, in the past twenty years, with regard to this disease, in the light of the various and numerous recommendations for the methods of diagnosis and the control and cure advanced by our laboratory investigators, scientists, experimenters, and commercial biological houses, has been anything but enviable and we have not succeeded in the past in gaining or enhancing the respect and confidence of the breeders of cattle in our profession. In fact, our knowledge of the disease has been so limited that we could do but little to help the owner in its control.

I have clients in whose herds I have attempted to combat this disease in the past, who have lost all faith in our measures of serological tests for diagnosis or diagnosis by abortin and in our methods of treatment, and when I ask them about the present condition of contagious abortion in their herds, they smile and say: "I would not want to broach the subject if I were in your position", or some such unpleasant or sarcastic remark.

However, I am of the opinion that we are now in a better position to give more intelligent advice and treatment in the control of this disease than we have ever been in the past, and the practicing veterinarian should do more than he is now doing.

The disease is very widespread and has become a serious problem, not only in immense losses to individual owners of breeding and dairy cattle, but is second only to tuberculosis as a national economic question.

The disease has been known to be infectious for a number of years, but the organism which is responsible for this scourge was not discovered until 1896 when Prof. Bang of Denmark succeeded

*Presented at the meeting of the A.V.M.A., Detroit, Mich., Aug. 22, 1916.

in proving that it was a small bacillus which produces a catarrhal inflammation in the pregnant uterus.

Further investigation by M'Fadyean and Stockman, Schroeder and Cotton, Moore and Williams, led to the discovery that infection could and did take place through the alimentary canal by ingestion of milk in young animals and by the ingestion of contaminated foods in older animals.

There is a difference of opinion between investigators as to the source of the bacillus in milk. Schroeder, Cotton and Mohler's work concludes that the bacillus enters the udder from the blood, while Williams claims that it enters through the canal from contamination by discharges from the diseased uterus and genital canal.

Investigators agree that they find the abortion bacillus in milk for years after the abortion.

Investigators agree that the bacillus of abortion is found in the fetus, in the placenta and the uterine discharges of animals after abortion and animals that have aborted once may still carry the bacillus in the placenta at the time of the third successive normal parturition or four years after the last abortion occurred. Thus, although they are not aborters, they are still carriers and disseminators of the infection.

Dr. Boyd, of the University of Minnesota, has a Guernsey cow under observation that aborted twice and since then has given birth to three normal calves. He has succeeded in getting cultures of the *Bacillus abortus* from the placenta after each parturition.

There is a difference of opinion as to the infection being transmitted by copulation. Some believe the bull is only the passive carrier, especially where several breeders use the same animal or he is allowed to serve both healthy and infected animals. Others believe the bull is capable of direct transmission and that the seminal fluid carries the infection, while others believe that the bull does not carry the infection in any manner.

All agree that infected pregnant animals introduced into healthy herds are responsible for the introduction of the disease when they abort. Bacteriological examination of the vaginal scrapings have proven the bacillus is eliminated through this channel for a period of forty-six days after abortion. This is probably the principal source of the disease in a noninfected herd, but it is impossible to determine by any clinical examination whether or not a cow be infected with the germ of abortion.

Dr. Williams believes that calves born in infected herds from diseased mothers become contaminated not only *in utero* but from nursing the diseased mothers.

The disease has been produced artificially by feeding infected material, by injecting pure cultures of the bacillus abortus intravenously, and also by placing pieces of the placenta of aborting animals into the vagina of pregnant cows.

Investigators disagree as to the channels of infection. M'Fadyean and Stockman, and Mohler believe that the infection enters the digestive tract by contaminated food and passes through the blood to the uterus and there produces pathologic lesions which cause the abortion. Drs. Bang and Williams believe that the organism enters the uterus through the cervical canal not later than the date of conception and after the cervix has been sealed and the infection has not gained entrance the animal will not abort. Williams believes "most animals become infected at a much earlier date, and the infection is lying in wait in the uterine cavity at the time of first copulation or exists elsewhere in the system in a more or less latent state."

SYMPTOMS:—Williams claims that the act of abortion is only one symptom of this chronic contagious disease of the generative organs of cattle and that the disease is improperly named. He states that the disease manifests itself by the four leading symptoms: viz., abortion, premature birth, retained afterbirth, and sterility. He also states that "granular venereal disease is universally distributed and it has, by clinical observation, a vital relation to contagious abortion." In herds in which contagious abortion exists, white scours and pneumonia in the newborn calves are very common. Both of these infections have a close association with contagious abortion. The investigations of Schroeder and Cotton, and others show that the calves are exposed to the bacillus of abortion through the ingestion of raw milk. In the fetus from cows which have aborted pure cultures of the *Bacillus abortus* are found. Williams believes that calves born from diseased mothers have the infection in their alimentary tract from having swallowed the amniotic fluid while in utero. He states "granular venereal disease appears in the genital sheaths of calves at 30 to 50 days of age, when fed upon raw milk," and the "preputial hairs concurrently become stained brown or black and matted together with mucus-pus. The blood of these calves

largely reacts to the serologic tests from the 20th to the 60th day, receding for a time when the calf is placed largely upon herbage food, but will react again about the time of the first estrum". He says, "calves grown exclusively upon boiled milk generally retain clean sexual or preputial hairs, do not develop granular venereal disease markedly, and their blood fails to respond to the serologic tests for contagious abortion."

The premonitory symptoms of abortion are swelling of the udder and vulva, a muco-purulent, odorless discharge from the vagina, which may be streaked with blood.

Animals may abort, however, without any premonitory symptoms. If animals abort in the early stages of pregnancy the fetal envelopes will be expelled with the fetus, but when abortion comes at a later stage the membranes are invariably retained for some time.

Following the abortion there is a typical vaginal discharge continuing for several weeks; this discharge is of a dirty brown or reddish brown color, sticky in character and adheres to the tail and other parts of the body with which it comes in contact. Gradually the discharge becomes lessened and may finally cease.

There is always a pyometra or endo-metritis present, which is primarily due to the abortion bacillus followed by a mixed infection.

Sven Wall claims that the endo-metritis caused by the abortion bacillus "seems not to occur or is rare." He states that the secondary infections are of a more serious nature than the abortion infection, and "they sometimes end fatally by septic and putrid intoxication or by bacteremia; sometimes they lead to a chronic metritis or pyometra, which heals more or less slowly and often leaves an atrophy and sclerosis of the mucous membrane of uterus, and the wall of the uterus may be thickened."

The cervix will contract but the wall of uterus often times loses its tone and may be flaccid.

The pyometra often leads to a cystic degeneration of the ovaries, of the corpus luteum, manifested frequently by nymphomania. It may also lead to a salpingitis or inflammation of the oviducts. The oviducts may become cystic or there may be a pyosalpinx or purulent collection of the oviducts. All of these pathological changes in uterus, ovaries and oviducts produce temporary or permanent sterility, which is a source of greater financial losses to the owner of valuable dairy or breeding animals than is the abortion itself.

The sacro-sciatic ligaments drop lower and lower, giving the spine a humped-up appearance in front of the base of the tail.

DIAGNOSIS:—From the standpoint of the practitioner our means of diagnosis in the past with the idea of protecting the owner in the spread of the infection to healthy pregnant animals has been our greatest problem.

The premonitory symptoms, if there are any, are not noticed and are of very short duration and there are no specific symptoms or lesions until the abortion occurs.

The bacillus cannot be found in uterine or vaginal discharges until just before and following abortion.

M'Fadyean and Stockman first introduced the abortin test. Our experience with it in this country has been anything but satisfactory. Animals reacting to the test would be removed from the herd and after a short period a number of those which had failed to respond to the test would abort, while the ones that had reacted would continue to carry their calves to full time.

We were then recommended to have laboratory men make the precipitation, the complement-fixation and the agglutination tests. The practical results obtained from these tests in our experience were not much better than when we undertook to separate the diseased from the non-infected ones by the abortin test. However, it is the concensus of opinion of investigators that the agglutination and complement-fixation tests are the most reliable and if they are able to make a series or succession of tests on the animals in a herd, they succeed in finding the infected animals.

These blood tests, when successful, are only of use in detecting the infected animals and do not indicate the degree of infection, as a cow which reacts may not abort but may show other symptoms of the disease. Some authorities claim she may react and be an immune animal. They will thus prove of value in the early detection or diagnosis of the infection in a herd where there is a question of diagnosis.

All abortions, premature births, retained afterbirths and sterility in dairy and breeding cattle are and should be treated as symptoms of this contagious disease.

IMMUNIZATION:—Some investigators have concluded that because abortion is more common in heifers and after they have aborted from one to three times and then cease to abort, they have acquired a natural immunity.

Sir Stewart Stockman in 1914, on immunization stated, "immunization appears to promise the best solution of this difficulty. It is admitted that the majority of cows do not abort at two successive pregnancies, and that this is due mainly to a certain degree of resistance having been acquired from the first attack of the disease, as is the case of many other diseases. Unfortunately, a considerable proportion of cows do abort twice in succession, and a smaller proportion may abort three times. It is possible that this is due partly to some of the animals not having had a large enough dose of infective material to render them sufficiently resistant to infection; it may also be that the virus had not acted long enough to produce immunity, or that some animals are not so immunisable as others, and we know that this applies in relation to other diseases".

Dr. Williams states that an animal which has aborted once or twice does not become immune but is more liable to abort again or be sterile, to suffer from premature birth or retained afterbirth than a cow which never has aborted. He says: "Immunity cannot come as a result of disaster. If immunity is to be secured, it must be considered as a consequence of the presence of the infection in the system and not as a result of any disaster which it may have occasioned. There is no more reason to expect immunity from abortion than there is from premature birth or retained afterbirth. Yet we frequently observe that a cow which has retained afterbirth one year is very liable to have it again the succeeding year, and in our clinic we have followed some cows with retained afterbirth through three succeeding years. In these cases we find that if the matter is followed closely and the uterus repeatedly and thoroughly disinfected, the retained afterbirth does not recur, but if the retained afterbirth is removed in the ordinary way and the animal then abandoned, the retained afterbirth or some other disaster quite probably follows if she breeds again. That is, the one defeat by disease has lowered the vitality of the animal and invited succeeding disaster. If the infection which exists in the uterine cavity is not destroyed or washed away by douching, it is retained there ready to produce disease again at the first opportunity. According to our data, a heifer which conceives at the first service, carries her calf for the normal period, calves promptly and expels her afterbirth promptly, is far more likely to repeat the performance during her second breeding year than is the heifer which has con-

ceived with difficulty, requiring several services, or has aborted or given birth prematurely or has suffered from retained afterbirth. This is not in conflict with the generally accepted idea of immunity in infectious diseases. In those infectious diseases where immunity is artificially induced, it is brought about without producing disaster or disease”.

Williams, in an earlier article, states: “heifers in general are not so liable to abort in the second pregnancy as they are in the first, nor are they so liable in second pregnancy to have metritis with retained afterbirth. As the age of the animal advances, until old age with diminished vigor arrives, the constant tendency is to suffer less and less from the infection of contagious abortion. It is then an age immunity and not an immunity founded upon disaster.”

In 1908 M’Fadyean and Stockman started some experiments with the idea of producing immunity. They have had encouraging results and Norris, of Dublin, recently stated: “artificial immunity vaccination has now had a fairly extensive trial. It may be used to strengthen an already existing naturally acquired immunity, or to set up immunity in clean animals which might be exposed to risks of infection.” In the same article he states: “generally speaking it may be said the results so far show a decided but not striking tendency in favor of vaccination. It should, however, be used intelligently, a warning necessary in these days when vaccine therapy appears to be accountable for a good deal of promiscuous quackery of a pedantic type.”

Mohler and Traum, Giltner and Bang have carried out experiments both with living and killed cultures of the *Bacillus abortus*, but the majority of these experiments resulted unsatisfactorily.

We are waiting anxiously the result of the work of Dr. Eichhorn, Chief of Pathological Division of the Bureau of Animal Industry, in the immunization of animals for this disease by vaccination and feel confident that he is sufficiently conservative that we may have no fear he will advance or recommend any vaccine for use in the field, until such time as his experiments have warranted such deduction.

Until we have something more positive in the line of immunization by vaccination, I am of the opinion that we, as practitioners, should not undertake to build up false hopes in the minds of owners

of our herds throughout the country, by the use of the various vaccines that are now on the market.

TREATMENT:—Many medicinal agents, quack mixtures and concoctions have been recommended, bought and used by veterinarians and the owners of cattle, but none have proven to be of any value.

The use of carbolic acid was first recommended by Brauer, who administered it in small doses subcutaneously to the pregnant animal. Later other investigators recommended its use in solution for administration by the mouth. Veterinarians in dairy and breeding districts immediately grasped this treatment in the forlorn hope that they finally had a cure and a solution of the problem of control of this disease. In some sections of the country we have able and conscientious practitioners who are satisfied that they are obtaining good results from its administration and some still regard it as a specific. In the researches of others and in our own experience we have found it to do no good.

Rich, of Vermont, later recommended the use of methylene blue as a remedy. He found that it was a strong germicide for the bacillus of abortion. Other investigators experimented with its use and invariably their results have been unsatisfactory.

Again the veterinarians and breeders grasped this new treatment with enthusiasm. In breeding districts the cattle, their attendants, the floors of dairy barns, the milk secreted and the urine excreted were saturated with methylene blue and still contagious abortion continued in the herds and continued to increase throughout the country.

There is no question but that in individual herds where either the carbolic acid or the methylene blue treatment has been used under the direction of a qualified veterinarian, some good results have been obtained, not from the administration of the drugs, but from the sanitary precautions and measures which have been used in conjunction with the treatment. It is a known fact that we can succeed in getting an owner to practice sanitation in his herd, if he is also given some remedy to administer to the animals. In all instances where practitioners claim to have had good results from the use of these drugs, we will find they have used disinfectants liberally in the barns, have isolated the aborters, removed the afterbirths, flushed the vagina, washed the external genitals and thighs of all pregnant animals, etc. They have thus succeeded to a certain extent in controlling the disease.

This disease, like all other contagious diseases, appears in waves or cycles, in other words it may be severe one, two or three years or mild or entirely disappear the next succeeding years. A herd may have been so generally affected with disease that practically all of the heifers and many of the cows will abort, and those that carry the calves to full time give birth to young which die from white scours, pneumonia or other affections resulting from their weakened condition. Thus the herd is depleted of its young animals, the older animals have acquired a natural or age immunity, or have become sterile, and unless new heifers from outside sources are introduced into the herd the abortion will have subsided. If any treatment is undertaken in these particular herds at this time, the veterinarians and owners could possibly draw the wrong deduction and conclude that the disease had been controlled by the specific treatment or drugs administered.

CONTROL:—I will attempt to give briefly a practical outline of control of this infection in the light of our present knowledge.

(1). Clinical diagnosis, when not positive, should be confirmed by agglutination or complement-fixation tests in order to detect the disease early. We should remember, however, that these tests only detect infection and do not indicate the virulence or severity of it.

(2). Prevent gross infection by the proper disposal of fetus, placental membranes, premature calves, uterine discharges, etc.

(3). Minimize infection in stables by liberal use of disinfectants and whitewash badly infected quarters.

(4). All pregnant animals a few days prior to calving should be thoroughly bathed, removed to a box stall which has been cleaned and disinfected the vagina should be douched, the tail, thighs and udder should be washed with a mild antiseptic. The new born calves should be allowed to suckle the mother for a period of a few days after birth, but the vagina should be douched, the thighs, tail and udder washed with antiseptic each time before allowing the calf to suck. Some prefer that the calf should be fed, when the cow should be washed and cleaned in the same manner, the milker should disinfect his hands, the first few streams of milk discarded in a separate vessel and not on the floor, and the milk should then be drawn into a sterilized vessel. Feed calves on boiled milk after they are eight to ten days old to prevent infection of *Bacillus abortus* and colon bacillus which often coexists.

(5). If conditions permit and it is practicable, remove aborting animals, those which give birth prematurely, animals with retained placenta and those that show premonitory symptoms of abortion, to a quarantine in separate stables. They should not be allowed to remain in the stable or pasture with the rest of the herd. A close vigilance should be kept for abortions in early pregnancy as they often escape notice. All animals which have aborted and those with retained afterbirth and uterine discharges should be kept in quarantine and not be bred back for a period of two months or until the uterus has regained its normal condition. Treatment of these animals should be carried out faithfully and in a large percentage of cases you will be able to prevent sterility and they will continue to be useful and productive. Fetal membranes should be removed as soon as possible if it can be done without force. The uterus should then be douched with a mild antiseptic and the fluid carefully drawn off. Williams recommends the introduction of one-half ounce of iodoform in a capsule or in suspension in olive oil. This dissolves slowly, does not irritate the uterus and prevents decomposition and the extension of the infecting process. As a douche he recommends a two per cent solution of Lugol's solution, which should be followed by a normal salt solution. The douching should be repeated once a week until the uterus and cervical canal are normal, then the animal should be bred.

Authorities claim that the cystic degeneration of the corpora lutea is always associated with the chronic endometritis and that by dislodging the diseased corpus luteum and disinfecting repeatedly the uterine cavity and cervical canal, you will succeed in getting satisfactory results.

Until within the last year we have been unable to properly disinfect the uterus and succeed in removing all of the fluid. Now the operation is greatly facilitated and if one is careful can be done with practically no danger to the animal by the use of instruments which were originated by Albrechtsen of Copenhagen and later brought to this country and perfected by Williams.

(6). Newly purchased pregnant heifers should be kept in quarantine until after calving before being introduced into herds.

(7). Sheath and penis of bulls should be douched with antiseptic before and after service; the vagina of the heifer should be douched with a mild antiseptic and followed with normal salt solution before breeding.

(8). Advise owner as to danger of abortion from the establishing of breeding blocks where several breeders use the same bull.

(9). Advise clients when purchasing cows to select animals with second or third calf if possible.

(10). Advise against disposal for slaughter of valuable animals in herds where abortion has appeared, with the idea of starting again with all young animals, as the cows that have already aborted are less apt to abort again than the young animals, and unless they have become sterile will continue to be valuable.

(11). The problem of sterility following in the wake of abortion is the cause of such great losses that any outline of control or remedy for their infection which ignores it, cannot be called effectual.

I do not intend to pain you any further nor undertake to advise you on the treatment of sterility, as my knowledge of this subject has been obtained by study of Dr. Williams' writings and a few days personal association with him in the work.

Our profession and the live stock industry of this country owe him a debt we can never pay for the practical results he has succeeded in obtaining by his long and arduous investigations in the field.

I hope that all veterinary institutions will shortly give a course in uterine surgery and the treatment of sterility, and I believe practitioners in dairy and breeding districts will immediately avail themselves of the first opportunity to learn the practical technique as recommended by Williams.

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SOME ADVANTAGES OF SANITARY PRECAUTIONS IN CATTLE PRACTICE*

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We are now at an era when the subject of so-called contagious abortion, sterility and the allied maladies are receiving more attention both by the veterinary profession and stockmen than perhaps any time in the history of the world.

The cause of this unusual interest is probably due in part to the advance in value of the bovine coupled with the increasing interest in purebred cattle by shrewd business men of large affairs; and partly to the advanced methods of studying diseases that are so rapidly being improved and modified both by the veterinary and medical professions. As is true with all maladies, in order to control them with greatest efficiency and least financial loss, their true character and characteristics must be worked out and naturally the burden rests upon our bacteriologists, pathologists and their co-operators.

The conditions mentioned above have in turn apparently prompted all strict scientific workers to direct most of their energies towards bacteriological and biological research with the hope of evolving something that will be useful to the cattle industry through the veterinary practitioner.

A few others, notably Prof. Williams of New York have recently taken up, in reference to sterility, what might better be termed, surgical interference coupled with sanitation requiring highly professional knowledge and technique—but so far as the

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writer is aware very few practitioners in the face of all this extremely scientific atmosphere that prevails at present, have had the temerity to present before veterinary bodies or to contribute to our veterinary journals any of the simpler every day practical methods which have given results, in the way of money saving to our clients and credit to our profession.

I yield to no man in respect for the scientific advancement of our profession, but no one can gainsay that up to the present time our scientific knowledge of sterility, abortion and the allied venereal ailments with the various biological tests and treatments are far from being perfected or reliable agents. I therefore believe it the duty of every practicing veterinarian to apply such harmless sanitation as our present knowledge gives proof to be judicious, so that we may not be looked upon as drones and useless ornaments to the cattle industry until such a time as our scientific workers make it possible for us to make positive statements and give more certain relief. The interest in purebred cattle has made wonderful strides during the past one or two decades and as is true with any other branch of animal industry, maladies and annoyances have kept pace with the increase. This is quite explainable in the case of, for instance, tuberculosis where the traffic in cattle and the feeding of unpasteurized by products has spread this scourge as surely and as widely as if a sower had gone forth with his bag on his shoulder and scattered it to the four winds. With this malady one diseased animal placed in a healthy herd serves as a nucleus to contaminate and infect a large majority of that herd and a member or several members of that herd going into another herd contaminate it and so we have an endless chain. Similarly the cow with a tuberculous udder infects the entire milk supply of one dairyman. This milk was dumped into a vat at the creamery with other batches and the skim milk drawn out and taken home to feed the heifer which in due time developed a tuberculous udder to contaminate more milk to feed more calves.

This serious situation did not receive much attention until some 15 years ago and even then the question of suppression and correction was ridiculed by many and while I am ashamed to admit it, it is nevertheless true that bills seeking to correct these abuses, particularly the one pertaining to the compulsory pasteurization of creamery by products, has for several years been defeated in the legislative halls of our own state and while we hoped it would

surely be placed on the statute books this year it has again been defeated by those who pose as the friend of the farmer.

After giving these matters a little thought we find that the spread of other contagions are quite as simple from animal to animal and through milk and its products as is tuberculosis.

While we who have the interest of animal husbandry at heart have been bending every effort to control and suppress tuberculosis among cattle, infectious swine diseases among hogs, and rabies among all animals, our pure bred cattle men have been knocking at the doors for knowledge and saying to us, "There are scourges among our cattle which unless something is done to prevent their progress, will prove a greater menace to us than tuberculosis has ever been, with all its seriousness.

These scourges referred to are what we term for want of a better name, contagious abortion, sterility, white scours or infectious scours in calves. Prof. Williams has wisely said that in his judgment these diseases have a strong relationship, and I would go one step further and add that a large percentage of all our udder troubles is associated with these infections of the generative organs, whatever they may be.

In order to cope successfully with the phenomenon that brings about diseased ovaries, metritis, infectious mammitis, gangrenous mammitis, etc., we must begin before conception. We must either select our animals from a herd where there is a herd record kept showing that they are free from these scourges as well as tuberculosis, so far as can be determined by the application of our present knowledge for the detection of these diseases or we must if we are to be successful breeders, apply every known sanitary precaution, examination and test to determine that our breeding animals are healthy before we mate them. If the female generative organs are not healthy then they should receive proper attention under veterinary supervision before a valuable sire is allowed to cover such an animal at the risk of either contamination or infection and even in herds where there is no possible evidence for suspicion, it is carelessness and bad management to allow a male animal to do service without flushing the prepuce with a mild antiseptic both before and after service. A simple and very effective and sane precaution in animal breeding even though the danger of contagion may not be so great in the male as in the female and one which the veterinary profession should advocate, is the douching

of the sire of every herd: this also incidentally impresses the owner with the danger of contamination where bulls are allowed to be used miscellaneously on neighbor's cattle.

We believe even with our meagre knowledge of these serious ailments that it is possible for the practicing veterinarian to be of material assistance to stockmen in controlling these scourges and with intelligent co-operation ultimately build up a non-diseased herd. We realize that this subject is to be discussed by men who are giving great energy and thought to its solution and consequently I will summarize my remarks with what might be styled statistics or case reports.

I wish, however, to add here a word relative to infectious scours in calves which we believe to be so closely correlated to our breeding problems: in fact it is our opinion that if rigid sanitation is applied in controlling sterility and contagious abortion, calf troubles need give us little concern.

If you will refer to even the most modern text books you will find that many authors agree that the ways in which white scours may be transmitted to calves are: first—uterine infection, second—vaginal infection at the time of parturition, third—through the umbilicus coming in contact with an infected stall.

For several years our observations have convinced us and we have so stated before that there is still another important way in which a calf may become infected and that is through the digestive tract: by its mouth coming in contact with the infected coat of the cow shortly after birth, when searching about for the mammae: or taking into its digestive tract milk which has become infected in the udder through the teats as they become congested and filled and the sphincter partly dilated.

The writer has had occasion to give advice in several large herds where contagious abortion in cattle and white scours in calves have appeared with no uncertain violence. In such cases for several years past it has been our custom to carry out sanitary methods such as I will briefly enumerate by citing two particular cases that occurred in our practice within the past year and give our methods of control. The positive abatement of the maladies in both of these and other herds leave no question in my mind as to the merit of this method.

CASE I. A large dairy herd consisting of several hundred milch cows where there had been more or less abortion was stricken

rather suddenly with a violent outbreak of the so-called white scours in calves. They had lost up to the time we were called in consultation, about 30 calves, about 75% of all that had been born within the past two months. We at once established a routine treatment for the animals in advanced pregnancy. Every animal within a month of calving was douched daily with a mild warm solution of permanganate of potash ($\frac{1}{2}$ dram to the gallon.) and all the external genital organs, hindquarters and udder thoroughly scrubbed with soap and water. This was kept up to within about a week of freshening when the animal received an additional scrubbing of the entire body. A maternity stall was then prepared by thoroughly disinfecting and liming the floor where she was housed until she freshened; the douching being continued each day until she had freshened and for a period after freshening, depending upon the character and amount of discharge following birth, with the result that the infectious scours ceased immediately.

The offspring of any cow that had treatment for four days before she calved did not develop white scours and no particular attention was paid to the calf other than to keep it clean and the udder milked out a little (before the calf is allowed to nurse) and scrupulously cleaned so long as there was any vaginal discharge to infect it.

We contend that the discharges from the vaginal tract infect the stalls, slime the tail and get into the udder and infect the calf. We frequently have the same source infecting a cow's udder and giving rise to mammitis.

Another outbreak differing in character which we had occasion to treat recently in northern Orange Co. may also be of interest to some of you owing to the fact that not only the life of the fetus was involved but also the life of the dam. I will recite the history of this outbreak in order to again substantiate my belief in the virtue of sanitation in these conditions.

The owner called our office one morning and said that he had some six or seven cows to freshen recently; that the calves had apparently white scours and that they had lost three of the cows and all the calves and that the udders of two of the cows that had freshened within the past three days were apparently affected the same as those that had died. We went to the farm at once; one of the cows was already dead and the other died during the day. Both of these animals had gangrenous mammitis thus making a total of five cows and their calves within two weeks.

The history was that all the animals that had so far freshened this season had retained the membranes which were of a dark sanguinous appearance, putrefying rapidly, followed by a copious catarrhal vaginal discharge. The dams had in each case gone full term and freshened in apparently splendid physical condition. The calves would develop white scours two, three or four days after birth and either die immediately or develop septic arthritis and terminal pneumonia. The cows that died developed a darkened udder either the second or third day with progressive gangrenous mammitis, general septicemia, death following in three or four days. Those that survived developed the catarrhal vaginitis mentioned above; lost the udder, lost flesh and were practically worthless.

We immediately prepared a section of the barn for the cows due to freshen within the next month. This section was thoroughly scrubbed, disinfected, limed and bedded with new shavings. We scrubbed with warm water and soap every cow that was to be moved in this section. We explained to the owner that it was our judgment that the discharge from the vagina was killing his cattle by infecting the udder and if he wished to save his herd that douching twice a day every animal until the time she freshened was imperative.

One of the cows so treated freshened two days later, the same semi-putrid membrane being in evidence; the calf lived two days and died. The cow was taken from her quarters twice daily, put in the douching stall and douched, with the result that she never missed a feed, dropped the membranes in a few days, and made a record of 31 pounds. Sixteen more freshened within the next two months without a single mishap to the udder, cow or calf, notwithstanding that the membranes according to the herdsman were of the same character of the cows that died. Every animal in this herd has been douched daily for three months after freshening and the owner and herdsman tell me that conception has been more prompt and certain with them this year than ever before.

This in turn encourages our original argument, that by controlling one of the maladies we have saved the cow, stamped out calf scours and surely lessened sterility.

THE DEATH AND EXPULSION OF THE IMMATURE FETUS AS A STANDARD FOR MEASURING THE PREVALENCE OF CATTLE ABORTION*

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The death and expulsion of the immature fetus, which two occurrences combined we term "abortion", do not constitute a disease, a lesion, or, except with some important reservations, a symptom. Neither the death of the fetus nor its expulsion from the uterus is basically of great significance.

Death is the universal destiny of all life, and consequently is in no sense unique or striking. The ovaries of cows contain many thousands of ova, but very few of them become fertilized. Thousands die for each one which lives to experience fertilization. Among spermatozoa, death is even more extravagant, and millions die for each one that comes into conjunction with a fertilizable ovum and contributes to the generation of a new animal.

At the moment the fertilized ovum commences its existence, its death begins, and the life of the individual may be terminated at any time. From the beginning of the life of the individual to the maximum duration of life, there is no time at which death may not occur. Death is not an important symptom of any one disease, is peculiar to no one disease, and cannot serve to differentiate one disease from another. In abortion, the death of the fetus occurs beyond our view, within the uterus. We do not observe the process of death, but merely the fact that death has occurred. We have not seen the fetus sicken and die. The expulsion of the fetus from the uterus reveals the fact that it has died.

The expulsion of the fetus from the uterus has nothing very remarkable about it. Most fetuses are expelled from the uterus. When a fetus is not expelled, we regard the failure as abnormal. Writers speak also of symptoms of impending abortion, of abortion in course, and of past abortion. These "symptoms of a symptom" are not of remarkable value. The symptoms of impending abortion are fundamentally identical with those of impending parturition, those of abortion in course have no basic differences from the act of parturition, and the symptoms that abortion has occurred are not fundamentally different from those following parturition.

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It has been the custom, however, for the phenomenon of abortion to be used as an index of the intensity of the contagious disease of cattle misnamed "contagious abortion". Investigators generally assert freely that the death and expulsion of the immature fetus is not the disease, but, having made the admission, they generally ignore it at once and turn to the phenomenon as their index of the severity of the malady. One finds the phenomenon of abortion in general use as an index in research work, in differential diagnosis, and in attempts at eradication, cure or control.

In research work the phenomenon of abortion has been made the alleged basis for establishing the cause and character of the malady. For many years various investigators, because they thought they had experimentally and reliably induced abortion in cattle and other animals, have imagined they have proven thereby that the disease was contagious and that it was due to the activity of a certain organism. Attempts to produce experimental abortion have been recorded in such a manner as to lead to the common belief that the phenomenon of abortion could be readily, regularly, and reliably induced in cattle and other pregnant animals at will and that the induction of this phenomenon proved its contagiousness and its other basic characters. Few of the failures to induce experimentally the death and expulsion of the fetus have been recorded, and even when recorded the facts have been largely ignored and the apparently successful experiments magnified. Readers lost sight of the evident failures, were blind to them, and saw only the imaginary successes. Perhaps the most extensive and valuable researches in this field yet recorded, and which are perfectly typical, were those of M'Fadyean and Stockman of England. Most readers, after studying their very valuable report, came to believe that they had shown beyond question that they had at will caused pregnant heifers to abort by inoculating them in one way or another with the abortion bacillus of Bang. A critical review of their work shows, however, that only twenty-five per cent of the heifers experimentally inoculated really aborted.

Any veterinarian who, without any attempt to cause abortion, has failed to observe a higher rate of abortions than that recorded by M'Fadyean and Stockman in their experiments, has had a very limited experience with the disease. Indeed, we see frequently in heifers in first pregnancy fifty to eighty per cent of abortions, even after the administration of supposed sure cures. We have re-

corded one instance where we administered abortion bacterins, which some regard as a reliable prophylactic agent, and yet eighty per cent of observed abortion followed. So we have observed over twenty-five per cent of abortion after the use of methylene blue, carbolic acid, and other alleged prophylactics of supposedly great value. Thus, we observe frequently a higher abortion rate where the most popular methods for controlling the disease are applied than experimenters are apparently able to induce experimentally.

It was claimed by M'Fadyean and Stockman that their experiment heifers were clean, that the animals had not been exposed to the contagion prior to their experimental infection. This was a mere hypothesis, incapable of proof or of disproof.

In our own experiment cited above, we had, according to ordinary standards, no evidence of infection prior to the use of the bacterins. According to our own standards, they were intensely infected and would have largely aborted had we let them alone, injected either living or killed abortion bacilli, fed methylene blue or administered carbolic acid.

We have frequently cited two contemporaneous experiments, technically one by the writer and the other by Dr. Moore. Dr. Moore caused large volumes of pure cultures of the abortion bacillus to be injected into the jugular veins of five pregnant cows. Each of the five cows aborted. The writer had equally large doses of the abortion bacillus injected into the jugular veins of six pregnant heifers. None of the six heifers aborted.

Applying the standard of observed abortions, the two experiments were hopelessly contradictory. It might also seem to some that the experiments had been improperly manipulated, that one of us believed one way and the other another way, and that each would prove his point regardless of method. The cultures used in each experiment were made in the same laboratory, from essentially the same strain and by the same man. Each group of cattle was kept on the same farm, fed by the same man, and handled essentially alike. The abortion cultures were injected into the jugular veins of all the cattle by the same man. Everything was all right and ran smoothly until an attempt was made to apply the standard of observed abortions in order to measure the effect of the experimental inoculations. Then came irreconcilable conflict. Either there was some radical error in the experiment or our standard of measurement was wrong. When the two groups of animals were

analyzed, it was found that during the prior year two of the five cows in Dr. Moore's group had aborted, two had been sterile or had aborted unseen, and one had calved. They came from a herd in which an abortion storm had raged. They had every right to abort without having been experimentally inoculated. Perhaps the inoculation intensified the infection and made abortion more probable. The six heifers were not known to have been exposed previously to the infection. According to our present views, they were almost certainly infected, but only mildly. Perhaps the inoculation increased their tendency to abort, but not sufficiently to cause an actual abortion. Taking each experiment group alone, some would have been sure from Dr. Moore's experiment that such inoculations would regularly cause abortion, or from our experiment, measured by the same standard, that the inoculation was powerless to disturb pregnancy. The experiments were correct: the standard for measuring them was wrong. According to our most recent researches, our experimental inoculation of the heifers probably induced serious infection, and, had the heifers been retained long enough for the development of this very chronic malady, disaster properly attributable to our experiment would probably have been revealed.

The standard for measuring our results was one which has not been applied in any other disease. In the experimental transmission of contagious diseases in cattle or other animals, we do not rely upon the death of an animal for our proof of the transmission of the disease. We do not diagnose the disease by the death of the animal. An animal may die from any disease. It might well be said that no disease is absolutely fatal, although some diseases have a mortality of very near one hundred per cent. In research work with other contagious diseases, when an experimenter wishes to produce disease he does not require that the animal which is inoculated shall die. In contagious abortion, however, the experimenter goes a step further. He inoculates one animal with what he believes to be the essential contagion and expects this to cause the death of another animal which is intimately related with the inoculated one. That is, he inoculates a pregnant cow or heifer, and, without killing her or producing serious disease in her, expects to destroy the life of a fetus *in utero*.

When an experimenter wishes to reproduce a transmissible disease, he regularly accepts as proof of such transmission, not

death, but lesions or certain distinctive symptoms. He expects to complete his proof by recovering from the tissues of the experiment animal, providing the microorganism is recognizable, the same organism as that which he has introduced. Preliminary to his experiment, however, he must have satisfied himself that the experiment animal is not already infected with the particular disease under study. In contagious abortion, we are not yet in a position to determine the freedom of an experiment animal from the Bang organism. We have no lesion which is generally acceptable to experimenters as conclusive evidence of the presence of the abortion infection.

The contagious abortion of cattle, being a chronic disease, may like other chronic diseases, produce a long and varied list of symptoms, or may produce none, and when the symptoms are present they are not highly distinctive of the one disease.

We do not need to produce the death of the fetus and its expulsion from the uterus in order to establish the place of the abortion bacillus of Bang in cattle abortion. It is no more necessary to cause the death and expulsion of the fetus in our experiments in contagious abortion than it is necessary to produce death of the experiment animal in tuberculosis and glanders. We do not prove, by causing the death of the animal, that we are working with the tubercle or glanders bacillus. We do not at all need to cause abortion in order to establish the character of cattle abortion. We have long had abundant evidence regarding the power of the abortion bacillus to cause the death and expulsion of the immature fetus. The evidence, wholly aside from the phenomenon of abortion itself, is so abundant and so conclusive that we are fully warranted in proceeding upon the basis that the abortion bacillus described by Bang is the fundamental cause of the disease of cattle so outrageously misnamed "contagious abortion".

If we study the question of the clinical diagnosis of contagious abortion, we find again that the frequency of abortion in a herd has generally been regarded as the principal basis for differentiation. If the abortions have been very numerous, it is contagious; if comparatively rare, it is accidental. In applying this standard of measurement, however, very few attempt to define what they mean by "frequent" or "rare". They fail yet more definitely when they conclude that frequent abortions prove the contagious character, while rare abortions indicate accident instead. In

acute infections, such as foot-and-mouth disease, the spread is very rapid, and if one animal having the disease has been placed in a susceptible herd of cattle it may reasonably be assumed that the contagion will spread rapidly and the symptoms will be unquestionable. In a chronic disease, however, we have no such criterion. The disease spreads slowly, it develops slowly, and it may involve any organ in the body, thus enabling the malady to produce an endless variety of symptoms. Some cases of white scours in calves are certainly due to the abortion bacillus. In some cases of arthritis in calves, we get pure cultures of the abortion bacillus from the joint cavities. In the pregnant female, according to our present understanding of the pathology of contagious abortion, the lesion imperilling the life of the fetus is fundamentally an inflammation of the uterus. This may occur in the non-pregnant animal, causing sterility. It is by far most common in pregnant cattle, where it may cause abortion or premature birth, or, persisting for a longer period of time, may cause tardy or difficult parturition because of the paralysis of the uterus. Once the fetus has been expelled, retained afterbirth which has long existed may come prominently into view. Following pregnancy and in continuation of the metritis of pregnancy, there may be pyometra, admittedly modified by subsequent additional infection, as a result of which sterility may assume a very serious aspect. Under these conditions, we necessarily have wide variations in symptoms, or rather in results, because there is extreme variability in the quantity, the quality and the duration of the infection in the uterine cavity. It is therefore unfair to measure the intensity or prevalence of the infection by one of these symptoms. We might be much more accurate if we could always see clearly the metritis of pregnancy, but during this period we cannot observe the disease clinically and must await the emptying of the uterus. Then, with the dilated condition of the genital canal, other infections may freely enter the uterine cavity, to complicate and becloud the problem.

Our symptoms are not clear. Certainly, however, we cannot afford to elect the one phenomenon of the death and expulsion of the immature fetus as a reliable standard for the measurement of the disease. The deficiency of this standard is not restricted to abortion, sterility and retained placenta or other disasters dependent upon the metritis or other disease of the female genital tract. It has recently been shown with great clearness that the

milk of many cows contains the Bang abortion bacillus. We are not at present in possession of adequate proof that the milk of any cow is wholly free from this infection. Yet the presence of the abortion bacillus in the milk has no immediate relation, so far as we know, with the death and expulsion of the immature fetus which may at the time exist in the uterus. The relation of the infection in the udder is with the infection of the new-born calf, through feeding upon the infected milk.

The agglutination and complement-fixation tests show very clearly also the futility of depending upon the death and expulsion of the immature fetus as our standard for diagnosis. In herds where the infection is intense, we find by these tests that the blood of a large percentage of calves, when not more than twenty days old, reacts strongly to the test for contagious abortion. So also does the blood of breeding bulls. The blood of many cows which do not abort reacts very strongly. Consequently, if we accept, as we must, the complement-fixation and the agglutination tests as having some degree of reliability, it becomes very clear that we cannot accept the phenomenon of abortion itself as a reliable measure of the infection.

In a yet more important respect this standard of measurement for contagious abortion fails. When we consider the question of the cure, prevention or control of contagious abortion in cattle and attempt to use the phenomenon of abortion as a standard of measurement, we find that it underlies and supports the errors and quackery surrounding the handling of this disease. A purveyor of quack medicines sells his alleged remedy to a breeder, with the promise that it will eliminate, check or control the one phenomenon of abortion, but does not represent that it will repress retained after-birth or metritis in cows or white scours or arthritis in calves or that it will have any favorable influence whatever upon the infection as a whole. If, after the quack nostrum has been given, no abortions follow, a cure is claimed upon the basis that the death and observed expulsion of the fetus constitutes the disease. Other results of the abortion infection continue unabated. They may even increase. In many severe storms of the infection, there are few observed abortions, but the metritis of contagious abortion is very intense, the calves very largely die from scours or pneumonia, the afterbirth is retained in many, and sometimes in nearly all of the cows. In numerous outbreaks, many of the cows die from septic

metritis. Pyometra or metritis occurs frequently, and many animals become incurably sterile. In spite of these great losses, the purveyor of the quack remedy claims that he has stopped the disease. The breeder believes also that the nostrum has controlled the malady and cheerfully subscribes to a misleading testimonial.

It is not quacks alone who mislead the people. Carbolic acid and methylene blue were recommended by capable and honorable veterinarians. They believed implicitly in the value of these drugs. Their belief was founded upon the false standard which they used in measuring the disease. In some of the herds where these drugs were first used, there was a decrease or cessation of the observed abortions. There may even have been some decrease in the intensity of the infection, so that possibly in some cases where these drugs were used there was less retained afterbirth and less sterility. These variations in intensity rise and fall in all herds, whether any remedies are applied or not. They have nothing whatever to do with the essential problem. The infection remains, and its power to do harm has not been importantly affected by the drugging.

Recently much has been claimed for the use of bacterins to control abortion. The philosophy of the use of these bacterins is not clear. Even when applying the observed phenomena of abortions as the standard for measuring the disease, the hypothesis upon which abortion bacterins are used is difficult to follow. Apparently those who believe in their value believe that they induce immunity, although the disease is a chronic one. They fail to appreciate the fact that a chronic infectious disease is chronic because the disease itself does not produce immunity. Thus far, we have been able merely to imitate nature and to provide an artificial immunity in some of those diseases which themselves induce immunity after one attack. Before they can arrive at their belief in immunity in abortion, they must create the hypothesis of vicarious immunity. They must believe that because one fetus has died from an infection, a subsequent fetus not yet generated is to be immune. If they would claim that it is the cow, not the fetus, which is made immune, they need still believe that the immunity is based upon the death and expulsion of a fetus, upon the disease of a fetus, and not upon the disease of the pregnant animal. This, again, is a vicarious immunity, in which, owing to the death of one animal from a given infection, another is rendered immune thereto.

If it is admitted, as we have long held, that the infection of contagious abortion is essentially universal, the use of bacterins would appear illogical because it would only be adding more of the same toxic substances which exist already in the animal and which constitute the principal power for harm. So long as we apply the false standard of measurement which we are discussing, we may readily select a number of instances where it appears that the use of bacterins has served an important purpose and has actually controlled abortion, but we may turn face about and examine other herds where the bacterins have been used in precisely the same manner and show, by the same standard, that they increase the amount of abortion.

Recently, after reading one of our publications, a veterinarian in a personal communication suggested that we were in serious error in holding that abortion bacterins do not and cannot control contagious abortion. He cited a number of herds where abortion had been severe and in which he asserted he had totally eliminated the disease by the use of bacterins. A little later, reading one of our published contributions where we had stated that retained afterbirth was simply one of the results of the presence of the contagious abortion infection in the uterus, he at once took us to task for this view. He was just then having a serious time with retained afterbirth. So far as we could determine, this was in the same herds where he had supposedly eliminated contagious abortion by administering abortion bacterins. This reminded us somewhat of an attempt to tamp into a hole more soft putty than the cavity would contain. As fast as it was tamped on one side, it would bulge above the surface on the other side. If he believed that he was controlling contagious abortion with bacterins, the contagious abortion bobbed up in the form of retained afterbirth. If then, by some *hocus-pocus*, he could tamp the retained afterbirth back, the disease reappeared as sterility. This he controlled by some vigorous punches with a steel rod in the vicinity of the cervical canal. Thus, by applying a false standard of measurement, he chases an *ignis fatuus* hither and yon, and the real condition of affairs never becomes tangible, is never attacked and never affected.

In another instance a veterinarian of high repute does not understand why cows in a certain herd should suffer and quite uniformly die from retained afterbirth. He is sure it is not caused

by contagious abortion, because none of the cows has been seen to abort.

When handling the disease, the application of this standard involves certain questions of vision. An embryo or a fetus may perish in the uterus at any time, and it may be expelled or it may not. If it perishes before the fifth month of pregnancy, there are usually none of those alleged symptoms of impending abortion. The embryo or fetus slips away unseen. The standard cannot be used as a measure in such a case. Again, in the later stages of pregnancy, there is almost inevitably difficult labor—the dystokia of contagious abortion. If the uterus is very badly inflamed, the fetus is extracted dead. It has probably died from the infection of contagious abortion. The animal, with some assistance in getting rid of the dead fetus, has aborted, but the abortion is not visible to most observers. Thus, in applying this standard of measuring the amount of contagious abortion in a herd there is an epoch of visibility which extends from about the fifth to the seventh month inclusive. On either side of this epoch, are two others, where abortion is essentially invisible. Consequently it is said that abortion occurs chiefly from the fifth to the seventh month of pregnancy inclusive. As a matter of fact, however, the death and expulsion of the immature fetus are clearly visible during this epoch and difficult to observe at other times.

Quackery has profited more and is profiting more today in connection with contagious abortion than with any other disease of animals. The underlying reason which makes this quackery possible and permits the great profits which quacks are reaping is the false standard for measuring the disease. If an able and perfectly conscientious veterinarian, measuring contagious abortion by the false standard we are discussing, states that methylene blue has controlled contagious abortion or has stamped it out of a herd where it has previously existed, and submits the data, we must accept the facts as stated. If a quack powders some dried codfish and sells it at a high price as a sure cure for contagious abortion, and a breeder administers it to his cattle, there may be no abortions seen for a time. Perhaps abortions do occur and are not seen, but that is not the point, according to the general standard of measurement. If no abortions are observed over a given period of time, the quack may publish the data. They are just as good data as those published in connection with methylene blue. If

the data are co-extensive and the percentages of abortion, according to the standard of measurement applied, are alike, the promotor of methylene blue has little right to criticize the purveyor of codfish. The evidence is perhaps just as sincere and the results when placed upon paper cannot be differentiated. There have been no abortions, and according to the standard of measurement that is the end. Neither of them has done any good or any harm.

If some eminent veterinarian states that he has assembled a herd of abortion-free cattle, selecting them by the agglutination or complement-fixation test of the blood, and that no abortions have occurred in the herd so assembled for one or two years, the assertion looks good upon paper, it is perfectly correct and perfectly honest. Another man of poor repute may assemble another herd of the same size and may administer regularly to that herd some secret concoction and for one or two years not a cow in that herd may be seen to abort. He may be able to sell his concoction at a lower price than the expert veterinarian can make the agglutination and complement-fixation test. Each arrives at the same result. The only difference perhaps between the two is that in the one case the breeder is misled because of an error, while in the other he is misled by design. We cannot, however, in all cases prove that there has been deliberate fraud., Thus quackery and charlatanism flourish side by side with error. The results of fraud and error are essentially the same to the breeder.

We cannot hope to aid the breeder in the control of contagious abortion in cattle until we place before him the truth in connection with the nature of contagious abortion. We must discard as rapidly as possible all false standards of measurement and must teach the breeder as rapidly as sufficient knowledge can be obtained the true character of this very destructive disease. When we have done this, the opportunity for the present large volume of quackery will disappear. No purveyor of quack remedies can flourish now by offering for sale an alleged remedy for tuberculosis. The people know better. The quack may prosper for a few weeks, as was recently observed in connection with human tuberculosis, but not for long. The more intelligent breeders, especially the breeders of pedigreed cattle, in America are beginning to learn something of the true character of contagious abortion. They have tried all of the alleged remedies in their sincere desire to escape from the

enormous toll which this infection is levying upon their herds. They have become thoroughly convinced of the insufficiency of the standard we have discussed for measuring the disease. The purveyors of "sure cures" for abortion and sterility are not getting their principal reward at present from the more progressive and intelligent breeders of pedigreed cattle. Such breeders have learned their lesson fairly well.

The live stock papers of America have recently taken an advanced stand and have largely discarded the phenomenon of the death and expulsion of the immature fetus as a measure of the prevalence of contagious abortion in a herd. They are turning with energy to the broader and more comprehensive definition of the disease and are advising permanent measures of breeding hygiene, expecting to wage perpetual warfare against this great infection.

It is interesting to observe that, broadly, the more intelligent breeders of highly pedigreed cattle and the editors of the leading live stock publications of America are apparently in advance of the average veterinarian in their view regarding the character of contagious abortion. It is to be sincerely hoped that veterinarians generally will soon see their way to discard the hitherto prevailing standard for measuring the intensity and prevalence of contagious abortion in cattle and adopt a more comprehensive view which will permit the recommendation of practical measures for the control of the most serious disease economically which the dairyman and cattle breeder are now compelled to face.

A recent government report states that the enrollment of students at the veterinary colleges of the United States at the last session, 1915-16, was larger than at any time since a record has been kept. There were enrolled nearly 3000 students—an increase of 442 over the preceding session. Of these, 734 completed the course of study and were graduated at the end of the session, or 36 more than were graduated from the previous session.

THE OPHTHALMIC TEST FOR GLANDERS: WITH A SIMPLIFIED METHOD OF PROCEDURE

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According to the Report of the Special Committee for the Detection of Glanders¹ which was presented to the fiftieth anniversary meeting of the American Veterinary Medical Association at New York, Sept., 1913, the following methods of testing for glanders were tabulated:

“Mallein Test.

- A—Subcutaneous
- B—Ophthalmic
- C—Cutaneous
 - 1—Cutaneous
 - 2—Dermal
 - 3—Endermal

Laboratory Diagnostic Methods

- A—Examination of Pus or Nasal Discharge
 - 1—Microscopic
 - 2—Cultural
 - 3—Animal Inoculation
- B—Examination of Blood.
 - 1—Opsonic Test
 - 2—Conglutination Test
 - 3—Precipitation Test
 - 4—Agglutination Test
 - 5—Complement Fixation Test”.

This list includes all of the known tests, that are considered of any value, both for field and laboratory work, irrespective of their relative merits.

While it is recognized that some of the above mentioned laboratory diagnostic methods are absolutely reliable and should always be used in obscure cases or for corroborative purposes, yet it is obvious that they can be carried out only in the laboratory by trained workers.

Therefore, for general diagnostic work and for field tests, one or more of the mallein tests must be resorted to

Mallein, the substance found in cultures of the *Bacillus mallei* which is responsible for the supposed allergic reaction in animals

properly sensitized, was first discovered by Hellman and Kalning in 1891. The exact composition of the active principle of mallein, whether it be a toxin or a proteid extract, still remains unknown, although its specificity has been established beyond a doubt.

Raw or concentrated mallein, as it is now prepared, is a dark brown syrupy fluid possessing a distinct characteristic odor and usually giving a neutral or acid reaction. Originally it was made by extracting potato cultures with water or water and glycerin, but at the present time the method of Roux is followed; namely: by growing one or more tested strains of *B. mallei* in glycerin peptone bouillon at 37.5° for about six weeks. At this stage the culture is usually sterilized by the addition of a sufficient amount of trikresol or some other preservative and filtered; after which procedure the filtrate is concentrated to one-tenth of its original volume with as little application of heat as possible.

During the past few years extensive experiments have been carried on in several countries to determine, if possible, which of the mallein tests would give the most satisfactory results for the general diagnosis of glanders.

According to Mohler and Eichhorn² "In judging a method which would be the most satisfactory for the diagnosis of glanders, various things have to be taken into consideration, but especially the reliability of the test. It should be convenient, the results should be manifested as early as possible, the reaction should be distinct and well marked, and, probably the most important of all, it should be possible for the practicing veterinarian to apply the test. The last condition must be seriously considered since the standing of the veterinarian in the community and the confidence of the public in his work would be more manifest if in suspected cases he could personally decide on the diagnosis instead of having to depend entirely on the results of serum tests made at some distant laboratory."

It seems to be the concensus of opinion among most of the authorities, both in this country and abroad, that the subcutaneous mallein test is not as reliable as was first thought and that the ophthalmic test is by far to be preferred.

According to Mohler and Eichhorn² "There is no question but that the subcutaneous mallein test is one of the valuable diagnostic agents for glanders, but no one can any longer deny that failures from this test are more numerous than are desirable. As a matter

of fact, the uncertainty of the results from this test caused numerous investigators to seek some other methods which might replace the subcutaneous mallein test. Besides the failures resulting in this test, the technic of execution of the test, together with the time required for the conclusion of the test, makes it unpopular for many veterinarians and sanitary officers."

In favor of the ophthalmic test the following authorities are quoted: Mohler and Eichhorn² "The popularity of the test is rapidly gaining wherever it has been applied, and among its supporters we find at the present time the greatest authorities on the subject of glanders and on clinical diagnosis."

"Its practicability is apparent, and its use in the control of glanders appears to be now an absolute fact." The method was thoroughly tried out by the Bureau of Animal Industry and from reports in more than 18,000 cases the results from all sources were uniformly satisfactory.

The test has been officially recognized in several of the foreign countries as well as in Canada and in the United States. In a report of Mohler and Eichhorn² they say, "In the United States the Bureau of Animal Industry, in consideration of the favorable results obtained, has recognized the method of diagnosis for interstate shipments of equines."

Schnurer, probably the greatest authority on glanders, gives the following report:¹⁰

During the period 1910-1913, 93,352 ophthalmic tests were carried out in Austria (excluding Galicia and Bukowina); out of these 341 glandered horses gave positive results in 88.8 per cent of cases, doubtful results in 7.6 per cent and negative results in 3.5 per cent. Out of 75,879 healthy horses 99.6 per cent gave negative reactions and 0.34 per cent positive reactions. The negative results in the glandered horses (3.5 per cent) are attributable in part to the fact that the horses were not only tested once or were tested only a few days before death, and probably in part to errors in judgment and mistakes in the post-mortem diagnosis."

He also says, (1) "Glanders can be stamped out by the slaughter of clinically affected animals and of animals recognized as diseased by means of a test. Immunization is at any rate, superfluous.

(2)—The most satisfactory test is one that does not involve the intervention of a central authority, yields reliable results within

a short time (12 to 24 hours) in the hands of persons who are not required to be specialists, is easy to apply and to base a decision upon, is suitable for application on a large scale on the frontiers, can subsequently be verified, and is comparatively cheap.

(3)—The serological tests (agglutination, complement fixation, precipitation, conglutination, Alderhalden's test and anaphylactic reaction) do not fulfill these conditions either singly or in combination with each other, because they cannot be carried out without the intervention of a central authority.

(4)—The ophthalmic mallein test (conjunctival reaction) carried out with a reliable concentrated mallein painted upon the eye with a brush, swab, glass rod, or some other instrument, and not dropped into it with a pipette or drop bottle, satisfies all the conditions mentioned."

In the Report of the Special Committee for the Detection of Glanders, mentioned previously, the following may be found: "In deciding upon a method which would be most satisfactory for the diagnosis of glanders: the simplicity, reliability and trustworthiness of the method must be above reproach.

The results should manifest themselves as soon as possible, the reaction should be well marked and distinct and easily applicable by the average practicing veterinarian.

A test with these requirements places a test into the hands of the practicing veterinarian along with which the standing of the veterinarian in the community and the confidence of the public to the veterinarian is brought into closer relationship, in that it enables the veterinarian to personally decide on the results of the test.

The ophthalmic test not only meets all these requirements, but is without doubt the most convenient diagnostic method at our command.

Its reliability compares favorably with any of the other available tests.

The reaction is usually distinct, and doubtful or atypical reactions are rather infrequent.

The ophthalmic test does not interfere with subsequent serum or other mallein tests if such are deemed necessary.

The ophthalmic test should be recognized by state and federal authorities since its reliability can no longer be doubted.

In all atypical and doubtful cases of the ophthalmic test the combined complement fixation and agglutination or subcutaneous

mallein tests should be utilized for confirmation. Such a procedure should minimize the failures and assure the best results in the control of the disease in a single stable or in an entire community."

A comparative investigation concerning the various biological methods of glanders diagnosis was undertaken, in Russia, by a committee under the direction of Prof. Dedjulin on 245 healthy and 6 glanders-infected horses, with the following results:

Ophthalmic reaction	0	positive	(0%	failure in reaction)
Complement fixation method	0	"	0%	" " "
Agglutination	4	"	2%	" " "
Subcutaneous mallein reaction	4	"	2%	" " "
Precipitation reaction	11	"	5%	" " "

The ophthalmic and complement fixation reactions proved the most reliable methods in healthy horses.

In the infected horses all the methods gave positive reactions.

Dedjulin thus summarizes the results of his investigation, "That the malleinization (ophthalmic reaction) is to be regarded as the most efficient and for practice the most convenient aid for the diagnosis of glanders."

"It apparently yields no more failures in diagnosis than other methods, but it is decidedly simpler, and its execution can take place independently of the laboratory; this latter is of no little practical significance. Moreover, the judgment of results of this reaction seldom offers occasion for disagreement in opinion."

The writer, in preparing the material for the simplified ophthalmic test, followed the work of Foth¹, Wladimiroff², Fröhrner³, Reinhart⁴, Meissner⁵ and others who used a desiccated precipitated mallein. This was made up by them into a watery solution and used in a similar way to the raw mallein, with like results. Comparing the dry purified mallein with the raw mallein, Mohler and Eichhorn⁶, state that "The advantages of the use of one as compared with the other of these forms of mallein for the eye are not marked, as equally good results were obtained from the application of both forms of this product."

The usual method of preparing the desiccated mallein is to precipitate the raw mallein with several volumes of absolute alcohol, wash the precipitate with ether and dry *in vacuo*.

Taking this as the point of departure from all preceding methods, the writer moulds the purified mallein with milk sugar, which is a soluble, non-irritating and harmless base, into small tablets, in

such a proportion that each tablet shall contain the exact amount of mallein required for one test. Instead of dissolving the tablet in water prior to its application, as has previously been done with desiccated mallein, the tablet is placed directly into the conjunctival sac at the inner canthus of the eye and there allowed to remain. The tablet will soon (one to three minutes) dissolve without apparent discomfort or annoyance to the animal and without an irritating effect upon the conjunctiva. The mallein which is thus set free, produces typical reactions similar to those recorded as the result of the instillation of the raw mallein, or the solution of the dried mallein.

Soon after this material was first prepared and tested, Meyer⁹, from the Laboratory of the Pennsylvania State Livestock Sanitary Board, reported his results with desiccated mallein, which was the first report on the use of desiccated mallein, in this country. Meyer prepared his "Mallein Siecum" by precipitating the raw concentrated mallein with 30 parts of absolute alcohol. The writer, who used a much smaller percentage of alcohol, has found that it is not necessary nor desirable for practical purposes, to use as much as 30 parts of alcohol.

Meyer concluded after a thorough test of 210 horses with his desiccated mallein that "The conjunctival test for glanders is very reliable. It can, in a short time, without large expense, be applied by every practicing veterinarian and will permit the untrained to make a diagnosis of glanders with the greatest possible accuracy."

The advantages of the method proposed by the writer, for the general diagnosis of glanders, are evidenced by the fact that it fulfills the requirements of a most satisfactory test as suggested by Schmurser, Mohler and Eichhorn and others, while the material itself, being composed of desiccated mallein moulded into a convenient form, is extremely stable, can be handled with impunity and placed directly into the conjunctival sac without a previous solution in water.

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OBSERVATIONS ON THE TREATMENT OF FISTULOUS WITHERS*

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In the treatment of these cases the first thing to consider is the value of the animal. A horse that a dealer will ask \$200 to \$250 for will not as a rule bring the producer over \$150. Generally it takes an extra good horse to sell for \$150 on the farms. The United States Department of Agriculture has placed the average value of horses at \$90 to \$100. Lately they have raised it to \$139. In my opinion this is far too high. One hundred dollars would be much nearer their sale value. During my first experience in a veterinary hospital I was told the desperate treatment necessary for the relief and recovery of animals affected with fistulous withers. In the eradication of pipes or the walls of old sinuses, the most severe caustics such as arsenic, mercury, turpentine, chloride of zinc, silver nitrate, actual cautery and so forth were recommended and the saw and chisel for decayed spines of the dorsal vertebrae. Also the most thorough washing daily or irrigation with disinfecting solution or cold water. Most of the hospitals at that time had a ring in a post or stocks, or both, where horses with fistulous withers were roped with heavy halters and other means of restraint and were cauterized, washed, syringed, probed and tortured according to the knowledge of each individual veterinarian. When I began practice in my present location I treated just one case following this line of treatment and promised myself I never would treat another unless I could find or invent some more successful and humane treatment. I have seen these cases under treatment in numerous prominent veterinary hospitals and at the end of a year the lesions were worse than when the treatment was commenced. Every time the cavity was cauterized a pipe could be pulled out the next day or two followed by streams of pus for a week or two when the treatment would be repeated indefinitely until the patient was a physical wreck and had to be destroyed as an act of mercy. A bill of several hundred dollars was created on a worthless horse; the owner was sore and disgusted and the veterinarian was discredited for all time. After getting rid of

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my first case. I refused to treat any more of them for several years. Finally, at the solicitation of an owner, I operated on another one on his promise to take care of it himself. I advised him to wash it out occasionally. On visiting his farm in about a month I asked him if he had kept the cavities syringed out. The owner replied he had syringed it out once and it was so much bother he had quit. On seeing the patient I found she had nearly recovered. I immediately injected some colored water and, when the patient made a complete and permanent recovery in a few weeks more, got credit from the owner for curing her.

Shortly afterwards I saw another case that had been under treatment some time and as a last resort they fastened the horse and poured the cavities full of boiling soft soap. The old horse broke loose, ran back in the woods and as the owners were completely discouraged and thought he was worthless, they left him there. Late in the fall when he came up for something to eat he had made a complete recovery. That same winter while buying a carload of horses at Morrison, Illinois, I saw a big colt in the corn-stalks with extremely large swellings of the withers and asked the owner why he did not get someone to treat it. He replied that a veterinarian would keep it sore forever. He was going to cut it open and pour in a can of fistula cure and it would be well in short order. On returning there several months later I found the colt had completely recovered and the owner told me he did not have to pay any horse doctor either.

It is a very simple matter to realize that the reason these cases recovered was because after they were once opened they were afterwards let alone; there is no especial virtue in soft soap or Fleming's fistula cure. If the owner had had twenty cans or hot soap enough and used them he could have kept them from healing for all time. Likewise the reason the others did not recover was because of the caustics and treatment they received.

Drs. Williams and Frost have developed two or more new operations which mark a tremendous advance in the treatment of these conditions, from the fact that they eliminate both caustics and bacterins. They do, however, describe very complicated, difficult and dangerous operations for the relief of this condition. They also mention a mysterious fluid originating from some cause unknown to them in the fenestrum of the ligamentum nuchae as the predisposing cause. Of the atypical cases which they describe

as constituting about 3% of the whole, I have seen very few, and they responded nicely and quickly to treatment.

Very little horseback riding is done nowadays and ill-fitting riding or harness saddles cause very few fistulas at the present time. Occasionally we still have some fractured spines of the dorsal vertebrae to deal with. My experience has been mostly with the class they describe as typical and I cannot see why they separate them from the others on the ground that they are not due to mechanical injury. In all the cases I have seen in which I could trace the history I considered every one of them due to a mechanical injury. There is no essential difference that I can determine between a shoe boil, a serous abscess from a collar bruise on the lower part of the shoulder or what they describe as a typical case of fistulous withers also caused by an ill fitting hame collar with a heavy tongue hanging on the neck of a soft green horse. All these lesions contain the same serous fluid in the early stages and all of them have the same tendency to spontaneous recovery if the objects bruising and irritating them are eliminated immediately. In fact it is safe to say all of them will recover spontaneously if recognized in the early stages and relieved of irritation or bruising at once. All of them, if neglected, contain in turn the pale yellow tough discoid masses and all of them (provided suppuration does not occur) develop into fibrous tumors under sufficient irritation in time. It is possible the fluid in fistulous withers may be thicker and darker colored and that some substances from the lig. nuchae may cause this difference.

Not all of them result from collar bruises. I saw two colts that developed them from fighting flies and rubbing their necks against a limb of an apple tree. Also a young team that had a post in the stall between them which they would jam against and each of them had a fistula on the side next to the post. Most of mine, however, have resulted from collar bruises, coincident with the working of inferior green and young horses on manure spreaders, corn harvesters and binders.

If you accept these views of the etiology of fistulous withers the treatment is a simple matter. If recognized in the very early stages, quit working the horse in a hame collar: use a breast collar and bathe with cold water and in a couple of months complete recovery takes place.

If, however, there is any considerable swelling it is best to operate at once. Bearing in mind that you have a horse in most cases that is not worth over \$100 if he was sound, a treatment in proportion to his value that will leave the owner some equity in the animal is the first consideration. Also bear in mind that you have neither pipes, sinuses, dead tissue or fistulas to consider in the early stages, but simply a serous abscess and that it makes no difference if the serosity contained therein originates in the fenestrum or gravitates to it; all you have to do is let it out. No expensive equipment or elaborate technique is necessary. The essentials are a sterilized knife and a nose twitch. Have an attendant hold the twist, disinfect the shoulder, pick out the most prominent part of the swelling an inch or two above the scapula and about half way from the top of the 5th dorsal vertebrae and anterior angle of the scapula. Plunge the knife in the tumor about two inches and in one sweep bring it down in front of the anterior angle of the scapula into the neck. Repeat the cut on the other side and force your knife through the neck to the first cut. Wash out the fluid, calcareous particles and discoid bodies if there are any with any disinfecting or antiseptic solution and let your wound alone thereafter and he will get well, I believe, quicker and better than from any other operation or method. I may say further that there is never any hemorrhage that will not take care of itself. The wounds are usually about three inches in length but may be six inches in some cases and always heal without leaving unsightly scars. If no caustics are used there is very little suppuration. Further the horse can go to work the next day in a breast collar and do his ordinary work.

There are two essentials to maintain after the operation. 1st. The wound must be left alone, no meddling by the owner or veterinarian, and 2nd. under no circumstances should a hame collar be used until after all the swollen, bruised or inflamed tissues have fully recovered. Further, in all scar tissue we have necrosis and secondary abscesses and these locations are no exception to the rule. Occasionally small abscesses will develop in the scar tissue in six months or a year. They are usually superficial, small and break of their own accord and require no treatment.

There is one other point I wish to speak about and that is the impatience of the owner. In about a week he wants to know why it has not healed. All serous abscesses are slow to heal and in this

location they are slower than any where else. About the time it is making good progress the owner employes another doctor. In a few weeks the fistula has healed and the owner comes around and tells you how quickly the patient recovered after he used the other man's medicine. That if he had employed him in the first place his horse would have been well in one-third the time. That your treatment was no good and he will not pay you but will see his lawyer and decide if he will sue you for damages. About the only safe way to treat these cases is to collect your fee in advance and have the owner post a forfeit in case he does not follow instructions or has anybody else meddle with it in any way. Since adopting this line of treatment the recoveries in my practice have been 100%. The labor has been not more than 1% compared with previous treatment and most horses have earned \$100 in the time in which they would have been in the hospital. No operating tables, drainage tubes or packs are required. The exercise these cases get in a breast collar assist the discharge of fluids and hastens the healing process. I have seen several of these so-called fistulous withers that were left until they broke of their own accord that never had any treatment of any kind that recovered rapidly and permanently.

I wish to call your especial attention to the fact that in my experience the cauterizing, washing and syringing that I have seen done never accomplished anything but retarded recovery. This simple operation which does not take over five minutes to complete has been successful in about 150 cases in my practice and instead of dreading these cases, they now constitute the easiest and most profitable operations I have, providing there is no meddling or treatment after the operation. We have many recovered patients in this section that the owners will be pleased to show at any time.

VALUES OF FARM WORK HORSES. Estimates obtained by the U. S. Department of Agriculture from about 150 owners indicate that the farm work horse is considered to be in his prime shortly after six years of age, and that even though still perfectly sound, he has declined in value about one-half from the maximum when between 14 and 15 years. The estimates were made on a basis of a maximum value of \$250 and covered values by yearly steps from birth to 16 years of age.

PRACTICAL DAIRY INSPECTION*

F. D. HOLFORD, Chatham, N. Y.

Although dairy inspection has been in vogue for many years, a satisfactory state of perfection has never been reached. The national state and municipal governments, as well as the dealers and consumers of milk, are realizing to-day more than ever before the necessity of producing clean, wholesome milk, which is almost universally consumed in a raw state. The dairymen's unsanitary methods, poor equipment, together with the lack of scientific knowledge have brought about the necessity of dairy inspection.

This inspection has been carried out along different lines, among which may be mentioned, an annual inspection tour in which an inspector visited the dairies once each year ascertaining the existing conditions and possibly scoring them according to some score card or other. No effort at all was made to remedy any undesirable conditions which existed, no suggestions were offered, the dairymen were rarely consulted and no improvements were therefore made and surely none could be expected. This method was soon modified by having the inspector visit the dairies at least once each month, giving suggestions for improvements, going over the score card with the dairymen, pointing out to them the reasons why certain changes in their equipment and methods would be beneficial, thereby increasing the quantity of milk and improving the quality thereof. It is wiser that all inspectors of dairy farms should be veterinarians and they should have had previous training in the production and handling of clean milk.

Great care should be exercised in scoring dairies giving credit only where credit is due. One of our greatest difficulties now encountered is the correction of careless or we dare say dishonest scoring where the inspector gives the dairymen credit for something they do not deserve. By such scoring the inspector neither gains the respect and confidence of the dairymen nor does he secure improved conditions. In order to be a successful inspector, one should be a judge of human nature, for the secret of success lies in gaining the confidence of the dairymen. It is much easier to lead a man than it is to drive him.

*Presented at the meeting of the New York State Veterinary Medical Society, Ithaca, N. Y., August 2, 1916.

A more practical dairy inspection includes a physical examination of the herds by a competent veterinarian who is not only honest with himself but with the dairymen. Whenever an animal is detected which is dangerous either to the milk or other animals in the herd, it should be removed as soon as possible and the nature of the trouble should be explained to the dairyman so clearly that he will see the necessity of removing this animal not only for the effect it will have on the production of wholesome milk but also for the protection of the remainder of his herd. In this way he will not only feel satisfied that this animal must be removed for his own benefit but he will also be able to detect the same trouble which might hereafter appear in his herd without the necessity of having a veterinarian call his attention to it. By this method the dairyman is satisfied, the danger is removed without the slightest friction or discontent and at the same time the dairyman will feel that the veterinarian was working for his best interests.

In order that a dairy herd may be brought to a maximum of efficiency, it is necessary that it should be provided with comfortable quarters which are sanitary and convenient. In the first place the stable should be located on elevated ground with good natural drainage. Poultry houses, privies, hog-pens, uncovered cesspools, manure piles or pits or any surroundings which pollute the stable air and furnish breeding places for flies, should not be near the cow stable. It is also important that the barn yard should be well graded and drained. An ideal site for a barn yard is on a south slope which drains away from the stable. If the barn yard is inclined to be muddy, the cows carry mud on their legs and feet to the stable where it dries and then drops upon the cow beds causing them to become dirty and dusty. When this condition exists, any movement of the cows causes the air of the stable to become saturated with dust, thereby exposing the milk to a dirty atmosphere at the time it is taken from the cow.

The floors of the stable should be hard, tight and easily cleaned, at the same time they should not be slippery, thereby causing the cow inconvenience. The gutters should be deep and wide enough to hold all the excrement and should be perfectly tight, not allowing any liquid matter to saturate the ground underneath. Cement seems to be the best material for the construction of stable floors and of late years is most commonly used. At the present time some experiments with a mixture of two parts of sawdust and one part

of cement are being tried on the cow beds. This is supposed to have all the advantages of the cement floor and in addition, is warmer because it is a poor conductor of heat and is not so liable to become smooth and slippery.

While it is desirable to have ample air space in the stable this feature is not so important as adequate ventilation. Every cow stable should have sufficient ventilation to keep the air fresh and pure and at the same time, not expose the cows to injurious drafts or keep the stable at too low a temperature. Disagreeable odors at any time indicate imperfect ventilation.

An abundance of light is necessary, care being taken to see that it is well distributed and not obstructed in any way. Thoroughly whitewashed stables help to make the stable lighter.

In this day and age it is needless to say that an abundant supply of pure, clean water is essential in the dairy.

One of the most important parts of the dairy equipment is the milk house. It should be convenient to the stable but so placed as to be free from dust and stable odors. The ideal place for it is on a well drained spot away from any source of contamination. The floor of the milk house should be properly graded and water tight. There should be sufficient light and ventilation and during the summer months, all openings should be tightly screened so as to make it cat, rat, bug and fly proof. Milk racks should be provided in the milk house for the milk utensils when not in use.

All utensils which are used in the handling of milk should be made of durable, smooth, non-absorbent material. Avoid all utensils which have roughly soldered seams, complicated parts, crevices or inaccessible places which are hard to clean properly. Milk pails of small mouth design—openings not greater than eight inches, permit the least amount of foreign matter to enter the milk at the time of milking.

One of the things most often neglected in the average dairy is the milk stool. During my experience of the past ten years I have seen many varieties used, such as old pails, school-house seats, boxes, kegs, etc., which were invariably in a filthy condition. A metal stool is the most satisfactory type available because this can be readily cleaned and sterilized if necessary but a very cheap practical stool can be made of wood provided that all surfaces are smooth and painted to close the pores in the wood, thereby furnishing a seat that is sanitary and easily kept clean.

But the equipment as we have discussed it, is not the most important factor in the production of clean milk. The point I wish to emphasize most in the production of clean milk is not particularly the equipment but the methods employed. It is possible to produce sanitary milk with a poor equipment and good methods and it is also possible to produce unsanitary milk with a good equipment and poor methods; of course it is most desirable to have both methods and equipment up to a high standard.

In the first place whether the equipment is good or bad it must be clean. The interior of the stable must be thoroughly whitewashed, no cobwebs should be tolerated, walls, ledges, windows and floors must be free from dust and foreign matter; in fact the cow stable should be a kitchen because we are here preparing an animal product for human consumption.

The cows should be clean, all hair on udders, flanks and tail (except the brush) kept short and all visible dirt removed from the cow, because it is very difficult to obtain clean milk from a dirty animal. It has been proven by experiment that a cow will more than repay the dairyman in the extra amount of milk given for the time expended on her with a currycomb and brush. Brushing and currying a cow stimulates surface circulation, makes the cow feel better and when she feels good she shows it in the milk pail. Just previous to milking, the udder and teats should be thoroughly wiped with a damp cloth. A damp cloth tends to cause the particles of dust to become sticky and adhere to the udder, not allowing them to drop into the milk during the process of milking. It is advisable to discard the first stream of milk from each teat because it removes from the teat canal large numbers of bacteria which might be lodged there and also enables one to detect thick milk.

No cow manure should be allowed to accumulate within the cow stable or yard and it is good farm practice to haul it to the field daily to prevent loss by leaching.

The milk should be strained in a milk house or at least in a room with a clean atmosphere and never in the cow stable. The milk utensils should always be rinsed with cold water immediately after using and then washed with clean hot water and washing solution after which they should be thoroughly rinsed with boiling water, and allowed to dry without wiping with a cloth or towel. If they are hot they will dry readily.

One of the most essential factors in the production of sanitary milk is proper cooling. We all know that the number of bacteria increase very rapidly when milk is kept at a temperature of 60° F. or above. One of the greatest secrets in keeping the bacterial count low in milk is cooling it at as low a temperature as possible immediately after it is taken from the cow and keeping at a low temperature until it is consumed. The most practical way of accomplishing this is by constantly keeping a good supply of ice in the cooling vat, twenty-four hours of the day, protecting it with a tight wooden cover over the cooling vat. In this way the dairyman always has ice water to cool his milk and we know that the milk is stored at a low temperature. In some localities where there are springs of cool running water, it is practical to properly cool the milk without ice.

One of the great fields now opening up to the veterinarian is along the line of practical dairy inspection. I do not mean simply the act of making a physical examination of the animals but the opportunity to recommend changes which should be made to improve the quality of the milk, other than those respecting the cow itself. All private practitioners can improve their standing in their own community by just such practices. Their value to the farmer is not alone in treating his sick animals but also in preventive medicine by suggesting better sanitary conditions. He is also, by not only prescribing for the sick animals but also by observing existing conditions, making valuable recommendations and may be able to impress upon the farmer that he is working for his best interests and thereby gaining for himself an envious standing in the community. He soon becomes an invaluable factor to the people at large who will soon recognize his ability as a practical man working for their welfare as well as a doctor of veterinary medicine. A veterinarian can greatly increase his value in the community by informing himself along modern agricultural lines so that he will be able to talk intelligently about general farming—a subject in which the farmer is, of course, interested.

It seems to me that the local practitioner should assume the responsibility of seeing to it that his community is supplied with milk produced under the best sanitary conditions and impress upon the people the value of having a veterinarian inspect the dairies supplying them with milk, thereby creating a remunerative position for the veterinarian as well as doing genuine public

service. He has not only created a position which means money to him but has become a great benefactor which in itself lightens his tasks and makes him feel that he has been of some real and lasting value—a monument which neither moth nor dust can corrupt nor ruthless man obliterate.

INTRADERMAL PALPEBRAL TUBERCULIN TEST*

BESNOIT AND CUILLE

Translated by H. J. WASHBURN, Washington, D. C.

TECHNIQUE. We give at first, for those veterinarians who have not yet practiced intradermal injections, the technique which we have employed. It is based upon the intradermo palpebral mallein test described by Drouin and Nandiant, now regularly used in the army and in no material manner differing from the method of Moussu.

The necessary outfit contains: a metal syringe of 1 c.c. capacity, graduated to tenths, with visible plunger and furnished with a fine, short needle; also a supply of the ordinary tuberculin sufficient to give each animal $1/5$ c.c.

The choice of the needle is a matter of real importance. In order to overcome the great resistance of the bovine cutis without breaking, it should be nicely sharpened, short and a little stronger than needles used in the mallein testing of horses: the most satisfactory dimensions are 0.7 to 0.8 m.m. in thickness and 15 m.m. or more in length. There should also be an extra supply of needles for replacing any that may be broken by sudden movements of the head of the subject.

Except for cattle which are untamed, vicious, or very strong, the test may be applied with the assistance of only a single helper. The latter grasps the cow by one of the horns with one hand, and by the nostrils with the other, and lightly turns the head in such a manner as to bring the eye chosen by the operator, to the upper side, thus making everything convenient for the injection.

The injection is made into the dermis of the lower lid at or near its middle and 10 to 15 m.m. from the edge of the lid. The operator seizes a fold of the lid at this point, between his left

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thumb and the index finger and with the right hand, in which is the syringe, with piston set to deliver one-fifth of a c.c., placed upon the head in such a way that the hand will follow all movements made by the animal's head, inserts the needle very superficially into the dermis parallel with the surface of the skin, and for a depth of 2 to 3 m.m. The injection is then made with the right index finger while the thumb steadies the syringe; because of the resistance of the tissues the tuberculin will form a small nodular swelling about the size of a lentil, within the track of the puncture.

With a very thick lid it is sometimes difficult to grasp a suitable fold. The fingers may in such cases be placed under the lid in such a manner that upward pressure will produce a prominence of the skin along the lower lid, and the injection may be made into this elevation.

The injection, in principle, should be strictly intradermal. However, if the needle passes into the subcutaneous tissues, producing a subcutaneous injection, no interference with the results will occur. Following Drouin and Nandiant, we have confirmed this statement in its relation to intradermal mallein testing, and M. Moussu has made intradermal tuberculin testing the basis of a great variety of tuberculin tests, and it now appears, has given the intradermal method the preference. This detail is a matter of great importance for it overcomes one of the chief objections of the adversaries of intradermal testing, who have pointed to the difficulty of making the injection within the skin without penetrating the subcutaneous tissues.

Altogether the manual operation is simple and may be rapidly executed, one operator with a single assistant being able to apply the test to one hundred cattle in an hour.

The dose to be injected, as we have stated, should be 1/5 of a c.c. In our first tests we used 1/10 c.c. The results obtained were clear, but less reliable probably than those resulting from the use of 1/5 c.c. However, with the latter dose the test approaches the classic subcutaneous test, and there is in consequence a risk of producing an elevation of temperature with all its inconveniences.

RESULTS. The local reaction appears in about 12 hours after the injection, increases gradually, and attains its maximum at about 48 hours. It soon begins to recede, disappearing usually by the 4th or 5th day. On certain cattle, traces of the reaction may be seen as late as the 6th or 7th day. The examination of the eyes for

the determination of the results of the test should therefore take place during the course of the second day.

Upon healthy animals no results will be produced; sometimes a slight edematous engorgement of the treated lid may be observed. It appears immediately after the injection but only lasts for a few hours. With tuberculous cattle, on the contrary, a voluminous swelling invades the lower lid, and in some cases even extends along the sides of the face to the zygomatic arch. The reacting lid is infiltrated, edematous and swollen. Over its surface the skin is tense, and without sensitiveness. The palpebral opening is reduced $1/4$ to $1/3$ in size by the edema, and as very correctly stated by M. Moussu, "the eye is in a pocket."

The conjunctival reaction is less marked than in case of mallein intradermo-palpebral reaction to glanders. The eye sometimes contains a few tears and the conjunctiva may appear injected, but a purulent discharge, such as is frequently seen in reactions to the test for glanders, is rarely observed.

It is unusual for the upper lid to participate even feebly in the reaction, although such action has been noticed.

The local reaction is sometimes accompanied by a slight thermal rise, which may attain .8 degree to 1.0 degree during the 24 hours which follow the injection. It is inconstant, but may occasionally be of use in deciding some questionable result.

Incomplete or indecisive reactions are exceptional; but in case of doubt a new test may be applied to the opposite eye. The reaction to such second test is usually more pronounced and occurs more quickly, due no doubt to an increased sensitiveness of the organism because of the first test. In case of the second intradermo-palpebral test proving indecisive, one may still resort to the subcutaneous method, as the small amount of tuberculin used in the intradermal tests will not have any effect upon the response to a subcutaneous test. The intradermo-palpebral test may, if necessary, be repeated at short intervals almost indefinitely. The local reaction under these conditions occurs more and more quickly but does not fail to appear. Certain facts, which we have thus far been unable to study to our satisfaction, seem to show, contrary to statements previously made, that a subcutaneous injection with tuberculin will not prevent a local reaction to a subsequent intradermal injection, even if made on the following day. It will only cause the reaction to occur much earlier. We purpose to verify

in their relations to tuberculin the claims which Lanfranchi has made in this regard concerning the action of mallein.

No difficulty is presented in reading the positive reactions. It is only necessary to examine both eyes to determine the degree of variance between them through comparison of the swollen reacting eyelid with the other which has remained normal.

ADVANTAGES. After the statements just made by us the advantages of the intradermo-palpebral tuberculin test over the old subcutaneous method must be evident. They have been shown many times, particularly by M. Moussu, and we know of no better statement of comparison between the two methods than the one made by him.

Among the inconveniences of the subcutaneous method, the ones having inherent difficulties are the thermometric readings and their interpretation as well as the conditions material to the test. They are: the great amount of work necessary in reading the temperatures; the possibility of making an error in their reading even when well taken, and the results of badly read temperatures; the false results given to results through premature or delayed reactions; the classic delays; the uncertain reactions in which the temperature approaches but does not reach the point of condemnation, leaving uncertainty as to the proper disposition of the animal; the necessity of keeping the cattle stabled during the test even though they are cattle that have been running at pasture, or animals that are kept for work, this change in daily routine being sometimes sufficient to produce unexpected thermal variations; the impossibility of applying the test to feverish animals; the obligation of reading results at exact hours under the risk of making a serious mistake in the test; the effects of outside heat, the drinking of cold water, etc., upon the temperature of the animal during the test.

Other objections, less striking, but perhaps more important, touch the interest of the owner; they are: lessening of the flow of milk; danger of producing specific mammitis in the reacting cows; and finally the danger of aggravating the disease in cattle that are already affected.

On the contrary, the intradermo-palpebral method presents many valuable advantages. To the veterinarian they are: no necessity of taking temperatures; no chance of error in reading temperatures because the temperature reactions are established

automatically; no obligation for operating at any fixed hour; possibility of testing cattle that are feverish; possibility of repeating test immediately in case of uncertain results; no time lost in testing a large number. To the owner the advantages are: less disturbance of daily routine is required; it is not necessary to move the helpers from place to place; all cattle in a herd may be tested at one time, whether kept at pasture, or in the stable, and may be injected any moment in the day; little if any check to the flow of milk; no danger of producing mammitis; no danger of aggravating a tuberculous condition should such be present; possibility of retesting at short intervals, a matter which is of great importance in the eradication of the disease from an infected herd.

CONCLUSIONS. 1. The intradermo-palpebral tuberculin test has a value at least equal to that of the subcutaneous tuberculin test.

2. It may be executed simply and rapidly and without the enormous labor demanded by the subcutaneous test and without the too frequent errors which accompany it.

3. We are convinced that for future research in the diagnosis of tuberculosis in current practice, it should be substituted for the subcutaneous method, which should be reserved exclusively for the control of uncertain results.

These conclusions impress themselves by all of the evidence. Will they be adopted? Alas, they will encounter the indifference, inertia and routine spirit which in science as in everything else opposes innovations even those that are most justified. We think nevertheless that the experience gained by our brothers in the army in the use of the intradermo-palpebral mallein test, will convince them of the value of this technique and will act as a powerful aid in diffusing a desire to use the intradermo-palpebral tuberculin test in the diagnosis of bovine tuberculosis.

DECREASE OF RANGE STOCK. Between 1910 and 1914 the government figures show that the number of live stock in the eleven range states of the West decreased thirteen per cent. The opening up of range territory for farm homesteads is responsible for this reduction. Every year sees more ranges pre-empted by homesteaders.

THE AGRICULTURAL COLLEGE AN IMPORTANT STEPPING STONE TO THE VETERINARY SCHOOL

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The writer believes the following statement to be true, in the main, viz., that no system of agriculture can reach the maximum of success which does not include intelligent diversification and rotation of farm crops; that no system of diversification can succeed without the inclusion of suitable livestock; and that the farmer is not likely to make the most out of his livestock without the aid of the broadly-educated and intelligent veterinarian.

The greater increase and development of the country's livestock industry have created the demand for greater assistance from, and call for a more extended field of information on the part of, the veterinarian, more especially the country practitioner, whose clientele is made up largely of the agricultural class, or those specially engaged in the breeding and raising of the different varieties of farm animals.

That which seems much to be desired, in the opinion of the writer, at least, is a stronger bond of sympathy and co-operation between the farmer and the veterinarian, not merely a cold business connection, but a sense of mutual helpfulness, which does not always appear to exist at the present time. In fact we are aware of instances in which the services of the veterinarian are sought merely as a last resort in cases of extreme emergency; and where the only interest the veterinarian seems to take in the farmer, is the collection of his fee. So long as this lack of mutual interest on the part of the two classes of individuals obtains, the profession is not going to come into its own as it should, nor be capable of as much beneficial influence as it might, if there existed a greater amount of confidence and friendship on the part of the client, and a little less of the commercial, and somewhat more of the sympathetic and co-operative spirit shown by the veterinarian, toward his client, concerning the welfare of his livestock in general.

There is an old saying in the profession, viz., that it is often much more difficult to treat the owner than it is to treat the animal, and that if one can successfully manage the former, the latter is generally easy. And we believe that, in many cases, this may be

true. The point, therefore, is, how best to treat the owner so as to gain his confidence and make him feel that the veterinarian is one of his best and most valuable friends, instead of a mere individual whom the farmer often tries to do without just as long as he can, and if he has to employ his services at all, is glad when the time comes for him to get off the premises.

The writer does not presume to say that the condition alluded to is universal, but it does exist, and may be more general throughout the country than is commonly suspected.

In our opinion, which we give for what it may be worth, the solution of this problem will depend largely upon the possession of wider information of an alleged character to veterinary science, on the part of the veterinarian. Or, in other words, a more extended knowledge of the subject of hygiene, in its wider sense, as applied to the livestock of the farm.

The objection may here be raised, as it was by the medical profession in years gone by, viz., that to instruct people in the science of preserving health and preventing disease, would be ruinous to the profession. But do we find any fewer physicians today, or their having their fees reduced? Rather do we not find a stronger bond of union, and greater confidence established, between the family and the physician, who is not only the doctor, but the adviser in matters of family hygiene?

And so we believe that a similar condition might be brought about, to a larger degree than at present, between the veterinarian and the farmer and his animal family, and to the greater benefit of both parties concerned.

True, the subject of zootechnics appears on the curricula of our veterinary schools, but it is a question, we think, whether the ordinary student entering a veterinary college realizes the full import of the subjects classed under this head, and is more inclined to view them as "padding," and of little service to him in after life as a practitioner. Or, in other words, the student's idea of the main requirements of a veterinary course is not to study the principles of feeding, for example; nor the judging of livestock; nor yet the various breeds of animals, with which he may be called upon to deal in practice; but merely the commoner forms of animal disease, and the sources, actions and doses of the "pills, potions and powders," so to speak, usually employed in their relief.

Of course it is not the privilege of every prospective veterinary

student to be able to take a course in agriculture at a state agricultural college. But to those who may be so privileged, we would certainly commend it as being one of the most valuable stepping-stones to the veterinary college, and, afterwards, to a more successful career in practice, particularly in the rural districts, as, after all, the country practitioners constitute the bulk of the profession.

Among the subjects taught in our agricultural colleges which might be considered as allied to that of the veterinary science, and which are likely to receive greater attention there than in the veterinary school, the following may be mentioned: Zoology; economic botany; study of the breeds, and the breeding and judging of farm livestock; the chemistry of feeds, and the principles of economic feeding; topics connected with dairying, etc., and the veterinary course which is included in that of agriculture in most, if not all, of our agricultural colleges.

We repeat, that at least some of the subjects mentioned do appear on the curricula of the veterinary schools, but we are inclined to the opinion that the teaching of them must, necessarily, be more thorough, and the facilities and equipment more complete, in the agricultural, than in the veterinary, college.

There can be little question, we think, of greater value, to the farmer and stockowner, of the veterinary graduate who, in addition to his purely professional training, is possessed of a more or less accurate and practical knowledge of other branches which are so closely associated with the well being of the livestock department of the farmer's business. Consequently, and in order to accomplish greater things for the individual, and for the profession generally, and owing to the constantly improving and developing livestock conditions of the country, the veterinarian should not only be a well-trained practitioner, by which we mean a good diagnostician and a therapist, and a more or less expert surgeon, but, in addition, should be an intelligent *adviser* in other, but associated directions. However, to be able to meet the latter requirements successfully, he must have a reasonably-accurate grasp of the more important of the subjects which we have been pleased to term, allied.

The successful treatment of a case of acute indigestion may impress the owner with the ability of the practitioner in that particular direction: but he is likely to be more impressed, if, in addition, the veterinarian is able to give him an accurate and intelligent ex-

planation of the true causes involved, and, incidentally, put him right on the subject of the rational and intelligent feeding of his animals.

Again, the practitioner may successfully inoculate a herd of hogs for the farmer, and so impress his ability as a successful inoculator of hogs, against cholera, which many laymen, also, seem to be. But he is going to make a much more decided impression upon the farmer if he knows, and is willing to take the trouble to explain to the owner something about the different media through which infection of cholera may be carried, and the most effective and practical means by which to sanitize his premises.

The intelligent and economic feeding of farm animals is not generally looked upon by the farmer as a part of the information possessed by the veterinarian; and yet it ought to be, and to some extent is, a part of his education, and a valuable aid in gaining the confidence of the owner of livestock. In other words, the veterinarian has got to know more concerning the livestock problems of the farmer than the mere curing of individual cases of the commoner diseases and injuries.

When that time arrives, and advancing conditions are already hastening it on, there is going to be a most gratifying change in the attitude of the farmer and stockowner toward the veterinary profession generally. The practitioner will not, then, be looked upon merely as an emergency man, but one of the most valuable friends, associates and advisers the farmer can possibly possess in his business.

There is a piece of advice frequently given to young men just starting out in life, and which may be applicable here, viz., "Always show a willingness to do more than you are asked, or required to do," which is worth bearing in mind, as it is sure to pay in the end. To be able to do this successfully, however, the information possessed by the veterinarian must be increased along the lines which we have attempted to suggest; and we believe we are reasonably correct when we say, that the source from which to obtain this broader education, or rather the pre-veterinary college part of it, is the course of study offered to students of agriculture by our state agricultural colleges throughout the country.

CLINICAL AND CASE REPORTS

“Knowledge is born in laboratories and in the experience of the thoughtful. It develops form in the journals and ‘when dead it is decently buried in books’.”

TETANUS DURING LACTATION IN A MARE

E. V. VELD, D.V.M., Harvey, Ill.

On May 11th, 1916, I received a call to Homewood, Ill., and on reaching there was shown a five-year-old black pure bred Percheron mare which was nursing a foal about six weeks old. It did not require a close examination to determine that the mare had tetanus, as her movements indicated general spasms of the muscles of the trunk as well as pronounced trismus. Since the previous day, the owner stated, she had only partaken of fluid nourishment. Examination revealed a neglected suppurating contusion of the frog of the right hind foot, which the mare was said to have contracted about ten days previously. She was not lame. Three thousand units of tetanus antitoxin were administered, the foot was trimmed, antiseptically dressed, thin oatmeal gruel prescribed as nourishment, and the mare put in slings.

The owner now propounded a knotty question, which I found difficult to answer. Will the foal, if allowed to suckle the mare, contract the disease from the milk, or will the milk be in any way harmful to him? He went on to state that the foal, a pure bred one, was of uncommon value, and he would prefer to wean and hand-raise him rather than take any chance. In discussing this phase of the question, I told him that if the foal were removed from the mare she would fret so that it would diminish any chances she might have of recovering. To help solve the problem, Dr. Joseph Hughes was called in consultation, and the decision was reached that the colt should remain with the mare, there being no possibility in his judgment, of the foal contracting tetanus from the mare's milk, and that in all probability the toxins in the milk would be neutralized and rendered harmless by the hydrochloric acid in the stomach of the foal. In about twelve days the mare commenced to take solid nourishment, and in four weeks had completely recovered. During the attack she gave an abundance of milk, of which the foal partook without any injurious effects being observed.

That the toxins of various infectious diseases are eliminated with the mammary secretion when the gland is active is a well-known fact, and that these frequently prove fatal to suckling animals is also well known.

While the case recorded does not definitely set at rest the question as to whether the milk of animals affected with tetanus is innocuous to sucklings, still it may act as a more or less valuable contribution to the literature of tetanus, for the reason that in this particular instance the attack was a decidedly severe one.

—*Chicago Veterinary College Quarterly Bulletin.*

LUMBAR ABSCESS

J. F. ROUB, D.V.M., Monroe, Wisconsin.

The patient was a dark, bay colt of the heavy draft breed, two years old, weighing about twelve hundred pounds when in good flesh. The owner lived eighteen miles from town and like a good many others did not care to go to the expense of calling a veterinarian to see the animal, but informed me that the colt was getting thin and had been losing flesh for the last two months. At the owner's request I prepared a tonic powder for the colt. This was the tenth of March.

I heard nothing more of the case until the fifth of May, when the owner called at my office and reported that the colt was becoming more and more emaciated every day, yet the appetite was fairly good; the colt staggered when walking and appeared to be weak across the loins, which gave the owner the impression that the colt was suffering from kidney trouble. The information that I could get from the owner was not sufficient to enable me to diagnose the case, so he concluded to have me call and see the colt.

On the following day I went to the farm and found the colt a mere skeleton. Careful examination revealed no diagnostic symptoms, the pulse being normal and the temperature 102 degrees F. I came to the conclusion that I had some constitutional trouble to contend with, but decided to make a rectal examination before leaving. By manipulation I discovered what I thought to be two distinct tumors just in front of the right anterior iliac spine. By using my left hand in the rectum and my right externally I was

able to make out their form quite distinctly. They were heart shaped and placed one above the other, the superior one being the largest and its walls seemingly very thick and hard. At this point I informed the owner where the trouble was and that an operation would be necessary, but was doubtful as to the outcome, owing to the colt's poor physical condition.

Not considering it wise to cast the colt owing to its weakened condition, I proceeded to operate in the standing position. Having clipped off the hair and disinfected the field and with the left hand in the rectum as a guide, I made an incision through the skin and passed a trocar into the abscess, evacuating two quarts of thin, creamy, fetid pus. The second abscess was tapped in a like manner and contained about a quart of the same kind of pus. I next made an incision from the lowest point of tapping upwards about four inches, thus connecting the openings. This gave me ample room to explore the cavities, which proved to be multilocular. I then washed the cavities out with a three percent solution of carbolic acid and gave instructions to inject tincture of iodine once daily.

I had no report from the case until July 8th, when the owner called at my office to inform me that the colt was gaining in flesh and doing nicely with the exception that a small fistulous opening existed at the lower part of the incision. At the request of the owner I made a second visit and after making a rectal examination I found the walls of the abscess much diminished in size. I cast the colt and made a free incision from the fistulous opening downward and cleansed the parts thoroughly, leaving instructions as before to inject iodine once daily. The colt made a rapid and uneventful recovery.

—*Chicago Veterinary College Quarterly Bulletin.*

PURULENT MYO-PERICARDITIS

CLARENCE E. MOCK, D.V.M., Ryegate, Mont.

On the morning of April 9th, I examined a red Durham cow on a farm near Ryegate. The animal was 7 years of age, well advanced in pregnancy and in good condition. The owner said the cow had been noticed to absent herself from the herd and seemingly to try to hide. Her appetite was good.

Upon examination the temperature was found to be normal and the abdominal organs seemed to be functioning normally. There was an accelerated weak heart action and the cow carried her neck in an odd position, with nose extended and chin nearly on the ground. At that time no definite diagnosis was made as it was thought the body changes might be incident to the pregnancy.

The cow was examined again May 5th, about one week after she had given birth to a live calf. The cow was down, unable to rise, grunted a little and when placed on her side the condition seemed to be aggravated. An extensive edematous swelling was noticeable over the brisket region. The temperature was normal, respiration 36 per minute and pulse imperceptible. No cardiac sounds were audible over the heart region, no jugular pulse was visible, but the visible mucous membranes showed venous congestion. There was an enlarged area of dullness over the cardiac region on percussion. Peristalsis was normal and the appetite fair.

A diagnosis of pericarditis and unfavorable prognosis was made. The cow died May 9th and autopsy was held.

Upon removing the skin, an extensive serous infiltration of the areolar tissue was found over the brisket region, the infiltration extending well up on the neck and on both arms. The abdominal cavity contained a large quantity of straw colored fluid. The lungs were extensively adhered to the pericardial sac and the adhesions were so firm that they had to be cut with a knife. The pericardial sac was greatly enlarged, its walls being several times their normal thickness. The sac contained fully three gallons of purulent fluid but no foreign body could be found.

So changed was the heart in appearance that the attendants would not believe it was the heart until the large vessels were traced into it. The organ had atrophied to fully one-third its natural size and had much of the appearance of a human hand which has been submerged in water for some time. The wall was fibrous, and one and one-half centimeters thick over the lower three-fourths of the organ.

The apex of the heart had grown firmly to the pericardial sac over a space of about six to eight centimeters in diameter. From microscopical appearance one might believe this interesting condition was not caused by the inflammation but had always existed in this particular animal.

The reticulum contained several foreign bodies such as nails and staples but careful examination failed to disclose any wounds or cicatrices on the reticular wall. All organs other than the ones mentioned were normal.

A diagnosis of myopericarditis was made but it is difficult to account for the excellent condition of the cow at time of death, the continuance of appetite, digestion and circulation up to that time, and the absence of an elevation of temperature.—*Kansas City Veterinary College Quarterly.*

PYEMIC MENINGITIS AND PNEUMONIA FROM CASTRATION AND DOCKING IN LAMBS

D. H. UDALL, Ithaca, N. Y.

The flock contained about 20 lambs from four to six weeks of age. About two weeks before trouble was noticed the males were castrated, and the females docked. Before turning to pasture one was taken sick, and shortly afterwards four others followed in a pasture orchard near the house. It was rather rainy and cold when the lambs first went to pasture, but they were put in the barn nights. One had already died. The owner stated that about fifteen years previous his lambs had been affected in a similar manner.

Symptoms. The mildest cases showed symptoms of paralysis of one or more extremities (monoplegia). One carried the front legs stiffly, below the fetlocks they appeared to dangle. Another knuckled slightly at the knees. A third was affected behind, walking on the ends of the claws (contraction of the extensors of the toe?) Two of the patients were in bad condition; both were males that had been sick about three days. One was down and unable to rise; condition good. Pulse, 180; respiration, 64; temperature, 104.4. Respirations very irregular; slight brownish muco-purulent nasal discharge; vesicular murmur increased. Could stand when placed on its feet, but general paralysis was well marked.

Autopsy. Slight suppuration of the scrotum and spermatic cord; both lungs affected with bronchopneumonia; brain appeared to be slightly congested.

The second of the two severe cases presented striking nervous symptoms. He lay flat on the side unable to rise. When disturbed the entire body would begin to tremble; this was immediately followed by extension of the head, curving backward of the neck (opisthotonus), sometimes the head would be drawn to the right or left, at the same time the back and legs stiffened (general tetanic contractions). The eyes were very prominent, and were drawn so that the sclera alone appeared. After a few minutes the nervous symptoms would entirely recede, but when the lamb was touched they returned again.

Thinking that the second lamb might also have pneumonia, and that "pneumonia of the new-born" might be revealed as the cause of trouble in all the lambs, this one was also chloroformed and posted, but no pneumonia was present. Like the first, the brain appeared congested. An examination of histologic sections made in the department of pathology revealed a purulent inflammation on the meninges of the brain with many polymorphs in the arachnoid tissue.

Before the laboratory report settled positively the true character of the disease numerous interesting opinions were advanced, each reflecting the holders training, experience, or reading. A bacteriologist was inclined to believe that blood infection explained the symptoms. One or two practicing veterinarians naturally took refuge in our universal asylum for ignorance and called it "forage poisoning". The extent to which this once useful term has been prostituted may be realized when some of our own students could not be convinced that it was not the proper diagnosis. Others, of course, associated the affection with the cold wet rains of spring.

Similar symptoms from infection are not infrequent in ruminants. Stiffness of the hind limbs, and meningo-encephalitis, are more or less frequent sequelae to purulent infections of the uterus in cows.

ABSTRACTS FROM RECENT LITERATURE

DOUBLE GALL BLADDER IN A SHEEP. Philip Bruce, B.Sc. *Journ. Comp. Pathology and Therapeutics*. The specimen was removed from the liver of a sheep, and consisted of two filled gall bladders with their ducts. They were of equal size and loosely attached to each other. Each had its own duct, which in each case was not more than one inch long, that from the larger vesicle received one or more hepatic ducts and one common duct was formed to connect with the duodenum. Complete duplication is rare and the origin of such a malformation must, of course, be sought in a bifidity of the primitive bud from which the gall bladder arises.

LIAUTARD.

HISTOLOGICAL EXAMINATION OF PIGMENTED FAT IN HOGS. Dr. Olt. *Zeitschrift für Fleisch- und Milchhygiene*, Vol. 26, pp. 97-100, 1916. — In the fatty tissue of the abdominal wall of the hog, pigmentation is occasionally seen in the form of a slate gray dust and as finely branched twigs against a white background. This condition was described in 1878 by Saake (*Arch. f. wissensch. u. prakt. Tierheilk.* Vol. 4, 1878, p. 226) and lately by de Jong (*Réc. de méd. vét.* 15, 2, 1896).

Dr. Olt examined specimens from a sample of smoked bacon from America; two slaughtered sows, and from an 8 months old wild sow that had not yet farrowed.

The pigment was not due to hemorrhages. It was localized largely in the mammary gland tissue and in its distribution the pigment followed the milk ducts. In these particular cases the glands were not active or had never been active. In the smoked bacon from America, the glandular distribution was noticeable.

The pigment cells pass some of the pigment into the mammary lymph vessels where the pigment is destroyed.

The above described slate gray discoloration of the fatty tissue occurs rarely. From the meat inspection standpoint, such discolored fat is to be regarded as of inferior value. The losses need be but slight, however, if in removing the fat, it be remembered that the discoloration is localized about the mammary glands.

(For pigmentation of fat due to hemorrhage, see Ostertag's *Handbuch der Fleischbeschau*, Ed. 6, p. 371 and Edelmann, Mohler and Eichhorn's *Meat Hygiene*, Ed. 3, p. 233.)

BERG.

NOTES ON CASES—Arthur New, M.R.C.V.S. *Veterinary Record*. PECULIAR INJURY TO A BULL.—He was reported as having the penis injured and being unable to serve a cow. With the animal cast and secured, the penis was pulled out with tape attached to it and there was found, about two inches from the end of the organ, a quantity of matted hairs wound tightly around the penis and causing considerable irritation and some ulceration. The hair was removed, the wound dressed antiseptically and recovery was speedy.

CRAMP OF FEMORAL MUSCLE.—Chestnut mare was taken suddenly lame in off hind leg. She dragged the limb and stood with difficulty when the foot was placed in its proper position. There was no displacement of the patella nor indication of any inflammation. The femoral muscles were tense and rigid. She was put in slings and stimulating liniment was applied. In two hours recovery was perfect.

RUPTURE OF AURICLE IN A MARE.—A well bred light hack had fallen in the street. She had been working, ate her dinner, and after a while suddenly stopped, staggered and fell after having been drenched with some hot ale and gin. As another similar dose was about to be administered she died with a large quantity of blood running from both nostrils. At the post-mortem the pericardial sac was found full of blood and a star shaped rupture existed in the left auricle.

LIAUTARD.

PERFORATION OF THE ABDOMINAL WALL WITH PROLAPSE OF THE INTESTINE. P. Wittmann. *Münchener Tierärztliche Wochenschrift*, Vol. 66, pp. 589-590, 1915.—A stallion ran against a broken shaft and injured the scrotum, the medial surface of the thigh, and in the umbilical region, he sustained a puncture of the abdominal wall 5 cm. long. A loop of the small intestine had been extruded, and was clamped, like a bent thumb, in the opening. Upon my arrival I found that the horse had been driven three-fourths of an hour after the injuries were sustained; he was excited and sweating in his stall. For the purposes of operation the horse was laid on his back. After careful disinfection the attempt to replace the intestine failed. On account of an incorrect history of the case, I had brought no anesthetic with me and could obtain none; under the circumstances the movements of the horse, and especially the straining of the abdominal muscles were very

pronounced. A second attempt to replace the extruded intestine failed, although the wound was enlarged. The failure was due to the extrusion of a 50 cm. long loop of the intestine. A second enlargement of the wound brought about the desired replacement after three-fourths of an hour's work. Strong sutures were used to close the wound and bring the musculature together. The other injuries were then treated; they were not serious. Prophylactic treatment against tetanus was administered the next day. The horse received only small amounts of bran mash and was suspended for eight days.

Contrary to expectations, the horse made a recovery. I had only the owner to assist me. The principles of antiseptics could not be followed because the horse, in his struggles, filled the air with particles of straw, etc., likewise the field of operation. There was neither fever nor pus and after four weeks the horse was put to work.

BERG.

A CASE OF STRICTURE OF THE ESOPHAGUS IN A COW. J. Bouwman. *Veterinary News*.—She had never shown any symptoms of illness before, but for five days she ejected her food a few minutes after eating it. Now and then there was tympanitis. Her appetite was good. The symptoms manifested were as follows: No abnormal sound of the gullet by auscultation. After swallowing some food, nothing was observed for a few minutes, then she arched her back, voided some urine and ejected the food. This was quite moist. While ejecting she had no anxious expression. For five minutes she refused any more food, but then her appetite returned and the same disturbance took place. Diagnosis of dilatation or stricture of the esophagus was made and the animal destroyed. In the thoracic portion of the esophagus there was a dilatation, of the size of two fists. The bulging was in the wall of the esophagus; the muscles and outside wall were intact. On palpation, there was found a stricture in the inside of the esophagus. The bulging contained pus.

LIAUTARD.

INFLAMMATION OF THE SPLEEN IN A COW. P. Wittmann. *Münchener Tierärztliche Wochenschrift*, Vol. 66, p. 591, 1915. A cow which had strayed from the pasture on to a railroad platform, shied at a passing locomotive and jumped off the platform. Several hours later the owner of the animal noticed that she was off feed, moved about with difficulty and was depressed. When I

arrived I found the rectal temperature to be 37.5 degrees, heart beating very strongly and general debility. Ears and skin felt cold. Visible mucous membranes were pale. I diagnosed the case as one of internal injury, and as there was no improvement by the next day, the cow was slaughtered.

On opening the abdominal cavity, 6-8 liters of partly fluid and partly clotted blood were found. The spleen was enlarged to 2 or 3 times its natural size, but no injury could be found. On incising the spleen, the lymph follicles were found thickened, as large as peas. The spleen pulp was grey, but not softened. The other organs showed no pathological conditions. The bacillus of anthrax could not be detected in the blood. Probably the inflammation of the spleen was caused by a concussion sustained while the animal was alive.

BERG.

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PARTURITION CASES WITH DECOMPOSITION OF THE FETUS. J. Bouwman. *Veterinary News*.—Records of two cases in mares which were taken ill some time before the epoch for parturition. One of them was delivered of a dead decomposed fetus, the other had two foals, one of which was dead and the other alive. Both mares were treated with injections of common salt water in the uterus, which were made every three hours. Recovery took place without further trouble.

The author records these cases to show that the prognosis when decomposition is present, is not always unfavorable and that injections of common salt solution is very effective on such occasions.

LIAUTARD.

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THE HOG CHOLERA PROBLEM, WITH SPECIAL REFERENCE TO SWINE TYPHOID (Ferkeltyphus). R. Standfuss. *Zeitschrift für Infektionskrankheiten, etc. der Haustiere*, Vol. 16, pp. 459-469, 1915. According to several investigators, there is a widespread disease of hogs in Germany which Pfeiler has named swine typhoid (Ferkeltyphus). The bacillus causing it can be sharply characterized biochemically and serologically. Its cultural characteristics are so different from those of the paratyphoid group that it cannot belong to this group.

The swine typhoid bacillus is very similar to the typhoid bacillus in its cultural characteristics. This justifies the term swine typhoid. Different strains of the swine typhoid bacillus are agglutinated by the same serum, showing that they belong to the same group, but they are not agglutinated by paratyphoid serum, or only at very low dilutions.

When strains of bacteria of different origins show such identities in their behavior, an epidemiological fact is established which must not be overlooked. It shows that in all those cases from which strains were obtained, the etiology was the same. It consisted of a bacillus which is as different from the paratyphoid bacilli as the typhoid bacillus is. The swine typhoid bacillus is more sharply differentiated from the colon-typhoid group, especially the paratyphoid bacilli, than for example, the *Bacillus enteritidis* Gaertner.

Clinically, swine typhoid may be differentiated from hog cholera, although statements have been made to the contrary. The differential diagnosis may be based on the general chronic course of the disease. If, in an establishment, the young swine become affected, year in and year out, with out affecting the older animals, hog cholera may be excluded with certainty. Practitioners know that it is the severe septicemic form of hog cholera which takes so heavy a toll, and the chronic form of hog cholera is the rarer form of the disease.

The bacteriological diagnosis can be made more rapidly and with greater certainty than the diagnosis of swine erysipelas, insofar as the cultural tests render a decision in 12 hours.

Just why, in some cases of hog cholera, there are septicemic processes, while in others there are diphtheritic alterations, has not by any means been settled. But so much is certain, that the filterable virus alone can cause acute septicemia or diphtheritic alterations. Likewise, it is not yet determined whether there is a separate disease caused by paratyphoid bacilli (*suipestifer*). In the absence of more definite information it is not advisable to attempt to distinguish between hog cholera, paratyphoid or parapest. Especially because in practice it is not possible to differentiate between virus and mixed infections.

Until further investigations indicate otherwise, it is better to speak only of hog cholera without attempting to give special names to the secondary infections. Swine typhoid should be separated from hog cholera.

The above results are of great practical importance. As a disease of hogs, swine typhoid is second only to hog cholera, from which it may be distinguished by its lesser infectiousness.

The failure to obtain results in the treatment or eradication of hog cholera is undoubtedly due to the failure to distinguish between swine typhoid and the secondary paratyphoid infections.

(See following abstract.)

BERG.

OBSERVATIONS ON THE HOG CHOLERA PROBLEM. II. ON SWINE TYPHOID. E. Joest. *Zeitschrift für Infektionskrankheiten, etc., der Haustiere*, Vol. 16, pp. 470-482, 1915.—In the preceding paper, Standfuss has considered the relations of the swine typhoid bacillus to the typhoid bacillus (*B. typhosus*, Eberth-Gaffky) and to the paratyphoid B. bacillus. In order to properly understand these relations it is necessary to consider the swine typhoid bacillus in its relations to the entire colon typhoid group.

If all of the bacteria of the colon typhoid group are arranged in a series according to their biochemical behavior, *B. typhosus* is at one end, *B. coli* is at the other, and midway between the two are the paratyphoid B. bacillus and the *Bacillus enteritidis* Gaertner.

Bacteriological research during the past ten years has brought forth many members of the colon typhoid group from human and from veterinary pathology. These new members resemble the end members of the series in some respects, in others they resemble the middle member, the paratyphoid B. bacillus. In this way an almost continuous chain has been formed between *B. typhosus* at one end of the series and *B. coli* at the other.

The individual members of the group owe their relationship to one another to the fact that although they have certain biological properties in common, they also have certain differences. In those diseases caused by a particular member of the colon typhoid group, the human paratyphoid B. bacillus for example, atypical strains of the bacillus are found occasionally. The atypical strain differs from the atypical in a few reactions and this tends to place the atypical strain of *Bacillus paratyphosus B.* near another closely related typical member of the group. Altered living conditions or continued culture in artificial media may so alter a culture of a typical strain that in some of its reactions it resembles a closely allied member of the group. The number of varieties in the colon typhoid group has become so great that the limits between the members are no longer sharply defined.

From the systematic point of view, the difficulties are increased when varieties of an individual member of the group, the human *Bacillus paratyphosus B.* for example, produces the same clinical and pathological-anatomical picture as the original typical *B. paratyphosus B.*

If from this general point of view, the swine typhoid bacillus be considered, it is at once apparent that it is one of the many

transition forms in the colon typhoid group and that it is closest to the *Bacillus paratyphosus B*.

The history of the swine typhoid bacillus is an example which shows the correctness of the view that the number of members of the colon typhoid group increases as the methods of differentiation become more numerous and more refined.

In 1903 I described certain atypical strains of *Bacillus paratyphosus B*. (*Bac. suispestifer*), long before any one thought of swine typhoid bacilli. Before the biochemical differentiation had reached its present development, the bacillus corresponding to the swine typhoid bacillus was regarded merely as one of the many sports or varieties of the *Bac. suispestifer*. The new member was added to the colon typhoid group through the use of more recent methods of differentiation.

A sharp biochemical differentiation between the swine typhoid bacillus and other related members of the colon typhoid group cannot be made, and hence, it cannot be regarded as an individual variety of bacillus.

Before swine typhoid can be regarded as a distinct disease similar to typhoid, it is necessary to show that in its agglutinating properties, the swine typhoid bacillus of Standfuss is related to the *B. typhosus* of Eberth-Gaffky. According to Glaesser, Pfeiler and Kohlstock, there is no serologic relation between the two. The agglutination tests show that the swine typhoid bacillus is no closer to the *B. typhosus* than it is to *B. paratyphosus B* (*suispestifer*).

For hogs it has been shown that intestinal necroses and swellings are caused by a large number of bacilli of the colon typhoid group; these bacilli belong to that side of the group nearer the *B. typhosus*. The intestinal alterations described by Standfuss are not different from these and the pathological anatomy of swine typhoid is similar to that due to *B. paratyphosus B* (*B. suispestifer*) and the Gaertner bacillus. BERG.

CHRONIC INDURATIVE NEPHRITIS IN A DOG. J. Bouwman. *Veterinary News*. Male dog since he belonged to the present owner had been noticed making a large quantity of urine. His appetite was poor and he had great thirst. He was easily tired and much emaciated. The pulse was normal, the urine resembled water, was acid and contained much albumin. No sugar. Nephritis was diagnosed. The dog was destroyed and showed two kidneys much indurated so that the tissue could not be torn with the fingers.

LIAUTARD.

ASSOCIATION MEETINGS

AMERICAN VETERINARY MEDICAL ASSOCIATION

ADDRESS OF WELCOME

WOODBRIDGE N. FERRIS, Governor of Michigan

Mr. President, Members of the American Veterinary Medical Association and Ladies and Gentlemen: I can assure you that as Governor of Michigan, I extend to you a most hearty welcome. I presume an address of welcome has been delivered in behalf of this beautiful city of Detroit. If no such address had been given, twenty-four hours in this beautiful city would convince you that it is worth traveling across the continent in order to see it. I am loyal to Detroit, because Detroit is a part of the great State of Michigan. I can assure you that if you had time to go out from Detroit into the state you would have a still further admiration for Michigan.

I am exceedingly sorry that Doctor Dunphy, my friend, has gotten me into this trouble. The idea of the Governor of Michigan, or of almost any other state daring to address an association of this kind is really one that ought to cause alarm. What do I know about the matters that you have occasion to discuss? In order that you may be fully convinced in advance instead of after I am through, I want to give out just a little bit of my boyhood experience.

Of course, I am aware that you do not devote your attention as practitioners primarily or entirely to horses. When I was first invited, I suppose that my idea of the functions of the veterinarian was quite different from what it is now. Since I arrived in Detroit, Dr. Dunphy has done the best he could to coach me, and let me down as easy as possible, and still let you have a little respect for the Governor of Michigan.

I have changed my view in respect to the work you have to do. Prior to reaching Detroit, I supposed that the major part of your work was with the horse. I know that that is all I have ever called a veterinarian for in my own home, for the horse, and for the dog; and I noticed that the veterinarian did not know very much about the dog. Possibly he did know a little something about the horse, but I am not sure about that, as I finally had to hire a man to shoot the horse.

About fifty-five years ago. I was a rather small lad standing at the side of the road in front of the log house in which I was born. Father had driven the ox team up on the other side of the road, and the team was attached to a long wooden sled. I do not expect you will understand very much of what I will say for the next five minutes. I do not presume that half a dozen of you ever saw one of those long sleds. The sled did not have iron shoes. It had wooden shoes, and, as nearly as I can remember it was four or five or six feet longer than the longest sleds we now have in use, even in Michigan.

Father drove the oxen that were attached to this sled up to the side of the road. They were not oxen, but in this mixed audience I have to speak of them as oxen. To be perfectly frank about the matter, my father never had a pair of oxen during the time that I was on the farm, and I was on the farm until I was twenty-one. I remember their names, which were Buck and Brandy. If father had had anything of the poetical in him, he would have called them Brandy and Buck; then it would have had a meaning, whether you applied it to oxen, or to some other things.

He was about to unyoke them, when I suggested to him—I was a pretty small boy by the way—that he had not detached them from the sled. He said, "Stand back", which, translated into English, meant "Get out of the way. I know what I am about." These oxen were a little peculiar, particularly Buck. Buck was the "nigh" ox. Again I suppose you do not understand what I mean. Brandy was the "off" ox. In unyoking an ox team, or a team akin to an ox team, we always unyoke the "nigh" ox first. I will make this as clear as I can for you—purely a matter of history. Father proceeded to back the oxen as close to the sled as he could, not having detached the sled from the yoke. This "nigh" ox had the peculiarity when you drew the bow, of backing up suddenly in order to gain his freedom. An ox that was a gentleman when you took the bow out would pass forward and out from under the yoke; and in that way the man holding the yoke would not be in danger of having his hands skinned by the horns of the ox; but, this ox had this trait of always backing up. When father took the bow out from the yoke, the ox plunged suddenly backwards and landed on the sled. He had arranged the sled in such a position that if he went back very far, he would

be loaded on the sled, and he succeeded. There the ox was, so to speak sitting on his haunches; his fore legs out as if they were his hands; bellowing the best he could, and my father making the remark, "Now, there, take that, damn you!" In Michigan that language is understood, especially in Democratic audiences. Then he proceeded to unyoke the "off" ox, who was really a gentleman. After that I remember that whenever he unyoked that team the "nigh" ox glanced to the left, and then to the right, and walked straight forward. In other words, he was "eared".

I am just dropping a hint or two here that is fundamental in education. Father taught the ox a lesson, and did it in rather a crude way. I said to him afterwards, "Supposing that this ox had broken his leg, then what?" "Huh," he said, "We would have had some fresh beef." He said, "We shall never have any unless it is through an accident." That was true, too. I am not going to tell you what we had to eat instead of beef, but he was equal to the emergency.

I only give you this incident to help you understand how fairly familiar I am with oxen or with creatures akin to oxen. During all those twenty-one years on the farm, I yoked and unyoked; I plowed; I dragged; and did every kind of work that could be done with an ox team, and at no time was there ever a horse brought on the farm, except that occasionally father would rent a skeleton and have me ride it in plowing out corn. It wasn't a horse, just a skeleton. That is all the knowledge I had of the horse as a boy. I used to hope that the day would come when father would have one horse on the farm, that I might do as other boys did. If I remember correctly, there never was a horse team employed on that farm except in haying time, and that was during the last year or two that I was on the farm.

Since that time, I have owned two horses, one at a time. All of my knowledge of the horse has been worked out through those two. I became very fond of both of them; the last one, as I have told you, had to be shot. The first one I had to let go at almost any price, on account of her peculiarities in insisting on having her own way. But I came to love the horse just the same. I know now I am dropping a side remark that is not very commendable in a man of twentieth century intelligence, but, so far as I am concerned now, to go about the country for my leisurely ride of an hour or two a day, I would rather have a good

horse than the best automobile that is made in the City of Detroit. With the last little brown mare I had, we could mosey along all over Mecosta County; and the most beautiful part of the county really is out from the roads on which the automobile can with some difficulty run. I could go with this horse wherever I pleased, over the roughest kind of roads, comfortably too; see something, get a sniff of the air, and appreciate in some measure the beautiful things that God Almighty had given to us. Whereas, in an automobile, you see nothing, hear nothing, get nothing at this season of the year but hot air. You can always get hot air without buying an automobile and going riding.

I pay this tribute to the horse; and if your work were confined solely to this animal, you need not worry. We have many horses in Michigan, and we are going to have more. There is going to be a reaction by and by, and people who have sense enough to enjoy nature, and sense enough to ride, and sense enough to take a little further view of God's world will insist upon a change by and by, and that change will be a return to the horse. I am longing for that time to come.

I do not pay this tribute to the horse to be odd or eccentric. I wish I had time to go into the story of the development of the horse, and of its usefulness to man, but I have not. I leave that. I have convinced you now that practically I know very little about the horse. Practically I cannot tell you men and women—if there are any women here practicing veterinary science, and I do not know why in thunder they should not, as they practice nearly everything else—but I have a few other things that I think must apply to veterinary men and women as well as to the medical men. I am glad to have had a little closer knowledge of some other fields of human effort.

In 1873—I have told it before in Detroit, so if there are any reporters or any here who have heard me, they won't say, "Well, same old story; the old fellow is getting pretty old, isn't he? getting in his dotage: isn't conscious of repetition"—thank God I shall probably not know when I am in my dotage; but I do know when I have repeated and stated a fact two or three times. I have told medical gatherings in the State of Michigan and elsewhere that in 1873 I was a student at the University of Michigan in the Medical Department. I wasn't there to become a physician. I was there in order to fit myself better for the educational field

that I have occupied all these years, with the exception of the last three and a half years when I have been Governor of Michigan, and even my educational equipment has been needed during that time. How far I have succeeded in doing anything remains for history to tell.

At that time, in six months I received my credits for one year's work in medicine. Had I returned in the fall of 1874—I was there in 1873-4—in six months more I could have received my degree of doctor of medicine. What is my object in telling this? You will see presently.

We had the same lectures the second year that we had the first, without any variation. A considerable number of the students would matriculate for the first year, and go out and teach school all winter, during that six months, get back in time to get their credits, and then in the second year with a senior's notebook, graduate in medicine, having received a six month's training at the University of Michigan. Don't forget, of course, in the second year you had a little dissecting and possibly listened to a few additional lectures. During the first year, however, there was not a single quiz; no roll call, and no record kept.

I am talking of 1873. I know whereof I speak. I attended the lectures, because I was there to see what benefit I could get from the lectures in order that they might be of some value to me as a teacher. That was only in 1873. And when you received your degree, there was no further trouble about practicing medicine. Six months' training. Now, you have four years of at least nine months each. Remember it was only six months then. You have thirty-six months now in the poorest medical college as against a possible twenty-four weeks boiled down. A revolution has occurred.

While I could have furnished academic papers when I matriculated, I was not asked to supply them. I simply paid my fee, answered a few questions as to whether I had studied Latin or not, as to pursuing certain other studies, and was admitted. There were in that same class, men who could not write a decent sentence of English; and men who could not spell the most common words; men who did not have a common school education.

That was in 1873. There has been a revolution since then. Today a boy or girl cannot enter a reputable medical college without a high school education. The tendency is to require at

least one year of college work besides; in other medical schools two years; and in some of our great medical colleges a college training. What has been the result? It has been that in the last ten or fifteen years, the number of medical graduates of the United States has been cut in two. Medical colleges have gone out of existence that never ought to have existed in the first place, and we are having a new era in turning out medical men. We have a sufficient number of medical men now, at least so says the last number of the *Journal of the American Medical Association*, wherein you will find a detailed report of all these matters.

While I have told this story of the requirements in medical schools many times, what has that to do with you? All the way along these years since 1873, I have met with men who are kicking, kicking, kicking, because we demanded some academic training for a man who should enter the profession of medicine. Kicking, kicking, kicking, because the requirements were becoming stiffer, stiffer, and stiffer all the time. Thank God we have entered this new era where the medical man must have an academic training; whereby he must have the very best possible medical training; the very best possible clinical training in order that he may go out into the world and do something as a medical man.

The same thing has happened to your profession, and I am glad of it. Yes, I venture to say there are men of your profession who are doing this kicking—not in this convention—they don't come into conventions, they don't read the recent literature, they use every available opportunity of finding fault when a new law is passed whereby the standard is raised a little higher. I am glad that you are entering upon a new era. I am glad that you are requiring in your best veterinary colleges that the student shall be at least a high school graduate; furthermore that he shall pursue a four year course; furthermore that in many states he should go before a state examining board and prove that he has a right to practice as a veterinary surgeon.

There may be some doubters or sceptics here. I do not say I am glad of this, because it will lessen the number. Dr. Dunphy tells me that there are not too many veterinary practitioners today. Consequently you have nothing to worry about along that line. But, let me beg of the members of this association,

don't do a thing by word or by hint that will lower the standard of the requirements for training men for your profession.

Gentlemen, you might at first thought say, "That is right; it is better for us," but how much better it is for the animals you practice on. That is where it is. In my thoughts I was thinking of the animals and not of you.

By the way, since I arrived here, I have gotten another idea:—well, I really had this idea got it coming down on the train—I do not give Dr. Dunphy entire credit for it. I knew I had to say something when I arrived here or try to say something; so I made my friends who were on the train think I was asleep, so that I might have a chance to run over any thought or catch any thought that might be running around loose in my brain. I began to think about your work and the skill that it must require. As I said, I have not had any practical experience in observing you men to any extent. I do not know whether you have some of the characteristics of the ordinary family physician or not. I suspect that you have. I suspect that you cannot be entirely different from the ordinary doctor. You know where the doctor's weakness is. We all have weaknesses. We might as well be perfectly frank about it, all of us. If any of you men don't think so just ask your wives what they think about it. After a man has been in practice for some time—I am talking about the regular physician now—he is likely to go off half-cocked, and say "This is your ailment", writes a little prescription, sends you to the drug store. There is no especial value in very many of your prescriptions, by the way. I was a sceptic when I entered the medical department of the Michigan University and I came out a sceptic, and I have been growing, growing, growing in my scepticism so far as the use of very many drugs is concerned on human beings, horses, cattle or dogs.

I am not abusing you. It is too bad that some young men start off with putting in their cases twenty-five or thirty remedies, thinking they are armed for anything that may happen. Rubbish! Just as well throw it in the river and go on and see your case and prescribe,—in most cases, not all—I am not talking about surgery now. I am not careless in what I have to say, but the tendency of the physician is to go off, as I said, half-cocked, and where he thinks a certain epidemic is prevailing, pronounces it without careful examination.

In examining a human being, except a baby, you can get some testimony from the patient, and the ordinary physician has an advantage over the veterinarian. Very few of the animals you have to deal with can talk back, very few. Some of them can, in a language which you understand, but ordinarily they will not give you a complete account of their condition. Consequently you have to know accurately and scientifically symptomatology, or the behavior of the animal in order to know whether he is well or sick and just what that ailment may be. Consequently if the standard for education and for scientific acumen ought to be high in any profession, it ought to be high in yours and quite as high as in the medical profession. I rank you along with the regular medical profession.

I am aware that years ago they used to say, "Oh, he is just a horse doctor." I have known men to get angry when some allusion of that kind was made. I have seen some comment in the newspapers recently that I did not sympathize with in particular. I could not see any reason why anybody should reply to an innuendo, to a criticism based on the vocation that a man might follow. It matters not what a man's vocation is in any given position. If he is equal to the job, if he is master of the situation, it is nobody's business whether he pulls teeth, cures horses or practices medicine or is in the political game.

After all, my friends, there is a change that ought to come over your profession, similar to that which has come over the medical profession. I can remember the old family doctor who used to come to my father's house. He was a caution, in dress and in his want of cleanliness, and his language. There is nothing personal about this. I do not want anybody to get sensitive at all. Most of you seem to be as well dressed as the Governor. I have been told that I am entirely out of style. I tried to buy a white vest the other day in Lansing and they said to me, "Don't you know that this is a dry town?" I see that some of you understand. In other words some of you men know who must wear white vests. I have not been at any place in Detroit, consequently I cannot speak for Detroit, but honestly, I could not buy a white vest in Lansing. I want you to bear in mind how fashions change. I am not going to try to get one here tomorrow before I go. I told Mrs. Ferris I would wear these out, and bid them an eternal and ever-lasting farewell.

My friends, there were people in that neighborhood, a few of them, who thought that old Dr. Garfield was all the more powerful because of his superabundance of whiskers, his lack of cleanliness, his unfitting clothes and his never-clean boots. We wore boots in those days. I do not know whether any of you fellows ever saw a pair of boots or not. We wore boots. We never wore shoes. That was not a shoe age. It was a boot age, and the boot is much more serviceable than the shoe in some civilized society. I think in some localities we shall come back to the boot after a while. Go into his office, and it was simply a junk shop.

That has all passed and gone now. In even a small community let a regular physician come and not recognize the fact that the people generally, whatever hardship they may be bearing, however humble they may be, or however simple in their dress, like to see their physician who is supposed to be an illustration of some features of sanitation, in good clothes, clean shaven. If he does not wear "bushes"—and I have no objection to that—that is only a question of style; a man who will wear fur in Michigan at this season of the year, well—I am glad you are good natured or else I would be thrown out, I am sure.

Today he drives a good horse; he drives an automobile, he drives a Ford, of course. I do not get anything for this remark, but I ought to be paid for it. I prize the little Ford for other things than simply getting you there. You get Swedish movements thrown in free, when gasoline is 19 cents a gallon I like to get something free. So I have kind words for these institutions that help a man in more ways than one.

I say that the old-time physician that I am describing as belonging to my father's day is gone, dead and gone beyond all possible resurrection. He did his work. Just so with the veterinarian. The time will come when no veterinarian will feel that it is imperative that he shall have a junk shop in connection with his livery stable. I understand that is to be handed to horses, but thunder, the largest part of your work is outside of the consideration of the horse, isn't it? If you are onto your job, if you are really twentieth century veterinarians, your work is immensely bigger than the horse, so it is not absolutely necessary that you should be where you can sleep with the horse and eat with the horse and smell with the horse.

In other words, these remarks that I am making do not apply to you. They apply to the people at home. But what can you do? Why, you can wake them up. Go after these people. Show them wherein they fail to get the confidence of the people and be worthy of any especial consideration. I congratulate you men that you will travel across the continent, that you will come together for several days to discuss the great problems connected with your profession: and I have only thrown in these side hints to show you that you are marching right along fully abreast of all the other professions, and there is not any courtesy that I can think of that they are worthy of that you are not worthy of.

If you will pardon me I want to appeal to you just as I did to the physicians. I think that your field is simply marvellous. The work that you can do in relation to sanitation, in relation to domestic animals, in relation to the different analysis of food products—why, it seems to me that the field that is open before you is magnificent in the extreme. I had a dream once upon a time that I would be a doctor, but my father handled me the way he handled the ox, so I did not become a doctor at the time I had expected to. I am very glad because I would have begun at sixteen. I would have been traveling around the country today with rabbits in my whiskers and probably had fifteen to eighteen children which, of course would have elicited the sympathy of Roosevelt, and he would have made me popular in that way; but nevertheless my career would have been quite different and then Michigan would have lost immensely.

I have paid you high enough compliments and I have been absolutely sincere in it, because the animal world has for me a sublime attraction. I wrote home this morning, sent a special delivery to Mrs. Ferris telling her that this morning at four o'clock when I came out of the front door my dog Tot was at the door. I had given her a treatment yesterday, a gentle one, just what any one of you veterinarians would have given her if I had called you and paid you five dollars. I saved five dollars, you see, by my knowledge. I wrote home a special letter. "Please, while I am gone, take good care of Tot."

I do not care what you say about the Governor in regard to his relations to animals. If you have got to whip your dog, just excuse me long enough to get out of hearing. I do not say you should not whip the dog; I do not say you should not whip

your boy; I do not say you should not whip your girl. That depends altogether on your knowledge. That depends altogether on your control. If, however, there is no other medicine in sight, rather than let the child go to the devil, or the dog or the horse, I would use the rawhide if necessary.

I hope the newspaper men will get me correctly, because I have never used the rawhide very much. I have never had occasion to whip a dog; I have never had occasion to strike a horse a blow. I go to the other extreme. I will say the man who will strike a horse an unnecessary blow, who will strike a dog an unnecessary blow, who will strike an ox an unnecessary blow, will, when the occasion arises, strike his wife or his mother. If there are unmarried women in my audience, I would ask them to be particular to observe the young man whose attentions they have in relation to their treatment of the horse or dog. You can get at the real essence of the brute.

I expect you men to do something in the future away beyond what you have done in the past in the way of humane treatment of the animal creation. Bless your heart, what is the main thing that you and the doctors have to do? Give dope? No. Cure disease? No. What is the big thing? The greatest thing, the all important thing in this world today is prophylaxis, to prevent disease; how to teach sanitation and the laws of health, whereby both men and animals will be free from disease. That is the first thing, the big thing, the everlasting thing. What can you do in your community in that line?

We have found out that even hogs thrive best in cleanly surroundings. I think the man is in this audience tonight who, when I said to him, "How are you getting along in such a county overcoming hog-cholera?" He said, "First rate." "I suppose you are doing this magnificent work, in overcoming hog-cholera with serum?" "No, no." I said, "How under heavens are you doing the great work of overcoming hog-cholera?" "By teaching the farmer, the owner of the hogs, cleanliness, cleanliness, cleanliness," so that even the hog thrives in cleanly surroundings and it is an injustice to the hog, a slander on the hog to think that by nature he is a filthy animal. He is a cleanly animal, and most animals are cleanly when they have half a chance, even human beings. I add that because it is pathetic. So I beg of you men to go out as teachers.

The regular physicians are giving from time to time free examinations for tuberculosis. Think of it, in ten years by teaching sanitation, by teaching the laws of health, we have reduced it in the United States, that is for the portion of it that is now listed or for which we have statistics, about two-thirds is listed, we have reduced the death rate in ten years, twenty-five per cent. By curing tuberculosis? No, no. By preventing tuberculosis. Likewise in dealing with hogs and cattle and horses, your chief work is in the line of teaching sanitation and incidentally when you teach sanitation with reference to hogs and horses, when farmers actually discover that horses need pure air, that in their home they must have light, that cows must have light and must have air, and must be cared for and must have exercise, exercise, exercise, that the simple laws of health that apply to men apply to animals. Can't you do something to teach the people along that line? There will come a reaction as simple as a, b, c.

The story is told in the slums of London that one day a little child from a very humble home slipped out into the street and was caught by some woman who was conducting a mission. The little child was taken into the mission, face washed, hands washed, hair combed, made as cleanly as possible, and the little child finally strayed back to his home and when the mother, who was unkempt and unclean, saw the little child, she at once proceeded to put herself in order.

I say to you men that we can get from you a reaction in the home: that naturally when farmers and people generally come to understand that hogs and chickens and sheep and horses and all the domestic life must have cleanly surroundings, must have the best sanitation, there will come a reaction in the home and by and by, slowly, people will, at night, sleep with the windows open. I am not referring to this particular spell of weather—and will get the benefit of the simple laws of sanitation.

So I plead with you men; and beg of you men to do something more than wait for a call. Do a little constructive work in your neighborhood, and that will be the easiest way to shut out the quack. All over Michigan we have the quack and kicker, the fellow who ought to be exterminated for the good of the animals of the state in which he resides. It is up to you to do it. When the people become thoroughly convinced that your function is

as important as I have described it, it will have a healthy action.

Lastly, do not forget the human side. It is in your power, dealing with these dumb animals, to shed a genial influence over the boys and girls in the treatment of animals. You have learned already that I am a school master, but I want to say to you that these things are important from the last point I am making tonight, the humane point.

I saw a little boy come out of a certain church in Big Rapids on a dark Sunday morning. I was not in the church, of course, I was coming home, probably from the post office, and met him on the sidewalk. I will be perfectly frank with you because naturally you would say, "How did you happen to be out on this dark morning?" This little fellow had just come from Sunday school and had under his arms two books, evidently books he was going to read during the week. I inferred that. At the point where we met there was a stone walk that went out to a horse block and on that stone walk there stood a toad, attending to his own business. Probably he did not know that it was Sunday; probably he did not know that there was Sunday school that day; and he probably did not know that a boy who had failed to learn kindness to animals would be likely to come that way. The boy stepped out from the walk, out of his way, off the main line of the walk, stepped out and put his heel on the toad and crushed its life out. Remember now, he had just come from Sunday school.

That is nothing against the Sunday school, not at all, but you cannot teach morals, nor you cannot teach religion. I am saying this dogmatically—simply by word of mouth: you have got to do it by example. The boy had got to learn kindness to his dog through the kindness his father renders to his horse, to his mother, to his sister and to animals on the farm. It is the objective kindness, the objective tenderness that must be practiced towards the animal world, and you men are in a better position to teach some things that are humane to the boys and girls of this country than the preachers, than the school teachers, all because you are dealing with animals directly.

Pardon me for this personal appeal. I thank you ever so much for listening to me for fifty minutes. I did not come here with any special message. The only reason I dared talk to you for this hour is that we are all human; we are looking for better times; we are looking for better things in education;

we are looking for a larger degree of kindness towards the animal kingdom.

The present war in Europe strikes terror to the hearts of most men who think at all. They wonder how it is possible that we could have gotten down to the primitive element, the primitive brute instincts, brought them to the surface, to destroy to the bitter end. They wonder whether we shall ever get back to where we can be kind at all, where we can be humane. But it goes clean down along the line as I have described it and I still have faith, and I still have hope that by and by we shall actually come to the conclusion that we are on the right track, and that we are great in proportion as we are humane.

RESPONSE TO ADDRESS OF WELCOME

J. G. RUTHERFORD, Calgary, Canada

Mr. President, Ladies and Gentlemen: I have been connected with the American Veterinary Medical Association for a very considerable number of years. I have been a horse doctor for a great many more. I have listened during that period, and even in years before that, to a very great many addresses of various kinds. I have from time to time regretted, even after the passage of years, the time spent in listening to some of those addresses. During all those years, I have no recollection of ever having listened to so good, so searching, so intelligent, and so comprehensive an address given by a public man to a special audience, with whose aims and objects, manner of life, he himself confessed in his opening sentences, he was altogether unfamiliar. I will look back to the end of my days with very great pleasure and personal gratification to having been present tonight.

We in Canada, always friendly to our great big sister south of the line, have been particularly friendly to the State of Michigan. You know we at one time had proprietary rights in Michigan, and then when these were lost, they were once more resumed, and again Michigan passed from our hands. "It is better to have loved and lost, than never to have loved at all", and we have never lost our love for Michigan. In the State of Michigan, there are many thousands, and tens of thousands of people who were born across the line, and who came over here into Michi-

gan—and because it is a part of my creed, following the Governor's principles, I am not going to tread upon anybody's corns if I can help it, but I am going to suggest that possibly the intelligence which is by common consent yielded to Michigan may be to some slight, infinitesimal extent, due to this infusion of Canadian blood from across the border. We have always known that the people of Michigan were possessed of good, common sense; and that that was one of their main characteristics. We knew that they were comparatively, at least, honest. We knew that they were upright. We knew that they were progressive; and we knew that they were, generally speaking, at any rate, a sober people, a sober-minded people. If anybody in this audience ever had any doubt upon that subject, those doubts have been forever set at rest tonight, because a state possessing a people which has shown the common sense that the people of Michigan have shown in electing to the governorship of this state a man possessed of the mind and the ideas, to say nothing of the oratorical powers of our friend the Governor, needs, like the old wine, no bush. We need make no song about the State of Michigan and its common sense, because to our minds it has been justified fully by the selection of its chief magistrate.

You and I, ladies and gentlemen, on both sides of the international boundary, have listened to a very great many addresses from public men, who honored us by coming to our various conventions. You, as I, have noted, although we did not always remark it publicly, a vast difference in the various addresses presented to us by these public men in different parts of this continent. Some of them were child-like in their simplicity. Others were funny. Some were positively painful. I think I am safe in saying without any unkindness in my heart to the gentlemen who made these speeches, that none of them were in any way to us, as a body, instructive until tonight. We have had a sound, practical sermon from a sane, hard-headed man.

We who have been in the profession for many years know that everything he said tonight was true in regard to our profession, as regards the humility of its origin, and the social disparagement, which is from time to time cast upon it and its progress upward through the years, the decades of progress to which so many of the gentlemen whom I see sitting around me here tonight have contributed in no small degree. The mem-

bers of this association who have had to do with the uplift of the veterinary profession know every word he said was absolutely true. His speech was true and searching, not only in regard to what I have said, but in regard to the actual work of our profession.

His remarks in regard to prophylaxis or prevention of disease, were worthy of note by every young practitioner in this room and out of it; and I want to tell you something as one who for many years practiced in a rural community, that there is no better way to acquire an influence for good under control of public opinion, than to tell these people everything that you possibly can in regard to the cause, as well as the prevention of disease.

A great many veterinarians, particularly of the older school hesitate to tell the farmer what is the reason that his horse, or his cow, or his hog is sick, because they say, "Why, the number of cases that we get will be reduced, and our fees will suffer in proportion." That is the greatest mistake in the world. Keep on educating the owners of the live stock which you are called to see. Show them the errors which they are making from a hygienic point of view, from a dietetic point of view; from a point of view of exercise and work, and you gain the confidence of those men just as soon as they find out that you know what you are talking about, and realize that what you say is true. Once you have the confidence of those men, they come to you with every little ailment, they come to you for advice, and you need not always charge them for it, if it does not cost you anything to give it to them. It is absolutely true, what the governor said, it is part of the duty of the veterinarian in any community, in a city community, as well as in the country. This is more readily seen, and possibly more lasting in the rural community than in the urban community.

Then he grasped what so many people fail to grasp, and that is the fact that the real skillful and conscientious and successful veterinarian has to be a whole lot better man than the medical practitioner. He has to be a better man, because he has to find out from a dumb animal what is the matter with it, and the whole thing is observation. A man must cultivate observation from the time he starts practicing. He has to know what every move a sick animal makes, means. Lameness they say is the language of

pain. So it is; in sickness, there is a language of pain, and I know there are sitting around me tonight a great many men who understand that language, and who by their ability to read that language can make a correct, sound diagnosis. They know what is the matter with the animal, and consequently they can treat it intelligently.

I have often thought and I have often regretted that I did not go into that line of practice myself, when we know the terrible mortality among children that there is all over the world. I have often thought that the best possible man to treat young children, would be the veterinarian, the skillful, sympathetic, observant veterinarian. He has become so accustomed to observe and read the symptoms of dumb animals that in nine cases out of ten, he can make a very much better diagnosis in a child than can the physician who is accustomed to asking the patient a whole lot of questions, using the bed-side material, which, of course, is not so necessary in the case of our patients, and must judge for himself as to whether the patient is telling the truth or fabricating falsehoods as he goes along. The veterinarian, with sympathy and intelligence certainly has the training to treat the young children.

I remember, away up in Manitobá, when I was in practice, there was a young Scandinavian servant girl, and she spoke no English. There were no other Scandinavians in the neighborhood, and her employer had no knowledge of her language at all, and the girl took very ill. They called in the physician, and he came and tried to find out from that poor girl what was wrong with her; but he could not speak to her, and she could not speak to him; and finally he turned around and said to her employer, "There is only one man around here who can tell what is the matter with this girl, and that is Rutherford; you had better send for him."

That was just an illustration of what the Governor was referring to tonight. There is not one layman in a thousand who, in my experience, takes enough thought of the veterinary profession, or of the difficulties which attend veterinary practice, to put his finger on that little point, but he did it.

Then again, he talks about kindness and humanity to dumb animals. You all know he is absolutely right. You all know how much more you can do with an unruly or fractious patient by

treating him kindly than you can by treating him roughly. In our work, as you know, there comes a point where we have either to use force or an anaesthetic. Personally, I generally prefer the latter, but long before that point is reached, those of us who have worked in the profession for many years, know how much can be done by patient and gentle handling of our suffering dumb friends. We also know this: from certain farms the horses come to us for treatment, and the cows with which we deal are kindly and gentle, docile and friendly; you can do almost anything you like with them. The horses from some other farms are savage, ugly tempered, cranky, vicious, bite and kick, and do all sorts of mean things. Why? That is the treatment received at home. You all know that just as well as I do, and the Governor also put his finger on that, and I reiterate that never in my long life have I listened to a better and sounder address than we had tonight from Governor Ferris of Michigan.

I have heard a lot of these public men upon a public platform—you know I was ten years in politics myself,—and I am on to a good many of their curves,—I was wondering what he was going to get at. When he began discussing the professional man, the medical man and the veterinarian, it reminded me of the old story, the scene of which, by the way, was laid in Michigan, the story of the farmer, who one very hot afternoon in August, was driving along a very dusty road on the spring seat of a lumber wagon chewing a straw. He overtook an individual in somewhat rusty black clothing who was trudging along on the dusty grass by the side of the dusty road. He offered him a ride, and the chap climbed upon the spring seat, and they rode along a couple of miles in silence. Finally the farmer said, "Say Mister, what might your business be?" "Oh," said the chap, "Friend, I am a professional man." "Oh," said the farmer. They rode along for another half mile, the farmer keeping a sly glance at the visitor, and he said, "What kind of a professional man be you anyway? You ain't a preacher, or you would have a collar on; you ain't a doctor, or you would have your kit; you aint a lawyer, or you would be talkin; what kind of a professional man be you?" "Why," said the chap, "My friend, I am in politics." "Why," the farmer said, "Politics! That ain't a profession; that's a disease." All I can say is that if they get into that disease, politics, a few such doctors as our friend Governor Ferris, the stigma will be taken out of it in short order.

Now, Ladies and Gentlemen, I do not propose to occupy any more of your time. If I were to talk to you for an hour, I could not say anything more in appreciation than I have said, and there is no use rubbing it into you, for you all know that it is true, and you all know that I have not overdrawn the picture one word. On behalf of this association, I desire to convey to you, sir, our most sincere thanks for your courtesy in coming to visit us to-night, for your kindly words, and above all, for the practical sermon which you were good enough to deliver.

REPORT OF THE SECRETARY

During the past year many matters have come up which deserve mention in the report of the secretary:—

(1) THE QUESTION OF DUES. At the 1915 meeting in Oakland, the association voted to increase the annual dues to five dollars. This matter had been proposed at the New York meeting in 1913 and referred to the executive committee. At the 1915 meeting, the executive committee recommended that the proposed amendment be rejected. The association, however, rejected the recommendation of the executive committee and voted the adoption of the amendment to increase the dues to \$5.00. A study of the debate preceding the vote as transcribed by the official stenographer convinced your secretary that it was the understanding of those present and voting that the change in dues would not take place until September, 1916. (See Journal of the A.V.M.A., Vol. 2, p. 287.) This opinion was endorsed at the special meeting of the executive committee held in Chicago, Dec. 3rd, 1915. Acting on this ruling, dues during the past year have been collected at the \$3.00 rate but applicants for admission have been charged \$10.00 instead of \$8.00 and applicants for reinstatement \$11.00 instead of \$9.00.

(2) FINANCIAL CONDITION OF THE A. V. M. A. For several years the treasury has been in a somewhat impoverished condition. At the 1913 meeting, the financial conditions were such that in publishing the proceedings of that meeting, it was necessary for the officers of the association to assume responsibility for some \$3000.00. The cancelling of the 1914 meeting, which was to have been held in New Orleans, resulted in temporarily bettering the financial condition of the association by the accumulation in the

treasury of an entire year's dues without the expense of publishing the proceedings of an annual meeting. During the past year, it has been possible to pay bills, although several times, the balance in the treasury has been reduced to almost nothing.

On October 1st, 1915, because of lack of sufficient funds to purchase the American Veterinary Review, the sub-committee on Journal (Drs. Marshall, Eichhorn and Lyman) gave personal notes amounting to \$1500. Only five hundred dollars of this still remains to be paid and this note does not mature until October, 1916.

The financial prospects for the coming year are excellent. The acquisition of a Journal was a good financial move. At the present rate, in less than two years, it will pay for its purchase price of \$2500, through the saving over the former cost of publishing the proceedings in book form. The Journal has doubtless been of enough indirect benefit to already pay for itself. The larger number of applications on file, 421, are largely due to the prestige of publishing a journal. With the annual dues at \$3.00, the association has been able to meet the obligations of financing the Journal and to this has paid \$5112.35, including \$2000 on the purchase price. The coming year, there remains only \$500 to pay on the purchase price. All bills presented up to date have been paid and there yet remains a cash balance of \$1349.06 in the hands of the treasurer. The 1916 dues now payable amount to over \$10,000. In case it is decided to continue the dues at \$3.00, about \$900 of this will either have to be returned to applicants or credited on their 1917 dues.

(3) REORGANIZATION. It is recommended that the association proceed to reorganize without further procrastination. The present by-laws are unsatisfactory for conducting the business of the association.

In order to conform to the requirements of the U. S. Post Office Department, it has been necessary to change the form of application blank. The present method of transacting business causes not only a waste of time but is an undignified procedure for a national organization such as the A.V.M.A.

(4) INCORPORATION. The Oakland meeting accepted the recommendation of the executive committee "that this association be incorporated as the American Veterinary Medical Association." (See Journal of A.V.M.A., Vol. 1, p. 776.) The President arranged with his attorney, without expense to the association, to draw up

tentative articles of incorporation. These were discussed by the President and Secretary. Since the attorney's advice, after several conferences, was not to incorporate until after reorganization, it was deemed for the best interests of the association to hold the matter in abeyance. This decision was concurred in by the chairman of the reorganization committee.

During the year, over 25,000 pieces of first class mail have been sent out by the secretary's office. Your secretary regrets some mistakes which have occurred in his office. With a limited amount of time to devote to the association work, it has been difficult to personally attend to some of the details. I would recommend that a full-time secretary be employed and that a permanent office be established in some centrally located city. The secretary of the American Medical Association recently granted an interview to two of your officers (Dr. Hart and the writer) during which it was suggested that there were certain advantages in establishing the secretary's office in the state in which the association incorporates.

SUMMARY OF SECRETARY'S FINANCIAL REPORT

Am't Rec'd for dues and applications.....	\$10,150.40		
Am't Rec'd from other sources (see items below)	3.05		
		\$10,153.45	
Total Received		\$10,153.45	
For Debit Acct. see p. 195.			
Amt. sent Treasurer, Dr. Schneider.....	\$10,137.45		
Debit in acct. checks returned (insuffic. funds)	16.00		
		\$10,153.45	
	MEMBERS	MEMBERS	
Alabama	22	Hawaii	8
Arizona	3	Idaho	15
Arkansas	3	Illinois	121
California	142	Indiana	110
Colorado	33	Iowa	80
Connecticut	31	Kansas	50
Delaware	4	Kentucky	22
District of Columbia.....	40	Louisiana	22
Florida	5	Maine	14
Georgia	11	Maryland	31
Guam	1	Massachusetts	48

MEMBERS		MEMBERS	
Michigan	69	Vermont	12
Minnesota	57	Virginia	28
Mississippi	21	Washington	29
Missouri	66	West Virginia	13
Montana	20	Wisconsin	59
Nebraska	67	Wyoming	7
Nevada	9	CANADA	
New Hampshire	8	Alberta	17
New Jersey	33	British Columbia	14
New Mexico	13	Manitoba	22
New York	145	New Brunswick	1
North Carolina	16	Nova Scotia	4
North Dakota	59	Ontario	26
Ohio	99	Quebec	11
Oklahoma	9	Prince Edward Island	1
Oregon	22	Saskatchewan	16
Pennsylvania	144	OTHER COUNTRIES	
Philippine Islands	18	Australia	1
Porto Rico	1	China	1
Rhode Island	6	England	2
South Carolina	13	France	1
South Dakota	27	Ireland	1
Tennessee	13	South America	1
Texas	35	South Africa	
Utah	9		
Number of members resigned during year			11
Number of members died during the year		} Honorary	2
		} Active	13
Number of members suspended 1915 for non-payment of dues			68
Number of active members (not including H. R. or Honorary)			2051
Number of honor roll members 1915			46
Number of Honorary members 1915			28
Applications on file			421

Mail has been returned during the year from the following 48 members:

Aicher, Edward H.	Agricultural College, Miss.
Albershardt, A. H.	Indianapolis, Ind.
Baker, Horace M.	Univ. of Sydney, Australia
Basinger, H. P.	Mitchell, S. D.
Braginton, Fred	Indianapolis, Ind.
Braisted, Wm.	New York City
Brown, Arthur C.	San Francisco, Cal.
Burke, James W.	Chicago, Ill.
Caldwell, F. W.	St. Joseph, Mo.
Coover, W. E.	Indianapolis, Ind.

Cumming, David	Port Huron, Mich.
Davis, Wm. L.	Omaha, Nebraska
Drake, Edw. J.	Toledo, Wash.
Embree, Warren J.	Aberdeen, S. D.
Engle, Frank P.	Ft. Worth, Texas
Ferneyhough, James G.	Burkville, Va.
Findlay, Alexander	Camden, N. Y.
Gimper, W. S.	Harrisburg, Pa.
Hamilton, Wm. C.	Chicago, Ill.
Heaton, John B.	Indianapolis, Ind.
Hemneberger, W. B.	Portland, Ore.
Hill, Wm. P.	Ft. Riley, Kansas
Howard, Julian	Stanwood, Wash.
Howard, Ogden J.	Coloma, Mich.
Hudgins, Patrick H.	Fredericksburg, Va.
Hurley, Paul C.	East St. Louis, Ill.
Johnson, Albert C.	Portland, Ore.
Johnson, August F.	Memphis, Tenn.
Knap, Anton E.	Billings, Mont.
Lang, August R.	Porterville, Cal.
McCarthy, Thos. A.	Chicago, Ill.
McEvers, Albert E.	Chicago, Ill.
MacDonald, R. W.	Flint, Mich.
MacIntosh, R. D.	Toronto, Ont.
Mackie, Clement L.	Towson, Md.
Meade, Albert M.	National Stock Yards, Ill.
Morel, Jules F.	Portland, Ore.
Moyer, B. Franklin	Philadelphia, Pa.
Munce, Thomas W.	Washington, D. C.
Parrish, R. D.	Omaha, Nebraska
Pearee, Frank H.	Carson, Ia.
Phillips, S. C.	Sheridan, Ind.
Preston, M. J.	Moosomin, Sask.
Prien, Otto L.	Laramie, Wyo.
Ransom, Sherman	Vancouver, B. C.
Springer, U. S.	Grand Rapids, Mich.
Struthers, Chas. E.	Chicago, Ill.
Venzke, Harry E.	Garretson, S. D.

Executive Committee, American Vet. Med. Ass'n.

Gentlemen:

I herewith present the names of the following members for honor roll who, according to the records of the A.V.M.A., have been in continuous membership in good standing for twenty-five years:

Ackerman, E. B., 367 Flushing Ave., Brooklyn, N. Y.

Brenton, S., 121 W. Alexandria Ave., Detroit, Mich.

Connaway, J. W., Univ. of Missouri, Columbia, Mo.

- Grange, E. A. A., Ontario Vet. College, Toronto, Ontario.
 Hughes, Joseph, 2537 State St., Chicago, Ill.
 Knowles, M. E., Helena, Mont.
 *McNeil, Jas. C., 3349 Webster Ave., Pittsburg, Pa.
 Mayo, N. S., 4753 Ravenswood Ave., Chicago, Ill.
 Meisner, H. A., 1133 Hartford Ave., Baltimore, Md.
 Nelson, S. B., Pullman, Wash.
 Paige, Jas. B., Amherst, Mass.
 Peterson, W. E., 16 Lyman St., Waltham, Mass.
 Reynolds, M. H., Experimental Farm, St. Paul, Minn.
 †Ryan, J. F., 2525 Indiana Ave., Chicago, Ill.
 Sollberger, R. J., 1412 S. 8th St., St. Louis, Mo.
 Turner, J. P., 916 O. St., N. W., Washington, D. C.
 Whitney, Harrison, 20 George St., New Haven, Conn.

(Five of these members were admitted to the association in 1890; the others in 1891.)

*Delinquent (1910)

†Delinquent (1913)

C. M. HARING, Secretary.

NEW MEMBERS ELECTED AT THE DETROIT MEETING ALABAMA

Ayer, Hobart C.	New Decatur
Head, Cage	Wilton
Howle, Thos. Blake	Oxford
King, D. Edwin, Jr.	Mobile
Meador, Daniel J., Jr.	Auburn
Reidy, John B.	Birmingham
Rayercroft, W. C.	Mobile
Strickler, Don B.	Birmingham
Venable, Jos.	Cullman
Wilson, Howard C.	16 Yancy St., Montgomery

CALIFORNIA

Beach, J. Raymond	University Farm, Davis
Bonnikson, Harry P.	2226 Parker St., Berkeley
Brooks, C. S.	Hollister
Caldwell, Robert A.	6th and Grayson St., Berkeley
Carr, Wm. R.	816 San Pedro St., Los Angeles
Dardis, Thos. L.	Stockton
Howell, Edgar C.	Bishop
Kerr, Owen W.	Turlock
McKim, H. C.	816 San Pedro St., Los Angeles
McLean, Wm. C.	San Mateo
Mantor, Herbert O.	354 Chestnut Ave., Long Beach
Peterson, Peter T.	610 65th Ave., Oakland
Rebold, George P.	Stockton
Rydberg, August J.	San Rafael

COLORADO

Bryant, John B.	Trinidad
Carrol, Arthur N.	Pueblo
Hammond, Wm. L.	404 Post Office Bldg., Denver
Lamb, Percy	Englewood

CONNECTICUT

Brown, Peter B.	Meriden
Maxon, Fay Irwin	62 Oakland Terrace, Hartford
Meyers, Chas. H.	100 Berlin St., Middletown
Sutherland, Arthur W.	Bristol

DISTRICT OF COLUMBIA

Berg, Wm. N.	B. A. I., Washington
Hall, Maurice C.	B. A. I., Washington

FLORIDA

DeMilly, John W.	Tallahassee
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GEORGIA

Dinse, Alfred J.	Box 161, Jackson
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IDAHO

Brown, W. W.	Liberty
Smith, George A.	Rigby

ILLINOIS

Bailey, Hugh W.	Orion
Baldwin, Boyd	405 South 3rd St., Rockford
Bott, Anthony E.	East St. Louis
Darby, R. N. G.	Barrington
Faulhaber, Louis G.	2840 West North Ave., Chicago
Frost, George P.	4527 Ravenswood Ave., Chicago
Johnson, Ralph H.	Woodhull
Kempf, Silas	Roanoke
Kincaid, Albert R.	Stonington
Leibold, A. A.	4515 N. Robey St., Chicago
Lucas, Clinton E.	Olney
McGrath, Elinor	3217 Indiana Ave., Chicago
Merriam, Cecil	Mt. Pulaski
Potter, Leslie G.	Quincy
Rasmussen, J. C.	Wyanet
Rives, Robert	National Stock Yards
Salter, W. R.	Stronghurst
Simmers, C. O.	Tolono
Sisk, David E.	Mohamet
Swingle, C. W.	Freeport
Teckenbrock, W. G.	Metropolis
Vanderwarf, Cornelius	Chicago Heights
VanCleave, Walter B.	Chrisman
Velez, Hepolito C.	4651 Hermitage Ave., Chicago
Walters, Frank A.	Lemont
Wright, Carlton J.	Cerro Gordo

INDIANA

Alexander, E. V.	3309 Park Ave., Indianapolis
Anderson, Jas. E.	Ligonier
Baxter, Jos. M.	Middlebury
Bowne, Frank	Hazelton
Boyd, Ralph H.	Avilla
Bray, F. O.	Arcadia
Carpenter, Ira V.	North Liberty
Chapin, Chester E.	Fremont
Cannal, Harvey J.	Rensselaer
Lynch, John E.	124 W. 22nd St., Indianapolis
Redman, Jos. F.	Covington
Sharp, Charles E.	Greenfield
Silberg, Frank W.	Spencerville
Sleigely, Raymond W.	La Porte
Whallon, E. A.	Akron
Whiting, Rex A.	W. LaFayette

IOWA

Baldwin, Arthur F.	Creston
Ballard, Fred S.	Sibley
Betts, Roy S.	Lost Nation
Blossenberger, W. P.	Williams
Bowker, George W.	Van Horn
Brill, Jos. A.	Dow City
Cameron, H. M.	Springville
Carson, George W.	Lake Mills
Dorweiler, Philip O.	West Bend
Drown, Frederick A.	Kellogg
Foster, Lloyd E.	Greenfield
Greenwood, Edward S.	Laurens
Haskins, Albert B.	Davenport
Jessen, Julius A.	Shelby
Johnson, Homer,	Bussey
Johnson, Howard C.	Brighton
Johnson, Philip E.	Dayton
Juhl, Charles E.	Osage
Kippen, N. A.	Independence
Likely, Chas. W.	Ankeny
Mill, Benj. F.	Denison
Miller, W. J.	Indianola
Moore, Robt. G.	Dunlap
Nulty, Nathaniel S.	Nevada
Parker, Chas. S.	Fayette
Rice, Chas. D.	Ames
Ross, Roy G.	Estherville
Schoenberger, John Guy	Winterset
Smith, Wilber C.	Fairfield

Stott, R. O.	Mason City
Teague, B. B.	Boile
Thomsen, John T.	Armstrong
Thomson, Jacob J.	Gladbrook
Van de Woo, H. J., Jr.	Orange City
Van Vranken, Henry S.	Story City
Willey, Louis E.	Ames
Wing, Casper Lee	Van Wert

KANSAS

Boyce, Walter	20 P. O. Bldg., Kansas City
Fleming, Jas.	23 Federal Bldg., Kansas City
Frey, Jesse J.	Manhattan
Ruffner, Fred K.	Beloit
Syders, Roy A.	Moran

KENTUCKY

Austin, J. A.	Fulton
Calldemeier, Edwin	Louisville
Crisler, Lewis H.	Covington
Farley, Edwin P.	Paducah
Himmelberger, Leo R.	Lexington
Huffman, Ludwig R.	Paris
Irvin, Walter J.	Carlisle
Longnecker, Allen O.	Hickman
Mackie, Cyril	(Elmendorf) Lexington
Pedigo, George W.	Glasgow
Tiffin, Chas. H.	Frankfort
Westmoreland, Dewey E.	Owensberg

LOUISIANA

Bushong, Jos. P.	603-604 Roumania Bldg. Baton Rouge
Kindrick, A. D.	Homer
Smith, Ernest I.	Baton Rouge
Wirt, Frederick G.	Napoleonville

MAINE

Baird, Paul R.	Waterville
French, C. B.	Rockland
Henderson, E. P.	Houlton

MARYLAND

Sapp, Chas. F.	Hampstead
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MASSACHUSETTS

Balkam, Ralph W.	53 Whiting St., Springfield
Broderick, Wm. H.	2475 Massachusetts Ave., Cambridge
Cone, Michael J.	Pittsfield
Keene, Chas. A.	25 Beacon St., Fitchburg
McNamara, W. J.	8 Green St., Worcester
Plaskett, Wilfred F.	Clinton
Thayer, Warren L.	598 Pleasant St., Worcester

MICHIGAN

Armour, Henry M.	Chelsea
Armstrong, Robert	641 Field Ave., Detroit
Buck, Samuel H.	Marquette
Carpenter, Howard	Detroit
Clark, Chas. H.	McCords
Cox, William	Mayville
Curl, Chas. M.	Highland Park
Davidson, F. N.	Petoskey
Ducey, John	Freeland
Ducey, M. D.	Merrill
Dunphy, Chas. B.	Mason
Duncan, Francis	Ithaca
Geiger, Milton J.	Croswell
Haynes, Wilfred A.	Jackson
Hicks, Floyd H.	Allegan
Kemp, Donald T.	St. Louis
Mayer, Gustav P.	Elk Rapids
Mendenhall, Maurice	Detroit
Moody, George C.	Mason
Nichols, Abner Z.	Hillsdale City
Perry, Burton A.	Hastings
Schaffer, George R.	Midland
Schubel, Otto W.	Quincy
Smith, Eldon	717 Watson St., Grand Rapids
Sprink, George F.	Parke, Davis & Co., Detroit
Van Brussel, O. H.	Wayland
Wileden, Lewis A.	Lansing

MINNESOTA

Andreassen, S. K.	Barnesville
Berg, Elmer W.	106 Spruce St., Minneapolis
Bouesein, Gustav L.	Spring Valley
Bromaghin, Walter	Belle Plaine
Campbell, John N.	Truman
Cook, Bertram L.	Cannon Falls
Donaldson, Robt. R.	Argyle
Elmes, Jos. H.	Eagle Bend
Erickson, Chas. W.	Marine Mills
Evenson, Harry	Sacred Heart
Havreberg, Arne H.	Olivia
Higbee, M. R.	Alberta Lee
Kernkamp, Howard	829 E. 3rd St., St. Paul
Lees, Arnold F.	Red Wing
McLaughlin, Wm.	Rush City
Metzger, George E.	99 Western Ave., Minneapolis
Olson, Lewis	McIntosh
Rasmussen, Hilmar	Tyler

Titterud, Oscar H.	Preston
Utter, B. A.	Triumph
Utter, G. W.	Sherburn
Weaver, Gilbert S.	Olivia

MISSISSIPPI

Horn, S. J.	Stratton
Knutzen, Virgil H.	Cleveland
Norton, Edwin S.	Greenville

,MISSOURI

Backus, L. S.	Columbia
Carver, Hubert C.	Higginsville
Churchhill, Thos. W.	St. Louis
Coughlin, John G.	Edina
Drake, Wm. C.	St. Joseph
Graham, Ralph	Sedalia
Lockhart, Ashe	1336 East 15th St., Kansas City
Morgan, Roy	Skidmore
Morgan, Samuel S.	Richmond
Piatt, Harry B.	St. Louis
Shulz, Carl A.	Independence

MONTANA

Back, Richard G.	Medina Lake
Boyd, Benj. W.	Shirley
Brawner, H. L.	Livingston
Gunn, Nelson T.	Butte
Mock, Clarence E.	Ryegate
Rathbun, R. A.	East Scobey
Rein, A. E.	Lewistown

NEBRASKA

Bohaby, Anton W.	Prague
Foltz, Wm. C.	Lincoln
Gruber, John M.	Lexington
Harold, Wm. E.	South Side Station, Omaha
Ojers, Samuel P.	Crete
Perrin, Floyd	Spencer
Prowett, H. L.	Fullerton
Salsbury, Jos. E.	Western
Sebright, Melvin R.	Crofton
Tumbleson, Benj. F.	Genoa
Viers, Silas B.	Dilles
Walther, Wm. A.	Moorefield

NEW JERSEY

Horner, Lewis D.	Woodstown
Plumer, M. L.	Branchville
Smillie, E. W.	Princeton

NEVADA

Baker, Frank H.	Gardnerville
Wright, David E.	323 Ralston St., Reno

NEW HAMPSHIRE

Law, Samuel T.	Colebrook
Sail, Clark E.	Dixville

NEW MEXICO

Freeman, Carl E.	Carrizozo
Miller, Melvin W.	Albuquerque

NEW YORK

Boschart, John K.	Camden
Goldberg, Samuel A.	Ithaca
Hagan, W. A.	204 Fairmount Ave., Ithaca
Hall, Arthur G.	Earlville
Howe, Ivan G.	Angelica
Krohn, Lester D.	1465 60th St., Brooklyn
Latshaw, Jos. B.	Ithaca
Pendergast, Walter M.	316 W. Willow St., Syracuse
Price, Leo	1309 Carroll St., Brooklyn
Schreiber, R. J.	Monticello
Selby, Stephens A.	429 W. 43rd St. New York City
Smith, Arthur L.	Mechanicsville
Sullivan, E. J.	Saratoga Springs
Tilson, Hobart W.	Oneonta
Weaver, Philip V.	Glen Cove, Long Island
Wilder, Joseph L.	Akron

NORTH CAROLINA

Flowe, B. Berry	Raleigh
Flowe, Homer P.	Raleigh
Herndon, Franklin C.	Rocky Mound

NORTH DAKOTA

Craig, D. E.	Edmore
Fitch, Edward Henry	McHenry
Foust, Harry L.	Agricultural College
McNiven, Alexander	Williston
Shigley, Jos. F.	Kenmare
Wilson, Roy O.	Stanley
Wilson, W. S.	Bowman

OHIO

Anderson, L.	Cedarville
Backus, Newell D.	Elyria
Bratten, J. W.	Lebanon
Brown, A. Walter	220 South Champion Ave., Columbus
DeTray, E. M.	840 Scott St., Napoleon
Doek, Norton	515 Ludlow Ave., Cincinnati
Dowens, E. Aaron	Mt. Sterling
Frost, Charles E.	Stryker
Gardner, J. P.	Kingston
Greenwood, Ross A.	Painesville
Hinkley, Emmett R.	738 Market St., Sandusky

Haver, E. V.	Conway
Howett, Mark W.	Brookville
Johns, Clarence A.	Medina
Kennedy, R. J.	Bucyrus
Lambert, F. A.	O. S. U., Columbus
Lasher, George H.	Rutland
McNeal, Neal	Burkettsville
Niday, C. Ross	Galliopolis
Ryper, S. T.	1221 Superior Ave., Dayton
Richards, L. J.	Delaware
Sater, Clinton	Hamilton
Schaftstall, A. C.	New Washington
Schlingman, A. S.	Eaton
Trone, Winson O.	96 Hower Ave., E. Cleveland
Turney, Carl D.	Germanatown
Wadsworth, Francis R.	Lindsey
Way, R. D.	3911 Perkins Ave., Cleveland
Wills, Frank E.	Westerville
Wickham, J. C.	Galion
Young, Frank A.	Delphos

OKLAHOMA

Gerber, D. W.	Oklahoma City
McCall, William R.	Oklahoma City
Moore, Herbert K.	Blackwell
Shuler, W. P.	Stillwater
Smith, Roy C.	123 E. Randolph St., Enid

OREGON

Beletski, Theodore	L. Wasco
Flack, Edwin R.	Enterprise
Gardner, Chas. M.	Portland
Gunster, Francis	Corvallis
Hanson, Peter	310 City Hall, Portland
Tate, H. L.	102 Custom House, Portland

PENNSYLVANIA

Brossman, Edw. E.	39th and Woodland Ave., Phila.
Church, Harry R.	Wilkesbarre
Faivre, Clovis F.	Latrobe
Ferron, Eugene	3718 Spring Garden St., Phila.
Gearhardt, D. C.	215 South Saint Clair St., Pittsburgh
Hendrick, M. Parks	Meadville
Ivens, Wm. H.	Haverford Ave., Phila.
Kremer, Wm. C.	110 Market St., Sunberry
Leinhardt, H. F.	102 Lancaster Ave., Wayne
Marshall, Freeman A.	Towanda
Reed, J. O.	230 East New St., Lancaster
Rockwell, C. S.	5128 Chestnut St., Phila.
Schmidt, John P.	200 West North Ave., Pittsburgh
Sheckler, Wm. E.	39th and Woodland Ave., Phila.

Waugh, Wm. J.	Washington
Wright, Harmon K.	Mulford Company, Phila
Caughman, Frederick P.	Columbia
Jacobs, Thos. B.	Newberry

SOUTH DAKOTA

Arbeiter Reinhold	Marion
Edminston, George A. H.	Rapid City
Griffin, W. C.	Rapid City
White, Timothy P.	Mitchell

TENNESSEE

Bell, Wm. J.	610 Broad St., Nashville
Cochran, Willard M.	Trenton
Fry, Hugh L.	Columbia
Haynes, M. C.	Springfield
Metcalf, Glen A.	Knoxville
Nowell, Lester D.	118 12th Avenue, Humbolt
Twitchell, J. M.	Nashville
Willis, Harry W.	Columbia

TEXAS

Bethell, Bailey O.	College Station
Bittick, Samuel G.	Fort Worth
Boyd, Robt.	Q. M. D., U. S. A., El Paso
Constable, George W.	Fort Bliss
Crabb, Lewis C.	Fort Worth
Cummins, W. M.	Eagle Pass
Green, Benj. F.	Cumby
Gregory, Wm. G.	Fort Worth
King, Paul R.	Remount No. 2., Fort Sam Houston
Lundell, A. O.	218 Live Stock Exchange Bldg., Fort Worth
Ruble, Jerry L.	Remount Station, Fort Bliss
Stahl, Benton M.	care Y. M. C. A., Fort Worth
Whitney, Clifford	College Station

UTAH

Dallas, John T.	Provo
McGinnis, Ralph W.	Ogden

VERMONT

Thomas, J.	Wells River
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VIRGINIA

Adair, Hugh M.	Bristol
Chesterman, R. L.	606 East Clay St., Richmond
Garvey, Jas. J.	Alexandria
Hays, Clark H.	Burkeville
McGuire, Francis X.	Warwick Hotel, Newport News

WASHINGTON

Ahnert, Ernest F.	646 Central Bldg., Seattle
Copess, S. A.	Waterville
Gallbraith, Alister R.	Garfield

Jones, Charles E.	North Yakima
Oliver, Karl M.	646 Central Bldg., Seattle
Richmond, Harry A.	Molson

WEST VIRGINIA

Hall, Clifford L.	126 North Park St., Wheeling
Holt, A. J.	Charleston
John, Carl E.	Buckhannon

WISCONSIN

Ames, C. H.	191 12th St., Milwaukee
Bleecker, Arthur B.	Lake Mills
Crump, Leroy S.	Ft. Atkinson
Heller, Edward	Chilton
Hollister, A. V.	Clinton
Kielmeier, S. G.	Cleveland
Lange, A. W.	Lake Mills
Larson, Vernon S.	Berlin
Lee, Jephtha D.	Menomonie
Nolechek, Wm. F.	Thorp
Paquette, J. D.	Cuba City
Swan, Wm. R.	Stevens Point
Veidig, C. C.	Luck
Warn, Chas. C.	Dodgeville

WYOMING

VanHoozer, A. L.	Powell
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CANADA

ALBERTA

Christie, Victor V.	Cardston
McCarthy, Nathaniel	Castor
MacMillan, Donald	High River
Patton, Wm. T.	Coutts
Pinhorn, Gerald C.	Coutts
Wilson, A. F.	Carmangay

BRITISH COLUMBIA

Bruce, Edw. A.	Agassiz
Sleeth, Trewelyn, E.	688-690 Sycamore St., Vancouver
Thompson, Wm.	Keremes

MANITOBA

Bowes, Elliott D.	Boisswain
Robinson, Major S.	Camp Hughes

NEW BRUNSWICK

Doyle, Lawrence S.	Moncton
Johnston, J. Fred	St. John

NOVA SCOTIA

Fraser, Heywood J.	New Glasgow
Jakemen, Wm. W.	Halifax
Keyes, Burton	118 Falmouth St., Sydney
MacIsaac, D. A.	St. Andrews

ONTARIO

Ball, Chas. A.	St. Thomas
Bell, Wm. R.	423 Dufferin Ave., London
Bone, David R.	900 Bloor St., Toronto
Boyd, Henry	Essex
Buchanan, Henry	Thamesville
Brown, Arthur	Sarnia
Carley, A. A.	117 Brant Ave., Brantford
Clapp, Walter H.	Dresden
Clegg, Robert	516 Indian Grove, Toronto
Cook, Robert H.	1127 Keele St., Toronto
Ford, Albert T.	Wingham
George, John H.	60 Silverton Ave., Toronto
Irvine, D. A.	1127 Keele St., Toronto
Johannes, Conrad J.	22 Garfield Ave., Hamilton
McBride, Wm. J.	Amherstburg
MacMaster, Donald A.	Dalkeith
Marriott, Wm. H.	2 Hartington Place, Ottawa
Morse, Jas. E.	3 Brock Crescent, Toronto
Moynihan, Wm.	135 Wright Ave., Toronto
Murray, Alexander G.	Ingersoll
O'Hara, Peter W.	Manotick
O'Hara, R. T.	Maxville
Orchard, George W.	Windsor
Reid, Jos. C.	Biological Laboratory, Ottawa
Rhody, Francis S.	Chatham
Robertson, Allan	1127 Keele St., Toronto
Rowe, Wm. B.	143 Park St., Chatham
Sparks, H. C.	Ottawa
Sparling, Wm.	Harrow
Stewart, A. D.	Ailsa Craig
Stork, Wm.	Brampton
Tennent, David C.	833 A. Bathurst St., Toronto
Torrie, Arthur R.	17 Hepbourne St., Toronto
Wallace, Chester L.	381 Demdas St., Toronto
Watson, Thos. E.	23 N. Main St., Niagara Falls
Wilson, Arthur M.	Wheatley

PRINCE EDWARD ISLE

Leekie, Andrew A.	Charleston
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PHILIPPINES

Brower, Geo. W.	care Dept. Quartermaster, Manila,
Cherry, Allen E.	Jolo, Jolo

QUEBEC

Couture, Jos. N. L.	65 Walker St., Montreal
Genereux, D.	438 Amhurst St., Montreal
James, Wm. H.	557 LaSalle Rd., Verdun
Longevin, J. O.	Hull

McIntosh, Charles	74 LaSalle Rd., Verdun
Poirier, J. O.	Trois Rivieres
Starnaman, George	40 Rielle Ave., Verdun
Weaver, Cecil H.	St. Lambert
Wilson, Louis A.	167 Commissioner St., Montreal
Wood, Wm. R.	167 Commissioner St., Montreal

PERMANENT COMMITTEE OF THE INTERNATIONAL VETERINARY CONGRESS

MINUTES OF THE MEETING AT LONDON, AUGUST, 1914.

AGENDA.

I. Opening by the President.

II. Minutes of the last meeting.

III. Report of the Secretary on the work of the permanent committee since the last meeting.

IV. Completion of § 3 of the Bye-laws.

It is advisable to add the following sentence:

“The Executive Committee must present the official Agenda of the Congress before its publication to the President of the Permanent Committee for the purpose of receiving his signature.”

V. Amendment of § 8 of the Bye-laws:

The following wording was recommended:

“The committee will meet immediately after the closing of the congress and elect the bureau. The bureau consists of a president, two vice-presidents, the secretary and an assistant-secretary. The election of members of the bureau will take place by unanimous assent or verbal or written voting. A simple majority will decide; in case of equal voting decision will be by drawing lots.

The committee has its secretary's office fixed at the Hague under the Patronage of the Dutch Ministry of Agriculture, Industry and Commerce.

When the secretary lives in the Netherlands and does not act as treasurer, a veterinary surgeon at the Hague may be appointed as treasurer, if the secretary desires it. When the secretary does not live in the Netherlands, a veterinary surgeon at the Hague shall be elected as treasurer and assistant-secretary. The treasurer is to be elected by the committee.”

FOOT NOTE:—Different circumstances prevented the publication of the minutes of the London meeting at an earlier date.

Leiden, April 1916.

The Secretary
Prof. Dr. D. A. DEJONG.

VI. Resolution of the Committee about the report of Messrs. Hess, von Ostertag, Schnürer, Rabieux and Titze, on disinfection of railway-cattle-waggons.

VII. Resolution of the Committee about the report of Messrs. Stockman, Rickmann, Hoogkramer and van Es, on the subject of oversea-transport of domestic animals.

VIII. Report of Mr. de Jong on the subject of an international commission for combating tuberculosis.

IX. Admission of the Italian language as an official language of the congress.

X. Place of meeting of the next congress.

XI. Propositions by members of the Committee.

Present: Mr. LYDTIN, President, Sir JOHN M'FADYEAN, Sir S. STOCKMAN, MESSRS. DEGIVE, HANGKA, (in place of Mr. BINDER), HOLTH (in place of Mr. HALM), HAPPICH, PERRONCITO, PIOT-BEY, and DE JONG, Secretary.

I. The President opened the meeting by thanking the members who had come to London, and stated that as ten members were present a quorum for business was available.

II. The Minutes of the previous meeting at Lyons were not read as they had been published and circulated to all the members.

III. The report of the Secretary on the work of the Committee in the period between the meeting at Lyons and the present one was approved.

The President gave some information about the installation of the Permanent Secretary's Office at the Hague. He said there were members who feared that the absolute liberty of the Committee might be menaced, but they forgot that the Dutch Government stated that the Committee remained independent.

Mr. DEGIVE said that for the moment there was no reason for fear but only reason for gratitude. For the future the liberty of the Committee ought to be guaranteed.

Mr. PERRONCITO said that the members ought to be grateful to the Dutch Government.

The President remarked that the whole question was threshed out and closed at Lyons. The Committee remained free. We know now that from the balance of the Congress at the Hague, the Dutch Government had given a subsidy of 2626.14 guilders, for the year 1913 1000 guilders, and for future years an annual subsidy of 2000

guilders had been promised. There existed no reason whatever to discuss the matter at the Congress.

IV. The proposal to amend § 3 of the Bye-laws of the Committee was accepted unanimously. The French translation is, following a proposal of Mr. Degive, to read as follows:

“L'ordre du jour officiel des congrès ne peut être publié qu'après avoir été approuvé et signé par le Président de la commission permanente des congrès internationaux de médecine vétérinaire.”

V. Amendment of § 8 of the Bye-laws of the Committee is accepted, but with modification of the German text of the second sentence as follows:

“Der Ausschuss hat sein ständiges, unter dem Protektorat des holländischen Ministeriums für Landwirtschaft, Gewerbe und Handel stehendes Sekretariat im Haag.”

The French text of the second passage is to read as follows:

“La commission a son secrétariat permanent à la Haye sous le Patronage du Ministère hollandais de l'Agriculture, de l'Industrie et du Commerce.”

In English the second sentence reads as follows:

“The office of the Secretary to the Permanent Committee is located at the Hague under the Patronage of the Dutch Minister of Agriculture, Industry and Commerce.”

The German text of the third sentence was accepted without alteration. The French text is to read “secrétaire suppléant” for “secrétaire adjoint” and the English text “deputy-secretary” for “assistant-secretary.”

VI. Sir STEWART STOCKMAN gave information about the report on the disinfection of waggons. He regretted the mistake of the English Organizing Committee in connection with this matter, and gave the history of the question. It was difficult to obtain a reply from the reporters. Only Mr. TITZE answered by sending his report, but it was impossible to prepare a joint report. There was no reply from the other reporters, and it seemed advisable to postpone the joint report to the next Congress.

This conclusion was accepted and was to be communicated to the Congress.

VII. Sir STEWART STOCKMAN further said that the preliminary report of Mr. HOOGKAMER with the remarks of the other reporters could not be presented as a joint-report to the Congress, be-

cause the remaining time was too short. Mr. DE JONG said that Mr. HOOBKAMER addressed to him (Mr. DE JONG) his report with the remarks of the other reporters and correspondence about it. He had had it printed and had sent a specimen to the members of the Committee.

Sir S. STOCKMAN said that these reports would be reproduced and distributed to the members of the congress.

VIII. The report of Mr. DE JONG on the subject of the opportuneness of an international committee for combating tuberculosis was printed and distributed to the different members of the Permanent Committee. The President proposed to present the report for consideration by the Congress. This proposition was agreed to.

IX. Mr. PERRONCITO asked leave to address the meeting on the subject of the admission of the Italian language as an official Congress language. He said that the Italian Government could not send an official delegate if the Italian language were not accepted as an official one. He thought that in any case the Permanent Committee ought to recommend to the Congress that Italian be an official language for the discussions, and that the relative amendment to § 25 of the Congress bye-laws should be made. In this case he thought that Italy would invite the next Congress.

The President and Mr. PIOT-BEY referred to the inevitable augmentation of the expenses of the Congress if the proposal of Mr. PERRONCITO was accepted. That was indeed the difficulty.

Sir STOCKMAN said that one language more would cost about £ 1000.

Mr. DE JONG thought this estimate too high and recommended the proposal.

Mr. HAPPICH instanced the utility of accepting the Slavonian languages. The result would be a considerable augmentation of the members.

Sir S. STOCKMAN said that he would support the proposal to introduce the Italian language.

Sir JOHN M'FADYEAN said, as President of this Congress, he would allow discussions in the Italian language, but he would prefer to delay the question of the alteration of § 25, as at this Congress the majority of the members are English-speaking.

Mr. PERRONCITO again said that in that case it would be impossible for Italy to send representatives to the next Congress.

The President indicated the great difficulties which would arise if the Italian language was added to the others.

Mr. PERRONCITO asked for a copy of a decision of the Committee, indicating the desirability of introducing the Italian language.

Mr. LYDTIN said this was impossible. The Committee could only propose the question to the Congress.

Mr. PERRONCITO said he had heard from Sir S. STOCKMAN and Mr. DE JONG that the Congress could accept the proposal without discussion.

Sir S. STOCKMAN and Mr. DE JONG explained that this was possible, but that the Congress could not be forced to accept the proposal.

Mr. PERRONCITO said that in this case Italy could not invite the Congress.

Mr. LYDTIN replied that Italy in this case only desires to serve her own interests, but that notwithstanding this he would propose:

- a. Italian language for the discussions and
- b. Amendment of § 25.

Mr. DEGIVE thought it possible to reduce the expenses by diminishing the number of reporters. He supported the proposition of the Chairman, on the understanding that Italy would invite the Congress. On this he formulated a proposal.

Mr. HAPPICH said that possibly Russia would also invite the next Congress.

Mr. LYDTIN said that the Congress ought to be free to vote on the single question, and that the proposal of Mr. DEGIVE was dangerous in this respect. He maintained his proposal without any addition whatever. This was accepted unanimously.

Mr. LYDTIN proposed further that the two parts of the proposal should be brought before the Congress by the London Organising Committee, indicating that the matter had been approved by the meeting of the Permanent Committee. This proposal was also accepted.

Mr. DEGIVE said that now Mr. PERRONCITO could communicate with his Government about the next Congress, waiting the decision of the Congress at London.

X. The subject "Place of the next Congress" was postponed, a resolution not being possible on account of the war. Mr. DEGIVE

however, thought it advisable to undertake non-official steps regarding the next place. The meeting thought it better to wait.

XI. SIR S. STOCKMAN, Honorary Secretary of the London Congress, proposed two alterations of the Bye-laws of the Congress. The first was the modification of § 7 as follows:

“To assist in the preliminary work of future Congresses a standing National Committee of not less than three members shall be formed in each country. The names and addresses of the members of each Committee, and the name and address of the Secretary of each Committee shall be forwarded to the Secretary of the Permanent Committee for record, and each Committee shall advise the Secretary of the Permanent Committee of any alteration in its constitution which may have taken place. The functions of National Committees shall be restricted to their respective countries.”

“The rest of § 7 to remain unchanged.”

SIR S. STOCKMAN explained the reasons for this proposal.

The Président thought that this alteration of the Bye-laws would not insure more active National Committees, but he proposed to treat this proposal at the closing meeting of the Congress. This was accepted.

Mr. LYDTIN proposed the same with regard to the second proposal of Sir S. STOCKMAN, concerning alteration of § 47, which ran as follows:

Proposed addition to § 47:

“The funds under b., however, will not be subject to § 48, and 50, unless the donors have made the contrary a condition of their gifts, but the Permanent Committee may if they so desire, require that a portion of any surplus under b. not exceeding the sum of twenty pounds, be devoted to the expenses of administration of the Permanent Committee.

The meeting accepted the proposal to bring this alteration before the closing meeting of the Congress.

Mr. DEGIVE proposed the adhesion of the Permanent committee to the Association Centrale des Congrès internationaux at Brussels, which institution was supported by Carnegie funds. The meeting decided that the Permanent Committee could adhere (*peut s'applier*).

The CHAIRMAN thanked the English members for their hospitality, and for preparing the London Congress, which undoubtedly would prove to be a success, and all the members for their much ap-

preciated presence. SIR STEWART STOCKMAN offered his thanks in the name of Sir JOHN M'FADYEAN (who had been called from the meeting), for the assistance given by the President and the members of the Permanent Committee and for the honour they had bestowed on the Congress by coming to London. The meeting was then closed. Mr. HANGKA left before the closing.

The President,
Dr. A. LYDTIN

The Secretary,
Dr. D. A. DE JONG.

THE VIRGINIA STATE VETERINARY MEDICAL ASSOCIATION

The Virginia State Veterinary Medical Association met at Ocean View Hotel, July 13 and 14, 1916. This was one of the best summer meetings the association has experienced, and a large percentage of the members were present.

The papers were all good and there were a number of splendid addresses. Prof. Saunders, Professor of Dairy and Animal Husbandry at V.P.L., gave a splendid address on "The Veterinarian as a City Health Official." Dr. Henry Marshall, B.A.I., Richmond, Va., gave a splendid address on "Post Mortem Conditions of Animals Reacting from the Tuberculin Test."

Several members of the association have joined the army and are very much pleased with the conditions under the Hay Bill.

Dr. J. G. Fernyhough, State Veterinarian and Chairman of the Legislative Committee of the association, gave a full and detailed report of his work as chairman in connection with the passage of the army veterinary bill. He read a number of letters from Dr. Horace Hoskins setting forth the facts that he had been of great assistance to Dr. Hoskins in arranging interviews with Congressman Hay and Senator Martin, without whose assistance Dr. Hoskins thought the bill would not have passed at this session of Congress. Dr. Fernyhough was thanked by the association for the clever way in which he handled this work. I am sure the Virginia Association has a man of power and influence as State Veterinarian and Chairman of this committee.

W. G. CHRISMAN, Secretary.

REVIEW

VETERINARY BACTERIOLOGY: A TREATISE ON THE BACTERIA YEASTS, MOLDS AND PROTOZOA PATHOGENIC FOR DOMESTIC ANIMALS

ROBERT EARL BUCHANAN, Ph.D.

Professor of Bacteriology in the Iowa State College of Agriculture
and Mechanical Arts, and

CHAS. MURRAY, B.Sc., D.V.M.,

Associate Professor of Veterinary Bacteriology of the same institution.

Second edition thoroughly revised. Philadelphia and London.

W. B. Saunders Co., 1916. pp. 590.

The preparation of a text book in bacteriology has become exceedingly difficult because of the voluminous literature on the subject and further because there are still pronounced differences of opinion on many phases of the subject. The authors of this volume have taken for their task the preparation of a text for veterinary students covering the technic necessary for the study and identification of microorganisms and a description of those species pathogenic for domesticated animals together with a few somewhat closely related forms. Fungi, protozoa and filterable viruses are also discussed. The subject matter is well chosen and the sequence of presentation is good. A commendable variety of bacteriological methods including preparation of media and stains is given. The discussion of immunity is quite extensive but that on the bacteriology of milk is brief.

The volume is divided into seven sections which cover the subject matter that would be expected in such a book. They are as follows: Section I. Morphology, physiology and classification of bacteria. II. Laboratory methods and technic. III. Bacteria and the resistance of the animal body to disease. IV. Pathogenic microorganisms exclusive of the protozoa. V. Pathogenic protozoa. VI. Infectious diseases in which the specific cause is not certainly known. VII. Bacteria of water and food.

As a text, the details of method and the description of species tend to be general rather than complete, direct and definite. This is fairly illustrated in the definition of *Micrococcus*. "This genus is frequently defined to include *Staphylococcus*, just discussed. It may be differentiated generally by its Gram-negative character and the very common production of yellow pigment. Spores are not produced. The motile species are sometimes segregated under the heading of *Planococcus*." It is doubtful if a beginner will obtain

from this definition a clear conception of just what a micrococcus is and just how it is to be identified.

Although there is given a list of authors, to whom reference is made in the text, it is to be regretted that there are no bibliographies or references whereby a student may ascertain the sources of the statements made or to enable him to consult the literature on the different phases of the subject. While the literature is too extensive to admit of complete references, a text book, which should be a key to the knowledge of the subject, should contain some of the more important references to the results of original research or in other ways direct the student to the sources of information.

The authors have adopted a classification of bacteria that is difficult to account for and which from a scientific point of view seems to have little to commend it. The older and well recognized classifications of bacteria are not mentioned with the exception of Migula's which is referred to only. The later and more comprehensive classifications of Fisher are likewise omitted. The authors have adopted a system of grouping pathogenic bacteria. They refer to the streptococcus group, diplococcus group, anthrax group, dog-distemper group, etc. The somewhat antiquated genera of *Diplococcus* and *Staphylococcus* are revived. The statement is made that "the groupings used in the text will be based on the relationships rather than pathogenic resemblances". It is unfortunate that a text book to be used by beginners in bacteriology should ignore recognized scientific classifications without setting forth definite and sufficient reasons for rejecting them and for the terms actually employed. While it is true that in the study of the etiology of a disease the classification of the incriminated organism may be of little significance, the fact remains that all there is to make bacteriology a science rests in the classification and identification of the organisms, their physiologic, biochemic, and in case of disease producing organisms, pathogenic properties and the methods for their determination. In a broader sense, tissue reactions and immunity may perhaps be included but they do not interfere with the basic biologic principle of classifying organisms into families and genera according to their morphology. Groups of bacteria (including a species and its varieties) have long been recognized but the data are not given to justify the extreme position that genera are so closely related as to require group designations such as the blackleg-tetanus group. The difficulty in the classification

of bacteria does not rest with the generic characters but with the species which are determined by their physiologic and biochemic properties which may be more or less influenced by environment.

In the methods given for diagnosing infectious diseases by the aid of their organisms, either directly or by specific tests, there seems to be a lack of discrimination that comes with practical experience. Thus, Konew's precipitation test for the diagnosis of glanders, which has been thoroughly tried and generally found to be unsatisfactory, is given as one of the important methods of diagnosis. The authors have not shown as full an appreciation of the responsibility of the makers of text books to the students who use them as most teachers like to see.

The text is illuminated with 209 illustrations most of which are well chosen and instructive. V.A.M.

COMMUNICATIONS

EXECUTIVE BOARD AND DUES

To the Editor:—Before this issue reaches the members they will have received a letter enclosing the official ballot for the nomination of candidates for the office of District Member of the Executive Board, a statement of dues for those in arrears and a membership card for those having paid in full.

The letter should be read carefully and its instructions fully carried out to avert unnecessary correspondence and hasten the election of the members of the administrative body.

It must be remembered that the retiring secretary did not send out statements of dues during 1916 and that the members are therefore in arrears through no fault of their own. The dues for the years prior to 1916 are three dollars per annum but for 1916 they are five dollars, the new constitution and by-laws adopted at Detroit providing for the increase of two dollars.

It must furthermore be remembered that the quotation from the by-laws transcribed on the statements and which states that the dues are payable in advance on the 1st of January does not apply to this year.

If your statement seems to be incorrect or can be proven incorrect by receipts in your possession, the Secretary's office will be pleased to take the matter up with you promptly with the view of eliminating as many errors as possible from the new ledger to which all accounts will soon be transferred.

Very respectfully, L. A. MERRILLAT, Sec'y.

MODERN REQUIREMENTS IN THE SHOEING OF HORSES —ESPECIALLY IN CITIES

New York, September 16th, 1916.

EDITOR JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION:—A paper which I presented to the New York State Veterinary Medical Society at its recent meeting in Ithaca, and which you published in your September issue, on the above subject, seems to have struck a sympathetic chord; the vibrations from which, have reached me here in my office from all points of the compass in the form of letters from readers of the *Journal* who, having read the article, seem to have become very much interested and desire to know many things in connection with the method of shoeing that I proposed. Among others the name of the shoe which I referred to and from whom it can be procured I started to reply to them personally, and referred others to the firm manufacturing the shoe; but the inquiries have become so numerous, that I am compelled to reply to them through the *Journal*, asking to be pardoned for not replying to the letters individually. At the same time I want to express my intense gratification at the interest manifested by my brothers in the profession, in so worthy an object as that of a safe and humane shoeing of our faithful friend and patient toiler, the horse.

The two questions in all the letters, the answers to which will be a key to all the information desired, are, the name of the shoe and where to procure it, as once they have that they can get all the data on the shoe they desire from the manufacturers.

The shoe is called the "Spring Step" and it can be supplied and put on at any horse shoer's establishment. If, however, any difficulty is experienced in getting horse shoers to supply them, they can be procured by writing directly to the Revere Rubber Company, 59 Reade Street, New York. In writing to the firm for them, it will be well to address communications to Mr. Wm. J. Kent, Manager of the New York branch, who is the man who perfected the shoe, and can give valuable information. Especially as he is an expert on the horse's foot, having at one time been a shoer of high-class horses.

ROBERT W. ELLIS.

SHOEING FORGE*

Dear sir:—I am sending you herewith a drawing of a field forge fire. We are supposed to do cold-shoeing on battery horses but the shoeing smiths do not appreciate the cold methods. Necessity is the mother of invention and our smiths made a forge from available material.

The iron work of the fire-box is made from hammered out corrugated iron, such as is used for roofing store-houses, etc., spindles,

*Courtesy of Dr. Torrance,

gears and bolts being obtained from old push bikes. There are quite a number of these fires in the field now and they apparently answer the purpose for which they were intended. The Sergeant-Farrier has just told me that this fire will melt iron.

The weather has been tropical the past two weeks, and the dust beyond description. Have had a little mange but have managed to treat it ourselves without having to evacuate any to the hospitals. Watson, Cameron, Vickers and myself are using calcium sulphide solution and we make it by boiling over trench fires in empty oil drums. About three washings every eight days seem to check the disease nicely. As a preventive I use a mixture of soap-suds and bichloride of mercury 1-1000. Our apparatus is very rudimentary. It is very difficult to obtain appliances in the field. Am very busy now, V. O.'s being compelled to visit all horses "at least once daily"—the order reads. My area covers eight miles, possibly nine miles, I am not quite sure. Anyhow, I keep two or three horses going.

Some time ago I found an old farm cart and the engineers have painted it up and I am now a "self-contained unit." My men have found, borrowed and stolen sufficient harness and I can easily get a horse so I move myself (bed and board) from place to place.

Lt. Col. J. H. D. Smith has gone to England. I do not know why and we have Lt. Col. Wilson from Stonecliff as A.O.V.S. for this Division.

I was surprised to learn that Belgium is not more than twice or three times the size of Carlton County, Ontario and has in peace times a population of six millions. Now I appreciate the intense system of farming which is practiced in this country, practically every foot of available soil being under cultivation.

Looks as if we are to experience another winter out here. However, next month will decide that I suppose.

(Signed) T. CHARLES EVANS.

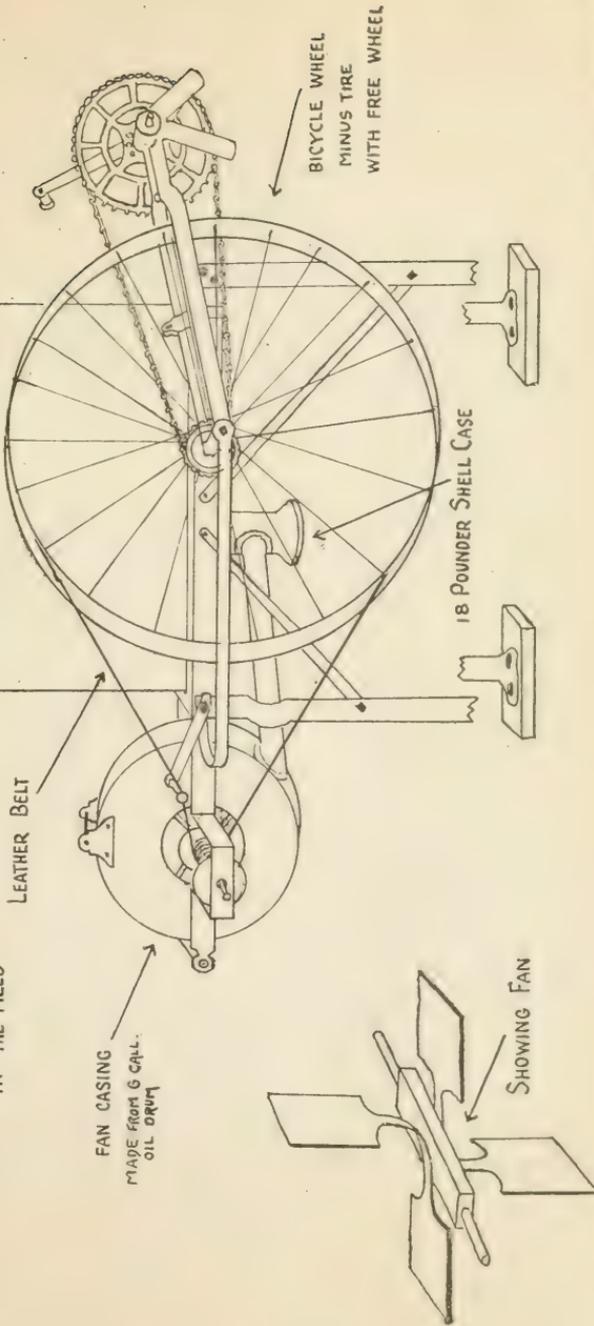
Dr. J. O. F. Price, formerly of Memphis, Tenn., is now stationed at Waterloo, Iowa.

Dr. J. J. Frey, formerly of Manhattan, Kansas, has removed to 3400 Indiana Ave., Chicago, Ill.

An address on the "Humane Treatment of Animals with Special Reference to Shipping Calves and Poultry" was delivered by Dr. V. A. Moore, at the 27th annual convention of the Societies for the Prevention of Cruelty to Children and Animals of New York State, at its recent meeting at Watertown, N. Y.

SHOEING FORGE MARK I

MADE BY J. D. THACKRAY SHOEMING SMITH
5TH BDE C.F.A.
IN THE FIELD



DRAWN BY H. HARRIS
6/12/16.

NECROLOGY

WILLIAM LOUIS ROSWELL

Dr. Wm. L. Roswell died at his home, 122 Fourth Ave., Corry, Pa., from an infection in the hand, received while treating a cow. He was a member of the A.V.M.A. and an inspector in the Pennsylvania State Livestock Sanitary Board. Dr. Roswell was born in Brooklyn, N. Y., June 27, 1880. He attended the public schools at Brooklyn and was graduated from the Veterinary Department of the University of Pennsylvania in 1914; went to Corry, Pa., and started in practice immediately after his graduation and was meeting with success. He established a good reputation in his community and had brilliant prospects for a useful career as a private practitioner in that community.

He attended the Detroit meeting and was as well as usual, but after his return to Corry developed a case of septicemia from which he died on September 13th, leaving a wife and one child.

MISCELLANEOUS

VETERINARY LAW IN KENTUCKY. An act was passed by the last General Assembly and approved March 24, 1916, which regulates the practice of veterinary medicine, surgery and dentistry in the State of Kentucky. A state board of veterinary examiners was created which shall hold meetings whenever necessary for the purpose of receiving applications for certificate of license or the examination of candidates for such certificates.

All persons who have been practising veterinary medicine, surgery or dentistry in the state for one year next prior to the passage of the act and these holding diplomas from recognized veterinary colleges are entitled to a license upon application to the board and its approval and the payment of a fee of \$7.00. The licenses must be recorded in the office of the county clerk in which the licensee resides. Until the license is recorded the holder shall not exercise any of the rights and privileges therein conferred.—*News, Willmington, Ky.*

DOMESTIC ANIMALS AND POLIOMYELITIS. In order that exact information may be obtained as to whether poliomyelitis occurs in domestic animals, and if so, whether the latter play any part in the

transmission of the disease, all the nurses in the department now visiting cases of poliomyelitis have been instructed to make a special inquiry regarding animals. If they find anything suspicious they will report the matter immediately and the suspected animals will be removed by the Department of Health for observation. A veterinarian will then examine the animal and if the suspicion is justified, the animal will be killed and an anatomical examination made.

In addition to this, arrangements have been made, whereby a veterinarian of the Department will visit the shelter of the Society for the Prevention of Cruelty to Animals to see whether any suspected cases of animal infection are there encountered.—*Weekly Bulletin, Dept. of Health, New York.*

The following named employees of the Bureau of Animal Industry have been assigned to duty along the Mexican border to cooperate with the War Department in the inspection and reinspection of meat and meat food products supplied to the troops on duty in that section. They are also observing the conditions under which these products are handled and distributed with a view to obtaining sanitary conditions:

- Dr. John R. Aufente, Eagle Pass, Texas,
- Dr. T. A. Bray, El Paso, Texas,
Mr. W. A. Kessler, assisting Dr. Bray,
- Dr. A. C. Drach, Laredo, Texas,
- Dr. J. E. Dwyer, Nogales, Arizona,
- Dr. Smith V. Ewers, Douglass, Arizona,
- Dr. R. M. Mullings, San Antonio, Texas,
Mr. J. L. Boyle, lay inspector, assisting Dr. Mullings,
- Dr. W. F. Osborne, McAllen, Texas,
- Dr. John W. Taggart, Columbus, New Mexico,
- Dr. C. M. Walton, Brownsville, Texas,
Mr. P. J. Brackin, lay inspector, assisting Dr. Walton.

In addition to the above assignments Dr. W. O. Trone, traveling veterinary inspector, has been detailed to assist in this work by investigating its conduct at the various headquarters. Dr. Boyd Baldwin is also assigned to army work at Chicago.

Dr. T. O. Booth has removed from Ash Grove, Mo., to Amarillo, Texas.

Dr. F. W. Schofield of the Department of Bacteriology, Ontario Veterinary College, Toronto, Canada, gives his future address as Union Medical College, Seoul, Korea.

We have received an inquiry relative to one Robert Hall who proposes to solicit money for the American Society of Foreign Veterinarians. We have no knowledge of such a society or of the solicitor. Every precaution should be taken to prevent the misappropriation of funds intended for foreign veterinarians in need of aid.

The marriage of Miss Fay Allison Scott of Middletown to Dr. C. W. Lynn of West Point, Ia., occurred at the home of the bride September 6. After a trip to the Rockies they will settle at West Point, where Dr. Lynn has an extensive practice.

HOG CHOLERA. Order No. 6 of the Department of Agriculture of New York State, requires that all persons shipping or bringing into the state any virus, virulent blood or similar product for treating swine, preventing or controlling hog cholera, shall report to the Commissioner of Agriculture; the name and quantity of such product brought in; name and address of shipper; name and address of person to whom such product is delivered; method and date of such shipment.

Any person using virulent blood must do so in accordance with Circular No. 7, issued by the Department and must inform the Commissioner at least five days prior to its use; the date and place where the product is to be used; the name and address of the owner of the swine and a statement that swine so treated will be isolated from susceptible animals.

Unless for immediate slaughter, swine shipped into public steek yards; shall not be removed without special permit from the Commissioner.

Swine coming from herds in which hog cholera has existed within sixty days prior to removal shall be slaughtered under the supervision of a veterinarian and a written report of the conditions sent to the Commissioner within seven days.

Swine not intended for immediate slaughter must be transported in disinfected cars or cars not previously used for hauling swine; they shall be kept in pens properly disinfected or pens not previously used for swine.

Carcasses of swine, dead of hog cholera shall be cremated; boiled or treated with steam at boiling temperature for two hours continuously, or buried with quick lime two feet under ground, 100 feet away from streams or other source of drainage.

According to the weekly Roster of the Medical Organizations of Philadelphia and vicinity. "The War Department at Washington has made the significant decision that the Government cannot accept the offer of the services of any doctor as a volunteer surgeon in the Army or Navy who is not a member in good standing in his County Medical Society, and, therefore, of the American Medical Society." Although the above statement refers to physicians it would also seem to have significance for veterinarians.

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OF THE

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PIERRE A. FISH, Editor

ITHACA, N. Y.

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No. 2.

Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary L. A. Merrillat, 1827 S. Wabash Ave., Chicago, Ill. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

TISSUE FLUID

Our usual conception has been to consider what we ordinarily term the lymph as fundamentally concerned in relation to the tissue spaces of the body. The colorless fluid of the tissues was called lymph long before the lymphatics were discovered, and it was therefore natural that the name should apply when the vessels containing this fluid were discovered.

Tissue fluid should be differentiated from tissue juice. The latter term refers to the fluid which may be pressed out of the tissue, as for example, the muscle or gland juice, each of which may vary in certain of its characteristics. The tissue fluid is the fluid which is present in the tissue spaces of the living animal, and includes the fluid of the serous cavities, the cerebro-spinal fluid and the aqueous humor.

It has been known for years that the plasma of the blood is constantly exuded from the blood capillaries into the tissue spaces, so that the cells of the supporting tissues and the special cells of each organ are bathed in fluid. With the varying activity of the cells, the fluid becomes laden with nutritive and stimulative substances and waste products so that its composition varies wide-

ly. In addition to these primary small spaces always containing fluid, there are also special systems of large spaces arising from small spaces by a definite method containing a fluid different from the other fluids in the body, as for example, the subarachnoid spaces which surround the central nervous system. It is now known that the cerebro-spinal fluid is secreted by a special organ and contains certain products of internal secretion. The pia-arachnoid membrane has an interesting structure and development. The arachnoidal villi are lacelike projections of the arachnoid into the dura, lying along the dural veins and lead to the dural sinuses. These villi have been shown to be the main organs of absorption for the cerebro-spinal fluid and are covered with a layer of mesothelial cells which tend to become more abundant at the tips, forming cell nests. Other relatively large systems of spaces are in the internal ear and in the eye.

Experiments have shown that the central nervous system has a special system of tissue spaces beginning with the spaces surrounding every individual nerve cell of the brain extending into the subarachnoid area and are drained, not by lymphatics, but by the arachnoidal villi into the cerebral sinuses. A similar system of absorbents, the pectinate villi, leading to the canal of Schlemm has been shown for the anterior chamber of the eye. When injections are made into the peritoneal cavity the results vary widely. Although our knowledge is far from complete, it has been shown that certain true solutions are absorbed by the blood vessels. On the other hand, it is known that granules are in large part taken up by special large phagocytic cells some of which pass into the lymphatics of the diaphragm. This suggests a partial differentiation in absorption between blood vessels and lymphatics. A partial differentiation of function of this character is a familiar phenomenon in the intestinal villi where most of the fat passes into the central lacteal while the carbohydrates pass directly into the blood stream. Investigations have shown that the blood vessels are the primary absorbents, and that subsequently partial systems of absorbents develop, such as the arachnoidal villi and the lymphatics which drain into the veins.

The foregoing statements are based largely on an article on "The Method of Growth of the Lymphatic System" by Florence R. Sabin, in a recent number of *Science*. Much discussion has centered around the lymphatics as to whether they represent an

open or closed system. The older view is that they are an open system and that the lymphatics began in wide mouths in the walls of the various cavities of the body, but these openings proved difficult to find. In the newer view of the lymphatics as a closed system, the lymphatic capillaries are regarded as definite vessels completely lined by endothelium and related to the tissue spaces just as blood capillaries are.

The study of the conditions in the adult system seems to be inadequate for a solution of the question. Embryology or the study of the development of the structures offers more promise, and Miss Sabin has adduced some interesting facts bearing upon the lymphatics as a closed system.

The lymphatic system begins in the human embryo during the sixth week of development. The first lymphatics are blunt buds which come from the internal jugular veins at the root of the neck. They are filled with blood which backs into them from the vein. These buds soon establish connection with each other and form a plexus which develops into a large sac. From this sac lymphatics grow out to the skin of the head and neck, to the thorax and arm and partially invade the deep structures of the head. The sac itself is transformed into different groups of lymph glands which might be analyzed as the primary lymph glands of the neck and these bear a definite relation to the secondary glands which form along the ducts growing out from the sac. Later stages show the development of lymphatic buds from some of the abdominal veins. The main abdominal lymphatics begin as a retroperitoneal sac which develops from a vein connecting the two Wolffian bodies. This sac is the key for the study of the abdominal lymphatics. The retroperitoneal sac and the paired iliac sacs become connected with the left jugular sac by means of the thoracic duct. There is thus formed a primary lymphatic system of sacs connected by the thoracic duct. In a general way lymphatic vessels from the jugular sacs grow to the head, thorax and thoracic viscera; those from the retroperitoneal sac to the abdominal viscera and in part to the thoracic viscera; and those from the iliac sacs to the abdominal walls and legs. The view held by Miss Sabin, based largely upon embryological evidence, is that the lymphatics arise from the endothelium of the veins and grow by the multiplication of endothelial cells, as opposed to the theory that the lymphatics arise from tissue spaces and grow by adding on more tissue spaces.

Up to the sixth week in the human embryo, the only absorbents are the veins. Subsequently other systems develop, as the lymphatic vessels and arachnoidal villi to assist in the function of absorption. To facilitate clearness the term "plasma" should be restricted to the fluid within the blood vessels, "lymph" to the fluid within the lymphatics and "tissue fluid" to the fluid within the tissue spaces.

P. A. F.

THE POISONING OF STOCK BY LARKSPUR

The U. S. Department of Agriculture has found that, with the exception of loco poisoning, larkspur poisoning is the greatest cause of loss in western cattle herds. Losses, it is said, are reported from all the mountain regions between Mexico and Canada and from the Rocky Mountains on the East to the coast on the West.

Experiments indicate that the various species of larkspurs are poisonous to cattle and horses, but not to sheep. Except under unusual circumstances it was found that horses do not eat enough of the plant to produce any ill effect. From a practical standpoint it may be said that larkspur affects cattle only. It was found that a quantity of the weed equal to at least 3 per cent of the weight of the animal was necessary to produce poisoning.

The fact that sheep can apparently feed upon larkspur with impunity, may be utilized to protect the cattle. The larkspur infested range may be used for sheep rather than cattle; or the grazing on these areas may be arranged in such a way that the larkspur shall be first eaten down by the sheep.

Generally speaking, there are two groups of larkspur—the tall and the low. The low disappear from the range early in July and cases of poisoning from them are usually confined to the months of May and June. The tall larkspurs live through the summer season, making their appearance in the early spring. This is the time in which they are most poisonous. After blossoming, their poisonous character appears to diminish. Ultimately it disappears and the plant dries up, although the seeds remain poisonous. In Colorado most of the cases of poisoning from the tall larkspur occur in May and June, with sporadic cases in July. In other localities where blossoming occurs later, poisoning may take place as late as August or even September.

The first evidence that the animal has been poisoned is frequently shown by falling down. After a short interval it will

probably regain its feet only to fall again. As the effect of the poison wears off, the animal is able to keep on its feet for longer and longer periods and finally walks off very much as if nothing had happened. In severer cases it is unable to regain its feet and dies.

Experiments indicate that beneficial results may be obtained by treating the poisoned animals with hypodermic injections of physostigmin salicylate, pilocarpin hydrochloride, and strychnin sulphate. If necessary these treatments may be supplemented by hypodermic injections of whiskey.

P. A. F.

EUROPEAN CHRONICLES

Bois Jerome.

THE DEFENSE OF THE ORGANISM BY PHAGOCYTES. — Several months ago there was presented at one of the great scientific meetings of the Institute in Paris a long communication by Professor Dastre of the Academie des Sciences, on a subject of intense interest, viz: "Wounds of the Battlefields and the Natural Reacting Organism," and Professor Kaufmann of Alfort has published in the *Recueil* a lengthy review of the original and considered at large the five chapters it contained.

Chapter I refers to the danger of wounds of the battlefields and their infection by microbes. The second treats of the defense of the organism by the phagocytes. The third examines the defense by the humors (bacteriolytins, antitoxins, vaccines, immunization, sero-therapy, antigens.) Chapter 4 treats of the mechanism of the immunizing action (hemolysis, alexin, sensitization, deviation of the complement,) etc. The last, chapter 5, relates to the treatment of wounds of the battlefields.

All these chapters are treated in a masterly way and I regret that their length does not permit me to consider them as they deserve.

Chapter 2, however, has appeared to me as the one that would interest our readers most, for the practical information it gives and on that account, I extract it from Kaufmann's review.

PHAGOCYTES OR DEVOURING CELLS are cells which possess the faculty of moving and adhering to solid objects, to envelop them and if these are sufficiently small to swallow them and finally digest them and promote their disappearance. If it happens that the digestion cannot take place, they carry in themselves, to the

intestinal mucous membranes, whatever they have eaten, deposit it or are disorganized and disappear.

The principal phagocytes are the white blood corpuscles, the *leucocytes*. By their movement they can pass out of the blood vessels and spread in the surrounding tissues, where there are microbes more or less infectious, and attract them. This attraction, which takes place in the inflamed tissues, filled with blood and distended, is due to a chemical substance, produced by the microbe spreading in the environment, acts on the leucocyte, calls it, so to speak, out of the vessel and guides it towards its prey. The outward motion of the leucocytes from the inflamed blood vessels (*diapedesis*) takes place without escape of blood. The white corpuscle does not cut through the vascular walls, it slips between its elements and travels through the interstices and guided by *chemiotropism* goes towards the invading microbial enemy. For the defense of the organism, legions of leucocytes are ready. They pass to the spot and invade the region contaminated by the microbes.

In the wound, covered with serous exudation, the battle is fought between the microbes and the phagocytes. Ordinarily, the latter pass to the bacteria, envelop and swallow them and surround them with their dissolving secretions, digest and absorb them. In ordinary conditions, the leucocytes treat in this manner all foreign particles that are within their reach, when they are sufficiently small or non-resistant to envelopment. If the foreign body is too voluminous to be the prey of only one leucocyte, others come, they associate and attach themselves to its surface, dilute it and finally overcome it. In this way, the minute objects which are accidentally introduced in the fortress of the organism, are treated.

The phagocytes destroy their enemies and use them for food.

The number of phagocytes taking part in this fight, must be considerable. Each cubic millimeter of blood contains about 7000: the lymph contains still more and the connective tissue has multitudes. In the phagocyte army, the most active class is the *polynuclears*, the *migrating* cells of the connective tissue form the reserve, and the territorial mobilization, in case of need, is represented by the *fixed cells* of that same connective tissue.

In the battle between the phagocytes and the microbial infection, the victory depends on several factors, namely: the number of fighters, the strength of the army and the various influences which may make the relative force vary.

The strength of the microbes is poison: they have no other. The toxic substance secreted, helps to repulse the phagocytes or to paralyze and destroy them after it has been in contact with or has been swallowed. Indeed all is not finished when the phagocyte has swallowed the microbe. It remains to digest it and that is the essential part of the work. Often, it is not accomplished; it is prevented by some microbial poison, and in this case, relieved from its enemy, the microbe comes out victorious.

The seizure of the microbe and its destruction by digestion are two independent and successive acts, separated, however, by a rather long interval. For instance, the spores of the tetanus bacillus introduced in the body of a guinea pig are rapidly swallowed, but are not killed and are digested but slowly. This operation requires several weeks and during that interval, if the guinea pig is submitted to the action of heat, which has the effect of stimulating the activity of the microbes, these rapidly grow and give rise to fatal tetanus (Vincent.)

The result of the battle between the two adversaries depends on quite a number of circumstances and may take place at all periods of the struggle: sometimes at the beginning, or much later and under different conditions.

When the microbes introduced in a wound are not in too great numbers and have only a moderate virulency, the phagocytes are called by the substances emanated from the microbe, through a kind of gustatory attraction, called positive *chemiotachism*. The phagocytes may swallow the invading microorganisms, but they do not all succeed in digesting them. Some filled with too many or too virulent microbes, carry in themselves a cause for death. Intoxicated by the microbial secretions, they gradually undergo fatty degeneration and become *pus corpuscles*. These are formed especially of dead leucocytes, which have succumbed in the long battle.

In the case of a severe infection, the microbes will have the superiority in number or will secrete a very virulent toxin, able to repel or rapidly intoxicate the phagocytes: then the wound, a true battlefield, is held by the microbes, which develop, and proliferate in it without hindrance. The pus, instead of being creamy, is thin, sanious and not abundant. Infection keeps up, fever persists and the patient succumbs.

In mild cases, the army of leucocytes wins easily. On its side, there are few deaths, a longer persistence permits fatty trans-

formation, that is the formation of yellow pus, but not abundant. The wound granulates and cicatrization goes on.

The body of the microbe is a true factory for poison. These are secretions, called *toxins*. These may be specific, such as those of tetanus and diphtheria, injections of which in the organism have the same effect as the contamination by the microbes themselves. Specific toxins cause the microbial infection without the microbes.

These toxic secretions are the special weapons of the microbe against the subject that attacks it. Among the different varieties found in wounds, some are trivial, and others are specific. There are various diastases, toxins analogous to ferments which have been extracted, for instance, the tetanic bacilli, the streptococci, the staphylococci, and the cholera vibrios. Besides these toxins, poisons thrown out as a true secretion, microbes produce others which may remain firmly incorporated in the microorganism, as occurs in *endodiastases*, such as those of Buchner. Some *endotoxins* are so firmly held that they cannot be liberated except by destruction or dissolution of the microbe.

Therefore microbial infection is resumed in a true intoxication by the specific poison of the microbes.

Phagocytes in their turn fight the microbe with the aid of digestive or destructive secretions. According to Metchnikoff, who has made known the action of phagocytes, the *leucocytic alexin* has for its function the dissolution of the microbe and destruction of its poison.

Finally, in the fight of the phagocytes with the microbes the struggle becomes a kind of *chemical* neutralization analogous to that of the acids by the alkalines.

The true signification of the defense of the phagocytes closes this interesting chapter. The principle of the protecting action of the phagocytic leucocytes is found in this law of the constitution of the organism, in virtue of which the living individual tends to the conservation of its integrity. The organism does not tolerate foreign substances in its tegumentary envelopes, which separate it from the external world and it always makes all its efforts to repair the disorders promoted by any accidental disturbance. It is the same general principle, which explains the tendency of wounds to cicatrize, a tendency which is always satisfied unless some interference from outside, such as microbial infection, causes an accidental obstacle. All the forces disposed of by the organism work

to the *maintenance and conservation* of its integrity. This principle of the *conservation of the organism* applies not only to the form and structure of the living being, it applies equally to its composition and its vital activity. The result is that form and matter tend equally to maintain, to preserve and to reestablish themselves.

EPIZOOTIC LYMPHANGITIS.—Three cases of this affection have been the occasion for M. M. Cazalbon and Pradel, to present a communication which I find in the *Revue de Pathologie Comparée* and from which interesting conclusions are drawn.

In the group of the lymphangites of horses, the clinic has already distinguished several types or species. For instance the diffused reticular lymphangitis, accompanied or free from visible lesions of the white blood cells and following a traumatism whose nature is still not well determined. The ulcerative lymphangitis, due to the bacillus of Preisz-Noeard, the lymphangitis of glanders which does not exist without internal lesions and whose development seems to follow a traumatism in an organism already infected, the sporotrichosis lymphangitis, and finally the epizootic disease which from the point of view of general pathological anatomy, like the ulcerative, that of glanders and the sporotrichosis, presents an ulcerative process of variable severity.

With the exception of the sporotrichosis form the authors have observed all the others since the beginning of the war and the three following are the subjects of their communication :

1st case. At the time of examination, the animal had numerous small abscesses around the eye-lids of the right side and on the corresponding cheek. At the border of the maxillary bone there was a short lymphangitic cord running to the inflamed sub-glossal lymphatic gland. The affection had started in a small lacerated wound, made by a barbed wire fence, over the temporal region. This wound had been received some three weeks before, had cicatrized and then reopened with one or two little abscesses. Therefore the inoculation had taken between three or four weeks to develop.

2nd case. An animal had on the arm, in the direction and along the entire length of the humerus, a big cicatrix, partly indurated and contracting. On a level with the old edges of the cicatrix, there were abscesses, not yet ulcerated, about the size of a

hazel nut. In front of the arm, there was a lymphangitic cord running to a corresponding preescapular adenitis. The initial injury, due to a blow from an automobile had been followed, several weeks after by the first purulent collection.

3rd case. In this subject the disease assumed a classical appearance. From the fetlock, where there was a common contused wound, there started a lymphangitic cord extending to the prepectoral lymphatic gland, with several ulcerated abscesses on its course.

The mallein test, of course, proved negative in the three subjects, which recovered after four or five months treatment.

These observations have brought the authors to the following considerations: 1st. In each one of the affected individuals the primitive inoculation has been received, while the animals were at the front, and during the cold season. As it was not possible to connect the origin of the affection with a previous disease, it is probable that the infectious germ came directly from the external medium into the wounds.

2nd. The parasite of epizootic lymphangitis was first described by Rivolta, as an ellipsoid coccus, with a double enveloping membrane, very apparent, which by its proliferation in lymph, gives rise to the disease in locating itself in the lymphatic vessels of the field injured by the initial traumatism. Considered in the morphology of the sick animal, this cryptococcus has been classed among the ferments. It has also been considered as a protozoan parasite of the white corpuscles and called by some *Leucocytozoon piroplasmoides*. This, however, is not admitted and the study still remains incomplete.

3rd. The various inoculations of the cryptococci of Rivolta which were obtained from the lesions or cultures of the three horses failed to reproduce lymphangitis. In admitting that these vegetable agents are responsible for the development of the disease, it remains certain that the conditions of their multiplication in lymph remains as yet unknown. All that we know is that the cryptococcus is easily transported from one sick individual to a foreign wound.

BIBLIOGRAPHY--REPORT OF THE NEW YORK STATE VETERINARY COLLEGE at Cornell University, for the year 1914-1915.

It is always with new pleasure that I receive this report, which has just arrived, and it is with greater satisfaction that the

occasion is furnished me to allude to it in these chronicles, where I consider, notwithstanding their title of European, I can introduce to my friends across the Atlantic, some material that they possibly have not benefited by.

A report from a public institution might be looked upon as merely a collection, a presentation and a résumé of the entire administration of said institution: a few words of introduction, a reference to the organization, to the faculty, the many professorships and their various duties, to the registration of students, to the arrangement of the curriculum, etc., etc. Of course every one of these subjects is presented in full by Director V. A. Moore, and the presentation is worthy of the leader of that institution and it is completed by concise allusions to other subjects relating to the work done in the various departments, which is treated in a more extensive manner in another part of the report.

As an appendix to the report of Doctor Moore, are presented those of four of the practical departments of the institution.

First, comes the report of cases treated in the consulting and medical clinics by Doctors Udall, Koenig and Wright. The number of animals, 287, is arranged by classes according to the various ailments for which care was demanded.

In the second, that of surgery and obstetrics conducted by Professors W. L. Williams, Frost and Webber, 428 cases cover the list, with 392 horses, 20 cattle, 8 sheep and 8 swine.

The third report is that of the clinics for small animals under the care of Professors H. J. Milks and W. E. Muldoon. This includes 399 dogs, 127 cats, totaling the number of 526 patients.

The report of the ambulatory clinic for large animals is signed by Professors Udall, Koenig, Frost and Webber. At these clinics some 33 students attended and each one had an average number of about thirty trips. The total number of cases visited was 1803.

Following these four reports on practical work, comes what might be called the solid portion of the book presented by Director Moore, viz: a preliminary report on the recognition of Swamp Fever or Infectious Anemia in N. Y. State by Prof. D. H. Udall and C. P. Fitch: an article from Prof. W. L. Williams on Contagious Abortion of Cattle. These two papers are illustrated by a number of plates most valuable to the reader.

Following these Prof. C. P. Fitch has a report on the Coagulation Test with Special Reference to the Diagnosis of Glanders;

from Prof. E. M. Pickens some Instruction in Selecting, Packing and Shipping Specimens for Laboratory Examination; from Prof. H. J. Milks a report on Verminous Bronchitis in Dogs, also illustrated; from Prof. W. E. Muldoon one on Unicariasis in Dogs and from Prof. S. A. Goldberg one on the Structural Changes that Occur in Certain Specific Inflammations of Joints.

The last few pages of the report are occupied by an important article by Dr. V. A. Moore on the Limitations of Tuberculin in Detecting Tuberculous Infected Animals, another from Prof. Pierre A. Fish on Physiologic Relations—Poultry and finally from Prof. Samuel H. Burnett an article on Lobar Pneumonia, So-called, in Domestic Animals.

In presenting such a complete report to the legislature of the state, the object is evidently to show that all the support given by the state to the institution has been fully appreciated and that no effort has been spared to show that the support was deserved. Similar documents have for years shown the legislature the good work done by the Veterinary College at Cornell University and it is certain that if this last report finds its way among intending students there will be no great difficulty in predicting a large increase in the class and in showing how urgent it is for the legislature to grant Director Moore all the financial help he asks and which is needed to keep up the good work.

L'ABATTOIR MODERNE. (The Modern Abattoir.) This is the second edition of a superior work, for which in 1906, was granted to the author prizes from the Academie de Medicine and from the National Society of Agriculture.

Doctor A. Moreau, late chief veterinary inspector, can be proud of the success obtained by his work, namely, the publication of a large and complete volume treating of all the various subjects connected with abattoirs.

When the first edition was published by the good old firm of Asselin and Houzeau it was my great privilege to call it to the attention of Americans interested in the question and it is a great pleasure for me to do the same again.

This book was written and almost under press when the fearful events of August 1914 threw the world into the terrific struggle which has already cost so many lives. Of course the publication had to be postponed and yet notwithstanding the very extreme

conditions in which it could be executed, today this second edition has come out, revised and considerably enlarged, in the shape of a handsome book that does honor to the editors by its appearance and to its author by the value of its contents and the many plates that illustrate the various descriptions.

This excellent book of nearly 900 pages has its contents divided into four parts.

The first under the title of *ABATTOIRS* gives a general historical aspect of the subject with a concise consideration of the abattoirs in France and in foreign countries: Germany, Switzerland, Austria, Italy, Spain, etc., in fact of all Europe.

The second treats of the construction of abattoirs. The proper place for such, the general disposition and then the various types of modern French abattoirs.

The third part deals with the interior of the abattoirs, with the disposition and arrangements for killing the various classes of animals, large and small; cattle, sheep, swine, horses. The question of refrigeration and in fact all the various subjects connected with the work carried on at such places.

The fourth part is essentially concerned with the services of the administration of the establishment, and of the sanitary inspection with the many attributes of the veterinarians, the laboratory work, etc., etc.

This concise examination of the contents of the work of Doctor Moreau will scarcely do it the justice it deserves. It is for those who are interested in the subject to fully appreciate its value. The illustrations which are reproduced in detail and the arrangement of the abattoirs of the various countries are of great value and will be consulted and advantageously studied by those to whom the building of an abattoir is a matter of interest.

I regret that illustrations of similar establishments in the United States are not given but hope that a third edition will include the reproduction of the many abattoirs of the large cities of the New World.

RÉSUMÉ OF REVIEWS AND ACKNOWLEDGEMENTS.

JOURNAL OF COMPARATIVE PATHOLOGY AND THERAPEUTICS, (June, 1916).

*Cases of Poisoning in Cattle by Feeding on Meal from Soya Bean after Extraction of the Oil.

Studies in Forage Poisoning.

Thrombosis of Pulmonary Arteries and Necrosis of Extremities in a Bullock.

*The Possibility of Amebic Dysentery in the Dog and its treatment with Emetin.

Osteoma of fowls.

Duplication of the Gall-Bladder in a Sheep.

Johne's Disease—The Reaction of Animals to "Johnin".

RECUEIL DE MEDICINE VETERINAIRE.

*A Case of Aberrant Thyroid Cancer in the Horse.

*A Remarkable Case of Tuberculosis of Castration in a Pig.

*Adynamic Typhosus in American Horses.

BULLETIN DE LA SOC. CENTRALE.

*Treatment of Epizootic Lymphangitis.

*Novarsenobenzol in the Treatment of Epizootic Lymphangitis.

CHICAGO VETERINARY BULLETIN (March).

Obituary of Doctor Arthur Hughes.

CORNELL VETERINARIAN.—Lead Poisoning in Calves—Roup or Chicken Pox—Contagious Pleuro Pneumonia in Horses.

CIRCULAR No. 58, Department of Agriculture.—Reports upon the Federal Meat Inspection.

A. LIAUTARD.

Articles marked (*) will be analyzed in other chronicles.

Dr. Clifford Ackley, veterinary inspector in the Bureau of Animal Industry, stationed at Blaine, Washington, has resigned. He has purchased the plant and business of a weekly newspaper at Winlock, Washington, and intends to take up the management of this business, together with the practice of veterinary medicine.

Dr. Maurice C. Hall, a graduate in veterinary medicine from George Washington University, occupying the position of assistant zoologist in the Bureau of Animal Industry, has resigned to take a position with Parke, Davis & Co., of Detroit, Michigan, as a parasitologist. He will conduct original investigations in the treatment of animals for parasites.

THE BULL AS A DISSEMINATOR OF CONTAGIOUS ABORTION*

F. B. HADLEY AND H. LOTHE, Madison, Wis.

INTRODUCTION. A large number of livestock men hold that the bull is an important factor in the dissemination of contagious abortion in the herd. A smaller number believe that the bull acts merely as a passive carrier of the abortion disease and is not actively concerned in its transmission.

These conflicting hypotheses have led to confusion on the part of all parties interested in the control of bovine abortion. It was impossible to prove or disprove either assumption until the exact cause of contagious abortion was discovered by Bang. Now that the causative organism has been isolated and methods of diagnosis perfected¹, means are at hand to control accurately and to interpret correctly the results of experiments.

This paper records the results of an experiment that was designed to shed light upon the question as to the ability of both mechanically infected and systemically infected bulls to transmit abortion by cohabitation. The work was made possible by a special appropriation of \$5,000.00, granted by the Wisconsin Legislature of 1912 to the College of Agriculture of the University of Wisconsin.

EXPERIMENTAL OBSERVATIONS. Before describing our experimental work it seems desirable to review briefly the work of a related nature recorded in the available literature.

The first reference to the part played by the bull in the transmission of contagious abortion appears in an article by Bang². Later investigations led him³ to conclude that cattle are often infected through the mouth and that the bull is not always to blame.

M'Fadyean and Stockman⁴ attempted to infect cows by using

*Published by Permission of the Director of the Agricultural Experiment Station, University of Wisconsin.

Presented at the meeting of the A.V.M.A., Detroit, Mich, Aug. 22, 1916.

- (1) Hadley, F. B. and Beach, B. A. The Diagnosis of Contagious Abortion in Cattle. *Research Bul. 24, Wis. Agr. Exp. Sta.*, 1912.
- (2) Bang, B. Die Aetiologie des seuchenhaften (infectiösen) Verwerfens. *Zeit. für Tier.*, Band. 1, S. 241, 1897.
- (3) Bang, B. Das seuchenhafte Verwerfen der Rinder. *Arch. f. wiss. u. prak. tier.*, Band. 33, S. 312, 1907.
- (4) *Report of the English Commission on Epizootic Abortion, Appendix to Part I*, p. 17, 1909.

a soiled bull for service, but admit that their experimental conditions did not approximate to those found in general practice. It should be noted, however, that in no case did they find lesions of the abortion disease in the uteri of their experimental cows, neither were they able to demonstrate the presence of abortion bacilli, although careful microscopic and cultural examinations were made from the uterine mucous membrane, cotyledons, and the contents of the fetal stomach. Only one heifer was allowed to live until the normal period of gestation was completed and she never showed signs of aborting and gave birth to a strong, healthy calf at full term.

This and other experiments conducted by the above mentioned investigators led them to assert that the bull has no part in the dissemination of contagious abortion, or, if he has a part, it is merely that of a passive carrier.

Cotton⁵ found it impossible to demonstrate the presence of abortion bacilli in the reproductive organs of a bull that had been used to serve aborting cows, or in the testicles of two bull calves, one of which had been fed and the other injected with cultures of the abortion bacillus. He states that his investigations seem to indicate that the bull does not harbor the organisms in the testicles.

In a personal communication Dr. E. C. Schroeder of the Bureau of Animal Industry, United States Department of Agriculture, states that he has found that bulls which are regularly exposed to abortion-infected cows rarely react with the agglutination test, notwithstanding that bulls which have received inoculations of abortion bacilli invariably react with this test. But, though he and his coworkers have made careful and extensive bacteriologic examinations of bulls after such inoculations, they have not been able to determine whether the abortion bacillus has the faculty of persisting anywhere in the bull's body, or of causing discoverable lesions in it.

While many investigators have carried out experiments with cows to determine how abortion infection is acquired and what lesions are produced, little work has been done along these lines with the bull. That this animal may sometimes be inoculated suc-

⁵) Cotton, W. E. *Proceedings of the American Veterinary Medical Association*, p. 851, 1913.

cessfully has been shown by M'Fadyean, Sheather and Minett⁶ in their experiment in which cultures of the abortion organisms were introduced into the prepuce.

It is interesting to note that the data relative to the reaction to the serum tests by the bull, gathered by investigators in Europe, correspond closely with that gathered by laboratory workers in the United States.

Attention was called in a previous paper from our laboratory⁷ to the fact that not more than 25 per cent of the bulls in herds where abortion was known to exist produce specific antibodies indicative of infection in their blood serum. On the other hand, about 36 per cent of the cows in such herds contain these antibodies as shown by the serum tests for abortion. As these figures are based on data secured from tests on 5,000 head of cattle over a period of four years, they cover a sufficiently large number of animals to be reliable.

Schroeder⁸ states that it seems that the abortion bacilli rarely get into the bodies of male cattle in a way to cause modifications which can be determined by any means at our command. He adds, however, that bulls may play a very important part in the transference of these organisms from cow to cow.

Since it has been shown by Melvin⁹ that infected cows may eliminate virulent abortion organisms in their milk and vaginal secretions, the natural inference is that infected bulls may do so in their seminal or preputial secretions.

(6) M'Fadyean, Sheather and Minett. Researches Regarding Epizootic Abortion of Cattle. *Jour. of Comp. Path and Thera.* Vol. XXVI, p. 142, 1913.

(7) Hadley, F. B. and Beach, B. A. Results with Complement Fixation Test in the Diagnosis of Contagious Abortion in Cattle. *Proc. of the A.V.M.A.*, p. 356, 1912.

(8) Schroeder, E. C. The Cause and Occurrence of Contagious Abortion in Cattle. *Jour. of the Am. Vet. Med. Assoc.*, Vol. XLVIII, p. 304, 1915.

(9) Melvin, A. D. The Bacterium of Contagious Abortion of Cattle Demonstrated to Occur in Milk. *U. S. Dept. of Agr., Bureau of Animal Industry, Cir.* 198, 1912.

Foot note:—Although it is assumed in this paper that a reaction to the complement fixation or agglutination test means a systemic infection, the junior author thinks that it may be possible for the infecting organisms to be injected by the bull and call forth the production of antibodies in the blood stream without a systemic infection. As it has been impossible to prove or disprove this conception the senior author feels that it is justifiable to interpret a typical reaction as indicative of a systemic infection.

Williams¹⁰ maintains that once a bull reacts to the agglutination and complement fixation tests we have no evidence to show that the infection is ever eliminated from the animal's body. He contends that such a bull conceivably must be capable of transmitting the infection by cohabitation, but has carried out no experiments of a scientific nature to sustain his contention. That he is in doubt is evident by the following statement: "Conclusive evidence that abortion bacilli can be readily transmitted by cohabitation and that it will rapidly induce abortion in pregnant animals is wanting."

PRACTICAL OBSERVATIONS. Apparently the abortion disease may be introduced in a previously healthy herd by the bull, if we accept the testimony of practical breeders. Some of these men claim that the only cows to abort during the first part of an epizootic are those served by bulls used for infected cows, while other cows in the herd will carry their calves to maturity, but abort during the following gestation period. This evidence is purely circumstantial so has only limited scientific value. If it could be proved that the infection was contracted from the contaminated bull and no place else, the chain of evidence would be complete and the bull would be incriminated. Unfortunately this has not been possible.

There are, on the other hand, breeders whose experience has led them to believe that the bull is incapable of transmitting the abortion infection from cow to cow either by copulation or otherwise. In fact, they assert that the same bull may be used for service in two herds and yet cows in but one of the herds will abort.

We have in mind the case of a farmer who purchased some pure bred cows and a bull at a public sale. These cattle were placed in his home herd where the abortion disease had never existed. Shortly the newly purchased cows commenced to abort. Later cows in his original herd started to abort until the infection had become quite generally distributed. This man also maintained a herd of grade cows on another farm a short distance away. The same bull was used in both herds, as well as on neighbors' cows. None of these cows aborted, although the disease continued its havoc in the pure bred herd. It should be noted that this bull gave a positive reaction to the complement fixation test for abor-

(10) Williams, W. L. The Outlook for the Control of Cattle Abortion. *Jour. of the Am. Vet. Med. Assoc., New Series*, V, II, p. 199, 1916.

tion, and so may be considered to have had a systemic infection, as well as having had every opportunity to act as a mechanical transmitter.

Additional light is thrown on the question of the influence of the bull in causing abortion by a careful herd record that was kept in a large dairy over a period of three years. During this time 1,238 conceptions resulted from service by 29 different bulls. There were dropped 1,043 full time calves, while 195 fetuses were aborted. That is, 84 per cent of the cows carried their calves to maturity, while 16 per cent of them aborted.

As would be expected in the light of our present knowledge of abortion, it was impossible to incriminate one bull more than another for no correlation could be established between the number of abortions and the different bulls. It was found that heifers aborted much oftener than older cows.

The cows that had aborted were bred almost without exception to one or the other of two bulls reserved for them. At the same time these bulls were used on virgin heifers. It is interesting to note that about 45 per cent of these heifers aborted. This would point to the bull as a very important factor in the transmission of the abortion disease, but for the fact that a similar percentage of abortions occurred in other heifers that were served by another bull that was used almost exclusively on heifers that had never aborted.

A careful consideration of these experimental and practical observations makes it apparent that our exact knowledge of the bull as a factor in the dissemination of cattle abortion is meager, to say the least.

PLAN OF THE EXPERIMENT. In order to shed more light on this highly important veterinary problem, the experiment to be described was carried out.

The plan of procedure was to mate abortion-infected bulls with virgin, abortion-free heifers. This involved the procurement of animals that would meet these requirements. In the first place, it was necessary to find bulls that had been used for service in infected herds and had themselves become infected; secondly, virgin heifers that were free from abortion infection and had never been exposed to the disease.

It should be stated that the agglutination and complement fixation tests were relied upon as guides in the selection of these

animals. Together with the clinical data these tests were also used to interpret the results of the experiment. More reliance was placed in the fixation than the agglutination test for the reason that in our experience it has shown itself to be in closer harmony with clinical data. In our opinion both these tests have fully justified our faith in them, certainly insofar as the heifers are concerned, for none of them aborted or showed other signs of infection during the first gestation period. The chance of error in technique and interpretation of the serum tests on the experimental cattle was eliminated by including serum samples of cattle from other herds, whenever tests were made.

An animal has been considered infected when it reacted to one or both of these tests. It is evident that the phenomenon of abortion itself could not be used to determine infection because the cow does not always abort as a result of infection and because the bull cannot be measured by it.

In handling the heifers every precaution was taken throughout the entire course of the experiment to exclude all possible sources of infection except the bulls. The animals were pastured by themselves until late fall, when they were allowed the run of a new, closed shed in which cattle had never been kept. During the winter they were turned into the barnyard for daily exercise.

Originally there was no thought of carrying the heifers much beyond their first parturition period. With the development of the work it became evident that much valuable information could be gathered by continuing to observe some of the heifers for a longer period. As soon as this became apparent, arrangements were made to transfer them to a herd of cattle that were on restricted rations. We hesitated before making the transfer as the rations were of such a nature as to cause abortion and because several of the cows in this herd were infected with abortion. It was thought that the latter would act as sources of infection that could not be controlled. However, it was decided to take these risks. Subsequent developments have shown that this was a fortuitous arrangement, as it gave an opportunity to follow these heifers through a second gestation period in an environment quite different from that of their first period. This explains why the data on bulls 3, 4, and 5 is meager.

HISTORIES OF THE ANIMALS. Summaries of the service records and parturition and abortion test records of the fifteen ani-

TABLE I. SERVICE RECORDS OF EXPERIMENTAL ANIMALS

Heifer	Bull	Date												
127	1	8-14-14												
129	2	10-10-14												
443	1	9-15-14	2	10-6-14	2	10-28-14	3	10-4-15	3	10-25-15	3	12-2-15	3	12-24-15
439	2	10-14-14	2	11-5-14	3	11-18-15	4	1-7-16	5	1-27-16				
364	1	8-14-14	2	9-4-14	2	11-28-14	3	12-20-15						
131	2	12-5-14	2	12-26-14	3	11-24-15	3	12-14-15	4	1-4-16				
257	2	12-16-14	2	1-6-15	4	1-7-16	5	1-29-16	5	2-18-16				
128	2	12-13-14	2	1-3-15	2	1-24-15	3	10-30-15	3	11-19-15	3	12-22-15	4	1-8-16
130	2	12-9-14	2	2-2-15	2	3-2-15	2	4-27-15						
440	2	1-9-15	2	3-9-15	2	4-9-15	2	7-9-15	5	2-9-16	5	3-31-16	5	4-17-16

mals used in this experiment are given in Tables I and II. The individual history of each follows:

BULL 1. A pure bred, registered Guernsey that had been used for service for two years for cows that had aborted and were eliminating virulent abortion bacilli in their secretions and excretions. He first reacted to the complement fixation test in January, 1912. Later his blood serum was tested for abortion agglutinins and found to contain them, but this was nearly a year after cows which he had served reacted and aborted. There is no reasonable doubt but that he had a systemic infection.

It was the original plan to breed all the heifers to this bull but on account of his slowness and heavy weight it was found necessary to replace him as head of the herd with a younger bull. This was not done, however, until he had served heifers 127, 443, and 364. The former was the only one of these to conceive to his service.

BULL 2. Also a pure bred Guernsey that was purchased October 1, 1914 from a herd in which the abortion disease was very prevalent, 80 per cent having responded to the abortion tests. The owner considered him a good sire but wished to dispose of him because he believed him directly responsible for the large number of abortions in the herd. This was due to the fact that the first five cows he ever served aborted, as did many of those served later. The last cow known to be infected was served by this bull August 9, 1914.

The first experimental heifer to be bred by this bull was 443, on October 6, 1914. She failed to conceive at this service but did on October 28. Heifer 129 was served October 10, 1914 and settled at this service. The other heifers were bred subsequently but most of them required more than one service before conception took place. So far as the experiment went, the greater number of services was desirable because they afforded a better opportunity for the heifers to become infected by the bull. Furthermore, these repeated copulations provided conditions by which any venereal infection would have been greatly increased in virulence if the experience gained in the study of other venereal diseases can be applied to contagious abortion. This is brought out by Williams¹¹ as follows: "If a bull has acquired in a moderate degree

(11) Williams, W. L. Researches Upon Contagious Abortion of Cattle. *Report of the N. Y. State Veterinary College, 1914-15.*

the infection of contagious abortion, but not sufficient to constitute any serious menace to his breeding power, the infection may be

abortion tests. He was mated to heifers 439, 257, and 430. Of

the infection of contagious abortion, but not sufficient to constitute any serious menace to his breeding power, the infection may be enormously stimulated and its power for evil indefinitely multiplied by repeated copulation."

It would, therefore, seem that conditions were ideal for this bull to infect the heifers if his genitalia were contaminated with or he was giving off living, even if only avirulent, abortion bacilli in his secretions. However, none of the eight heifers that conceived to his service aborted.

BULL 3. This bull and bulls 4 and 5 were employed only during the second year of the experiment. He is a pure bred Holstein and has neither never served an infected cow nor given a reaction to the abortion tests. He was bred to 128 in October, November, and December 1915; to 443 twice in October and twice in December, 1915; to 439, 131, and 364 in November and December, 1915 (see Tables I and II). Although heifers 128 and 433 later became reactors, there is no direct evidence that this bull infected them. In view of the facts that the other heifers served by him remained normal and that he never has given a reaction to either the complement fixation or the agglutination tests, it is more reasonable to attribute the infection of these heifers to other sources than to the genitalia of this bull.

BULL 4. A pure bred Angus that had served a cow in November and December, 1915 which had aborted some months previously and was a reactor. Tests failed to show that he was systemically infected. In order to discover whether he could transmit the abortion disease after having served infected cows, he was bred to heifers 439, 131, 257, and 128 during the month of January, 1916. Reference to the histories of these animals will show that the latter two reacted about a month later and were slaughtered, but no lesions or bacilli of abortion could be found. He served heifer 439 once, but to no effect. The fact that heifer 131 aborted 172 days after service by this bull is important and points to him as the source of infection. However, other factors were operative in the case of this heifer as reference to the history will show. In view of the fact that he has never reacted to the abortion tests, there is evidence that he may not be to blame.

BULL 5. An Angus-Jersey cross bred that was never used for service on abortion-infected cows and never gave a reaction to the abortion tests. He was mated to heifers 439, 257, and 430. Of

these 257 later became a reactor but as she was served by bulls 2 and 4 a short time before, there is a much greater probability that they or the infected cows with which she was in contact infected her than this bull.

HEIFER 127. This heifer, the first one to conceive, was bred August 14, 1914 to bull 1. Like the others, she was tested at regular intervals for evidences of abortion infection. The results of these tests are recorded in Table II and show that she never reacted. She calved normally May 23, 1915. Lack of pasturing facilities made it necessary to dispose of her in July, 1915.

HEIFER 129. This animal conceived to service by bull 2 on October 10, 1914. Nothing abnormal was noted throughout her gestation period. She dropped a full-term calf July 20, 1915. She was sold as a dairy cow shortly afterward, so no further tests were possible.

HEIFER 443. Service by bull 1 on September 15, 1914 failed to result in conception, but gave an opportunity for her to contract the abortion disease. When mated with bull 2 on October 28, 1914 she settled and dropped a normal, full-term calf on August 7, 1915. On September 11, 1915 she was transferred to a herd previously mentioned that was on a feeding experiment, some of which were later found to be infected. She was bred twice in October and twice in December to bull 3 and conceived December 24, 1915. The first indication of infection was on March 17 when she gave a partial agglutination reaction but did not respond to the fixation test. On April 13 she gave typical reactions to both tests. She was removed from the herd May 15, 1916 and placed in an isolated pasture so that she might be observed from time to time and so that she might have an opportunity to complete her gestation period without interference. To date, August 14, 1916, nothing abnormal has been observed except well marked lesions of granular venereal disease and a slight vaginal discharge. She will be watched with much interest until she aborts or until October 1, when she is due to calve.

HEIFER 439. This animal after two services by bull 2 had an uneventful first gestation period. On September 11, 1915 she was transferred to the above mentioned herd. On November 18, 1915 she was bred to bull 3. On January 7, 1916 she was bred to bull 4, whose history should be recalled in order to get a clear understanding of this case. As conception failed to follow these

services, she was mated with bull 5 on January 27, 1916 and is believed to be pregnant. Throughout her life she has been a consistent negative reactor and promises to remain so and deliver a normal calf early in November of this year.

HEIFER 364. This heifer was served by bull 1 August 14, 1914 but did not conceive at that time. After two trials by bull 2 she settled November 28, 1914. She has never shown the slightest sign of abortion infection, although tested regularly. Like 443, 439, and some of the others, she was placed in the herd of cattle on the feeding experiment and bred to bull 3 on December 20, 1915. As she has not come in heat since, it is assumed that she is pregnant. No evidence of infection has yet been shown by the usual tests.

HEIFER 131. This heifer has a history similar to that of 439 except that her second calf was sired by bull 4. Her serum tests had always been clear, yet very unexpectedly, on June 24, 1916, 172 days after last service, she aborted. There are four possible causes of this abortion, viz., (1) bull 3, (2) bull 4, (3) contact-infection from other cows, and (4) the ration which was deficient in certain substances that have been shown by Professor E. B. Hart¹² to be required for reproduction. Whether one or more of these causes was actually responsible has not been determined. It is important to note that the last tests made July 13, 1916, about three weeks after the abortion, were negative.

HEIFER 257. This heifer was bred to bull 2 in December, 1914 and conceived January 6, 1915. She carried her calf the full term. Two months after calving she was transferred to the herd on the feeding experiment. On January 7, 1916 she was bred to bull 4 and may have been infected by him. At any rate she did not conceive to this service, so was bred to bull 5 on January 29 and February 18 respectively. Up to February 25 she had never given the least sign of abortion infection. On that date the fixation test was positive, but the agglutination test was questionable. On March 14 this heifer was killed and her genital organs taken to the laboratory for detailed examination. The uterus was found to be normal in appearance, but was non-gravid. Culture media were seeded with material from the mucous membrane of the uterus, also from a small cyst in the left ovary. Although growths appeared

(12) Hart, E. B. The Influence of Certain Natural Feeding Materials on Growth and Reproduction. *Proc. Wis. Vet. Med. Assn.*, p. 110, 1916.

on and in the media after incubation, none could be identified as abortion bacilli.

HEIFER 128. This heifer was bred to bull 2 and everything was normal throughout her first pregnancy which terminated November 3, 1915. She was bred three weeks and again six weeks later to bull 3 but did not conceive until given service by bull 4 on January 8, 1916. The first intimation of infection was early in March when she gave an incomplete reaction to the fixation test, although the agglutination test was negative. On February 29 the herd was tested for tuberculosis and she was the only animal that reacted. A serum test at this time was indicative of abortion infection so it was decided to slaughter her, which was done on April 7, 1916. At the autopsy no macroscopic lesions of tuberculosis were found. The intact uterus was removed and taken to the laboratory for examination. It contained an apparently normal three-months fetus. Culture media was seeded with fluid from the utero-chorionic space but proved to be sterile. No evidence of "abortion exudate" was seen. Blood from the fetus was tested for abortion antibodies, but did not react.

HEIFER 130. This animal did not conceive until April 27, 1915, although given repeated service by bull 2. No sign was ever given of abortion infection, all serum tests being negative. She gave birth to a normal calf January 28, 1916, but retained her placenta. The second day after calving the badly decomposed placenta was manually removed. Septic metritis set in and resulted in death a few days later. Post-mortem examination revealed a ruptured uterus and peritonitis. It should be noted that this heifer was sick for about a week before calving which occurred 17 days before the full 285 day period had expired. However, this case would not be considered an abortion in any interpretation of the term. The blood of the four-day-old calf was tested for abortion and found to be negative.

HEIFER 440. This heifer was the only one of the lot that failed to conceive the first year, although she came in heat quite regularly and was bred to bull 2 many times. If we accept the opinion expressed by W. L. Williams¹³ that the cause of heifers failing to conceive is infection of the uterus with abortion bacilli, we would have expected a reaction at some time during the two-year

(13) Williams, W. L. *Loco citato*.

period in which she has been under observation, but none was obtained. After repeated services by bull 5 she settled April 17, 1916 and is apparently safe in calf.

DISCUSSION AND CONCLUSIONS. In drawing conclusions from these data, an effort will be made to exclude everything that savors of prejudice, tradition, and superstition. Nothing will be taken for granted. Only those facts that are capable of scientific proof will be given weight. It is hoped that they will strengthen another link in the chain which is each year being drawn tighter about the epizootiology of the abortion disease, and help, by connecting theory with practice, in our efforts to control it.

There is no question but that a bull may acquire a systemic infection by experimental inoculation and by copulation with a cow that harbors abortion bacilli in her uterine and vaginal secretions. Whether or not such an infected bull is capable of disseminating the infection by cohabitation remains to be conclusively proved. However, the soiled bulls with systemic infections used in this experiment did not transmit the abortion disease to the virgin, abortion-free heifers with which they were mated. This confirms the tentative conclusions of several other investigators, whose contributions have been mentioned, relative to the bull as a disseminator of abortion.

It has been shown that certain bulls are less susceptible to and possess a greater natural immunity against abortion infection than do heifers and cows. In some cases this is apparently a *sexual immunity*. In other cases it seems to be an *individual immunity*. The reasons for this greater protection may be: (1) A strong constitution or good conditions rather than specific bactericidal or other protective properties of their blood-serum; (2) the difference in the anatomic and physiologic arrangement of the reproductive organs of the male afforded a less favorable place for the propagation of the abortion bacilli than do those of the opposite sex. Whatever the reasons are, it is certain that something operates to exert a detrimental action on the abortion bacilli that gain entrance to the bodies of bulls which so attenuates them that they are incapable of setting up immediate infection in susceptible heifers. This theory is supported by the fact that the serum reactions given by systemically infected bulls gradually become weaker until they finally disappear entirely (Bull 2). In heifers and cows this is not the usual course of events.

The performance of bulls 1 and 2 afford grounds for the tentative conclusions that a bull acting simply as a mechanical carrier of infection, gained as a result of serving infected cows, cannot transmit the infection to susceptible cows which he may subsequently serve, if a period of a few weeks is allowed to elapse between the services.

The fact that bulls 3, 4, and 5 served heifers that later became infected and at about the same time heifers that never showed the slightest sign of infection, leads to the belief that under normal conditions the abortion disease is usually acquired from other sources than the genital organs of the bull at service. This belief is supported (1) by the previous discussion; (2) by the serum tests of the bulls which were always negative; and (3) by the fact that abortions do not occur in many cases until the seventh month of gestation, which would make the period of incubation, which is assumed to be the time that elapses between actual infection and abortion, in naturally infected cases much longer than it has been found to be in experimentally infected cases.

If a cow aborts it is far more likely that the source of her infection was another cow rather than the bull which served her, as the larger number of cows in all herds increases the opportunity for infection. The methods by which the infection may be transferred from one animal to another are the following: (1) by contaminated feed and water; (2) by licking of infected cows; (3) by smearing of infectious material upon the vulva.

SUMMARY. (1) Bulls may become infected with the abortion bacilli.

(2) Bulls with systemic infections used in the experiments were incapable of disseminating the abortion disease to virgin, abortion-free heifers by cohabitation.

(3) Bulls appear to possess a sexual or individual immunity to abortion infection that renders them less susceptible than cows and induces a more benign form of the disease.

(4) Bulls, when infected, have the ability to attenuate the infecting microorganisms in their bodies in a relatively short time, so that they will be safe for the service of non-infected cows.

(5) Cows usually acquire the abortion disease from other sources than the genitalia of bulls at the time of service.

A STUDY OF THE MILK IN BOVINE INFECTIOUS ABORTION*

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Great emphasis has been laid during recent years on the economic importance of infectious abortion in cattle. Some efforts have been made to warn milk-consumers against the possible danger to humans in drinking raw infected cows' milk. (Concerning the former matter we doubt if its importance has been overestimated; concerning the latter we have doubts as to the seriousness of the situation. Whatever the merits of the various contentions may be, it is clear that we must study bovine infectious abortion both from the standpoint of the cattle industry and from the standpoint of public health. Investigations have progressed sufficiently to demonstrate the very great importance of milk in either of these lines of study. It is our purpose in this paper to call the attention of the practitioner to the points that offer something tangible in his efforts to relieve the situation and the attention of the veterinary investigator to the points that require further elucidation.

The *Bacterium abortus* occurs in variable numbers (sometimes in enormous numbers) in a large percentage of samples of market milk and consequently in the milk of certain cows has become a demonstrated fact. Efforts to isolate the organisms are not invariably successful. Both cultural and animal-inoculation methods have been employed. The cultural method devised by Nowak takes advantage of the fact that newly isolated cultures require an atmosphere partially depleted of oxygen. This atmospheric condition is obtained by growing the agar streaks from suspected material in a closed jar with *Bacillus subtilis*, having 1 sq. cm. of culture surface to each 15 c.c. of jar capacity. While one of us (L.H.C.) has isolated *Bact. abortus* from milk sediment by this method, it is too tedious a process to apply to any number of samples on account of the rapid overgrowth of the plates by fast-growing organisms of other species. The development of colonies of *Bact. abortus* requires nearly a week.

Evans isolated *Bact. abortus* from milk by plating on ordinary lactose agar to which 10 per cent of sterile blood serum was

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added just before plating. After incubating for four days, the colonies which developed were transferred to nutrient broth containing 1 per cent glycerin and to tubes of whole milk containing litmus. It is interesting to note that the organisms developed more vigorously in the cream layer. Later she has stated that *Bact. abortus* may be the cause of bad flavors and odors in ripened cream. In this latter paper she reports isolating cultures of *Bact. abortus* type from 45, or 23.4 per cent of 192 samples and finding as many as 50,000 bacilli per cubic centimeter. The variety occurring most frequently in samples of milk is designated *B. abortus var. lipohyticus* because of its action on butter fat. Two other varieties were isolated but they all resemble pathogenic strains. This work is very interesting but it means to us that a great deal of work is necessary to determine the true relation of *Bact. abortus*-like cultures to the true abortion organism, or the organism that is responsible for producing the trouble in breeding cattle. Williams has already pointed out the probably almost universal distribution of *Bact. abortus* in breeding cattle. It is time that we considered something more than mere cultural studies of this organism.

The other method of study, the inoculation of guinea pigs with milk, while more reliable, is far from satisfactory, owing to the fact that it takes 8 to 10 weeks for the lesions to develop, and it is probable that the organism must be present in large numbers to cause the characteristic lesions with the 5 c.c. of milk used for inoculation. We have devised an H tube in one arm of which pure cultures of *Bact. abortus* from the lesions in the guinea pig can be isolated, while *B. subtilis* growing in the other arm will lower the oxygen tension to the proper degree if the tubes are closed with rubber stoppers.

In order to make the study of the milk more practical and more applicable to a large number of samples it was found necessary to devise new methods. Knowing that this organism is sometimes, perhaps frequently, present in considerable numbers in milk as it comes from the cow's udder, it was thought that this might indicate an infection of the udder and a consequent local production of antibodies. Consequently, agglutination and complement fixation tests were made using milk and milk serum, instead of blood serum, and *Bact. abortus* as antigen. Since the agglutination test was found to give all the data considered valuable this test has

been adopted in all routine work to the exclusion of the complement fixation test. Dilutions ranging up to 1 to 1000 have been used and no difficulty has been experienced due to the turbidity from the use of whole milk except where dilutions less than 1 to 50 are used when rennet milk serum is substituted.

As a result of these experiments it has been shown that a pure culture of *Bact. abortus* introduced into the milk cistern of a cow's udder caused the appearance of agglutinins for this organism to appear in that quarter the following day, after which they appeared successively in each of the other quarters and finally disappeared. It is of interest to note here that we have in no case found any evidence to support the belief that *Bact. abortus* produces any gross or macroscopic lesions in the cow's udder. We have data which point to the conclusion that there is an increase in the number of leucocytes and antibodies in the strippings over that in the fore milk from those quarters that give a milk highly pathogenic for guinea pigs. In other words, there appears to be antigenic action without pathogenic action. In every case in which *Bact. abortus* was found present in the milk by guinea pig inoculations the agglutinins for this bacterium were also found, but the bacterium was not found in every case in which agglutinins were demonstrated. Either of two explanations seems possible. The organism may be present in the udder in all cases, giving as active, local production of antibodies, but in too small numbers to be demonstrated by the animal inoculation method used, or the presence of antibodies in the blood may give rise to their presence, passively, in the milk. The importance of the whole matter rests in the question of the effect of the consumption of such milk on the human being and on the young bovine.

Certainly the agglutination test is of value as the simplest method of studying the presence of *Bact. abortus* in milk, and if the organism eventually proves pathogenic for humans this test may be of value as another means of safeguarding certified and all unpasteurized milk. Furthermore, if the milk of certain cows is responsible for furthering the spread of abortion because of its action on calves, it may prove more profitable for the veterinarian to assist the cattle breeders in picking out and rejecting unsafe cows than in advising universal pasteurization or sterilization of the milk fed to calves. The agglutination test of the milk may prove to be helpful in this connection.

In a large herd of Holsteins five cows were examined in our presence by Dr. Williams. All were failing to breed and there was a history of abortion in the herd. Three had cystic ovaries and three had chronic endometritis. The blood of three reacted to the complement fixation test and the milk of four reacted to the agglutination test. One cow giving no history of abortion reacted to neither test. It would appear from these results that an examination of the milk by the agglutination test might be of value in determining the nature of many cases of sterility in cattle, i. e., it might indicate an involvement of *Bact. abortus*.

A number of investigators have been led to fear that milk containing *Bact. abortus* might be dangerous for human beings, especially for children whose principal food is often raw cows' milk. Melvin says in this connection: "This bacillus may prove to be another danger in the use of raw milk as food, and may furnish an additional reason for taking advantage of the safeguard afforded by pasteurization". Mohler and Traum, in studying the pathogenicity of this organism to man, examined the sera of forty-two human beings by complement fixation and agglutination tests, using *Bact. abortus* as antigen with negative results. They also inoculated material from fifty-six tonsils and adenoids into guinea pigs and produced nodules in the liver of one guinea pig from which no cultures were obtained and distinct lesions in the liver, spleen and testicles of another guinea pig from which *Bact. abortus* was obtained. We are not satisfied that this proves the pathogenicity of the organism to man.

Larsen and Sedgwick have made an extended study of human infection by this organism. They were able to demonstrate seventy-three positive complement fixations out of four hundred and twenty-five cases examined. It occurred to them to ask the question: Are these antibodies in the blood of children the result of an active or passive immunity? They were unable to demonstrate the presence of antibodies in the milk of aborting cattle. In their later investigations they found that new-born children who had not received cow's milk gave negative blood reactions in all of forty-two cases tested. One infant, taken from the breast on the seventh day after birth and fed cows' milk, gave a positive reaction on the twenty-first day. Positive reactions were obtained in two children with enlarged spleens; children with many common diseases of childhood, including rickets, gave negative reactions.

Nicholl and Pratt have obtained positive agglutination reactions with the blood of some children. They say that the serum reactions are suggestive but not conclusive, failing the isolation of the bacillus. Ramsey examined the blood of fifty-eight boys and an equal number of girls, of whom six boys and one girl gave positive reactions to the complement fixation test.

We have shown that antibodies from *Bact. abortus* may be present in great concentration in cows' milk and may be confined to one quarter. The fact that antibodies are often present in milk leads us to suspect that the cases in which the appearance of antibodies in the blood of children has been looked upon as indicating infection are more probably due to a passive immunity resulting from the absorption of antibodies contained in the milk.

An examination was made of the blood of a number of persons drinking raw milk, pasteurized milk and no milk. Of six persons who had been drinking raw milk or cream previous to the test three gave reactions to both complement fixation and agglutination tests. Of four persons drinking pasteurized milk one gave a reaction to the former test only. All four who had been drinking raw milk gave negative reactions.

To determine whether *Bact. abortus* antibodies could be made to appear in the sera of adults by ingestion of infected milk a feeding experiment was arranged. Cows were selected whose milk had a high *Bact. abortus* antibody content and caused *Bact. abortus* lesions and blood reactions when five cubic centimeters were inoculated into the abdominal cavity of guinea pigs. During the experiment each person was drinking, for a period of eight weeks, about a pint and a half of this milk. The antibody content of the human serum was determined before beginning the consumption of milk, during the period of milk consumption and four weeks after this period. Of the seven persons drinking the milk five developed a slight increase in antibody content of the blood but in no case was there a marked increase. In only one case did the reaction persist after four weeks from the last drinking of the infected milk. Another experiment was conducted to throw some light on the pathogenic or antigenic properties of *Bact. abortus* in milk on humans. Negative milk to which was added 10 c.c. of a 48 hour culture of *Bact. abortus* was consumed daily in quantities of one pint by two adult males for a period of six weeks. There was no appreciable increase in the antibody content of the blood of either individual and no untoward effects observable.

If the *Bact. abortus* antibodies present in the blood were due to an infection of the individual by organisms being present in the milk, it seems that we could expect a fairly high and lasting antibody content: but if the antibodies are due to a passive immunity, we could expect but a weak reaction, which would persist for but a short time after one had ceased drinking the milk. It is probable, therefore, that the antibodies in the human blood represent a passive immunity due to their absorption from the milk. There seems to be little evidence to warrant a statement that *Bact. abortus* in milk is either pathogenic or antigenic to any marked degree for the human adult at least.

We wish to call your attention to some of the results of a long series of experiments conducted by one of us (I. F. H.) with guinea pigs, rabbits and calves, involving the use of milk reacting and not reacting to serological tests for *Bact. abortus* antibodies.

We have found no records in the literature relating to the feeding of milk in this connection to either guinea pigs or to rabbits, all such work having involved injections which are so unnatural as to shed no light on the real problem. However, Schroeder stated in the discussion of a paper read before the American Medical Milk Commission that he and Cotton have not only produced the abortion disease in guinea pigs by injecting them, but have successfully produced the disease in guinea pigs by feeding them upon seemingly normal milk from apparently healthy cows that had become chronic carriers of the abortion infection. Schroeder has not given any experimental data concerning the above statement.

Out of 18 guinea pigs fed on naturally infected milk, i. e., milk reacting to serological tests and producing lesions typical of *Bact. abortus* in guinea pigs when injected intraperitoneally, there occurred one abortion and two abnormal parturitions, one case with one stillbirth and one with two stillbirths. The guinea pigs were fed over periods ranging from 33 to 287 days daily with the infected milk which was tested every 14 days for antibodies. Only 2 or 11 per cent of the 18 guinea pigs developed antibodies, one at the time of autopsy and one 8 days before autopsy only which was at the time of parturition when one dead fetus and 3 live young were delivered. Two controls on non-infected milk and two on no milk remained negative. Two guinea pigs were fed on negative milk plus cultures of *Bact. abortus* and both developed antibodies, but no lesions.

We feel, therefore, that there is not sufficient evidence to condemn positive milk as dangerous to guinea pigs by ingestion since it has shown no pathogenic action and only slight antigenic action.

Fourteen normal rabbits, pregnant and non-pregnant females were fed naturally infected milk for a period of 124 days. Blood tests were made at intervals of 14 days. Of 4 controls 2 were fed non-infected milk and 2 no milk. The controls gave the same reactions and partial reactions given by the 14 on infected milk. These reactions are probably non-specific as shown by Kolmer and others, and due to a peculiarity of rabbit serum, a fact which renders the rabbit unfit for accurate work of this nature. Only one out of the 14 rabbits gave an increase in antibody content during the 124 day period and this reaction persisted in spite of a suspension of feeding for a period of 84 days. No lesions were found in any of the rabbits on autopsy.

Six rabbits were fed non-infected milk plus a culture of *Bact. abortus* daily. Antibodies developed to a maximum on the forty-second day and on the fifty-second day a weakened reaction was in evidence. The strength of the reaction weakened at subsequent tests becoming negative in four of the six at the eighty-fourth day although the mixture was being consumed throughout the entire period. Two litters of young were born to each rabbit during the experiment. No abortions occurred in any of the rabbits, nor were there any lesions in any of the rabbits when autopsied. We therefore, feel safe in concluding that positive milk is not dangerous to rabbits by ingestion, since no pathogenic action and very slight antigenic action results therefrom.

That new-born calves may acquire an infection through the ingestion of milk has never been proven to occur, nor has it been proven not to occur. Williams has made some investigations on the possibility of calves acquiring an infection through the ingestion of raw milk, but his results are far from being conclusive.

Fourteen new-born calves were selected for the experiment. Six calves were fed upon a naturally infected milk, 6 upon non-infected milk, 1 upon pasteurized infected milk and 1 upon non-infected milk plus 5 c.c. of a 48 hour culture of *Bact. abortus* with each feeding. One gallon of the milk was fed twice daily to each calf for a period varying from five to fourteen weeks. Each of the calves (excepting those fed non-infected milk) were separated from their respective dams at the time of birth. The calves were

never allowed to suckle their dams, thus eliminating a possible infection from material which might collect on the surface of the udder and teat that would not be present in the milk.

The calves which were fed non-infected milk were allowed to suckle their dams from 3 to 4 days after birth and then separated.

The blood of each of the calves (excepting two) was tested for *Bact. abortus* antibodies before the milk was fed.

Bull calf 995A was fed upon the naturally infected milk of its dam for a period of 13 weeks. The blood of the calf was negative before feeding. A slight reaction developed one week after feeding. A high antibody index developed at the end of the second week which remained until the end of the 3rd week. At the end of the 4th week the blood was negative and remained negative during the remainder of the time of feeding.

No matting or staining of the sexual hairs occurred during the time of the feeding of the milk. However, 3 weeks after the feeding of milk was discontinued, the sexual hairs became matted and stained. A microscopical examination of sediment collected from the matted hairs showed only epithelial cells, uric acid crystals and many bacteria. No pus cells were found.

The dam of calf 995A was about 2 years old at the time of giving birth to this calf. The blood of the dam was negative before parturition. The milk was positive before parturition. Both blood and milk were positive after parturition and have continued to remain positive up to this writing. Her milk produced lesions and *Bact. abortus* antibodies when inoculated intraperitoneally into guinea pigs.

Bull calf 1001A was fed upon the naturally infected milk of its dam for 5 weeks. The dam was 7 years old. She has given birth to 5 normal calves. No abortions have occurred. No test was made on the blood before calving. The milk was negative before calving. The blood was slightly positive and the milk strongly positive after calving.

The blood of the calf was positive at the time of birth and remained positive up to the third week after birth. The blood was negative when tested at the end of the 4th week and remained negative during the remainder of the time tested.

The sexual hairs of the calf became slightly matted and stained on the 2nd week after birth. A microscopical examination of the sediment from the matted hairs showed only epithelial cells, uric acid crystals and bacteria. No pus cells were found.

The remaining four calves which were fed upon naturally infected milk gave no reactions, each calf being fed upon the milk for a period of 13 weeks. At no time did the sexual hairs show any tendency to become matted or stained during the time of feeding. The blood and milk of the dams of the above calves were negative before and after calving.

The milk fed to the above 4 calves was the mixed milk from three cows. The milk and blood of each cow has given a positive reaction for more than 18 months. Each of the three cows has aborted one or more times. The milk of each of the cows, when inoculated into guinea pigs, produced lesions and *Bact. abortus* antibodies, and *Bact. abortus* was isolated from the diseased spleen of the inoculated guinea pigs.

One calf (calf 1004A) fed upon non-infected milk for a period of 12 weeks developed *Bact. abortus* antibodies at the time of birth. The blood continued to give a reaction up to the 4th week after birth. The blood was not tested again until the 9th and 12th week after birth. Both tests were negative. No matting of the sexual hairs occurred.

The dam of the above calf was eight years old. She has given birth to 6 normal calves. The calf of the second pregnancy was aborted. No tests were made on the blood and milk before calving, both were negative at the time of calving.

Three of the new-born calves which were fed upon non-infected milk for 12 weeks never reacted, nor was there a tendency for the sexual hairs to become matted. The dams of the 3 calves have never aborted, nor has the blood and milk been known to give a positive reaction.

Two calves (1008A and 1009A) were allowed to suckle their dams for 4 days after birth and then fed upon a non-infected milk. The calves were 2 weeks and 8 weeks old respectively when the first blood test was made. Each of the calves gave a positive reaction when first tested and remained positive during the 5 weeks the tests were made. No matting of the sexual hairs occurred.

The dams of the two calves are 5 years old. Neither cow has ever aborted. The blood and milk of each dam was positive at the time the above calves were born.

The above results strongly emphasize the necessity of testing the blood of calves at the time of birth in order to differentiate

between positive reactions due to the ingestion of infected milk and positive reactions present at time of birth.

The calf fed upon pasteurized, naturally infected milk gave no positive reactions. No matting of the sexual hairs occurred during the time of feeding. The dam of this calf was two years old. The blood and milk of the dam has never given a reaction.

The calf fed upon non-infected milk plus a culture of *Bact. abortus* gave a negative reaction at the time of birth. A high antibody index had developed when the blood was tested one week after the beginning of the feeding of the mixture. The antibody index remained constant for 4 weeks. The reaction began to decrease on the 5th week. The blood became negative on the ninth week and remained negative during the remainder of the time the feeding of the mixture was continued.

The dam of this calf is 4 years old. She has had two normal births and one abortion. The blood and milk were negative before calving. The cow died of milk fever two days after calving. There were no tests made of the blood and milk after parturition.

The sexual hairs of the calf did not show any matting or staining during the time of feeding and the calf remains apparently healthy to date.

We feel that we must conclude from the data submitted that there is no connection, whatever, between the feeding of infected or non-infected milk and the matting and staining of the sexual hairs of new-born calves.

That *Bact. abortus* antibodies develop in calves as a result of ingesting naturally infected milk seems to us to be a demonstrated fact, but the cause and significance of the appearance of the antibodies cannot be explained until further development of the studies on the calves. The antibodies may be due to an active infection, they may be due to an active immunity or they may be due to a passive transmission of the antibodies present in the milk.

The possibility of infections being acquired *in utero* seems to us to be a phase of the abortion question that should be given as much attention as other possible modes of infection. Since we have found that 16 per cent of the 12 calves used in this experiment possessed *Bact. abortus* antibodies at the time of birth and that the antibodies persisted for many weeks after birth, we conclude that the control of the disease must begin with a study of the calf at the time of birth.

It occurred to one of us (I. F. H.) that naturally infected milk might be highly bactericidal for *Bact. abortus*, thus being capable of destroying *Bact. abortus* after sufficient time has elapsed for bactericidal action to take place.

In order to demonstrate this point an experiment was performed in the following manner:

A milk which contained *Bact. abortus* antibodies was heated intermittently for one hour at 60°C. on three successive days in order to destroy all microorganisms present. Two c.c. of bouillon were placed in small sterile test tubes and to these were added in order: .2, .1 and .05 c.c. of milk, 24,000 *Bact. abortus* organisms and .1 c.c. of complement serum. Two controls were used, one containing bouillon, .2 c.c. of milk and 24,000 bacteria, the other containing only bouillon and 24,000 bacteria. The tubes were incubated for 2 hours at 37°C. .1 c.c. of the mixture from each tube was plated out before, and .1 c.c. after incubation. The tube that contained .2 c.c. of milk contained 1200 bacteria after incubation. The remaining tubes were sterile. The control tubes contained 48,000 bacteria. We, therefore, feel safe in concluding that milk containing *Bact. abortus* antibodies is highly bactericidal for *Bact. abortus*. Therefore, milk containing *Bact. abortus* antibodies that has been heated at a sufficient temperature to kill the organisms and not the antibodies should be looked upon as being beneficial to new-born calves. The milk containing antibodies should give the calf a passive immunity during its early development.

Full bibliography may be found in:

- L. H. COOLEGE. Agglutination test as a means of studying the presence of *Bacterium abortus* in milk. *Jour. Agr. Res.*, Vol. V, No. 19.
L. H. COOLEGE. Is *Bact. abortus* (Bang) pathogenic for human beings? *Jour. Med. Res., N. S.*, Vol. XXIX, No. 3.

Dr. E. M. Nighbert has been transferred from Atlanta, Georgia, to Jacksonville, Florida, where he will locate as inspector in charge of the work of the Bureau of Animal Industry in the eradication of cattle ticks in cooperation with the State authorities. The work in Florida heretofore has been directed from the Atlanta office, but Dr. Nighbert will be assigned with a corps of veterinarians to Jacksonville and will devote his entire attention to encouraging the building of dipping vats and supervising the building of such vats for the eradication of cattle ticks in this State.

FURTHER STUDIES ON HOG CHOLERA WITH REFERENCE TO SPIROCHAETA HYOS*

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INTRODUCTION. Several reports have been published relative to various studies on *Spirochaeta hyos*, an organism present in certain hog cholera lesions. The investigation, which is still incomplete, has been continued since the publication of the first preliminary paper in 1912. The present paper has been prepared for the purpose of reporting additional data and presenting a general summary of the investigation.

EXPERIMENTAL NOTES. *Presence of Spirochaeta hyos in blood of cholera infected hogs.* The study of spirochaetes found in swine was prompted by the results of early observations on the blood of cholera infected hogs which were reported^{1 2} as follows:

“In the specimens of blood from all infected hogs, which have been observed by means of the dark field, a relatively large spirochete has been found. It averages from five to seven microns in length and one micron in width. The body of the organism is flexible and round at its ends. It presents no knobbed appearance at its poles. Actively motile, it revolves about its longitudinal axis. Its motility is undulating in character and its spirals are fixed. A few of these organisms have been observed dividing longitudinally. In one permanent microscopical mount, prepared by India ink fixation, one of these organisms apparently shows a polar flagellum. On the dark field this spirochete is readily distinguished from bacteria on account of its lack of rigidity and its characteristic motility, and from ‘blood filaments’ by its greater refractive properties and characteristic morphology.

“This spirochete has not been found in large numbers, in any of the blood preparations. However, in nearly every specimen examined, more than one have been observed and in many cases five or six have been found with little difficulty. As a rule the organisms have been found to be more numerous at the height of the disease. The specimens of blood examined have been diluted in the proportion of about one to ten or fifteen with sterile sodium citrate solution, which factor should be considered in contemplating the number observed in a given positive specimen. Moreover, it is suggested that this organism, when observed as a spirochete form, constitutes only one stage of its development.”

*Read before the meeting of the Am. Vet. Med. Assn., Detroit, 1916.

Since reporting the blood findings resulting from the microscopical study on the dark field, no further data on this phase of the problem has been published. Subsequent work dealt with studies of spirochetes in the intestinal mucosa and local lesions, cultural studies, filtration and inoculation experiments and complement fixation tests. On numerous occasions, however, attempts were made to secure satisfactory stained preparations as well as cultures of the spirochete from the blood. These attempts were wholly unsuccessful. No growth of the spirochete occurred in cultures made from the blood in various special deep tube media, such as serum, blood, agar, ascitic and amniotic fluid in various combinations. A few months ago attention was directed to this particular phase of the problem because it seemed necessary not only to verify the results of the microscopical study of the blood, but also to investigate the possibility of securing pure cultures of the spirochete directly from the blood of cholera infected hogs.

Pure cultures of *Spirochaeta hyos* may be obtained from the intestinal ulcers or local lesions of cholera infected hogs by making repeated transfers from the original culture. Owing to the period of time necessary to eliminate contaminating organisms from the original cultures, the final transfers containing the spirochetes in pure culture, are often unsatisfactory for animal inoculation experiments. This is an assumption based upon the probable attenuation of the cultures because of long continued passage on artificial culture media. Since the spirochete had been found in the blood by means of the dark field, it appeared that by proper methods the organisms might be isolated in pure culture directly from the blood and thus afford unattenuated cultures for animal inoculation and other experiments. Failure to grow the spirochetes from the blood in tube media led to the use of mass cultures.

CULTURE MEDIA. The culture media used for the earlier blood cultures consisted of a mixture of 100 c.c. of veal bouillon, (5 points acid to phenolphthalein); 50 c.c. sterile ascitic fluid and 25 c.c. of 2% veal agar in a flask containing 4 or 5 small pieces of fresh, sterile rabbit testicle or kidney tissue. Considerable difficulty was encountered in putting up this media due to the nature of the ingredients, and the impossibility of sterilizing the mixture. Other formulae, using varying amounts of the same material with and without sterilization, were tried later.

Owing to the difficulty in obtaining ascitic fluid in a sterile condition, attempts were made to replace it with amniotic fluid obtained from pregnant sows slaughtered at the abattoir. This was used both with and without sterilization and in approximately the same amounts as the ascitic fluid. Some promising results were obtained, but it was not found to be as satisfactory as the ascitic fluid. Fluid obtained aseptically and used without sterilization, gave much better results than that sterilized.

The formula determined upon for use in the later cultures was as follows:

Ascitic Fluid.....	40 c.c.
Amniotic Fluid	50 c.c.
Agar	25 c.c.
Bouillon	100 c.c.

These ingredients were mixed in a 250 c.c. flask to which the tissue had been added and the whole mixture was autoclaved.

TECHNIC INVOLVED IN MAKING CULTURES. (1) Tail bleedings; the tail was washed carefully with mercuric iodide soap, shaved and treated with a mixture* of alcohol, acetone and coal tar product, possessing high phenol coefficient. The end of the tail was then cut off and the blood caused to flow in a thin stream directly into the culture flask.

(2) Aspiration from the heart; the skin over the heart was washed, shaved and painted with iodine. Then by means of a sterile syringe fitted with a long needle, the blood was aspirated directly from the heart and forced into the flasks from the syringe.

(3) Slaughter bleeding; the animal was stunned by a blow on the head, the thorax quickly opened and the blood sample aspirated from the pulsating heart by means of a sterile 25 c.c. pipette.

In all cases, at least 25 c.c. of blood were taken, if possible, and after mixing with the media a layer of sterile neutral oil was added. When the blood was drawn, control cultures were made on nutrient agar and bouillon, to aid in determining its sterility.

INCUBATION AND EXAMINATION OF CULTURES. The cultures were incubated at 37° for several weeks. Examination by means of the dark field were made at intervals of a day or two for some

* See article by McDonald, *Jour. Surgery Gynecology and Obstetrics.*, Vol. 21, July-1915, p. 82.

time and then at less frequent intervals. Whenever the spirochetes developed, they were found from four to twenty-nine days after the cultures were made.

The contaminating organisms consisted of *B. coli communis*, *B. cholerae suis*, *B. enteritidis*, *B. subtilis*, staphylococci, streptococci, and several unidentified bacilli and spirilla.

When the cultures showed growth of active spirochetes, transfers were made into aseptic agar tubes, containing tissue. In some instances, owing to the presence of very rapidly growing bacteria with gas production, the spirochetes did not develop and usually the purification was most difficult.

STRAINS OF VIRUS UTILIZED. Four strains of virus have been used in these experiments:—

- 1—New York, received from Drs. Moore and Birch of Cornell University.
- 2—St. Louis, received from Dr. Hawk of East St. Louis, representing stock strain built up by mixing together all the strains of virus obtainable.
- 3—Wisconsin, received from Drs. Hadley and Beach of the University of Wisconsin.
- 4—Grosse Isle, obtained from a herd of cholera infected hogs at Grosse Isle, Mich.

TABLE I.

GENERAL DATA. BLOOD CULTURES.

No. Flask	Hog No.	Strain Virus	Character of bleeding	No. days after inoc. when cults. made	No. Days before Spirochete observed
1	248	N. Y.	Heart (1)	15	11
2	254	St. L.	Tail	8	
3	256	Wis.	Tail	8	
4	251	St. L.	Heart (1)	16	11
5	254	St. L.	Heart (2)	18	9
6	261	N. Y.	Tail	10	
7	256	Wis.	Heart (2)	18	
8	259	Wis.	Tail	10	9
9	255	N. Y.	Tail	20	
10	258	G. I.	Tail	12	
11	259	Wis.	Heart (2)	13	29
12	257	G. I.	Heart (2)	22	6
13	255	N. Y.	Heart (1)	24	
14	262	St. L.	Tail	4	
15	265	G. I.	Tail	4	

No. Flask	Hog No.	Strain Virus	Character of bleeding	No. days after inoc. when cults. made	No. Days before Spirochete observed
16	263	Wis.	Tail	7	
17	264	N. Y.	Tail	7	
18	261	N. Y.	Heart (2)	20	29
19	258	G. I.	Heart (2)	20	
20	252	N. Y.	Heart (2)	36	
21	265	G. I.	Heart (2)	9	
22	262	St. L.	Tail	10	
23	263	Wis.	Tail	10	8
24	263	Wis.	Tail	12	18
25	264	N. Y.	Heart (2)	12	6
26	267	St. L.	Tail	5	
27	263	Wis.	Heart (1)	15	
28	262	St. L.	Heart (1)	17	9
29	266	N. Y.	Tail	10	
30	267	St. L.	Tail	10	
31	268	G. I.	Tail	10	
32	269	Wis.	Tail	10	
33	266	N. Y.	Heart (1)	16	4
34	267	St. L.	Heart (1)	16	
35	270	St. L.	Tail	8	
36	271	N. Y.	Tail	8	
37	273	G. I.	Tail	8	
38	269	Wis.	Heart (1)	22	4
39	272	Wis.	Tail	10	
40	271	N. Y.	Heart (1)	14	
41	273	G. I.	Heart (3)	15	
42	270	St. L.	Heart (3)	16	
43	278	Normal	Tail		
44	279	Normal	Tail		
45	280	Normal	Tail		
46	277	Normal	Tail		
47	272	Wis.	Heart (1)	18	12
48	268	G. I.	Heart (3)	28	6
49	277	G. I.	Heart (1)	3 or 4	
50	279	St. L.	Heart (3)	5	
51	281	Normal	Tail		
52	280	N. Y.	Heart (3)	6	12
53	270	St. L.	Heart (3)	23	
54	273	G. I.	Heart (1)	24	
55	279	St. L.	Heart (3)	8	
56	287	Normal	Heart (3)		
57	286	Normal	Heart (3)		
58	278	Wis.	Heart (3)	7	
59	281	G. I.	Heart (3)	9	
60	275	N. Y.	Heart (3)	7	
61	287	Wis.	Heart (1)	8	
62	285	G. I.	Heart (3)	11	
63	286	St. L.	Heart (3)	11	
64	281	G. I.	Heart (1)	10	
65	285	G. I.	Heart (3)	15	
66	286	St. L.	Heart (2)	15	9
67	287	Wis.	Heart (1)	18	*95

*Culture not examined after 19 days.

No. Flask	Hog No.	Strain Virus	Character of bleeding	No. days after inoc. when cults. made	No. Days before Spirochete observed
68	284	N. Y.	Heart (3)	12	7
69	278	Wis.	Heart (4)	20	5
70	294	St. L.	Heart (3)	6	†90
71	291	N. Y.	Heart (3)	7	
72	293	G. I.	Heart (3)	8	
73	292	Wis.	Heart (3)	9	
74	294	St. L.	Heart (3)	12	
75	293	G. I.	Heart (3)	12	
76	291	N. Y.	Heart (3)	14	6
77	293	G. I.	Heart (3)	16	6
78	294	St. L.	Heart (3)	16	6
79	291	N. Y.	Heart (4)	19	7
80	300	St. L.	Heart (3)	10	6
81	298	G. I.	Heart (3)	11	
82	301	N. Y.	Heart (3)	12	
83	299	Wis.	Heart (3)	12	
84	300	St. L.	Heart (4)	13	
85	299	Wis.	Heart (4)	16	5
86	298	G. I.	Heart (4)	16	15
87	304	St. L.	Heart (3)	9	7
88	303	G. I.	Heart (3)	10	
89	305	N. Y.	Heart (3)	12	
90	302	Wis.	Heart (3)	13	13
91	288	St. L.	Heart (3)	23	
92	304	St. L.	Heart (3)	16	10
93	290	Wis.	Heart (2)	18	
94	297	Wis.	Heart (2)	18	23
95	295	Wis.	Heart (3)	18	5
96	306	St. L.	Heart (2)	38	17
97	312	N. Y.	Heart (2)	10	8
98	313	St. L.	Heart (2)	10	18
99	311	G. I.	Heart (2)	12	12

†Culture not examined after 22 days.

- (1) Blood taken from the heart with 25 c.c. pipette after death.
- (2) Blood taken from the heart with 25 c.c. pipette while animal was stunned.
- (3) Blood aspirated from the heart by syringe while animal was alive.
- (4) Blood taken from the heart by syringe after death.

A summary of the results shown in TABLE I may be expressed as follows:

1. No spirochetes could be found in cultures made from the blood of normal hogs although contaminating bacteria were present in practically all cases.
2. No spirochetes were observed in blood cultures made from 1-5 days after inoculation of hogs with the filterable virus.
3. 15.8 per cent of total blood cultures made from 6-9 days after

inoculation of pigs with the filterable virus resulted positively.

4. 50 per cent of total blood cultures made 10 or more days after inoculation gave positive findings.
5. 53 per cent of total blood cultures made after death from hog cholera contained *Sp. hyos*.
6. *Sp. hyos* were observed in all positive cultures from 4 to 29 days after cultures were made, with two exceptions.

It should be borne in mind that the foregoing series includes all mass blood cultures since the beginning of the work.

For the first several weeks considerable experimentation was carried out for the purpose of developing the most satisfactory culture media formula, correcting errors in technique and devising the best methods for the elimination of contamination, in so far as possible. Notwithstanding these difficulties 40 per cent of the total blood cultures showed the presence of *Sp. hyos*. Most of the cultures, especially those in the first part of the series, contained many contaminating organisms and it is quite probable that in some instances the spirochetes may not have developed because of overgrowth of extraneous forms.

It is practically impossible to secure relatively large blood specimens from the hog, uncontaminated, therefore undue importance cannot be attached to the foregoing results. However, the general results corroborate those previously reported from the dark field study of the blood of normal and cholera infected hogs.

PATHOGENICITY OF SPIROCHAETA HYOS. References have been made in published data^{2, 3} to the successful production of symptoms and lesions similar to those of hog cholera by means of inoculation with contaminated and pure cultures of *Sp. hyos*. A summary of these reports is presented in Table II.

TABLE II.

SUMMARY OF PUBLISHED DATA, ANIMAL INOCULATION EXPERIMENTS.

Hog	CHARACTER OF CULT. OF <i>Sp. Hyos</i>		Age of transfers days	RESULTS
	Pure or contam.	No. of generation on cult. media		
559	contam.	1st	5	Disease typical of H. C. Check animal inoc. with contam. cults., remained normal. Berk. filtered serum. 559 produced disease similar to H. C.
622	contam.	2nd	57	Mild reaction.
623	contam.	2nd	57	Mild reaction.
612	contam.	2nd	22	Disease typical of chronic cholera. Berk. filtered serum. 612 produced disease similar to H. C.
613	contam.	2nd	22	Disease typical of H. C. Berk. filtered serum. 613 produced same in normal pig.
614	contam.	2nd	22	Disease typical chronic chol. Berk. filtered serum. 614 produced symptoms similar to those of mild chol.
627	contam.	3rd	36	Strong reaction, gained resistance against H. C.
628	contam.	3rd	36	Strong reaction—blood produced disease typical of H. C.
642	contam.	3rd	52	Disease typical of mild cholera.
643	contam.	3rd	52	Disease typical of mild cholera.
805	pure from filtrate	2nd	70	Disease typical of H. C. Controlled by check animal.
806	Pure from filtrate	2nd	70	Disease typical of H. C. Controlled by check animal.

During the past year 27 hogs have been subjected to inoculation experiments with *Sp. hyos*. The methods used in conducting these experiments and in controlling the results are illustrated by the following laboratory data:

EXPERIMENT II.—Hog 121 received injections of pure cultures of *Sp. Hyos* as follows:

Hog 121—5-27-15.	Intramusc. Inj. 6	c.e. susp. trans. II	112
6-1 -15.	Intramusc. Inj. 5	c.e. susp. trans. III	112
6-4 -15.	Intramusc. Inj. 4½	c.e. susp. trans. III	112
6-8 -15.	Intramusc. Inj. 8	c.e. susp. trans. III	112

Repeated inoculations of pure cultures were made for the purpose of comparing results with those from single inoculations. Flexner⁷ and his associates found that several intraperitoneal and

intraspinal inoculations of monkeys with cultures of the organism which they have isolated from cases of acute anterior poliomyelitis, were required to produce infection.

This animal showed a thermal and constitutional reaction 6-2-15 to 6-6-15, after which it regained normal conditions. Subsequent exposure to the filterable virus proved that it was immune to hog cholera.

Hog 123 received injections of pure culture of *Sp. hyos* as follows:

Hog 123—5-27-15.	Intramusc. Inj.	4½ c.c. susp. trans.	II	112
6-1 -15.	Intramusc. Inj.	4 c.c. susp. trans.	III	112
6-4 -15.	Intramusc. Inj.	5 c.c. susp. trans.	III	112
6-8 -15.	Intramusc. Inj.	10 c.c. susp. trans.	III	112

This animal showed very slight reaction from the cultures injected 6-2 - 6-5, on 6-8 exhibited marked symptoms similar to those of the subacute type of hog cholera and died 6-23-15.



FIG. 1. Kidney.

Hogs 122 and 124 were placed with hogs 121 and 123 at the beginning of the experiment, 5-27-15.

Hog 122 on 6-10-15 developed symptoms typical of H. C. which proved fatal in 18 days. It is significant to notice that this animal showed symptoms just 6-7 days after hog 121 exhibited a strong reaction from injection of cultures.

Hog 124 remained normal until 6-16, 7-8 days after hogs 123 and 122 manifested symptoms, evidently not becoming exposed from 121 at the same time as hog 122. With the exception of 121 all suffered from disease processes typical of H. C.

Autopsy Hog 122.

Pericardial sac—ecchymotic spots.

Heart muscle—irregular hemorrhagic areas.

Lungs—small hemorrhagic areas.

Spleen—enlarged, soft and engorged.

Glands, mediastinal, inguinal and mesenteric—enlarged and hemorrhagic.

Kidneys—petechiae, "turkey egg". See fig. (1).

Cecum—Mucosa ulcerated around ileo-cecal valve. Small hemorrhagic areas. See fig. (2).

Autopsy Hog 123.

Lungs—hemorrhagic areas.

Spleen—very large and friable.

Glands—mesenteric and inguinal enlarged.

Kidney—few ecchymotic spots.

Cecum—two small ulcers.

Liver—normal.

Heart—normal.

Autopsy Hog 124.

Lesions correspond with those found in hog 122 with the addition of petechiae on the ental surface of the bladder. See figs. (3), (4), (5).

EXPERIMENT 12.—Hog 131 received 12 injections of liquid cultures of *Sp. hyos* during a period from 6-15-7-25-15. The animal remained in normal condition and was found later to be immune to hog cholera.

Hog 132 placed in the same pen as a control throughout the experiment also remained normal and was found to be immune upon exposure to the filterable virus of H. C.

Hog 133—Another control, remained normal or nearly so for almost two months and then gradually developed symptoms characteristic of the chronic type of hog cholera to which it succumbed 9-8-15. Autopsy showed characteristic lesions.

Hog 134 received 12 injections of liquid cultures of *Sp. hyos* during a period from 6-15-7-28. As a rule this animal showed thermal reactions after each injection, manifested symptoms 8-3-15 and died 9-9-15. The autopsy showed lesions similar to those of H. C.

Hogs 137 and 138 were given 7 injections and fed cultures of *Sp. hyos* during a period from 6-15 - 7-12. After about 11 weeks both of these animals manifested symptoms of disease. No. 137 recovered and proved immune to hog cholera. No. 138 died of a chronic type of disease similar to H. C. 9-17-15. The experiments on these animals (137 and 138) were controlled throughout by the presence of normal hogs (135 and 136) which developed an immunity to the filt. virus of H. C., presumably through exposure to the



FIG. 2. Cecum.

attenuated organisms causing disease in 137 and 138. The accompanying photograph (see fig. 6) shows the condition of the animals included in this experiment on 9-10-15.

Hogs 133 and 137 do not appear in the photograph as No. 133 died on 9-8 and was destroyed while No. 137, in normal condition, was not in the field of the camera. Hog 134 had died the previous day, while hog 138 was very sick.

TABLE III.

SUMMARY OF UNPUBLISHED DATA.
ANIMAL INOCULATION EXPERIMENTS.

Hog. No.	CHARACTER OF CULT.		RESULT OF EXPERIMENT	
	Pure or Contam.	No. of generation on cult. med.	Age of Transfers. (days)	
1	Cont.	2	9	Acute disease, died 14th day.
2	"	2	18	Subacute disease, died 17th day.
3	"	5	5	Chronic disease, died, control, acute type.
4	Pure	16	8	Subacute, died 23rd day, control died.
5	"	16	8	Chronic, died, control died.
6	"	16	8	Chronic, died, control died.
8	"	18, 19 & 20	4, 7, 20, 30	Not affected by cult., died after exposure to filt. virus.
9	"	18, 19 & 20	4, 7, 20, 30	Not affected by cult., died after exposure to filt. virus.
7	"	4 & 5	6, 22, 25, 28	Not affected by cult., died after exposure to filt. virus.
97	"	4 & 5	6, 22, 25, 28	Immunized by cult. to filt. virus.
103	"	7, 8, & 9	3, 20, 23	Immunized by cult. to filt. virus.
104	"	7, 8, & 9	3, 20, 23	Died of subacute disease.
108	"	10 & 11	4, 7, 11	Not affected by cult., died after exposure to filt. virus.
110	"	10 & 11	4, 7, 10	Not affected by cult., died after exposure to filt. virus.
115	"	6	22, 28	Chronic disease, died, controls, acute disease.
116	"	6	22, 28	Chronic disease, died, controls, acute disease.
121	"	2 & 3	2, 6, 7, 11	Immunized by cult. to filt. virus, control died.
123	"	2 & 3	2, 6, 7, 11	Chronic disease, died, control died.
131	"	3, 4, 5 & 12	21, 3, 6, 2, 6, 4	Immunized by cult. to filt. virus, control died.
134	"	3, 4, 5 & 12	21, 3, 6, 2, 6, 4	Acute disease, died.
137	"	3, 4, 5 & 6	11, 3, 8, 17, 6, 6	Reaction only from culture—immune to filt. virus.
138	"	3, 4, 5 & 6	11, 3, 8, 17, 6, 6	Reaction only from culture. Chronic dis., died after exp. to filt. virus.
140	"	4, 5, 6, 9, 11	6, 22, 7, 11, 14, 10	Immunized by cult. to filt. virus.
145	"	4, 5, 6, 9, 11	6, 22, 7, 10, 14, 10	Not affected by cult., acute H. C. after exp. to filt. virus.
275	"	5	3, 6	Died while being bled. Had reaction and symptoms.
282	"	5	3, 6	Strong reaction, immune on expos., 2 controls immune.
306	(Contam.)	2	16	Reaction from cult. (Control, after exposure during reaction period, took subacute type of disease, and died. Cult. pig developed acute type of disease and died after symptoms appeared in control.

In the foregoing series of inoculations of 27 hogs with cultures of *Sp. hyos*, each of which was controlled by one or more normal pigs, except in the case of numbers 53 and 56, the following summarized results were obtained:

12 hogs, (45.2%) developed disease typical of hog cholera, the cases terminating fatally.



FIG. 3. Heart and Lungs.

7 hogs, (26%) exhibited reactions after which they were injected with the filterable virus and found to be immune to hog cholera. 7 hogs, (26%) were not affected by the injection of cultures of *Sp. hyos*, as shown by absence of immunity on subsequent exposure to the filterable virus.

1 hog, (3.7%), number 275, gave questionable results.

In these experiments nine different culture strains of *Sp. hyos* were used.

It is a well known fact that *Spirochaeta pallida* rapidly loses its virulence when cultivated on artificial culture media.

In the discussion of "Immunity in Syphilis" Zinsser⁶ makes the following statement:

"Were it not for the production of lesions with cultures in their early test tube generations by Hoffman, and by Noguchi in a few experiments, one would be almost in doubt as to the identity of the virulent with the culture organisms."

Further study may show that *Sp. hyos* may exhibit the same characteristic.

The results of animal inoculation experiments indicate that *Spirochaeta hyos*, when injected into healthy hogs, in some instances is capable of producing symptoms and lesions similar to those present in hog cholera.

Further experimentation is necessary, however, in order that definite conclusions can be drawn as to the specific etiological relationship of this organism to hog cholera. At the present time the following tentative suggestions are offered:

1. *Sp. hyos* under certain conditions, is pathogenic for swine, producing symptoms and lesions characteristic of hog cholera.

2. *Sp. hyos* may rapidly become attenuated when grown under artificial conditions and therefore may often become incapable of producing disease when injected into healthy hogs.

3. The injections of attenuated cultures into healthy hogs sometimes sensitize the animals and sometimes confer resistance against infection when subsequent inoculations are made with the filterable virus of hog cholera.

4. The results of several inoculation experiments have shown that control hogs confined with the inoculated animals may develop symptoms and lesions similar to those found in hog cholera, while inoculated hogs may remain normal or exhibit reactions only. This may be explained by assuming that the attenuated organisms multiply after injection, and, regaining their virulence in a natural habitat, may cause disease when ingested by the healthy control animals.

SUMMARY OF THE INVESTIGATION OF SPIROCHAETA HYOS. The general trend of results pertaining to this series of investigations justifies a continuation of the study of *Sp. hyos*. Much work re-

mains undone and some of the results which have been reported await the confirmation of other investigators. However, the findings bear some significance and further investigation of this organism is warranted on the part of those interested in the problem of hog cholera, its cause and prevention.

Hog cholera is at present classified etiologically as a disease due to an ultravisible virus. There exists no recognized consensus of opinion regarding the relative importance of the pathological

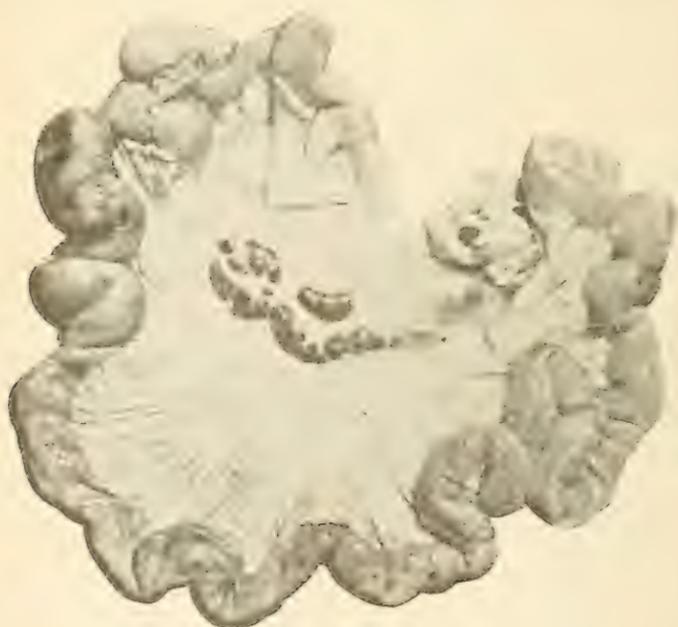


FIG. 4. Mesenteric Glands.

changes which take place in cases described as hog cholera and present literature on this subject constantly revolves around the query, "What is hog cholera"? The diagnosis rests entirely upon history of outbreak, clinical symptoms, autopsy findings and the results following treatment with serum. Preventive treatment depends upon the use of anti-hog cholera serum, which during the last six years has been manufactured in large quantities and used extensively. The value of anti-hog cholera serum has been abundantly proven, but the general, practical efficacy of the product, in proportion to its cost and certain other disadvantages, has been subjected to serious criticism.

Students of the hog cholera problem must place more concentration upon the study of the filterable virus and the pathology of the disease in order that a logical basis may be established for the successful solution of the problems of accurate diagnosis and practical prevention.

GENERAL CONCLUSIONS FORMED FROM RESULTS OBTAINED THUS FAR. During this series of investigations the following phenomena have been demonstrated:

1. The presence in small numbers, of a spirochete, described as *Sp. hyos*, in the blood of hogs infected with hog cholera, as shown by microscopical studies. In the majority of cases, mass cultures from the blood of animals suffering from hog cholera yield a growth of spirochetes, usually accompanied by *B. coli communis*, *B. cholerae suis*, *B. enteritidis*, staphylococci and other organisms:

2. The presence of *Spirochaeta hyos* in the intestinal ulcers, cecal crypts and external local lesions of animals suffering from hog cholera.

3. The successful filtration of *Sp. hyos* from suspensions containing a variety of contaminating microorganisms, as evidenced in one or two instances by growth of the spirochete in pure culture in transfers made from the filtrates, and the production of disease processes similar to hog cholera in hogs inoculated with the filtrates.

4. The production of disease similar to hog cholera, under certain conditions, in normal hogs inoculated with pure cultures of *Sp. hyos* which have passed through several generations on artificial culture media. The presence of sensitization in some instances and, in others, resistance toward subsequent injections of the filterable virus of hog cholera, in hogs which have received pure attenuated cultures of *Sp. hyos*.

5. The specific antigenic power^r of extracts prepared from pure cultures of *Sp. hyos* when used in complement fixation tests with sera from cholera hogs as compared with the results of similar complement fixation tests with the sera of normal hogs and those suffering from other disease processes.

CONFIRMATORY DATA. Relatively little work has been reported in confirmation of the foregoing conclusions.

Arnheim⁷ found spirochetes on dark field preparations made from the peripheral blood of infected hogs, but not from the heart's blood. He could not demonstrate spirochetes in the blood of normal hogs.

Comaway and Durant¹⁰ have found that an experimental antigen prepared from intestinal ulcer material, which is usually rich in spirochetes, gave encouraging results as a specific reagent in experimental complement fixation tests.

This experimental ulcer extract antigen was prepared in such a way that it was "practically free from blood and blood carrying tissue containing any large amount of the circulating 'filterable virus'."

Comaway and Durant also tested a total of 76 experimental spleen extract antigens, 10 per cent of which manifested antigenic

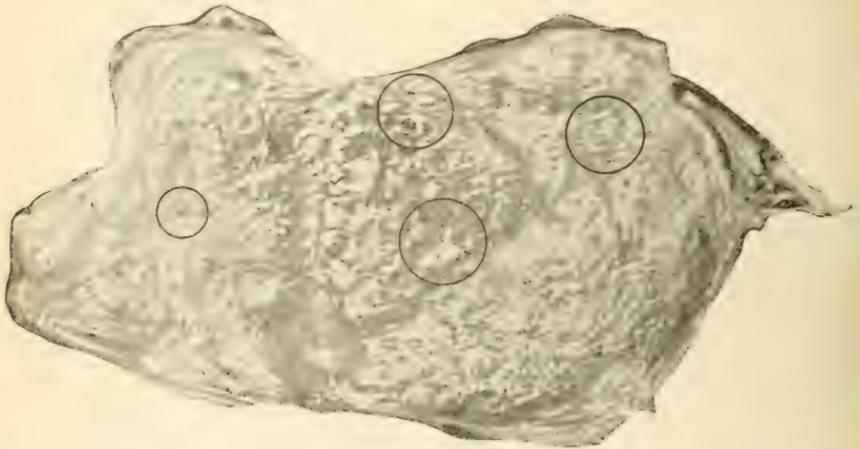


FIG. 5. Bladder.

properties. Experimental antigens prepared from the blood, kidneys and lymph glands yielded negative results.

Rüther¹⁰, Betegh¹¹, Uhlenhuth and Haendel¹², Arnheim⁸ and Dorset¹³ report the presence of spirochetes in the intestinal ulcers of infected hogs. Uhlenhuth and Haendel state that spirochetes have been found in the bile of infected hogs.

In former publications⁴ and ¹⁴, reference has been made to a short article published by Rüther¹⁰ concerning the presence of spirochetes in the intestinal mucosa of cholera infected hogs. In a monograph, "Zur Sichtbarkeit des Schweinepest-erregers", printed by Rüther in 1910, he reported the observation of spirilla in the blood of cholera infected hogs, referred to the passage of these organisms through a filter and suggested the etiological significance of the spirilla in hog cholera. In this monograph the term "spirochaeta" was suggested in one instance as synonymous

with the term "spirilla", but no attempt was made to describe a definite microorganism.

CRITICISMS. Some criticisms have been offered concerning the findings summarized in the foregoing. Such have been expressed, for the greater part, merely as opinions and not as facts based upon actual data.

While Arnheim⁵ verified the statement that spirochetes may be demonstrated in the blood and intestinal mucosa of cholera infected animals, he expressed the belief that *Sp. hyos* is a saprophyte. He based this conclusion upon the fact that treatment of hog cholera with salvarsan results negatively and also upon the assertion that spirochetes had not been passed through filters under pressure, at that writing.



FIG. 6. Sick Hogs.

Hayes¹⁵ states that spirochetes could not be demonstrated on the dark field in 12 specimens of blood from cholera infected hogs.

Dorset¹⁶ reports that he was not able to find spirochetes in the blood of infected hogs. He states that spirochetes can be demonstrated readily in the intestinal mucosa not only of infected hogs but also that "an extended examination of the intestinal contents of healthy hogs has shown that the same spirochetes are present there in considerable numbers.

He therefore believes that *Spirochaeta hyos* is a "saprophytic inhabitant of the hog's intestine."

Meyer¹⁷ calls attention to the destructive action of sodium taurocholate, saponin and lecithin on spirochetes, while the filterable hog cholera virus exhibits more resistance to such substances. This fact, according to Meyer, supports the opinion that *Sp. hyos* is not a pathogenic organism.

Referring to the negative evidence which has been advanced the following suggestions may be offered:

1. Failure to find *Sp. hyos* on the dark field in the blood of cholera infected hogs is an admission of lack of perseverance in following up the work. The spirochete may be secured in blood cultures as reported in this paper.

2. Failure to successfully treat cases of hog cholera with arsenical or mercurial preparations should not be considered as evidence that *Sp. hyos* is in no way related to hog cholera. The successful use of salvarsan in the treatment of syphilis is not uniformly accepted, and moreover syphilis is a disease which shows no clinical resemblance to hog cholera and the successful treatment with mercury and salvarsan depends upon continued application of these substances.

3. Claims of failure to pass spirochetes through filters under pressure cannot be maintained at the present time.

Sp. hyos has been passed through the Berkfeld filter¹⁸. Wolbach and Binger¹⁹ have described a spirochete, named by them *Sp. clusa*, which they passed through a Berkfeld "V" filter. They have also reported the filterability of *Sp. biflora*, which they found in fresh water.

Todd and Wolbach²⁰ have shown that *Sp. duttoni* could be forced through a Berkfeld filter with a pressure of 50-90 pounds per sq. inch, while they did not pass through the filter under atmospheric pressure. It is inferred that the organisms which passed through the filter under pressure represented the "granule phase."

4. The demonstration of spirochetes in the intestines of normal hogs, with the assumption that such spirochetes are identical with *Sp. hyos*, does not constitute sufficient evidence upon which to draw negative conclusions regarding this organism.

It is now recognized that *Sp. pallidum* is the specific cause of syphilis in spite of the fact that the oral cavity of the healthy individual is the normal habitat of saprophytic spirochetes. Positive findings of spirochetes in the intestinal mucosa of swine immune to cholera have been reported, but they are found in small numbers and only in rare cases in the intestines of healthy hogs, as compared with the findings in the intestinal ulcers and cecal crypts of infected animals. However, granting that spirochetes may be demonstrated in large numbers in the intestinal canal of healthy hogs, the assumption is not well founded that all microbial

forms of the intestinal flora which resemble spirochetes morphologically, are identical with *Sp. hyos*. With our present meagre knowledge of spirochetes, it is impossible to rely upon microscopical characters alone in distinguishing the known forms. As an illustration it may be stated that the intestinal tract of normal man contains non-pathogenic organisms so closely resembling *B. typhosus* microscopically that no differentiation can be made, consequently typhoid fever cannot be diagnosed in the laboratory by a morphological study of the organism.

During the course of this investigation, *Sp. hyos* has been found in large numbers in the intestinal mucosa of a few animals which had been immunized to hog cholera. It can be assumed that the presence of these organisms in the intestine of immune hogs may possibly characterize such animals as "carriers" of the disease.

5. The inference drawn from the data concerning the resistance of the filterable hog cholera virus to the action of sodium taurocholate as compared with that of spirochetes, like some of the foregoing, represents circumstantial rather than direct evidence. Much has been written concerning some of the phenomena attending the life history of *Sp. pallidum* and other spirochetes. While little is known concerning the life cycle of this group of organisms there are many well known authorities, Balfour²¹, Fantham²², Marchoux and Couvey²³, Hindle²⁴, Dutton and Todd²⁵, Sergent and Foley²⁶, Noguchi²⁷, who have observed the "granule phase." It is altogether possible that at certain stages of development *Sp. hyos* and other organisms of this group may be more resistant to various substances and conditions than during the period represented by the morphological form of the organism with which the worker is familiar.

GENERAL CONCLUSION. While much work remains to be done on *Spirochaeta hyos*, only one important step is necessary to prove with certainty whether or not this organism bears any direct etiological relation to hog cholera. Some means must be developed through which the organism may be isolated in pure culture directly from the infected animal in order that pure cultures, unattenuated by tedious manipulation in an artificial environment, may be utilized in a series of animal inoculation experiments. Under such conditions, uniformly positive results, together with data already in hand, would serve as final, conclusive evidence as to the specific pathogenicity of *Sp. hyos*. Until such experiments can be success-

fully carried out, positive conclusions must be withheld, but, in the meantime, *Sp. hyos.* may be regarded as an organism present in animals infected with hog cholera, possessing certain characters suggestive of its pathogenic nature.

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At the request of farmers and business men in Southeastern Texas, the Bureau of Animal Industry has opened a branch tick eradication office at Houston, Texas, and has placed Dr. J. B. Reidy in charge, with a corps of veterinary inspectors, to conduct the work of tick eradication in that section. The people of this section are especially anxious to have these counties free from ticks as quickly as possible so that their free territory will adjoin the free territory of Louisiana where compulsory state tick eradication promises an early freedom of that state from quarantine. The work of tick eradication now being carried on in Western Texas will be directed as heretofore from headquarters in Fort Worth.

THE COMBINED AND FOLLOW-UP SYSTEMS OF TUBERCULIN TESTING*

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Tuberculin was first reported by Koch in 1890 at the National Congress at Berlin, and introduced into the United States into general use in the nineties. Thus, in general terms, we may say this country has had twenty years of tuberculin testing on a large scale.

During this time, statistics have been gathered from which incomplete conclusions were drawn; state laws have been passed, worked on for a few years and altered or repealed; municipalities have drawn up ordinances which they could not enforce in spite of the fact that the highest courts of the land have declared their regulations constitutional.

One state law was passed, but later repealed, going so far as to prevent the application of the tuberculin test by municipalities as a necessary requisite to ship milk into their borders, and more local and general bitterness of feeling has been engendered in its name than any other veterinary police sanitary measure ever applied in these United States. And yet, today when we look back over our twenty years of effort, we find results that are somewhat disappointing. This is partly due to the fact that the first laws and regulations passed were the result of too much enthusiasm supported by too meager knowledge regarding the limitations of the tuberculin test, so that claims were made which we were not able to fully substantiate.

As a result of the early enthusiasm, laws and regulations were passed which were too drastic, and tended in themselves to create antagonism on the part of live stock owners in general. We permitted the cattlemen to infer that by the use of tuberculin their herds would speedily become free from tuberculosis; and history indicates that many cattlemen whose cooperation was secured at the beginning of the work have, through their disappointments, become so violently opposed to the use of this agent that their claims regarding the failures are greatly exaggerated.

The attitude then held by the profession was not altogether

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surprising since larger claims have been made and more enthusiasm exhibited by ourselves and sister profession over agents that have not been nearly as valuable as tuberculin.

There are many of us who started our professional life feeling that tuberculin was practically a sure method of diagnosis, and had we depended upon the impressions we then had, and not found out its limitations by extensive and in some cases, sad experience, we would still hold that opinion, in spite of the fact that the limitations have been called to our attention, by published articles from men of international reputation.

This opinion is naturally still held by many of those whose experience in tuberculin testing has not been extensive, or limited to herds where the percentage of reactors was low and therefore, have not had an opportunity to have the limitations of tuberculin forced upon them as strongly as those whose experience is extensive, and especially those who are dealing with herds where the percentage of reactors was large.

In spite of our disappointments, we believe that tuberculin is the most allergic diagnostic agent that we have today and without its aid, we would be entirely helpless in our fight against bovine tuberculosis.

To those of us who have used more than one method of diagnosis, it has appeared that a combination of the various tests would reduce the failures considerably. It behooves us in the face of the responsibility entrusted to us as a profession by the livestock industry to leave nothing undone in ferreting out all cases of tuberculosis. We must do all that we can do in a practical way to accomplish this end, and the object of this paper is to briefly call attention to the limitations of the various forms of tuberculin testing, and to point out the value of the combined and follow-up systems.

Statistics as to the accuracy of the tuberculin test have been compiled largely from the percentage of reactors which have been killed and tuberculosis lesions found. This is generally conceded to be high, so that today we recognize that animals which react to the test, will show tuberculosis on post-mortem examination in nearly 100% of the cases. We are justified in considering for all practical purposes that every reacting animal to a properly performed test is tuberculous. In the control of tuberculosis in ordinary herds the harm done by eliminating one or more tuberculosis free

animals is in no way comparable with that occasioned by leaving in the herd a tuberculous cow that has not reacted. The most dangerous animal from the viewpoint of control of tuberculosis is the tuberculous non-reacting cow.

Some will argue that by such drastic means of ascertaining reactors we will eliminate so many cows that we will be at a loss to properly handle them. This has been especially true in some European countries where so many reactors were found that tuberculin testing was discontinued simply because they could not from an economic standpoint, condemn for dairy purposes all reacting animals.

The handling of reacting cattle in communities where tuberculosis is very prevalent is a serious question, but with proper leniency shown, as the gravity of the situation requires, it need not be dreaded, no matter what the percentage. We were able, on account of the broad-mindedness of Dr. L. M. Powers, Health Commissioner of Los Angeles, who has had a life-time experience in public health work, to prove the practicability of the following system of handling reacting animals in a large dairy.

In the latter part of 1913 the University of California and the Los Angeles Health Department began regular tuberculin testing of a herd of 825 head of dairy cattle, which were known to be heavily infected with tuberculosis.

The land occupied by these cattle was divided by a railroad right of way into two distinct ranches. Following the first test, and at each subsequent one made at six months intervals, all reacting animals were kept on one ranch and all healthy animals on the other. Calves from both herds were kept on the healthy ranch, raised on pasteurized milk, tested when large enough to turn out on pasture, and the non-reactors used to replenish the great losses to the healthy herd which the first subsequent tests caused.

This produced a herd which at the time of its greatest numerical strength numbered over 500 head of cattle, all tuberculous, which were under constant observation and the milk from which was allowed to be sold in the city of Los Angeles after it had been pasteurized.

Animals in the reacting herd, as soon as they showed apparent evidence of tuberculosis, were removed, but no special means of ascertaining such cases by auscultation, percussion, or laboratory examination of secretions were resorted to.

By such a system no financial loss was caused to the owner in spite of the fact that 70% of a herd of 825 cattle reacted to the first test. This system worked sufficiently satisfactorily that during the following year another herd of 500 head of animals were brought under the same system, the only difference being that in this case the tuberculous dairy was conducted at a distance of eight miles from the healthy one.

We have had no cause to regret such action on our part from the public health stand-point, since extensive experiments conducted by the writers, and reported in the August number of the *Journal* of this association, show that milk from one of these herds in the raw state, contained living tubercle bacilli, on every examination, but after it had passed through an approved system of pasteurization as conducted on a commercial scale in an ordinary modern city milk plant, it then was entirely innocuous to guinea pigs without a single exception. We are convinced that in a community where tuberculosis is prevalent among livestock, it is no worse to allow the sale of pasteurized milk from known tuberculous cows than to allow the sale of pasteurized milk from untested cattle; and infinitely better than to allow the sale of raw milk from untested cattle, as is being done in innumerable places in this country.

In the two cases cited, this method of handling reactors, which is really a modified Bang system, was easy of accomplishment because the herds were large and the owners controlled two ranches. This same system, however, can be carried out among small dairies by establishing a so-called community herd of reactors, in which all tuberculous animals belonging to several owners will be kept, and the product of which will be pasteurized. There are some difficulties to overcome in establishing this community herd of reactors with several owners, but none which we feel are insurmountable, although at the present time, we have no working example to offer. The same system may be adopted by several pure bred breeders whose herds are in reasonably close proximity to one another.

THE SUBCUTANEOUS TEST. This being the original method of administering tuberculin, naturally the largest amount of data and statistics have been gathered in reference to it.

The Bureau of Animal Industry has gathered valuable statistics on the percentage of reactors in which tuberculous lesions were found. Thus Melvin reported in 1908 that 23,869 reactors

were slaughtered with 98.81% showing tuberculosis. This is generally admitted and, for practical purposes, we may say that all typical reactors are tuberculous.

A careful search of the literature has been made for failures of the subcutaneous test to detect tuberculous animals and little definite data on the point have been obtained. Moreover, it is not of extreme importance to know the exact percentage which failed to react, but the all-important fact that there is a certain percentage of these failures is forced upon us.

Eber gathered all available statistics from 1890 to February 1st, 1892, on the accuracy of the subcutaneous test in which reactors and non-reactors were slaughtered and found that 10.6% of the non-reactors were tuberculous. Lignieres states that from 7 to 8% of tuberculous animals fail to react to the subcutaneous test. In 1906, Carini reports that in the vaccine institute at Bern, where all animals used for the production of vaccine lymph are tuberculin tested, 17.4% of 361 non-reactors were tuberculous. More recent statistics on this include the report of the British Royal Commission on tuberculin testing by Corbett and Griffith.

Their animals were artificially infected with bovine tubercle bacilli and classified as follows:

Class A. 16 animals with severe progressive lesions
31% failed to react.

Class B. 6 animals with general infection, not of
the severest type. 100% reacted.

Class C. 61 animals general chronic infection not
apparently progressive. 9.8% failed
to react.

Class D. 47 animals minimal or local infection.
8.5% failed to react.

Berry of Paterson, New Jersey, reports in 1915 that in the course of five years he found 178 cases which failed to react to the subcutaneous test, but on post-mortem showed lesions of tuberculosis. While the percentage of failures in his report cannot be computed from the information at hand, the number indicates that it is of sufficient extent to give us a realization of the limits of the subcutaneous test.

In our own work, besides the data submitted in tables Nos. 2 and 3, we have recently met with the following unfortunate experience:

In January 1916, a large herd of 350 animals which had been kept under a semi-annual tuberculin test for several years, alternating subcutaneous with the intradermal, with a very low percentage of reactors, was tested by the subcutaneous method, and about 11% of reactors were found—probably resulting from failure of the intradermal test in August 1915, to detect all cases. This necessitated a retest at the expiration of six weeks, which was applied in March 1916. A combined ophthalmic and intradermal test was used and 18% of the remaining animals reacted.

While we realize that a good portion of these animals may have been infected after the subcutaneous test was applied in January, we nevertheless are convinced that a considerable number of them constituted failures of the subcutaneous test in January 1916.

INTRADERMAL TEST. This test was originated by Moussu and Mantoux and reported by them in 1908. It has been used and reported in this country by Ward, Baker and Longley of California, Luckey of Missouri, Welch of Montana, and thoroughly described by Haring and Bell of California in 1914.

The available data does not permit us to draw any definite comparisons as to the accuracy of this test with the subcutaneous. Such data would have to be secured by the coordinate testing of large numbers of cattle under identical conditions as to physical condition, previous injections of tuberculin, etc., after which all animals, both reacting and non-reacting were slaughtered and careful post-mortems made.

There are, however, the following data to be considered:

Jewett reports the summary of results furnished by the application of the associated tuberculin tests to 225 animals, viz:

1. Negative intradermal and negative subcutaneous		189	189
2. Positive intradermal and positive subcutaneous	9		
Suspicious intradermal and positive subcutaneous	1		
(All tuberculous at subsequent post-mortem)		10	10
3. Positive intradermal and doubtful subcutaneous		10	10
(All proved tuberculous at subsequent post-mortem)			
4. Positive intradermal and negative subcutaneous		9	9
(All proved tuberculous at subsequent post-mortem)			
5. Negative intradermal and positive subcutaneous	4		
Negative intradermal and doubtful subcutaneous	1	5	5
(See note marked * in following table)			
6. Suspicious intradermal and negative subcutaneous		2	2
(Not further verified)			

Of the animals tested		225
In 209 cases the two tests were in agreement (but note that in ten of these cases only doubtful subcutaneous tests were obtained against the positive intradermal ones)	209	
The intradermal test scored over the subcutaneous test in nine cases (positive intradermal and negative subcutaneous)...	9	
*The subcutaneous test scored over the intradermal test in five cases (but note that in two of these animals no tuberculous lesions were found at subsequent autopsy, and in another one calcified lesions were present, non-infective for guinea pigs). One of the other animals was an advanced clinical case	5	
The two animals gave suspicious intradermal reactions but negative to the subsequent subcutaneous test, and were not further verified	2	
		225 225

This comparison slightly favors the intradermal test. Objection, however, may be made to this comparison on the ground that the subcutaneous test was applied soon after the intradermal.

M'Fadyean and Sheather have not obtained such a favorable impression regarding the intradermal test. These workers tested a number of calves, artificially infected with bovine tubercle bacilli, applying the subcutaneous, intradermal and conjunctival tests simultaneously. One explanation for the rather low percentage of reactors to the intradermal test obtained by these workers is found in the fact that in all but a few instances, readings were not made later than 27 hours after the injection. The readings of the intradermal reactions, according to Haring, should be made at the 36th and 72nd hours; if only one reading is made, it should occur on the 72nd hour. The advisability of this procedure is supported by a great many field observations. In the intradermal tuberculin testing of certified herds around the Bay Region of California this procedure is followed and Roadhouse, who supervises that work reports that he finds a number of animals that fail to show reactions on the first observation, but, on the 72nd hour, show definite reactions.

In a test recently performed under his supervision fifteen definite reactors were picked, in a herd of 325 animals, on the 36th hour, and on the 72nd hour, eleven more definite reactions were recorded. Such a large percentage of animals to react in that manner is unusual, but the readings in both instances were made by careful and experienced observers.

With this test, as with the subcutaneous test, we believe that for all practical purposes a definite reaction is an indication of the presence of tuberculosis.

Thus, Luckey reports in 1915: "To date we have slaughtered 351 head of cattle which reacted to the intradermal test during 1914. Of these 94% showed lesions. We have good excuses which we might offer for 17 out of the 20 errors. As 94% was satisfactory I do not consider it worth while to bother with offering excuses.

Haring found that of 73 reacting cattle 69, or 94.5% showed lesions and that of 129 non-reacting animals 6, or 4.7% were tuberculous.

Dell of Los Angeles verbally reported a recent test, with the intradermal method, of 38 head of cattle not previously tested. In 35 of these animals he obtained definite, positive reactions. Granting the three non-reactors were tuberculous, the intradermal test was accurate in 92% of the cases.

From our work we have the following to submit regarding the efficiency of the intradermal test in detecting tuberculous animals. The owner of the large herd mentioned above thinking that many of his animals in the tuberculous dairy were healthy, insisted on a retest of the herd. In October 1915, 400 head of these animals were tested, of which all but fifty reacted. Only one reading was made at the 72nd hour. Following this in February of the present year the smaller tuberculous herd numbering 145 animals was retested and thirteen failed to react at one reading on the 72nd hour.

Thus, with a total of 545 animals we failed to get reactions in 63 and granting all these were tuberculous the test was accurate in 88.5% of the cases.

The intrapalpebral test reported by Moussou, Nørgaard, Mohler and Eichhorn, is simply an intradermal injection made in the lower eyelid instead of the subcaudal fold. Various portions of the skin have been used for this test. The skin on the neck has been extensively used by Europeans. In hogs, the usual and most desirable point of injection is the base of the ear, but we have given the intradermal test at the base of the heels, and hogs would go lame as a result of a reaction. In fact the tuberculin may give a reaction when injected into the skin on any part of the body. We believe the eye location, while easy to administer, is less practicable than the subcaudal location, because it requires additional help and is often seriously objected to by the dairymen on account of the disturbance caused by working on the heads of the cattle. It is much more difficult to apply to range cattle. While yielding

good recognizable swellings in most of the reactors, the reactions are not always distinctly visible and not uncommonly require actual palpation and comparison with the uninjected eyelid. In cattle where the reaction is not visible nor firm on palpation, it will be difficult to detect a difference between the injected and uninjected eyelid. In some adult cattle there is a normal puffiness present in the lower lid which makes this comparison difficult.

INTRADERMAL INJECTION, SUBCAUDAL AND INTRAPALPEBRAL.
20 EIGHT-MONTH-OLD CALVES, ALL TUBERCULOUS

Forty-eight hours.		Seventy-two hours.	
Subcaudal	Intrapalpebral	Subcaudal	Intrapalpebral
1 Walnut	Visible	Walnut	Visible
2 Egg	Distinctly visible	Egg	Same
3 Walnut	Distinctly visible	Walnut, large	Same
4 $\frac{1}{2} \times 2$	Just visible	2 almonds	Visible
5 Egg	Distinctly visible	Walnut, big	Same
6 Walnut	Distinctly visible	Almond, diffuse, 2x1	Distinctly visible
7 Large egg	Very distinctly visible	Large egg	Same
8 $\frac{1}{2}$ egg	Very distinctly visible	$\frac{1}{2}$ egg	Same
9 Walnut	Distinctly visible	$\frac{1}{2}$ egg	Visible
10 Egg	Distinctly visible	Same	Visible
11 $\frac{1}{2}$ egg	Distinctly visible	Walnut	Same
12 $\frac{1}{2}$ egg	Distinctly visible	Walnut	Barely visible
13 Almond	Visible	Almond, diffuse	Visible
14 Almond	Had to be felt	Hazelnut	Had to be felt
15 Pea, diffuse, 1 x $\frac{1}{2}$	Visible	Pea, diffuse, 1 $\frac{1}{2}$ x $\frac{1}{2}$	Visible
16 2 Almonds	Had to be felt, large pea	Almond	Had to be felt, small (?)*
17 Walnut	Barely visible	2 almonds	Barely visible
18 Egg	Distinctly visible	Egg	Same
19 Thickening 2	Pea, felt	Pea size, diffuse	Had to be felt, pea
20 $\frac{1}{2}$ egg	Barely visible	2 almonds	Barely visible
Above animals injected August 1, 1916, 2 to 3 P. M.		Used .1 c.c. 5% sol. of pp. tuberculin.	

These calves gave positive reactions to the intradermal (subcaudal) test in the early part of June, 1916.

THE OPHTHALMIC TEST. This mode of applying tuberculin received considerable attention, when first introduced by Wolf-Eissner and Calmette in human medicine and by Vallee in the control of bovine tuberculosis. Vallee was the first to recognize the fact that repeated instillations of tuberculin into the same eye do not cause it to become insensitive to tuberculin, but on the contrary such procedure would bring forth stronger reactions in animals re-

acting to the first instillation and positive reactions in animals that failed to show on the first instillation. Non-tuberculous animals, he noted, were not affected by repeated instillations of tuberculin.

Foth, Opalka, Jowett, Reinecke, McCampbell and White, M'Fadyean and Sheather, Bergman and others have reported on this test. None of the above, excepting Opalka and Bergman decided that this test is better or even equal to the intradermal or subcutaneous test. Reinecke obtained very poor results with this test but his conclusions were based on tests performed on but 25 animals, and we can easily understand how one might be inclined to reach such an opinion when only a small number of animals were tested, especially when a single instillation of tuberculin was made.

In the tests recorded in our tables, the single ophthalmic yielded 26.1% reactions in 172 animals at twenty-four hour observations and 36.5% in 85 animals in one twelve and one twenty-four-hour observation.

The secondary ophthalmic yielded 47.8% reactions in 115 animals while sensitized ophthalmic test gave 77.2% reactions in 57 animals. Our percentage of correct diagnosis would have been higher had we included as reactors, manifestations, which no doubt would have been considered reactors by some.

About 1350 animals were tested by the writers and members of the Division of Veterinary Science of the University of California, using the sensitized ophthalmic test, combined with or followed immediately by the intradermal or subcutaneous method. The ophthalmic test yielded about 72% reactors among the intradermal and subcutaneous reactors. If, however, we had limited our observations to a particular test made upon 247 animals, from which we selected but nine reactors, and upon intradermal test nineteen reactors were found, we would have unfairly concluded that the ophthalmic test is less than 50% accurate.

We do not believe that this test can replace either the subcutaneous or the intradermal test in routine work. It nevertheless, has a place in the control of bovine tuberculosis. It is of value where other tests are not applicable, but its principal value is in combination with other tests and as such it has been recommended and used by Vallee, Lignieres, Richter, Morel, Jugeat, one of the writers (Traum) and others.

From the facts briefly enumerated above, it is observed that none of the three methods of applying tuberculin can be depended upon to detect all cases of tuberculosis, especially where the percentage of infected animals is high and it is only natural that a combination of two or more of these tests should appeal to us. Lignieres went so far as to use his influence with the Minister of Agriculture of Argentine to issue a decree requiring that all animals at the Quarantine Station at Buenos Aires be tested with the ophthalmic and subcutaneous tests. With this combined method failures were very rare and the percentage of tuberculous animals stopped was multiplied by 3. The result also proves the enormous value of associated reactions in diagnosing tuberculosis.

Various combinations have been suggested and used by these men and in practically all of them the ophthalmic test is included. Lignieres recommends the ophthalmic followed by a subcutaneous injection of tuberculin; first, however, giving a small amount of the tuberculin in the derm before injecting beneath the skin. Littlejohn, Morel and Jugeat took advantage of the observations of Guerin, who noted that by following the ophthalmic test with ordinary subcutaneous injection, the latter often had the effect of reviving and intensifying the manifestations of the eye reaction. Littlejohn tested 64 head of cattle, 26 of which reacted to the subcutaneous test performed seven days after the ophthalmic test, and all 26 gave a secondary conjunctival reaction, whereas only sixteen gave a reaction to the first instillation. One animal gave an eye reaction both before and after the subcutaneous injection which failed to give a thermal reaction.

Jugeat and Morel also report very good results with this combination and all three of these observers claim that the single ophthalmic has limited value. On the contrary, our work recorded in tables 2 and 3 does not permit us to agree with these findings regarding secondary reactions. Jowett also failed to get such a large number of secondary ophthalmic reactions.

While we have used in a large number of animals a combination of ophthalmic and intradermal, or ophthalmic and subcutaneous, the information obtained from these tests was of such a nature that we could not draw definite conclusions therefrom. We, however, fully realized the advantage of combination tests. But in order to obtain information from which we could draw more definite knowledge we instituted the following series of combination tests, in

the larger tuberculous herd above described. Six strings of cows were used, totaling 176 animals. All of these animals were given a sensitizing instillation in the left eye, of concentrated tuberculin. The tuberculin was thrown upon the eyeball from a one c.c. glass syringe, from which the needle shank had been removed. No holding of the animal's head or assistance of any kind was required. The ease of this means of administration strongly recommends it, and the fact that we obtained as good a percentage of reactions as is usually obtained from this test shows the efficiency of this technic. A similar technic was used previously in another herd of 373 animals with equally good results. In strings one and two the first instillation was followed by a second instillation into the same eye three days later and at the same time the left subcaudal fold was injected intradermally with 1/10 c.c. of a 5% solution of precipitated tuberculin.

String three was injected in the subcaudal fold with 1/5 c.c. of a 10% solution of precipitated tuberculin four days after the eye instillation. String four was divided, part being injected in the subcaudal fold with 1/5 c.c. of a 5% solution of ppt. tuberculin and the remainder with 1/10 c.c. of a 5% solution of ppt. tuberculin, three days after the eye instillation. Two temperatures of these animals were taken before the injection and five afterwards in the same manner as is done in an ordinary subcutaneous test.

Strings five and six were given the regular subcutaneous injection in front of the left shoulder, using 2 c.c. of 12½% solution of concentrated tuberculin, four days after the eye instillation. The tuberculin used in all these tests was prepared at the University of California and all was made from the same batch of concentrated tuberculin. The precipitated tuberculin was obtained from the concentrated, 45 c.c. yielding 3.57 grams, thus making it approximately 12½ times as strong. Thus the 1/5 c.c. of a 10% solution of ppt. tuberculin, injected intradermally into string three, was of the same strength as 2 c.c. of 12½% concentrated tuberculin used in our subcutaneous test of strings five and six.

DISCUSSION OF THE TABLES. Tables I, II and III, showing the results of the work were prepared with a view of placing before you our findings in as tangible a form as possible. The subcutaneous, intradermal, ophthalmic, or in fact any form of tuberculin testing will in some cases, bring forth results that are difficult to interpret. In this work the diagnosis on the intradermal and oph-

thalmic tests were made in the field and no animal was recorded as positive to either of these two tests which was not a definite reactor.

Questionable reactors were recorded as negative. We appreciated the fact that, in estimating the value of any test, clearly positive reactions alone are of value. In the control of bovine tuberculosis, however, questionable reactors should be treated as infected until proved to be otherwise. In our diagnosis column to the thermal reaction we have included several questionable reactors, but, with the temperature records before you, you can place these as you may see fit.

Table 1: With a combination of sensitized ophthalmic and intradermal tuberculin tests on 59 tuberculous animals, we obtained distinctly positive results in all but two cases. Cow No. 19 gave a slight reaction to the ophthalmic test, but in our estimation it was not sufficient to be considered as definitely positive. The table is self-explanatory. It might well be stated here that in String No. 1 (animals 1 to 29) there were animals with visible indications of the disease which were to be removed from the herd on account of the advanced stage of the disease. Cows 6, 15, 23, 25 and 28 were advanced cases of tuberculosis. The general condition of cases 14 and 19, the non-reactors, was found to be good.

The negative intradermal reactors recorded in this table were examined on the 96th hour and at that time all were still negative.

A study of our next table leads us to believe that had temperatures been taken following the intradermal injection of tuberculin, even better results would have been obtained, since we find that three cows that failed to give positive local reactions gave thermal reactions.

Table II: The combination used upon animals recorded in this table consisted of an instillation of tuberculin into the eye, followed by an intradermal injection four days after the eye instillation in cases 60 to 88 inclusive and 3 days after in cases 89 to 118 inclusive. With this combination we were bringing into play a local, a thermal, an ophthalmic and a secondary ophthalmic reaction. Haring pointed out, contrary to the findings of Moussu and Mantoux, that he was able to obtain a thermal reaction as a result of the intradermal injection. In six herds, numbering 273 cattle reported by him, he found 153 cattle that reacted locally, 130 that reacted thermally, 25 that reacted locally, but not thermally, and two that reacted thermally but not locally. In his tests he used

Table No. 1

INTRADERMAL AND SENSITIZED OPHTHALMO
59 ANIMALS ALL TUBERCULOUS

Injected 10 c.c. of Sp. Tuberculin in Subcutaneous			Ophthalmic Instilled 10 c.c. Concentrated O.T.									
1st Observation	2nd Observation	3rd Observation	Diagnosis	1st Inst. 31-10-16 Observation	2nd Inst. 31-10-16 Observation	3rd Inst. 31-10-16 Observation	Diagnosis	Positive Bursa	Positive Ocul. Agar Culture, 10 Days	Negative Agar Culture, 10 Days		
1	2 Eggs	2 Eggs	Increase	+			S.C.O.L. Same	+	+			
2	2 Eggs	2 Eggs	Increase	+			M.C.O.L. Same	+	+			
3	Egg	Large Walnut	Increase	+			S.C.O.L. Same	+	+			
4	Almonds	Egg	Increase	+			B.F.L. S.C.O.L. V.S.W.T.L. K.C.O.L.D.	+	+			
5	Almonds	2 Almonds	Increase	+			Beau B.C. Dried	Negative	-	+L-0		
6	Almonds	2 Almonds	Increase	+			S.B.F.	Same	Dried	+	+	
7	Egg	Egg	Increase	+			M.B.C.O.L. S.C.O.L.	Same	Beau C.O.	+	+	
8	Almonds	Walnut	Increase	+			Negative	Negative	Negative	-	+L-0	
9	Almonds	Large Walnut	Increase	+			M.C.O.L.	Same	Same	Increase	+	+
10	Almonds	Walnut	Increase	+			S.C.O.L.	Same	Dried	S.W.O.	+	+
11	Almonds	Walnut	Increase	+			S.L.B.T.	Negative	Negative	-	+L-0	
12	Negative	Increase	Increase	+			V.S.C.O.L.	Same	Same	Same	+	+
13	Walnut	Walnut	Increase	+			M.C.O.L.	Same	S.W.O.	2 Te Cheri	+	+
14	Almonds	Increase	Increase	+			Negative	L	Negative	-	-	-
15	Almonds	Large Walnut	Egg	+			S.C.O.L.	Same	S.C.O.L.	S.B.F.L.	+	+
16	Walnut	Almond	Large Egg	+			M.C.O.L.	Dried	Same	+	+	+
17	Egg	Walnut	Egg	+			S.C.O.L.	Same	S.W.T.	Beau L.	+	+
18	Walnut	Almonds	Increase	+			M.C.O.L.	S.C.O.L.	Same	Increase	+	+
19	Walnut	Walnut	Same	-			S.L.B.F.L.	L	S.L.B.F.L.	-	-	-
20	Almonds	Walnut	Increase	+			M.B.T.	Negative	S.B.T.	-	-	-
21	Walnut	Walnut	Increase	+			Negative	Negative	Negative	-	-	+L-0
22	Almonds	Almonds	Increase	+			Not tested	Not tested	Not tested	Not tested	Not tested	Not tested
23	Egg	2 Eggs	Diff.	+			M.B.F.L.	Same	M.M.O.	Kinetol	+	+
24	Walnut	Walnut	Diff.	+			S.C.O.L.	S.C.O.L.	Negative	-	-	+L-0
25	Walnut	Walnut	Increase	+			M.C.O.L.	Same	Same	M.B.F.L.	+	+
26	Almonds	Almonds	Increase	+			V.S.C.O.L.	Same	Same	+	+	+
27	Egg	Egg	Increase	+			M.B.T.	Same	S.W.	M.B.F.L.	+	+
28	Walnut	Walnut	Increase	+			M.C.O.L.	Less Dry	Dried	+	+	+
29	Egg	Walnut	Increase	+			M.C.O.L.	Dried	Dried	+	+	+
30	Walnut	Walnut	Increase	+			M.B.F.L.	Same	S.Y.O.	+	+	+
31	Almonds	Walnut	Increase	+			S.C.O.L.	M.C.O.L.	Dried	+	+	+
32	Almonds	Egg	Walnut	+			V.S.C.O.L.	Same	Same	+	+	+
33	Almonds	Large Egg	Increase	+			B.F.L.	Beau B.	Negative	-	-	+L-0
34	Walnut	Walnut	Increase	+			M.B.F.L.	Same	Same	+	+	-L+0
35	Almonds	Walnut	Increase	+			L	S.B.T.	Negative	S.B.T.L.	+	+L-0
36	Egg	2 Eggs	Increase	+			V.S.C.O.L.	Same	Same	+	+	+
37	Walnut	Walnut	Increase	+			S.C.O.L.	Increase	Dried	+	+	+
38	Almonds	Small Egg	Increase	+			V.S.C.O.L.	Same	Same	+	+	+
39	Almonds	Walnut	Increase	+			M.B.C.L.	Same	M.T.L. Dried	+	+	+
40	Walnut	Almonds	Negative	+			S.L.B.C.W.	M.C.O.L.	Dried	+	+	+
41	Walnut	Almonds	Increase	+			S.L.B.T.	Negative	Negative	-	-	+L-0
42	Egg	Large Egg	Increase	+			S.C.O.L.	Same	L	+	+	+
43	Walnut	Almonds	Increase	+			Negative	L	S.L.C.O.F.	+	+	+
44	Almonds	Egg	Increase	+			S.C.O.L.	Same	Same	+	+	+
45	Walnut	Almonds	Same	+			S.C.O.L.	Less	S.L.B.F.	+	+	+
46	Almonds	Walnut	Same	+			S.C.O.L.	Same	L	+	+	+
47	Almonds	Same	Increase	+			S.C.O.L.	Dried	+	+	+	+
48	Walnut	Egg	Increase	+			Negative	Negative	-	-	-	+L-0
49	Almonds	Walnut	Increase	+			Not tested	Not tested	Not tested	Not tested	Not tested	Not tested
50	Walnut	Egg	Increase	+			V.S.C.O.L.	Same	Same	+	+	+
51	Egg	Egg	Increase	+			S.L.B.C.O.L.	Same	Same	M.C.O.L.	+	+
52	Negative	Almonds	Walnut	+			Negative	S.L.B.T.	Negative	-	-	+L-0
53	Almonds	Walnut	Increase	+			S.C.O.L.	S.C.O.L.	Same	+	+	+
54	Walnut	Walnut	Increase	+			S.C.O.L.	Negative	Negative	-	-	+
55	Walnut	Walnut	Increase	+			M.C.O.L.	Decreased	Dried	+	+	+
56	Walnut	Negative	Increase	+			V.S.C.O.L.	Same	Same	+	+	-L+0
57	Egg	2 Eggs	Increase	+			M.B.C.O.L.	Same	Same	+	+	+
58	Almonds	Egg	Walnut	+			M.C.O.L.	Same	Same	+	+	+
59	Walnut	Walnut	Increase	+			M.C.O.L.	Same	S.C.O.L.	S.L.B.T.	+	+

Extent - S = Slight
M = Medium
S = Strong
V.S. = Very Slight

Key to letters describing ophthalmic reaction
Character - C = Cream
Y = Yellow
W = White
B = Blue
G = Green

T = Translucent
O = Opaque
F = Flakes
L = Lacrymation

MEGALOMAL INJECTION TUBERCLE - LOCAL REACTIONS & SECONDARY OPTHALMIC REACTIONS
 58 ANIMALS ALL TUBERCULOUS

No.	Sex	Age	Species	Strain	Site of Inoculation	Reaction	Optical Reaction	Remarks	Date
1	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
2	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
3	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
4	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
5	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
6	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
7	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
8	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
9	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
10	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
11	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
12	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
13	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
14	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
15	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
16	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
17	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
18	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
19	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
20	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
21	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
22	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
23	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
24	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
25	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
26	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
27	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
28	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
29	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
30	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
31	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
32	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
33	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
34	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
35	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
36	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
37	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
38	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
39	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
40	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
41	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
42	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
43	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
44	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
45	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
46	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
47	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
48	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
49	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
50	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
51	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
52	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
53	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
54	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
55	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
56	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
57	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0
58	♂	24 days	White	1000	Subcutaneous	Small	None		11/17/0

Animals with unreactive tuberculin test left eye 30 to 33 and right eye 34 to 37
 by 11/18/0
 by 11/19/0
 by 11/20/0
 by 11/21/0
 by 11/22/0
 by 11/23/0
 by 11/24/0
 by 11/25/0
 by 11/26/0
 by 11/27/0
 by 11/28/0
 by 11/29/0
 by 11/30/0
 by 12/1/0
 by 12/2/0
 by 12/3/0
 by 12/4/0
 by 12/5/0
 by 12/6/0
 by 12/7/0
 by 12/8/0
 by 12/9/0
 by 12/10/0
 by 12/11/0
 by 12/12/0
 by 12/13/0
 by 12/14/0
 by 12/15/0
 by 12/16/0
 by 12/17/0
 by 12/18/0
 by 12/19/0
 by 12/20/0
 by 12/21/0
 by 12/22/0
 by 12/23/0
 by 12/24/0
 by 12/25/0
 by 12/26/0
 by 12/27/0
 by 12/28/0
 by 12/29/0
 by 12/30/0
 by 12/31/0

Table No. 3

SUBCUTANEOUS INJECTIONS THERMAL AND LOCAL REACTIONS & SECONDARY OPHTHALMIC REACTIONS
58 ANIMALS ALL TUBERCULOUS

No. of Tuberculous	Temperature		Ophthalmic reactions	Ophthalmic Secondary Reactions		Diagnosis Local reactions	All 3 positive	Positive to one or more	All 3 negative	
	Before injection	After injection		Primary	Secondary					
119	17	12	00	22	10	28	126	-	-	-
120	16	12	49	52	42	24	26	10	-	-
121	20	16	22	20	24	20	26	10	-	-
122	18	17	18	24	24	20	26	10	-	-
123	19	17	27	28	24	20	26	10	-	-
124	20	19	24	28	24	20	26	10	-	-
125	20	19	26	28	24	20	26	10	-	-
126	20	18	28	24	20	10	16	12	-	-
127	20	16	34	36	24	28	10	14	-	-
128	20	16	13	19	28	28	22	38	-	-
129	20	18	25	26	28	20	18	12	-	-
130	17	10	-	-	-	-	-	-	-	-
131	22	10	-	-	-	-	-	-	-	-
132	10	14	29	24	20	28	24	22	-	-
133	20	16	20	26	24	24	24	24	-	-
134	12	12	21	24	24	28	22	12	-	-
135	12	22	25	28	28	10	12	12	-	-
136	12	22	20	22	22	26	10	12	-	-
137	18	16	22	24	24	24	24	24	-	-
138	18	16	22	24	24	24	24	24	-	-
139	18	16	22	24	24	24	24	24	-	-
140	18	16	22	24	24	24	24	24	-	-
141	18	16	22	24	24	24	24	24	-	-
142	18	16	22	24	24	24	24	24	-	-
143	18	16	22	24	24	24	24	24	-	-
144	18	16	22	24	24	24	24	24	-	-
145	18	16	22	24	24	24	24	24	-	-
146	18	16	22	24	24	24	24	24	-	-
147	18	16	22	24	24	24	24	24	-	-
148	18	16	22	24	24	24	24	24	-	-
149	18	16	22	24	24	24	24	24	-	-
150	18	16	22	24	24	24	24	24	-	-
151	18	16	22	24	24	24	24	24	-	-
152	18	16	22	24	24	24	24	24	-	-
153	18	16	22	24	24	24	24	24	-	-
154	18	16	22	24	24	24	24	24	-	-
155	18	16	22	24	24	24	24	24	-	-
156	18	16	22	24	24	24	24	24	-	-
157	18	16	22	24	24	24	24	24	-	-
158	18	16	22	24	24	24	24	24	-	-
159	18	16	22	24	24	24	24	24	-	-
160	18	16	22	24	24	24	24	24	-	-
161	18	16	22	24	24	24	24	24	-	-
162	18	16	22	24	24	24	24	24	-	-
163	18	16	22	24	24	24	24	24	-	-
164	18	16	22	24	24	24	24	24	-	-
165	18	16	22	24	24	24	24	24	-	-
166	18	16	22	24	24	24	24	24	-	-
167	18	16	22	24	24	24	24	24	-	-
168	18	16	22	24	24	24	24	24	-	-
169	18	16	22	24	24	24	24	24	-	-
170	18	16	22	24	24	24	24	24	-	-
171	18	16	22	24	24	24	24	24	-	-
172	18	16	22	24	24	24	24	24	-	-
173	18	16	22	24	24	24	24	24	-	-
174	18	16	22	24	24	24	24	24	-	-
175	18	16	22	24	24	24	24	24	-	-
176	18	16	22	24	24	24	24	24	-	-

Injected 2.0 c.c. concentrated vaccine in D.T. left eye No. 149 & 176 on 1-III-16

Access to the animal on left side in front of shoulder 2.0 c.c. of diluted D.T. 1 to 1 at 4.30 P.M. 5-III-16

10% O. T., and 10, 2 and $\frac{1}{2}$ % precipitated tuberculin. Our findings are in accord with those of Haring. The temperatures recorded in this table and in table 2 were taken beginning with the ninth hour. We should have liked to begin with the eighth or even the sixth hour, but the owner of the herd was not compelled to have his herd tested, nor did he especially desire to have it done, and it was as an extreme favor to us that he permitted it. Hence, we were glad to have him permit us to handle them as we did. It should also be noted that 3 hours elapsed between the third and fourth post-injection temperature. This was due to the fact that we turned the cattle out and had a little difficulty in bringing them in at this unusual time of day. In cases 63, 67, 68, 91, 92, 98 and 115, where there were slight rises over previous temperatures, another temperature was taken at 9:30 with no increase over the temperature of 8:30 A. M.

It will be noted that in our interpretations of the secondary ophthalmic reaction we did not demand quite as much as in the case where we gave a second instillation of concentrated tuberculin. We took into consideration that the reaction was the result of a stimulation of subcutaneous or intradermal injection of tuberculin and the direct introduction of any irritating material into the eye that may be present in the tuberculin could be eliminated and for that reason the secondary reaction, even though it does not give as large a percentage of reactors as the two instillations, has in its favor the fact just mentioned. Foth, Jowett and others have felt that the glycerine present in the concentrated tuberculin (in our case 40%) may in itself have an irritating effect upon the eye and set up a slight inflammation. Foth tested the effect of 50% solution of glycerine on the eyes of 15 cattle and found that only reddening and lachrymation would result from it and that these would very soon disappear.

With this combination we had one tuberculous animal (No. 91) in 59 that failed to give a definite reaction to one or more of these tests, and that animal would not have been considered by us a distinct negative, since at the ninth hour it showed a temperature of 103.2 with a gradual decline in the following temperatures. Attention is called to the fact that in animals 106 to 116 inclusive, where the smallest dose of tuberculin $1/10$ c.c. of 5% precipitated, was used, equally good results were obtained as when four times that dose, $1/5$ c.c. of 10% precipitated was used.

From comparison of tables 2 and 3, we may infer that at least equally good thermic reactions can be obtained by the intradermal as by the subcutaneous injection of tuberculin. Besides, with the intradermal method one has the advantage of more pronounced and more regularly appearing local reaction.

Table 3:.* Here we have practically the same combination as in table 2 except that the tuberculin was injected subcutaneously in front of the shoulder. With this combination we had poorest results. It is to be regretted that in this particular case such an unusually large percentage of tuberculous animals should fail to react to the subcutaneous injection. The animals in those two strings from outward appearance and from history were of the same type as the other strings, except string No. 1 where there were several advanced cases.

The local swellings recorded in this table are of special interest since in five cases, 122, 153, 158, 160 and 172, they were present where the thermal reaction was absent. In all but one of these (122) the secondary ophthalmic reaction was also present. We took the observation on local reaction at the 48th hour and from our experience with the intradermal test we should not take into consideration a swelling that is found only while the usual post-injection temperatures are being taken. Our experience with local subcutaneous swellings is very limited, but all those recorded as positive were distinct.

CONCLUSIONS. We will not figure the percentage of failures of the various forms of tuberculin testing in detecting tuberculous animals, nor will we compare the various tests. The figures are before you. The fact that any of these tests will fail in a noticeable percentage of cases has been made evident and it has further been established that tuberculous animals, while giving negative results to one form of tuberculin application, may give positive reactions to another form. Therefore, the value of combining two or more of these tests should need no argument and no herd should be accredited as free from tuberculin reactors unless a combination of tests has been performed and then only after such a test is followed up by a further test six weeks later upon all non-reacting cattle. The value of the follow-up test is to detect animals in the incubation stage or those which are insensitive to tuberculin for

*Case 128 recorded as negative is a distinct thermic reactor.

other reasons at the time of the previous test. We have no special combination to recommend but it seems that the ophthalmic, either sensitized or secondary, together with an intradermal injection, making a record of thermal reactions resulting from such injection, is a very satisfactory combination, since with this combination, all three forms of tuberculin reactions will be brought into play with the least danger of making the animals tuberculin insensitive or immune. From our tables it promises to give the best results, and it should be followed up in 4 to 6 weeks with the subcutaneous test upon all the non-reactors.

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DISCUSSION

DR. CAHILL: I would like to ask whether or not with the intradermal and ophthalmic tests, there was an opportunity to check up results by post-mortem. Also whether or not there is any belief that either one of these tests overcome the weakness that we have always recognized in the subcutaneous, by being able to detect by the reaction any connection between the intensity of the reaction, or the intensity of the infection.

DR. FITCH: I would like to ask in regard to the system or method of performing the subcutaneous test particularly in relation to the number of preinjection temperatures, the times at which these were taken and the number of times of taking the temperatures following injection.

DR. KINSLEY: I feel like sympathizing with those of you who are in communities where you must apparently maintain so many tubercular animals. In the central part of our country, we feel that we have taken this situation sufficiently early, and I do not believe that we have to contend with the immense numbers of tubercular animals that have been reported here. In Missouri we test annually several thousand cattle. We have found, apparently, so far as future tests are concerned, that we have reduced the number of tubercular animals to practically a minimum. We have met with obstacles.

In our state the recognized test is the so-called intradermal method. In testing from the yards, of shipped in cattle for three years prior to practically a year ago, that is, from 1912 in August, to 1915 in August, we tested something like between ten and eleven thousand cattle, practically all of them, without indicating more than one or two out of three or four thousand head that passed without reaction. During the past year while the Chicago yards were closed, we received in our yards many cattle from the north of the United States, Minnesota, the Dakotas, northern Iowa, Nebraska, and some from Illinois. These cattle apparently had a higher per cent of tubercular animals than those we were accustomed to; and apparently these animals had been tuberculin tested and were immune, so to speak, from the action of the tuberculin. In one instance, perhaps one or two animals went out into a dairy composed of thirty animals and in that dairy we found this spring on re-test, 22 out of 26 animals tubercular: on post-mortem the indications were that they were all recent infections, except one; that had, no doubt, not reacted to the test.

The doctor reported one herd where there was a retest where he had sixteen reactors, an alleged failure of reaction, or perhaps failure of detection by the intradermal method. I am wondering how many new animals, if any, were introduced into this herd, and what means they have of knowing that these introduced animals were not tubercular reactors. We have found this the greatest

source of tuberculosis in our dairy herds. We have apparently had little trouble in keeping herds free, except where some animals have been picked up in the country and come in without having been tuberculin tested, and which carried the infection in that way. In the lesions that have been mentioned as tubercular, no doubt they have been proven tubercular or as carrying tubercular bacilli.

DR. TURNER: I would like to ask if any of these animals that were tested within the three months, if the tubercular animals escaped all of the tests. Don't you think that the subcutaneous test applied before the intradermal test interferes with the intradermal reaction? On the question of retesting subcutaneously, have you tried testing subcutaneously within three or four days or within a week with good results? In connection with the ophthalmic or the double ophthalmic test, or sensitizing, have you ever sensitized and applied the second droppings in twenty-four hours with good results? I would also like to ask in making retests or testing herds semi-annually, whether you do not find that the animals become loaded up and do not respond to any of the tests properly within six months and if your results are bad?

DR. ELIASON: The proof of the pudding is generally in the eating. We have tried out some cases in herds that have had a certain percentage of reactors in them by slaughtering the herd outright. In one case of forty animals in which twenty-five reacted, the whole herd was slaughtered with the consent of the owner. Every one of the animals showed lesions on the post-mortem.

DR. HARING: Every one of the forty?

DR. ELIASON: Every one of the forty.

DR. HARING: What method of testing was used?

DR. ELIASON: The subcutaneous test. I can cite several cases of a similar nature; and our experience showed that where a certain number of reactors are in a herd, you might as well treat that herd as a tubercular unit. I don't care what number of tests you apply. They have the infection, and you will get them on a later test if followed up.

DR. KINSLEY: How long before that test was the previous test? You don't know that they were not previously tuberculin tested.

DR. ELIASON: They were not previously tested. Just a word of explanation in reference to this herd. The owner was a tenant on a farm in the western part of the state who had accumulated a herd of pure bred Holsteins. He made arrangements for a farm in Minnesota, and asked for inspection before shipment. I am satisfied from the circumstances that he did not suspect tuberculosis. When I say that they were not tested, I mean they had not been tested on this man's premises, and it was some years since he

had bought. When there was fifty per cent of reactors the results were reported to Dr. Ward before any further move was made. He informed the owner that he did not wish to have the balance shipped into the state of Minnesota. It was then that the owner asked if we would condemn the whole herd, and it was done.

We have tried this out in a number of cases, and the results have been about the same. With all due honest attention on the part of the owner and everybody concerned, if you have fifty per cent of reactors in a herd, don't think for a moment that you can save a certain percentage of them. You can save them for a few years, but they will react some time. We have tied up the public into a sentiment that you can put the cattle in a sieve and sift out the well ones. I want to assure you that there is no such process. We should teach the public that the thing to do is to find out which herds are infected, and to keep those animals there and stop the dissemination of the diseased and exposed animals. I want to tell you that you can test cattle from now until doomsday without any results unless we take the bull by the horns and make a universal test. The greatest hindrance to the eradication is the cumbersomeness of the subcutaneous test. If it had been possible to unite on a test which is as simple as the intradermal, for instance, we might have gotten somewhere, but you will never get anywhere with a system as cumbersome as the subcutaneous test, which we are using now. What we are doing is just about as good as an advertisement in the papers. We are feeding the public with the sentiment that when a man is getting a certificate of health from a veterinarian that he is fully protected, and if he finds that he is not, or in other words, if he finds tubercular animals among his cattle in subsequent tests, the man who owned the cattle previously, and the man who tested them are promptly designated as crooks.

Let us educate the public to be just a little more charitable in the eradication of this disease and not set one man up against another in a court over a test which is a test only so far that when an animal reacts it may be considered tubercular. No test, however searching, can overcome the factor of contamination shortly before test or the dormant case which may show up at any later test.

The tuberculin test is the best method of protecting a herd against tuberculosis but it must be used regularly in order to procure results. We should also explain to the layman our difficulties and get his cooperation. The application of common horse sense before censure will help a whole lot.

DR. WINCHESTER: I note there has been a good deal of opposition to the tuberculin test in certain localities. Can the public come to us and approve the tuberculin test when we present to them the fact that such a large percentage of individuals die from bovine tuberculosis? Ought it not to be put to them as a matter of conservation of human life?

DR. EICHHORN: Dr. Hart brought out very strongly the advisability of using a combination of tests for the diagnosis of tuberculosis. It must be realized that in our desire to control the disease and to eliminate possible failures, it would be of advantage to employ a combination of tests, and possibly also to devise other tests which might be applied with satisfaction for the diagnosis of this disease. The application of the complement fixation test for the diagnosis of the various diseases in human beings and animals suggested also the possibility of this test in tuberculosis. The applications on this subject relative to human tuberculosis are quite numerous, but the results obtained were not uniformly satisfactory. Although it is generally claimed at the present time that when the test is properly applied to human beings, it might be utilized for the determination of the course of the disease, especially in progressive cases. In applying this test to bovine tuberculosis, various investigators employed different antigens to determine whether it could be utilized as a supplementary test or otherwise for the elimination of such cases which possibly had escaped other tests.

We have undertaken in the last year to test a large number of animals by this method, and aimed to determine whether we might not be able to devise an antigen which would be more accurate than any used for the test by previous investigators.

For this purpose we have run comparative tests with different antigens used by various investigators for the diagnosis of human cases, and also such as were employed in bovine tuberculosis. In all, about a thousand animals were tested, and we found that an antigen which we have devised, consisting of a combination of tuberculin precipitate prepared in a manner somewhat similar to the fractionization of antitoxin sera with an emulsion of tubercle bacilli gave the best results; but even at that, with such an antigen which proved superior to any heretofore employed in this test, we could only attain an accuracy of about 82 to 83 per cent. While it is not recommended that this test should be employed in connection with the diagnosis of bovine tuberculosis, at the same time it might be utilized from time to time as a supplementary test, especially where it is desirable to employ a combination of tests. For the present this test is principally of scientific interest, and considering the large number of animals tested, the results obtained might be given due consideration by investigators engaged in this line of experimentation.

DR. HADLEY: The question is often asked, what would you do if you tested a herd of cattle and found ten per cent of the cattle to be tubercular according to the intradermal test? That is a very important question from the standpoint of the veterinarians as well as from the standpoint of the owner of the cattle. Personally, I suppose all have had some experience in handling such cases. In my own case I would be very loath to give a bill of health to 90 per

cent of non-reactors. I always feel justified in telling the owner as well as the purchaser, in order to protect myself, as well as them, that in all probability at the next test more cattle, which at the first test appeared to be perfectly healthy, would react. We are not quite fair to ourselves in this tuberculin test, or to the owner or to the purchaser of the cattle. We have relied too much in the past upon the accuracy of the test, and have not taken into consideration its limitations.

DR. HART: The first question asked was whether we checked the results by post-mortem examination. In the animals represented by the tables thrown upon the screen we did not check the results by post-mortem examinations. We have had 750 tubercular animals on this ranch, and we now have 450. There have been approximately 300 tubercular cattle killed from this ranch; about half of them have been examined, and there have been only 3 or 4 animals killed that did not have tubercular lesions. There are animals at the present time on this ranch in all stages of the disease, those used in this work had twice reacted to tuberculin on previous occasions, and we felt that these animals were all tubercular. If we had had a little longer time to arrange our plans we would have purchased and killed the non-reacting animals which were three in the two tests and 13 altogether out of 176. But we considered, and we think justly so, that all of the 176 animals in these tables were tubercular.

The intensity of the reaction bears no definite relationship to the degree of infection. This is true also in the combination tests no matter which you use. There is no relationship between the intensity of reaction and the intensity of infection.

As to the system used in the subcutaneous tests asked by Doctor Fitch. In this case we took two previous injections; one about 1:30 to 2:00 in the afternoon and the other about 3:30 to 4:00 in the afternoon. The cattle in this dairy were put in the stanchions from 1:30 to 5:00 in the afternoon, and 1:30 to 5:00 in the morning. We started to inject these cattle at 4:30, and we commenced taking temperatures at 1:30 A. M. There was a period of nine hours between injection and the first temperature, which we admit was one hour too long. In the second table we missed one animal, and we think if we had gotten her on the eighth hour she would have shown a higher temperature than 103.2. We feel that the first temperature should be taken in eight hours and in some cases, especially where they are advanced, even earlier than the eighth hour is preferable; but in this particular series of tests we were unable to get at them until the ninth hour, and such conditions frequently arise in routine work.

The introduced animals, mentioned by Dr. Kinsley, is the greatest difficulty that we have to contend with in California, the introduction of new animals. In California, the land is very valuable

around the large cities, and dairymen who wish to raise their own heifers, are unable to keep those heifers on their own ranches until they are ready to milk. Thus, after they pass the weaning period, they are sent various distances to mountain ranches where they are mixed with other cattle and are then brought back to the dairies at the time they are fresh and they bring tuberculosis back with them. Auction sales are very frequent in that country, and this introduction of animals is the most serious thing that we have to deal with in the control of tuberculosis.

Dr. Turner asked if there were any of the animals which escaped the combination tests. In table number 1 we missed two animals with that combination; in table number 2 we missed one animal; in table number 3 we missed ten animals. The subcutaneous test interferes with the intradermal. I believe that the intradermal test, inasmuch as it will produce a thermal reaction, does interfere with the subcutaneous test, just as the subcutaneous will interfere with the intradermal test given three or four days later. The only test that is not seriously interfered with by other tests is the ophthalmic test. The ophthalmic test has the great advantage that it can be applied immediately after another test has been given. While the percentage of accuracy is not high, if you test a herd of cattle with the subcutaneous test and do not get any reactors, and yet you suspect the owner, and give the sensitized ophthalmic test and get some reactors in the herd, you will know that something has been done with the cattle to make them immune and that is one great value of the ophthalmic test.

A NEW AND ECONOMICALLY IMPORTANT TAPEWORM *MULTICEPS GAIGERI* FROM THE DOG*

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An examination of the tapeworms described by Gaiger (1907) as *Cocnurus serialis* shows that they belong to a new species which is described in this paper and named *Multiceps gaigeri* in honor of Doctor Gaiger.

The parasites of the dog are always of interest as they are to a certain extent an index of the conditions of human parasitism in the same localities. The presence of certain tapeworms in dogs is indicative of careless and improper methods of disposing of

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slaughterhouse refuse and a corresponding danger to people who obtain meats from houses so conducted. The presence or absence of hookworms in dogs, within certain limits, as indicative of meteorological conditions favorable or unfavorable to the extra-corporeal life cycle of hookworms in general. The importance of the parasites of the dogs, and their effect on the health of man and the domesticated animals, has been discussed at length in a previous publication by the writer (Hall, 1915).

Multiceps gaigeri Hall, 1916, new species.

SYMPTOM.—*Cocnurus serialis* Gervais, 1847a, of Gaiger, 1907, and Dey, 1909.

SPECIFIC DIAGNOSIS.—*Multiceps*: The head is somewhat pyriform in lateral view and almost square when viewed *en face*, and is about $950\ \mu$ in diameter. The weak rostellum is about $360\ \mu$ in diameter and bears a double crown of 28 to 32 hooks. The large



FIG. 1. *Multiceps gaigeri*. Large and small hooks.

hooks (Fig. 1) are 160 to $180\ \mu$ long. The blade is of slight curvature; the handle is nearly straight or only slightly sinuous, with usually a notch, slight or very pronounced, on the dorsal border between the middle of the handle and the union with the blade, the dorsal and ventral borders approximately parallel and the handle not tapering but ending bluntly and at times with a slight curvature dorsally at the distal extremity; the guard is approximately cordiform in lateral view, the point of maximum thickness being a short distance from the union with the blade and handle, thus forming a neck proximally and a roundly conical distal portion.

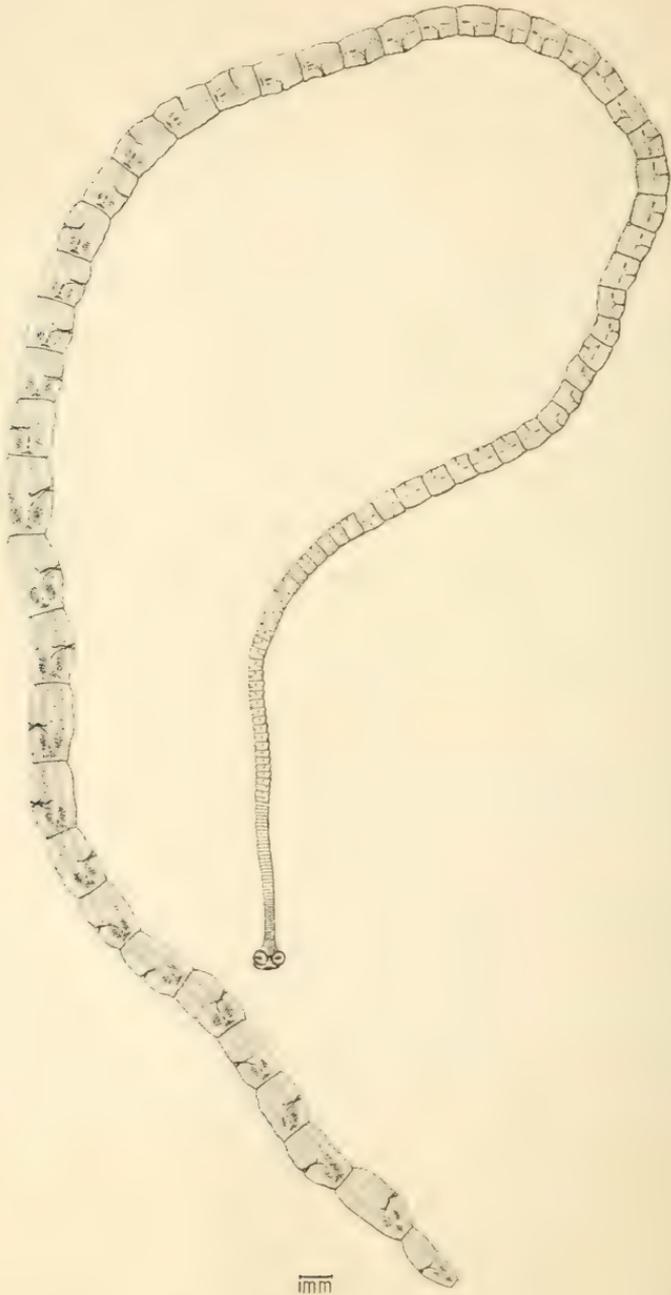


FIG. 2. *Multiceps gaireri*. Young strobila.

The small hooks are 115 to 150 μ long. The blade is strongly curved; the handle is long, straight, slightly sinuous in outline, and tapering to a rather blunt tip; the guard is rather oval in lateral view, has a slight median ventral depression without being bifid, and meets the handle at a very obtuse angle, almost a straight angle. The suckers are comparatively large, set prominently at the angles of the quadrate head and with relatively small intervals between adjacent suckers, and have a bulb diameter of 310 to 330 μ . The neck is quite distinct, of smaller diameter than the head, and may measure around 690 μ in length. The entire strobila may measure from 25 cm. to 1.82 meters, according to conditions and individual development. In well developed strobilæ, about 40 cm. long, the segments become square about the middle of the strobila, being 5 mm. long and 5 mm. wide at a distance of 20 cm. from the head. As the segments become longer than wide they become mature. At 30 cm. from the head they are 7 mm. long and 5 mm. wide. At 40 cm. from the head the segments are 14 mm. long and 2 to 3 mm. wide. The entire strobila is rather thin, delicate, and comparatively translucent (Fig. 2). The genital primordia appear in about the thirtieth segment, between 2 and 3 mm. back of the head, first as deeper staining areas in the median line. These areas become angular, the legs of the angles forming the genital canals. The primordium of the median stem of the uterus is the next thing visible. Calcareous corpuscles are especially large and abundant in the medullary portion of the head and the anterior portion of the neck, where they are elliptical and about 13 by 8 μ in diameter, but are elsewhere small, oval, around 4 to 5 μ in length, and, though numerous, are relatively inconspicuous. The longitudinal excretory canals are quite distinct, the ventral canal situated about 225 μ from the margin of the segment and the dorsal canal lying lateral of this. The genital papilla is flat and inconspicuous, an actual papilla formation being lacking as a rule, but is readily observed owing to the translucency of the segments.

Male genitalia.—There are between 200 and 225 large, irregularly spherical testes, confined principally to the lateral portions of the median field in the vicinity of the longitudinal excretory canals (Fig. 3). There is a wide field about the median stem of the uterus which is free or comparatively free from testes, only an occasional two or three occurring here. The field about the vas deferens and vagina is also comparatively free from testes for

some distance on each side. The testes press close to and even in contact with the lateral borders of the ovaries and also extend to the vitellarium and between the vitellarium and the ovaries. The vas deferens begins close to the median stem of the uterus on the pore side and first extends at an angle posteriorly and laterally. It is very much looped from its origin, the loops extending widely along the longitudinal axis of the worm, even across the vagina, and also back and forth along the general path of the vas deferens, the loops being so numerous as to form a dense wide structure. The cirrus pouch extends to the median border of the ventral excretory

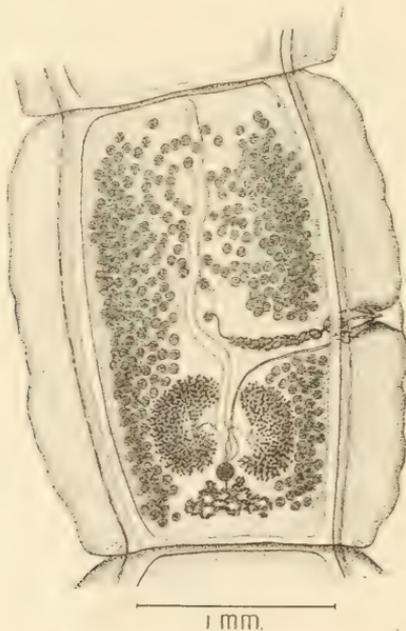


FIG. 3. *Multiceps gaigeri*. Mature segment

canal. It is piriform to elongate elliptical in shape, often with a concavity on the posterior side, toward the vagina, and about 260μ long by 100 to 125μ wide.

Female genitalia.—The ovaries (Fig. 3) are elongated along the longitudinal axis of the strobila, of the same size, and reniform to fan-shaped, the inter-ovarian field varying correspondingly from oval to almost quadrilateral. The vitellarium is roughly triangular in outline, the anterior angle projecting a short distance into the inter-ovarian field and occasionally suppressed at this point to

form a truncated or even invaginated structure for the reception of the shell-gland. The vitellarium is often irregular or asymmetrical and in some segments may even be elongated along the longitudinal axis of the strobila, a quite distinctive feature (Fig. 4). The vitellarium does not extend laterally as far as the ovaries

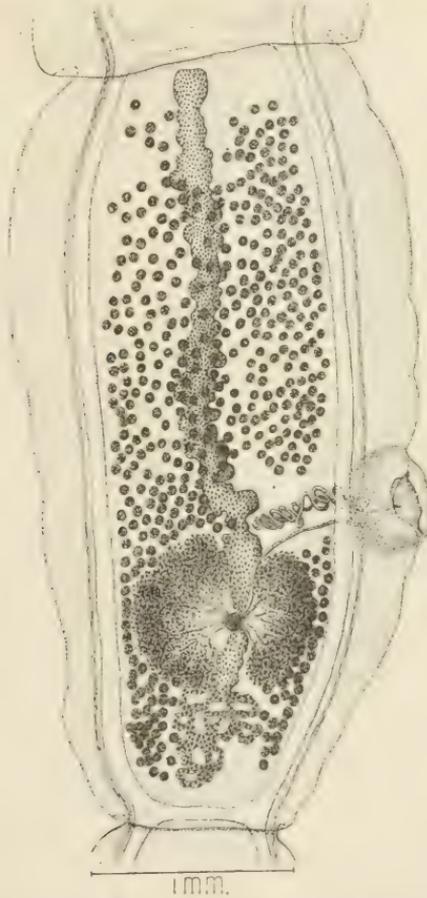


FIG. 4. *Multiceps guigeri*. Mature segment showing the occasional elongation of the vitellarium along the longitudinal axis of the strobila.

do. The shell-gland is comparatively large, at times distinctly in the clear near the anterior apex of the vitellarium and at times apparently in contact with the vitellarium or occupying an invagination at the anterior apex of the vitellarium. The vagina follows the general contour of the portion of the cirrus pouch lying nearest the lateral margin of the segment, being straight when the cirrus

pouch is straight and following the concavity when the pouch is concave posteriorly. It then bends abruptly, usually at right angles, but at times at an obtuse angle or again at an acute angle back toward the margin of the segment. It then turns medially and after pursuing a short wavy course, with usually two crests, or even making another loop, it swings in a wide curve around the nearest ovary to the receptaculum seminis in the inter-ovarian field. In gravid segments the median stem of the uterus is very wide and has from 12 to 15 wide lateral branches which in turn send out wide secondary branches. The median field of the narrow segments is thus reduced to nearly a solid mass of eggs, the space between the wide uterine areas being very small. The eggs are nearly spherical and are 25 to 30 μ in diameter.

HOSTS.—Primary: *Canis familiaris*. Secondary: *Capra hircus*.

LOCATION.—In small intestine of primary host. In central nervous system, liver, lungs, spleen, kidney, bladder, intermuscular connective tissue, under peritoneum and subcutaneous in secondary host.

LOCALITY.—India (Punjab, at Lahore, and Bengal) and Ceylon.

TYPE MATERIAL.—U. S. National Museum No. 16590. (Bureau of Animal Industry Helminthological Collection.)

LIFE HISTORY.—Eggs produced by the adult worm in the primary host, the dog, pass out and are ingested by the secondary host, the goat, in contaminated food and water. In the digestive tract the embryo escapes from its shell and bores into the tissues of the host where it gives rise to a larval form, or coenurus. On ingestion of this larva by the primary host, some or all of the heads attached to it may give rise to strobilate worms in the intestine.

Gaiger (1907) first recorded this parasite from the goat at Lahore, India. He had two cases of the larval parasite occurring in the connective tissue, and because of the site of the worm and the presence of what he regarded as daughter cysts, he concluded that the parasite was *Multiceps serialis*, the bladderworm commonly found in the connective tissues of the rabbit, rather than the gid bladderworm, *M. multiceps*, the form commonly found in the central nervous system of ungulates. He fed some cyst material to a dog and to a rat. The rat died in two days and the hooks were recovered from the stomach. The dog began passing segments of tapeworm on the fourteenth day and was killed on the thirty-first day. The small intestines were found packed with tapeworms from 1 to 40 cm. long.

Two years later, Dey (1909) reported this parasite from the goat in Bengal, India. In this case the parasites were found in the brain, intermuscular connective tissue, in subcutaneous situations, and in the mesenteries and attached to the peritoneum of the abdominal wall and the serous covering on the viscera. A dog was first treated with taeniocides and purgatives and then fed some cyst material. In a month and a half the dog began passing segments of tapeworm and was killed two weeks later. Seventy-five tapeworms, the longest 1.82 meters long, were recovered from the small intestine, and the scolices found to agree with those of the coenurus.

Southwell (1912) reports *Coenurus serialis* from the goat and *Taenia serialis* from the dog in Ceylon. The record from the goat must be regarded as a record of *M. gaigeri* and that from the dog may be.

Gaiger (1915) lists it from the goat in India with a note to the effect that it is common.

In a previous paper (Hall, 1910b), Gaiger's and Dey's records of *M. serialis* from the goat were provisionally accepted as correct, with a note to the effect that the parasite would receive further attention later. Through the courtesy of Doctor Gaiger, specimens of the coenurus from the goat and of the tapeworm from the dog were furnished to the U. S. Bureau of Animal Industry, and an examination of these showed them to be a new species. That there are no rabbits in India, a fact Gaiger (1909; 530) has himself noted, would suggest something of the sort. The specimens of the adult worm are much smaller than the largest specimens noted by Dey, but as the size depends largely on whether fresh material is measured in a stretched condition or preserved material is measured on a flat surface, this is a small matter. In the specimen which I have designated as type, the segments are mature about 5.5 to 6.5 cm. back of the head. The general anatomy of the species is much more nearly that of the gid tapeworm, *M. multiceps*, than *M. serialis*. The strobila is delicate and the vagina shows a peculiar bend which is strongly suggestive of the condition in *M. multiceps*. The hooks are also suggestive of *M. multiceps*. Gaiger states that the small hook has a bifid guard, but this statement is often made of tapeworms that do not have a bifid guard. In these cases, as in this species, there is an appearance of bifidity found on focusing which is due to the fact that the lateral mar-

gins of the guard are commonly thickened and the median ventral portion thinned and often slightly grooved, but such conditions must be differentiated from the condition of true befidity which is found in such hooks as those of *Taënia pisiformis*.

An examination of the larva shows it to be more closely related to the gid bladderworm, *M. multiceps*, than to *M. serialis* morphologically. Placed in a dish with typical specimens of these species it resembles the former much more than the latter, and the same is true of scolices detached from all three species. Gaiger (1907) states "There was a very distinct tendency in most cysts towards budding off of daughter cysts, and although actual separation of a daughter cyst was not seen, in one case there was a distinct neck dividing off a portion of the parent cyst. Internal budding was complete and many of the cysts were floating free. The daughter cysts were never more than 2 mm. broad and 4 long, and were always egg-shaped with one head at the narrow end. The majority of them were attached by a minute pedicle to the parent cyst, but could be easily detached, and often they were present in bunches, both attached and free." I find on examination that a striking feature of this species, so far as the available material is concerned, is the extraordinary ease with which the heads detach from the bladder wall and so come to lie free in the internal fluid. The great majority of the heads in the available specimen are free and lie in a mass inside the bladder, their former position being marked by neat prominent apertures perforating the bladder wall. This is the obvious explanation of Gaiger's statement regarding daughter bladders. These are deciduous scolices, but they are not daughter bladders. It is interesting to note that we have here a condition suggestive of what must have been the origin of daughter bladders, namely, a deciduous scolex, but it is so recent a development here that the cyst has not yet developed a reparative process at the site where the scolex separates. This species is apparently intermediate between *M. multiceps* and *M. serialis* in this and other respects. It presents an interesting study from a physiological standpoint in that it is capable of development in the central nervous system and also in the connective tissues and on serous surfaces, thus combining the sites of the other species, and causes the formation of an adventitious capsule, as *M. serialis* does and *M. multiceps* does not, even adhering tightly to the brain, from which *M. multiceps* slips very easily and with no trace of adhesions.

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A COMMON OR PUBLIC NUISANCE—THE TUBERCULAR MILCH COW*

J. F. WINCHESTER, Lawrence, Mass.

I have the honor as well as the privilege to call attention to centers of the cause of the most dreaded disease in mankind that is preventable.

“A common or public nuisance is one which tends to the annoyance of the public generally, and is therefore to be redressed by forcible abatement, or by an action by the State.”

That the tubercular milch cow is a common or public nuisance has been proven by the demonstration of the bacilli of Koch, or the tubercular bacilli, in the milk of such animals. That the milk from such animals is an annoyance to the public generally, is shown by the percentage of human beings whose deaths have been caused by or who have been made cripples by its use. The abatement by force will not be tolerated, but legislative action can correct the nuisance.

*An address presented at the Massachusetts Association of Boards of Health, Holyoke, Mass., Oct., 1916.

That the bovine type of the Koch bacillus does appear in the human subject, causing death and disability, has been demonstrated by various investigators. Eastwood and Griffith, in Great Britain, have made a report of the relative distribution of the various strains of tubercle bacilli in human bone and joint tuberculosis.

For the investigation, the material examined was removed directly from an affected joint or bone, or from an abscess in the neighborhood of such lesions. Out of a total of 261 patients, 55 or 21% were bovine cases. Of these only 3 were over 16 years of age. 155 cases were examined under 10 years of age, and 45 or 29% were bovines.

Dr. M. J. Ravenel, of the University of Missouri, writes, "The transmission of tuberculosis from cattle to man through milk is no longer doubted by anyone. The danger is particularly great in children under 5 years of age, but is marked in all children from birth to 16 years, *apparently diminishing* after that time."

Dr. Wm. H. Park gives a summary of patients, who have died from tuberculosis, as follows: adults, 16 years and over, 955 cases; 940 human, 15 bovine; children, 5 to 16 years, 177 cases; 131 human, 46 bovine; children, under 5 years, 368 cases; 292 human, 76 bovine.

Dr. Park further states that 10% of the fatal cases of tuberculosis among children was due to bovine bacilli; that of all the children which were fed with raw dairy products one-half died of bovine bacilli; and that about one-half of all the people, younger children and older children, that had gland tuberculosis, had bovine infection.

Dr. Delphine says, "Taking all evidence into consideration, it is possible to say, without fear of exaggeration, that not less than 25% of the children suffering from tuberculosis, under 5 years of age, suffer from tuberculosis of bovine origin, and that this rate is much lower than one based on probabilities would be."

Dr. Mitchell, of Edinburgh, examined 72 cases of children suffering from cervical tuberculosis, and of these 65 or 90% showed bovine infection. There were 38 cases under 5 years of age, and of these 35 were infection from the bovine and only 3 from the human. Some of these cases led to death later, but all of them led to more or less disease and deformity.

Infant mortality in this state under one year of age, for 1913, was 10,086 from all causes, while 4,180 deaths are registered as be-

ing due to consumption that year, but the ages of the victims were not recorded in the report.

Clinically it is impossible to tell whether a patient afflicted with tuberculosis, is infected with the bovine or the human type of the tubercle bacilli.

Professor Eber, Director of the Veterinary Institute Laboratories at Leipsic, has repeatedly shown that it is possible to so alter the human type of tubercle bacillus, by systematic passage through animals, that, with the means at present at our disposal, they cannot be distinguished from bacilli of the bovine type.

His researches furnish abundant evidence that the two types of tubercle bacilli, the human and the bovine, are not types of subspecies with constant characters, but rather varieties of one and the same bacillus with relatively variable characters. He recognized that the bacilli cultivated directly from human or bovine sources possess certain biological characteristics, which permit of a distinction, in the majority of cases, between the human and bovine type.

The law that deals with the detection of tuberculosis in cattle is as follows: "Tuberculin as a diagnostic agent for the detection of tuberculosis in domestic animals shall be used only upon cattle brought into the commonwealth, and upon cattle at Brighton, Watertown, and Somerville; but it *may* be used as such diagnostic agent on any animal in any other part of the Commonwealth, with the consent in writing of the owner or person in possession thereof, and upon animals which have been condemned as tuberculous upon physical examination by a competent veterinary surgeon."

Tuberculin is used upon foreign cattle, but *not* upon native or Massachusetts cattle at Brighton, Watertown, or Somerville.

In August, 1916, 1,931 milch cows went through the Brighton stock yards, and of that number about 480 were native Massachusetts cattle or cattle that have been owned at least six months in this state.

Each year a physical examination of all cattle in the Commonwealth is made by the city and town inspectors, and if a contagious disease is suspected in any animal, that animal must be placed in quarantine, and a certified copy of the order sent to the Department of Animal Industry.

Subsequent to his report, an inspector, a veterinarian, or layman is sent to examine the animal in quarantine, and if, in his opinion, the animal is not diseased, said animal is released.

There appears in Public Document No. 98 the fact that 1,456 native cattle were suspected of tuberculosis by the inspectors—some inspectors are veterinarians—and of that number 194 were officially released.

It is recorded in Public Document No. 98 that 49 head of cattle were reported as reacting to the tuberculin test by veterinarians, and they were released as they could not be condemned on a physical examination by agents of the Department of Animal Industry.

To me it is paradoxical that one department of this state should permit the existence of centers of disease that carry contagion to man from diseased cows through milk, while another department should be under great expense, in being constantly supplied with patients and using all the energy at its command to *restore* the innocent victims to health.

The subject has an economic as well as a humanitarian phase, and should be kept under the spotlight of public opinion until remedied.

Since the duty of the Boards of Health is sanitation, and sanitation stands for prevention, can this organization do a greater service to the Commonwealth than to have corrected and revised Section 31, Chapter 90, of the Revised Laws as amended by Chapter 322, Acts of 1903, thus aiding in the conservation of "The Common Health of the Commonwealth"?

Dr. William M. MacKellar, who directed the forces which were successful in eliminating cattle ticks from the entire State of California, has been transferred to Atlanta, and will take charge of the work in the State of Georgia. The work in Georgia has progressed very rapidly and the Bureau of Animal Industry believes that the ticks will be eradicated from the State in a very short time.

TICK ERADICATION. Forty per cent of southern territory put under quarantine on account of the Texas fever tick on July 1, 1906, was released from quarantine on this account September 15, 1916, when the recent order releasing additional territory became effective. In all, 294,014 square miles have been freed from this pest, and there now remain under quarantine 434,529 square miles. Four states have completely eradicated the tick from their borders.

CLINICAL AND CASE REPORTS

‘Knowledge is born in laboratories and in the experience of the thoughtful. It develops form in the journals and ‘when dead it is decently buried in books.’”

THE USE OF ARRHENAL FOR THE TREATMENT OF TEXAS FEVER

J. E. AGHION, State Domains, Sakha, Egypt.

An important disease which affords great interest to veterinarians of this country at the present time, and which causes considerable loss to cattle owners, is Texas fever.

The disease is due to the presence in the blood of the protozoan known as *Piroplasma bigeminum*, which is transmitted from animal to animal by the cattle tick: the piroplasma causes destruction of the red blood cells, and as a consequence hemoglobinuria (red water) occurs.

It is not my purpose to give in this short paper, the history, symptoms, or diagnosis of this disease, but simply to state, as briefly as possible, how cases of Texas fever are treated, and the results obtained by the use of Arrhenal.

In the summer of 1912 the experiment of immunizing cattle against plague was started, in cattle belonging to the Domain's Administration, the method of double inoculation (virulent blood and serum) was applied.

While conducting the said experiment, we were confronted with a serious problem. The development of a severe form of Texas fever made its appearance in some animals after double inoculation; some cases even succumbed to the disease before the application of any treatment. The diagnosis of Texas fever was generally always confirmed, when slides collected from the blood of diseased animals were microscopically examined.

For treatment we started giving a hypodermic injection of trypanblue in a solution of 1-2%: this dose was to be repeated on the second day, if the temperature of the animal was still high: this method of treatment has, according to some reports, yielded 50-60% of cures.

In October 1913 my chief, Piot Bey, urged the use of Arrhenal instead of trypanblue. This was used in the form of a 10% solution. One injection containing 10 grammes of the above solution and, in severe cases, two doses were sufficient to bring about a

prompt cure. According to Piot Bey, the treatment of Texas fever by means of Arrhenal when the case is properly and immediately attended to, and when no complications of other diseases are present, has yielded in his hands 100% of cures. The use of Arrhenal for the curative treatment of Piroplasmosis is well established in this country and has been widely employed ever since 1913 and has, so far, given satisfactory and even excellent results.

Cases of Texas fever are now seen quite independently of other diseases. The last cases, I have seen and treated successfully with Arrhenal, were in the northern part of the Delta. Ten head of cattle were examined and found with typical symptoms of Piroplasmosis. All were treated with Arrhenal and had to be freed from ticks; a change of food was also recommended. Two days afterwards they were again examined and found to be doing better; the temperature dropped to normal, all were feeding and ruminating. The same treatment and management were again applied.

I may just mention that two days prior to my visiting this lot of cattle, the manager of the farm informed me that he had lost five head of cattle presenting exactly the same symptoms. A report from the manager, which I received on August 10th, states that all the animals are doing very well and have been working for the last ten days.

A LESSON

D. V. S.

One does not learn all his lessons in college. Here is one I might have learned but did not. It may be of help to some other practitioner.

I was called about 8:00 P. M. to see an aged horse that had suddenly gone "dead lame" while at pasture. A young man who had been hunting started to drive the horse to the barn. The old horse appeared to be frightened at the boy's gun, galloped a short distance, stopped suddenly and refused to move except on three legs.

The owner, an old German, took a lantern and went with me to the pasture. An examination revealed a comminuted fracture of the os suffraginus of the left front leg. The broken pieces would simply "squash" on pressure. It was a hopeless case as the

horse was at least twenty years old, so I told the owner I could do nothing for the horse and that he should be put out of his suffering. The old man dropped his lantern and throwing his arms about the horse's neck cried like a child. On my way back to the barn the old man, between sobs, offered to pay me for my visit, but as he was in rather poor circumstances and this was his only horse I had pity for him and made no charge. After I had left he sent eight miles for a non-graduate to see the case. This man confirmed my diagnosis and prognosis and took his fee.

I did not like it very well and the next time I met Herman on the road I told him so. He said, "Vell, you didn't charge me nod-dinks, so I takes dat money for de odder feller."

THE INJURY CAUSED TO THE DAIRY INDUSTRY OF PORTO RICO BY TEXAS FEVER

JUAN VARAS CATALA, San Juan, Porto Rico.

Native cattle are immune to Texas fever, because when young they have suffered more or less from the disease. The immunization does not necessarily preserve the health of the cattle, owing to the fact that a great number of their owners allow the ticks to continue feasting upon the animals which become and stay weak and anemic; with the result that the working bull dies and the dairy cow yields a very small quantity of milk. The ticks remain infested with the *piroplasma*, thus inoculating the non-immune valuable Holstein or Jersey cows when put on pastures in which native cattle, suffering from the disease, are grazing. I have attended many epizootics of Texas fever: I will cite two outbreaks: Mr. Antonio Pizá imported seventeen Holstein-Friesian cows from the State of New York. Prior to this I had advised Mr. Pizá not to bring cows from above the tick-fever line, but he insisted and proceeded to import them. They were taken to the pasture soon after landing and eight days after he informed me that his cattle were urinating blood and that some had died. I went to his farm, made a post-mortem of two, made blood smears, examined the latter microscopically, and the coccus form of the *Piroplasma bigeminum* was seen. No treatment did any good. During the short time of three weeks, all the cows died. Mr. Pizá lost about five thousand dollars.

Dr. L. Baptista imported sixteen head of Holstein cows also

from the State of New York. He was wise; he did not put them in the pasture. He put them in a cement floor stable and everything went well for about ten months. Last month he went to a certain town of Porto Rico to spend his vacation. The attendant of the cows drove them to pasture with the result that nine died from Texas fever. I think the rest will die if not taken good care of, because they are more or less infested.

These losses of Holstein or Jersey cows cause considerable injury to the dairy industry of this island. The native cows are poorly fed; grass only, and are poor milkers, the best of them giving from eight to ten quarts daily. The udder has very little glandular tissue.

The only advantageous condition that the native cow has, when freed from ticks and taken good care of, is the resistance to disease. A great majority of the native cows give birth to their young out in the fields, and if the calves are not healthy from the start, they will succumb. The native cows hardly ever get sick and never suffer from tuberculosis, because they are kept in the open at all times where they are exposed to the hot sun of the tropics and to the cold rains and winds. These factors contribute to their prolonged health. They do not suffer from contagious abortion. Their mammary glands are very resistant to the entrance of infection, therefore they hardly ever suffer from mammitis.

If we can succeed in crossing American tuberculin tested dairy cattle with native cattle, then the dairy industry in Porto Rico will be considerably improved, because then we may have a native cow with great endurance, free from tuberculosis, and yielding a great quantity of milk.

AN EPIDEMIC AMONG RABBITS— THE VALUE OF THE MICROSCOPE

JUAN VARAS CATALA, San Juan, Porto Rico.

Mr. Alfonso Fernandez, a resident of San Juan, P. R., informed me of the loss of forty-four rabbits in the short period of a month and requested an investigation to find the cause of death. I went to his yard where the remaining rabbits, numbering thirty-two, were kept in cages, three to each cage. In one I saw three dead. The live rabbits presented a yellowish secretion in their ears.

I made post-mortems and found the membranes of the external, middle and internal ears very inflamed and covered with dry, yellowish scabs, which examined microscopically, showed the ear mite (*Psoroptes communis cuniculi*). The rest of the organs were perfectly normal.

By the above mentioned findings I arrived at the conclusion that the death of the forty-four rabbits was due to the irritation produced by the mites. I advised Mr. Fernandez to apply sulphur ointment to the ears of the remaining animals and to disinfect thoroughly all cages. He did so and a few days later he came to my office to inform me that the mortality had come to an end.

VETERINARY WORK IN A LUMBER CAMP

S. J. ALCALAY, Frazee, Minn.

At our graduation banquet, the freshman who represented his class said: the course of anatomy and its beginning osteology was a very dry study for him. Great was his anxiety to reach the threshold of myology. His assumption was that since this branch of anatomy dealt with softer tissue, correspondingly its learning would be easier on his mind. But all his hopes were shattered when he heard the professor in charge of myology say that nowadays the study of myology is done on muscles hardened "in situ" contrary to the old ways of studying on soft muscles. At this Professor Sisson and the audience indulged in laughter. In order to diverge from this "via arida" the writer begs the indulgence of his readers while presenting this paper dealing with the veterinary work on horses ranging from 100 in the summer to 250 in the winter, belonging to the Nichols Chisolm Lumber Co.

In the lumber camps and yards the horses not only discharged their ordinary duties but sometimes were also used in road construction. The writer had contracted for this veterinary work with the general manager of the firm in June 1915. A summary of the work is the object of this paper. The first work done was dentistry. After having the horse's mouth open and held so by the speculum the rasp was laid flat on the last molar, and with a gentle downward pull the sharp points were cut off, that is, those points that affected the tongue or the cheek. This procedure was repeated 2 or 3 times and the file was next used, also gently to

smooth what sharp points were missed by the rasp. Protruding points were cut off with the molar cutters. Prolonged use of file and rasp was avoided.

The next step was to eradicate the itch that affected these horses. Although they were dipped in a warm 4% solution of a dip, the results were unsatisfactory. A salve containing sulphur has given marvelously good results.

Another generalized affection was sore necks and shoulders from misfitting collars. Copper sulphate and zinc sulphate salves greatly helped in those cases.

In previous years these horses were under the care of the barn boss, who is quite a good feeder and a very reliable gentleman. Due to the lack of proper care while these horses were affected with influenza, they developed a chronic cough or a running from the nose. Phylacogens (P. D.) Fowler's solution, belladonna, nux vomica in their proper doses entirely checked these ailments, since these horses are young and their affection not very far developed. The drinking troughs were sprinkled with a few drams of copper sulphate. The hay and oats supply was at times obtained from the Dakotas or Montana. Every time some new hay or new oats were fed to these horses, we had our hands full treating colicky horses. The course of treatment, that greatly helped us in these conditions, was Quitman's colic recipe consisting of salicylic acid ̄ss, and ginger q.s. to fill up a capsule. This was my method of procedure. A dozen or two dozen of these capsules were always handy and the barn boss was instructed to use them in case the veterinarian was out on a call. In some way or another these horses would develop wind colic and also would be unable to void urine. In the latter case, sweet spts. of nitre or turpentine would be used; but I shall not fail to give full credit to the salicylic acid. I am often thankful to Dr. Quitman for his kindness in telling me of this treatment in 1914 when he took me out in his auto to see his cases in Borden's stables in Chicago. This year we are less troubled with colics. Oil meal is being mixed with the oats.

We have never had to contend with a case of tetanus as yet. In my estimation the reason is that every time a horse is wounded, whether by a nail or any other offending object, the wound is cleaned with tincture of iodine followed by the required surgical treatment.

For corns, contracted heels or any inflammatory affection of the hoof requiring softening "white rock hoof packing" was used with quite good results. This is practically a résumé of the veterinary work done on these horses during the summer of 1915.

The northern part of Minnesota is yet richly covered with trees belonging to the coniferae, natural order, which are used for lumber. These trees are mostly the white pine or *Pinus strobus*, the spruce or *Picea excelsa* and the like. The region in which these trees grow is mostly inhabited by Indians. The white men buy the timber from them or if it has been homesteaded by some white people, lumber companies buy the land and timber or the timber alone. From 500 to 800 men are employed to hew down these trees in the winter season, saw them into logs and carry them down to a lake or river. Camps are built which provide shelter for from 50 to 200 men and the camps are 10 or 12 miles apart. It was the duty of the veterinarian to drive from camp to camp, attend the cases and instruct the barn boss what ready-made mixture to use in emergency cases. Each barn was supplied with colic medicine consisting of sweet spirits of nitre, belladonna and nux vomica. Another bottle labelled cough medicine, contained sweet spirits of nitre, syrup, belladonna and tincture of opium. Besides these medicines there was a supply of lysol, tincture of iodine, soap, liniment and a drenching syringe.

On a bright day with a glowing sunlight the woods are very picturesque. Here is a long lake about six miles in length and a curve at the end of it. This is Elbow Lake, a name given by the Indians. While driving on the frozen waters of this lake one sees on both of its shores the great pines on the slope of the banks. In the lake one sees round areas where the water bubbles just as boiling water in a tea-kettle. These are water holes made by underground springs. The Indians are very careful to never cut a track close to where these water holes abound. Through the long drives in the narrow Indian trails one can never fail to enjoy the cool breeze that passes through a thicket of balsams, white pines, Norway pines and the tapering spruces. God and his greatness is revealed to that small creature the miser of all beings: the son of Adam. How long this scenery will last is not difficult to guess, as these trees are being cut down very rapidly.

Throughout the whole winter's work there are about one dozen horses out of 250 head that are destroyed on account of being dis-

abled by a heavy log or from some similar accident. What mostly troubles the horses in the woods are cuts from sharp calks, making very deep wounds; also wounds from snags. The hoofs treading on soft or wet snow become very tender and soft, and thus rendered accessible to penetrating snags which are remnants of some bush cleared out to make a road. These wounds are always treated with tincture of iodine followed by the usual surgical procedure.

ABSTRACTS FROM RECENT LITERATURE

MODIFICATION OF THE TECHNIC OF THE OPERATION FOR PENETRATING STREET NAIL. Dr. Coeu. *Recueil de Médecine Vétérinaire*, Vol. 91, pp. 184-187, 1916.—The operation for penetrating street nail as described by Nocard involves such mutilation of the plantar cushion as cannot be repaired by the proliferation of the underlying tissues. Almost always a deformation of the plantar surface results, with a change in the anatomical-physiological relations which assure to the horse's foot, the elasticity necessary for normal function.

Later, the retraction of the cicatricial tissue causes a depression which may be very deep and a keratocoele may develop in it. The compression exerted on the surface of the cicatricial tissue by this tumor is frequently the point of departure of inflammatory pneumonia. This may be followed by suppuration causing sloughing, which in turn necessitates further surgical treatment.

These accidents are particularly frequent after operations performed on the forefeet of animals doing hard work on city pavements.

It is probable that in order to obviate these inconveniences, Professor Cadiot, in his "Lecons cliniques," edition of 1899, advised the utmost sparing of the body of the plantar cushion.

It seemed to me that it was possible to still further obviate the mutilation by conserving entirely the plantar cushion and limiting the incisions to the aponeurosis.

In January 1915, a horse was brought to me, which gave occasion for a trial. The horse had sustained a deep wound in the "middle zone," caused by a hook such as butchers use for suspending quarters of meat. The hook had been brought to the surface of the road by vehicle traffic.

Although the wound was of recent origin, the leg was not used for support, there was incessant pain, abundant effusion of synovial fluid containing lumps, and rise in temperature. These necessitated immediate surgical treatment, which was done the next day.

I performed the operation on the horse in the standing position, after cocainizing the plantar nerves below the pastern joint; the foot was held by an assistant as in shoeing.

The extremity of the limb was disinfected and hemostasis assured by a rubber bandage around the pastern. The sole and frog were carefully pared; I divided the latter into two equal parts by a longitudinal incision which prolonged the central sulcus (middle cleft) of the frog to its apex and cut through the entire thickness of the plantar cushion. With the aid of right and left sage knives I loosened the two halves and detached them from the aponeurosis, beginning at the bottom of the median incision and working toward the right and left lateral lacunae. The two flaps were held in forceps and carefully lifted by an assistant. The plantar aponeurosis thus exposed showed, in its internal half, the large perforation due to the penetration of the point of the hook.

The internal part of the navicular bone was stripped of its cartilaginous covering and had been pitted, near one of its extremities, by the point of the penetrating body.

At this level, the substance of the navicular bone was yellowish, a trifle purulent, and easily penetrable by the curet. It presented, in a word, a condition of early caries. All of this altered part was most carefully curetted away in such fashion as to leave the cartilaginous layer intact:

The two halves of the pyramidal body were then brought together and united at five points by separate sutures, using a Cuseo needle and an aluminum bronze wire No. 4/10.

The wound was irrigated with cresol solution, dusted with iodoform, covered with several thicknesses of iodoform gauze and a tight compress of cotton held in place by a light shoe and a sheet iron sole.

Following the operation, conditions did not improve as rapidly as expected. The limb was not used for support, temperature remained in the neighborhood of 39°, the animal was off feed and became emaciated. The pastern and coronet became engorged,

leading to abscess formation, and later, to periostosis, which necessitated firing with loss of service of the animal.

The secondary infection, however, was without influence upon the wound of the operation which healed almost without suppuration. On the fifteenth day, I removed the metal wires which united the two halves of the frog. A cicatrization *per primam* hardly permitted the detection of the original incision.

With regard to the conservation of the frog, the result would have been perfect, were it not for the fact that, not having been used for support, it had become strongly retracted, so that its point hardly passed the sesamoid.

During the early part of March, the wound was entirely cicatrized and covered with horn on the entire surface; slowly the frog recovered its normal length and its point attained its anterior limit. However, painful lameness persisted. This, I believe, was due to the coronary periostitis and strong hoof bound condition due to long disuse of the limb. I then used cauterization followed by a vesicant application. On the 28th of April the horse was discharged from the hospital, having completely recovered from the lameness and contracted heels.

To summarize: The three following interesting facts have been brought out: 1. The possibility of performing the operation for penetrating street nail and conserving the frog intact. 2. The immediate reunion of the divided frog is easily obtained. 3. The retraction of the body of the plantar cushion is the operating stumbling block; it causes the separation of the cushion from the adjacent tissues.

In the succeeding operations this trouble was avoided by separating only one of the halves of the frog, leaving the other half fixed in place with its normal anatomical attachments. To facilitate the excision of the flap of the injured fascia, it is separated from the fascia under the fixed half of the frog, with a stroke of a sage knife.

The metal sutures which unite the halves of the frog prevent the detached half from retracting away from the fixed half.

Atrophy of the frog does not result from the above described operation. Healing is obtained in three weeks, that is, less than half the time required when the classical technic is used.

BERG.

THE RELATION OF STABLE AIR TO SANITARY MILK. Abst. from an editorial in the *Jour. of the Amer. Med. Assoc.*, p. 746, Vol. XLVII, No. 10, September 2, 1916. For purposes of comparison it may be recalled that Winslow and Browne found that the average number of bacteria per cubic foot (about 28 quarts) of country air was 56, for city street air 72, for offices 94, for factories 113, and for schools 96. Ruehle and Kulp have ascertained that the number of bacteria found in the air of representative stables during such barn operations as milking, feeding hay, grain and the like, usually varies between 50 and 200 per liter (quart) of air. Occasionally much lower results were secured and also a few much higher, the high record being 825 per liter of air. When sterile water was "milked" in a representative stable from an apparatus designed to imitate the exposure of milk in this process in the dairy barn, the germ content of the liquid was found to average 12 per cubic centimeter, with a maximum of 73 and a usual range of from 5 to 15. When the same process was repeated under extreme dusty conditions it was possible to stir up several thousand bacteria per liter of air, so that the water acquired from 30 to 100 organisms per cubic centimeter. Milking under the worst of these conditions, the experimental observers tell us, would, as shown by the results where an artificial dust was raised, have added from 100 to 1000 or more bacteria per cubic centimeter to the milk. On the other hand, under the conditions usually found in representative stables, the number of bacteria added to milk drawn would have been so few as to be undetectable by known methods of analysis.

"The bacteriologic experts of the New York Experiment Station reviewing the quantitative facts now available on the subject, state that no cases have preconceived ideas regarding the effect of certain factors on the production of clean milk so overruled the results of actual observation as in this case. They add that dairy-men and sanitarians who have been interested in the production of clean milk have been as badly misled as have surgeons and physicians. This was only natural because of the way in which our knowledge of air bacteria was developed. Bacteria do occur in the air of cow stables in relatively larger numbers than they do in the air of many other places. Occasionally under exceptionally dusty conditions, the number of bacteria getting into the milk from the air may be approximately as high as the number derived from the udder; but the number so derived under ordinary conditions does

not increase the germ content of the milk to any important extent. Lest there be any misunderstanding, however, we must emphasize again the other highly significant sources of bacterial contamination of milk. The unsterilized milk pail, frequently contributing many thousands of microorganisms per cubic centimeter affords an illustration of one remediable factor among several others beside stable dust."

REICHEL.

TREATMENT OF WOUNDS WITH SUGAR. Major Albert Lhoste. *Revue Pathol. Compar.*—1st observation. Two horses with badly broken knees were treated as follows: thorough washing with isotonic solution of chloride of sodium, heated to 40° and used as a mechanical antiseptic. Closed dressing with ordinary powdered sugar, which was left five days. When it was removed the wound was covered with a brownish crust. It was washed as before and then appeared rosy with healthy granulations. Another similar dressing was applied and left for five days. Then the wound was almost filled with granulations: hairs were growing on the border of the wounds. Continuation of the treatment brought recovery in 20 days. A saturated solution was used in the latter days of the treatment.

2d observation.—Horse had a wound on the coronet of the right hind leg. It had a bad appearance and quittor was likely to occur. A solution of permanganate was used for disinfecting and a sugar dressing applied. The results were surprising. Granulations developed rapidly, no suppuration took place notwithstanding the exposure of the wound under the conditions of stabling.

3d observation.—Deep scratches on the left posterior coronet. After thorough washing, a dressing of sugar was applied. On the 5th day the recovery was so far advanced that all lameness disappeared and the wound was almost healed. With salt solution saturated with sugar used as a dressing afterwards, the animal was able to resume work on short notice.

LIAUTARD.

A BACTERIOLOGICAL STUDY OF AN EPIDEMIC OF SEPTIC SORE THROAT. C. Krumwiede, Jr. and Eugenia Valentine. *Jour. of Med. Research*, 33 (1915), No. 2, pp. 231-238. *Abst. Experiment Station Record*, Vol. XXXIV, No. 5, April 1916.—An account of an epidemic of septic sore throat in a village of 4,250 inhabitants, was found to have its source in the milk supply coming from a certain dairy.

In a bacteriological study it was demonstrated that infection in milk-borne sore throat is of human and not of bovine origin. It is suggested that "in tracing the source of such an epidemic, the effort should be toward finding cases of sore throat among those engaged in producing the milk, not mastitis in the cow alone. If human streptococci are found in mastitis, they are most likely secondary agents in an already existing inflammation due to bovine strains. The streptococci in different epidemics differ culturally and those similar culturally differ in their immunity reactions. Cultural similarity of strains from man and cattle is insufficient to prove their identity. Cultural identity in every detail or immunological identity is essential."

M. J. HARKINS.

PAPILLOMA IN THE BLADDER OF A MARE. Capt. A. S. Leese, A.V.C. *Veterinary Journal*.—Brown mare, trooper, about 10 years old, was purged for what was supposed to be the removal of calculi. She showed bladder irritation by frequent straining and expulsion of a few drops of normal looking urine. Examination through the vagina, revealed the bladder as a solid organ and by urethral manipulation a firm growth was detected. Dilation of the urethra with the animal under chloroform, allowed the introduction of three fingers and showed that the tumor was quite large and the attachment beyond reach. The sphincter of the bladder was incised so as to permit the whole hand to penetrate into the organ, but the base of the growth was so broad that complete removal was impossible. Part of it was extracted, however, and this portion established the papillomatous nature of the growth. The mare was destroyed. The walls of the bladder were much thickened and the growth extended over nearly the whole of the interior.

LIAUTARD.

FURTHER STUDIES OF BIOLOGICAL METHODS FOR THE DIAGNOSIS OF TUBERCULOSIS. J. Bronfenbrenner, M. H. Kahn, J. Rockman, M. Kahn. *Archives of Int. Med.*, April 15, 1916. *Abst. Bulletin of the Nat. Assoc. for the Study and Prev. of Tuberculosis*, Vol. 11, September, 1916, No. 12, p. 7.—Further attempts to study the value of biological methods in the diagnosis of tuberculosis led to the following conclusions:

The tuberculin of Besredka gives the best results for the complement deviation test. The reaction seems specific even though

the test is positive in a certain number of clinically non-tuberculous cases. In at least 87% of positive tests fixation was confirmed by the use of one or more preparations other than that of Besredka. Different samples of the tuberculin of Besredka, though apparently identical in the mode of their preparation, may differ among themselves in their specific value. The most striking variation is in the amount of lipins contained in tuberculin. It is necessary to free each sample of tuberculin of all its lipin fraction before using such tuberculin for the complement deviation test. The lipins may be extracted by fat solvents, but the easiest method was found to be that of separation of the protein fraction by precipitation. Precipitation of the antigenic fraction of tuberculin also offers the possibility of using a standard number of units of antigen and thus eliminating variations due to the quantitative differences in specific properties of different samples of tuberculin, without increasing the chance of obtaining lipotropic reactions.

It seems, however, that different samples of tuberculin may vary also quantitatively. The variation rests apparently on the fact of the existence of strain specificity in the antibody. The existence of strain specificity in tuberculosis may explain why the results obtained by different investigators in the complement deviation test for diagnosis of tuberculosis vary so much.

A comparison of the frequency of occurrence of the Weisz reaction and the complement fixation in different stages of the disease, suggests that negative serum findings in the face of the positive Weisz reaction may indicate an unfavorable prognosis.

REICHEL.

LUXATION OF THE FLEXOR PEDIS PERFORATUS TENDON IN A DOG. G. Mayall, M.R.C.V.S.—An Irish terrier was lame in the near hind leg. He had received a recent injury about the point of the hock, which was capped. Seen three days later, after liniment had been applied the dog seemed somewhat better but it was then discovered that the tendon slipped off the point of the hock outwards with a click and the dog then walked lame for a few steps and then moved all right. The point of the hock was still slightly swollen. Soap and iodine liniment was prescribed. Improvement followed after a few days but the dog still continued to carry the leg at various times.

LIAUTARD.

INFERIOR HORIZONTAL HEMIANOPSIA IN THE HORSE. P. Vauthrin. *Revue Générale de Médecine Vétérinaire*, Vol. 25, pp. 246-250. 1916.—Shortly after the first cold nights of November 1915, a horse that had not been sheltered, was brought to our attention. He was troubled with disturbance of vision which was extremely rare, and probably has not yet been described in our veterinary literature.

It was a case of hemianopsia (hemianopia, hemiopia). This word is used in ophthalmology to designate the suppression of the lower visual field and the absence of perception of images formed on the upper half of the retina. The subjects affected can see only those objects situated above a horizontal plane passing through the center of the pupil.

The hemianopsia was complete in this case, that is, there was a symmetrical absence of vision in the entire halves of the visual fields of both eyes.

The subject was an American horse, black, six years, had been to the front for several months and was acclimated.

Symptoms.—The horse moves hesitatingly, staggering and shifting suddenly from one hind limb to the other as is seen in the beginning of azoturia. Conjunctiva a little injected, kidneys very sensitive.

After bleeding 6 liters, and the administration of a purgative, the horse was taken to a nearby stable. It was then that attention was drawn to other symptoms which will be described without further reference to the paraplegia menace which disappeared the next day.

The head is carried high enough; face anxious; fore limbs raised oftener than necessary and they seem to feel their way; they struck the smallest obstacles so that falling seemed almost inevitable. When led to a trough full of water the horse did not see it and did not stop until his fore-limbs touched it. He remained there without drinking until someone plunged his lips into the water. But he saw whatever was at the level of his eyes: he did not walk into walls, he lowered his head on passing through a door. Menacing gestures executed close to his head did not affect him until they passed the inferior palpebral border; the reaction was quick when the finger came near his eyes, even at a distance of 3 or 4 meters and at a man's height.

Brought into a stable without a manger, he did not touch the

hay on the ground before him; but went to it eagerly when it was raised to the level of his eyes, even when it was shown to him at a distance. The influence of the sense of smell seemed to be inadequate or nil. This was not therefore, a case of psychic blindness, i. e., loss of memory of optical images; since merely the sight of hay, of the door of the stable or a watering bucket, were sufficient and he would recognize them.

As with the hay, the horse did not touch oats laid down before him; he would eat them when they were shown to him from a distance, or when he was obliged to lower his head down to them. While eating he assumed a very bizarre and characteristic attitude. He curved his neck and gave it a very oblique direction from in front to the rear and from above downward, in such fashion that the forehead was almost horizontal, the nose posed between the forefeet; behind which the horse would look for hay that had been thrust under his eyes.

Picking up oats and bran was very difficult. The ration was put into a movable manger, somewhat narrow and long enough so that Punch (the horse's name) had one end of it under his eyes while he ate from the other end. He supported the inferior third of his forehead on the bottom of the box and ate in that posture as long as the layer of grain was up to the level of his mouth. When that layer was so thin that only his forehead and nose were buried in the oats, he continued to make mastication movements with his lips in the air for some time before he understood that by slightly shifting his head he would find what his eyes could not see.

Examination of the eyes.—The eyes are limpid, well opened; they present nothing abnormal except a slight injection of the conjunctiva and a slight dilation of the pupils. The elliptical pupils were of the same size in both eyes; at the middle they were 7 to 8 millimeters high. The reflexes were normal. The humors were transparent.

During two days these symptoms remained unchanged, but they subsided rapidly during the days following. The first to disappear was the singular attitude adopted while eating. By the sixth day all seemed to be in order. Two months have passed without a relapse; the recovery may be considered complete.

Diagnosis.—Hemianopsia is without doubt very rare among our animals and would easily escape detection because of the absence of information and ophthalmoscopic lesions. One must de-

pend upon a careful study of the animal's attitudes and the exploration of the visual field. The right or left homonymous hemianopsia in which the right or left halves of the visual fields are affected is easily detected by the carriage of the head aside from the median plane. If the right halves of the retina are insensible to light impressions the head is carried to the right and conversely. This form, which is most common in man, always indicates a lesion in the optic tract behind the chiasma and on the same side as the blinded halves of the retinas. It is also called lateral, to distinguish it from superior or inferior horizontal hemianopsia. With regard to the crossed forms, bitemporal or binasal, and especially the quadrant forms in which the retinas are blinded on approximately one-quarter of their surfaces, these remain practically always unsuspected.

(The paper concluded with an interesting discussion of the pathogenesis. The structure of the optic tract, with the results of lesions of the various parts is discussed. Hemianopsia in animals other than the horse is briefly mentioned in Hutyrá and Marek's Pathology and Therapeutics of the Diseases of Domestic Animals.)

BERG.

UMBILICAL HERNIA—OPERATION. Arthur Spicer, F.R.C.V.S. *Veterinary Record*.—A yearling filly, foaled all right, showed a week later a hernia which grew to be the size of an orange. Three or four interrupted sutures were applied; but the filly did not do well. The hernia became very large. An operation was necessary and performed by an incision through the skin about three inches from the base of the enlargement. Numerous varicose veins were present and bled freely. The dissection of the skin was rather difficult. The abdominal muscles were divided. The bowels were found adherent to the bottom of the sac and demanded careful dissection. A portion of the abdominal muscles had to be excised. The hernia was reduced. Six supporting sutures were put in place, passing through the skin and abdominal walls. The abdominal muscles were sewn up, then the skin and finally the supporting sutures were brought together and tied. The operation took two and three-quarter hours, fourteen and one-half ounces of chloroform being used. The case did well, the temperature varying between 103° and 104.5° the first week and then dropping to normal. The in-

errupted sutures were removed on the seventh day. Recovery was perfect, leaving only a slight bulging of the skin which will disappear as the filly grows.

LIAUTARD.

VACCINATION OF SHEEP AGAINST THE DISEASE SEPTICEMIA PLURIFORMIS OVIUM. H. Raebiger and A. Spiegel. (*Deutsche Tierärztliche Wochenschrift*, Year 23, No. 47, pp. 406-409, Nov. 20, 1915.) Abst.—*International Rev. of the Science and Practice of Agric.* Year VII, No. 1, January 1916, p. 100.—In their experiments with the vaccination of sheep, begun in 1912, against Septicemia pluriformis ovium, the writers have employed a serum which they prepared by means of inoculating 3 sheep with virulent strains of *Bacillus oriscepticus*. For the purpose of trial, white mice suffering from the disease were injected with 0.2 and 0.3 c.c. of the serum. The treated mice survived while those that remained unvaccinated, invariably succumbed. The serum was thus positive in action.

The veterinary practitioners who forwarded their reports to the writers had vaccinated 3230 sheep in 13 flocks of which 2804 were healthy, 250 diseased, and 176 doubtful: 867 animals were left unvaccinated as controls. The observations made may be summarized as follows:

Previous to vaccination, in 11 flocks (no report was sent in for 2 flocks) the mortality was 9 per cent. After vaccination, among 3230 animals, the mortality was 3.7 per cent or a reduction of 5.3 per cent. There were, however, among these sheep previous to vaccination 250 diseased animals of which 138 were slightly, and 112 severely attacked. The percentage diseased was thus 7.7 per cent, or almost equal to the percentage of mortality. Of these 250 animals 50 per cent, died after vaccination. In other words, 250 representing 7.7 per cent of the total, the number of sheep saved by vaccination was 3.8 per cent. Had these 7.7 per cent not been vaccinated the percentage mortality would have been $9 \div 7.7 = 16$ per cent. By means of vaccination the lives of $5.3 + 3.8 = 9.1$ per cent were saved. The mortality was thus reduced by 50 per cent.

M. J. HARKINS.

CALCULI IN KIDNEY AND BLADDER OF A BITCH. President W. R. Davis. *Veterinary News*.—This is from a meeting of the Central Veterinary Society. In making the presentation, the author

remarked that such cases are rather common and that he was induced to relate it because he had made a mistake in the diagnosis. The bitch had been ailing for nine months, showing at times inappetence and vomiting. Then she seemed to be all right but passed fetid and bloody material from the vulva. She was a fox terrier, very vicious and difficult to handle. Finally when she could be secured an examination was made and an enlargement within the abdominal cavity was detected. A diagnosis of chronic catarrh of the uterus was made. The owner declining to have the abdomen opened for more precision in the diagnosis, the dog was destroyed. At post-mortem the uterus was found normal but the bladder was enormously enlarged and distended with innumerable calculi, some as large as a walnut and hundreds of various sizes from a pea to a pinhead. The right kidney also contained several calculi.

LIAUTARD.

FRACTURE OF THE 7TH CERVICAL VERTEBRA. Mr. Willett. *Veterinary News*.—At a meeting of the Central Veterinary Society held in London, the author reported the following. Called one morning on being told that a horse had met with an accident in the riding school, where he was being trained and, when instead of taking the jump, the animal rushed and fell on his head. He was gotten up, walked two or three yards and went down again. Helped on his legs again, he walked a few steps and then fell. He was dragged to his box, attempts were made to put him in slings but he struggled so much that he had to be left lying down. The next day the horse was still unable to rise but fed well, had a normal temperature and a good pulse. Careful manipulation of the neck failed to detect any fracture. The horse was destroyed. On examination of the neck it was found that the seventh cervical vertebra had been broken into thirteen pieces; the sixth had a piece off the wing and the fifth was also broken.

LIAUTARD.

Dr. J. E. Cloud, veterinary inspector, has been placed in charge of B. A. I. work at San Diego, California, vice Dr. MacKellar transferred to tick eradication in Georgia.

ASSOCIATION MEETINGS

AMERICAN VETERINARY MEDICAL ASSOCIATION

REPORT OF THE COMMITTEE ON RESOLUTIONS

“The Finance Committee, in view of the fact that the A.V. M.A. has now attained a membership of huge proportions and has acquired the *Journal* of the A.V.M.A., all of which means that a large sum of money will be collected and disbursed annually, and in view of the fact that vouchers, books, etc., of the secretary, the treasurer and of the *Journal* should be carefully audited each year, we offer the following:

“*Resolved*: That a certified public accountant be employed each year by the committee on finance to audit the books of, and report on the condition of the A.V.M.A.

“*Whereas*, in view of the fact that in many instances vouchers are not receipted and returned by recipient of checks, be it,

“*Resolved*: That a voucher check be adopted by the A.V. M.A.”

“*Whereas*, it appears that certain county agents employed in agricultural communities have become active in performing work which properly belongs to the province of practicing veterinarians, be it,

“*Resolved*: That this association regrets the activity in this line displayed by some county agents in certain states. It is the sense of this association that such activities are not conducive to the best interests of agriculture nor to the prosperity of the growers of livestock: that the activities of these agents should be confined solely to educational channels, as it is absolutely unsatisfactory for them to engage in the treatment of diseases of domestic animals, thereby depriving the veterinary practitioner of his legitimate source of livelihood, and be it further

“*Resolved*: That a copy of this resolution be forwarded to the Honorable Secretary of Agriculture by the secretary of this association.”

Resolved: That the following letter be commended and transmitted to the Honorable Secretary of War, Washington, D. C. The American Veterinary Medical Association in session at Detroit,

Michigan, August 21-25, 1916, respectfully calls to your attention the following facts:

“It is a matter of common knowledge that the stock of horses on which this country would have to depend in large part in the event of our being involved in a war is being seriously depleted by the purchase and shipment of the most desirable cavalry and artillery types to Europe. The Horse Boards of England, France, Italy and Greece are buying and shipping geldings and mares alike. This shipment of large numbers of mares naturally cuts down very considerably the amount of breeding stock available for the future production of remounts in this country. With the decrease in the number of geldings available for purchase, owing to the great demand and large shipments, the proportion of mares shipped must increase.

“Already it has become very difficult to secure serviceable horses for the regular army and militia service and in the Southwest it is out of the question to buy the really desirable type as the amounts offered for the purchase of individual horses are not enough to meet the bids of the buyers of the foreign governments.

“It is the opinion of this association that this is a situation which is already a handicap to our army and which could be converted into a serious menace by international complications such as have threatened this country a number of times in the past two years. To meet this situation there are two things which this association would respectfully bring to your attention.

“One suggestion is that the United States Government meet the prices of foreign buyers in purchasing horses. It is not to be expected that owners of horses will sell them to the government at a sacrifice in preference to selling them to foreign buyers at a profit. Not only a regard for the best interests of the country, but good business judgment should indicate that when suitable remounts command increased prices, those prices should be authorized and paid rather than permit the purchase of unsuitable and inferior types of animals.

“Another suggestion is that the purchase of mares be authorized. The old objection that they could not be kept owing to the presence of stallions, the property of officers, no longer applies as the use of stallions is not permitted. It is the opinion of the army and militia officers in general that mares are as desirable animals, and polo players regard them as perhaps superior in endurance and

perception. All of the foreign armies use mares. A new French contract now being filled, calls for 25,000 horses, of which 20% to 30% shall be mares. At Ft. Riley 40% of the remounts are mares and in the army polo organizations 60% of the ponies are mares.

“We have the precedent of the purchase of mares for the Native Cuban Cavalry by Q. M. Gen. Luddington during the Spanish-American War on the grounds that these animals would be of more value to them at the close of the war in re-stocking the country with horses. At the close of the present European War, unquestionably many of the mares now leaving this country will be sent to the farms as were the mounts of the Cuban Cavalry and those of the American armies at the close of the Civil War. There could be no objection to this if it were not that the removal of the pick of the American Cavalry horses is already so extreme as to threaten us with serious consequences if our army should need them any time in the next few years. A fresh crop of horses can no more be produced out of hand on demand than can trained soldiers be so produced.

“In view of the above facts, this association respectfully commends to your attention the desirability of having this Government meet the competition of foreign buyers in purchasing suitable animals for our own army, and of purchasing mares in order to increase the present too restricted field of purchase and to retain them in this country for the possible needs of future breeding operations.”

“Whereas, the livestock interests of the country have been threatened by the ravages of the dreaded foot-and-mouth disease, and

“Whereas, the great and efficient work of the federal and state authorities in completely eradicating the infection of the disease from the entire country in such a comparatively short space of time, therefore, be it

“Resolved: That this association desires to go on record in highly commending the great services to the country of the national and state authorities in the accomplishment of such a monumental piece of livestock sanitary work.”

“Whereas, division and discord have existed in the ranks of the veterinary profession in the states of Wisconsin and Oklahoma, and

“Whereas, these differences have been satisfactorily adjusted and harmonious reunion of broken ranks effected,

“Resolved: That the American Veterinary Medical Association learns with pleasure that the veterinary profession of Wisconsin and of Oklahoma presents perfect fraternal solidarity.”

“Resolved: That this association hereby express its appreciation of the entertainment furnished the members and visitors at this meeting by Parke, Davis & Company.”

“Resolved: That this association hereby express its appreciation of, and tender its thanks to the local committee of arrangements for their successful efforts in providing entertainment for this meeting.”

“The Special Committee on Advertisements of Veterinary Remedies, recommends that the following resolution be adopted, by this association:

“Resolved: That misleading claims for biological products should not be tolerated by this association, and any official of any firm or corporation who is a member of this association and allows such claims to be made, the same shall be sufficient reason for rejection or expulsion from this association; and this association should accept the federal regulations governing biological products as a standard of applicaion.”

JOHN W. ADAMS, *Chairman*

L. FROTHINGHAM

GEORGE R. WHITE

GEORGE H. GLOVER

JOHN L. WHITE

REPORT OF THE COMMITTEE ON REORGANIZATION

CONSTITUTION

ARTICLE I.

Section 1. This organization shall be known as the AMERICAN VETERINARY MEDICAL ASSOCIATION.

ARTICLE II.

OBJECTS

Section 1. The objects of this association are:

(a) To protect and promote the professional interests of the veterinarian.

(b) To elevate the standard of veterinary education.

(c) To procure the enactment and the enforcement of uniform laws and regulations relative to veterinary practice and the control of animal disease.

(d) To direct public opinion regarding problems of animal hygiene.

(e) To promote good fellowship in the profession.

ARTICLE III.

MEMBERS

Section 1. Membership in this association shall be of two kinds—Active and Honorary.

ACTIVE MEMBERS

Section 2. Active members must be graduates of veterinary colleges approved by the association and recommended by the Executive Board and elected to membership in accordance with the By-laws.

A member who has been in good and regular standing for twenty-five years, shall receive the title of Fellow of the American Veterinary Medical Association. A certificate of such fellowship shall be issued by the secretary.

HONORARY MEMBERS

Section 3. Honorary membership may be conferred upon any person resident in any part of the world, who has rendered valuable service to Veterinary Science. A person presented for Honorary Membership must be recommended by the Committee on Intelligence and Education, and elected by three-fourths majority vote of the active members present at a regular meeting. They shall have all the privileges of active members, except that they shall not pay dues, hold office nor vote, nor have any right or title to or interest in any real or personal property of the association. Not more than three Honorary Members shall be elected in one year.

ARTICLE IV.

MEETINGS

Section 1. Meetings of the association shall be regular and special. The regular meeting shall be held annually. It shall be convened not earlier than July 15th, nor later than the 31st of December of each year, unless otherwise ordered by a two-thirds vote of the members of the association, and notice of the selection shall be given to each member by the secretary at least sixty days before the date of the meeting, or at such time as may be designated by a special election held in accordance with the By-laws.

The time, place and duration of the regular meeting shall be fixed by the Executive Board unless otherwise ordered by the association at a regular meeting. Special meetings may be called by the President upon request in writing of not less than 200 active members. The time, place and purpose of special meetings shall be designated in the call.

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. They shall be elected at the regular annual meeting, and hold office, except the Executive Board, 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 office of the President, Vice-President, Secretary or Treasurer unless he has been a member in good standing for the five years preceding his election.

PRESIDENT

Section 2. The President shall preside at all meetings of the association. At the regular annual meeting he shall be expected to deliver a short address. The President shall appoint members of committees and all officers whose appointments are not otherwise provided for; he shall perform such other duties as ordinarily devolve upon a president. He shall not be eligible for re-election.

VICE-PRESIDENTS

Section 3. In case of death or resignation of the President, or in case of his inability to perform the duties of his office from any cause, the same shall devolve upon the Vice-President in sen-

iority for the remainder of the unexpired term, or until the disability be removed.

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. 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), to be approved by the Executive Board. He shall present a written report at the regular annual meeting.

TREASURER

Section 5. The Treasurer shall account to the association for all moneys received. He shall give bond to the association in the sum of ten thousand dollars (\$10,000), approved by the Executive Board. At the expiration of his term of office he shall account for and turn over to his successor in office all moneys, vouchers and account books belonging to the association.

The Treasurer shall pay out moneys only on vouchers countersigned by the President and Secretary, excepting minor expenses of the Secretary, and such revolving fund allowance as may be placed at the disposal of the Editor and Manager of the "Journal" by the Budget Committee.

The treasurer shall at the regular annual meeting present a written detailed statement with vouchers covering all receipts and expenditures.

PROPERTIES

Section 6. All officers shall, at the expiration of their terms of office, turn over all property of the association to their successors.

EXECUTIVE BOARD

Section 7. The Executive Board shall consist of five members, one from each Executive Board district and one member at large and it shall elect annually its own chairman.

Each member of the Executive Board shall hold office for five years, except the district members first elected under this Constitution. Those first elected from the First, Second, Third, Fourth and Fifth Districts shall hold office respectively for One, Two, Three, Four and Five Years from the date of the election.

The Executive Board shall constitute the Administrative Body of the association, and shall make all necessary regulations for carrying into effect the provisions of this Constitution and the By-Laws.

Unless otherwise provided for, the Executive Board shall select the time, duration and place for holding the annual meetings, and shall make necessary arrangements therefor.

The Executive Board shall pass upon the eligibility of all candidates for membership and report their recommendations to the association. Four members of the Executive Board shall constitute a quorum for the transaction of business.

The Executive Board shall act upon and report promptly on all recommendations of the President of the association and resolutions or other matters duly referred to them by the association, or sections thereof.

On the written request of at least one hundred members of the association, the Executive Board shall submit any question to the whole membership for decision by mail ballot. All ballots returned to the Secretary shall be signed by the active members voting and said ballots shall be retained by the secretary for at least two years after they have been counted. All mail ballots on specific questions, nominations and elections shall be of the same date and issue. Ballots not signed, and ballots not returned within sixty days after date of issue, shall not be counted.

Accurate records shall be kept by the Secretary of the association of all meetings of the Executive Board.

A summary of such records shall be published in the proceedings and distributed to the members, except when the Executive Board deems it for the best interests of the association to temporarily withhold from such publication and distribution such records or any part thereof.

Itemized accounts of all disbursements, with the purpose thereof and records of votes shall never be withheld from publication.

The Executive Board shall have full discretion to withhold from the "Journal" in whole or in part any paper or part of proceedings that may be referred to the Board by the association or by the editor.

It shall be the duty of the Executive Board to consider and recommend yearly to the association concerning the selection of an Editor and Business Manager of the "Journal" of the American

Veterinary Medical Association. The Editor and Business Manager of the said "Journal" shall receive such salary and allowances as may be recommended by the Executive Board and approved by the association.

The Executive Board shall have the "Journal" accounts audited by a qualified accountant annually or oftener if deemed necessary, and submit annually to the association a financial statement including inventory.

The Executive Board shall be vested with power to hear all complaints filed before it in writing relative to the improper conduct of any member, and shall if thought advisable, summon the member so charged to appear before it at the next annual meeting of the association, to answer the charges and make defense. If the Board find the defendant guilty as charged, said Executive Board shall report at once to the association a summary of the charges and evidence submitted on both sides, together with such recommendations as may be deemed wise: but no public report of such charges or evidence shall be made by the Board or any member thereof until after trial by the Executive Board.

EXECUTIVE BOARD DISTRICTS

Section 8. There shall be five Executive Board Districts as follows:

District No. 1 shall consist of Canada.

District No. 2 shall consist of Wisconsin, Illinois, Michigan, Indiana, Ohio, Pennsylvania, New York, the New England States, New Jersey and Delaware.

District No. 3 shall consist of Kentucky, West Virginia, Virginia, Maryland, District of Columbia, Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Florida, Cuba, South America.

District No. 4 shall consist of Alaska, Washington, Montana, North and South Dakota, Minnesota, Iowa, Nebraska, Wyoming, Idaho, Oregon, Philippines, and Hawaii.

District No. 5 shall consist of California, Nevada, Utah, Colorado, Kansas, Missouri, Arkansas, Oklahoma, Louisiana, Texas, New Mexico, Arizona, Mexico, and Central America.

VACANCIES AND REMOVALS

Section 9. The President shall fill any vacancies in the Executive Board from the district in which such vacancy occurs, and said

appointee shall hold office until a special election of the district may be held.

If a member of the Executive Board removes from his district, such removal shall automatically cause a vacancy.

Vacancies in the office of Secretary or Treasurer shall be filled by appointment for the unexpired term by the President.

The Executive Board may for dishonesty or incompetence, remove the Secretary or Treasurer from office upon approval of the President.

EXECUTIVE BOARD MEETINGS

Section 10. The Executive Board shall hold its regular session at the time and place of the annual meeting of the association. Special meetings may be called by the Secretary upon written request of 5 members of the Executive Board.

ARTICLE VI.

Any amendments to this Constitution shall be proposed in writing at an annual meeting, but shall not be acted upon until the next following annual meeting, nor shall it be adopted finally except by the votes of at least two-thirds of the members present and voting.

BY-LAWS.

ARTICLE 1.

ORDER OF BUSINESS

Section 1. The following shall be the order of business, except as otherwise provided:

1. Call to order by the President.
2. President's address.
3. Presentation and adoption of minutes.
4. Report of the Executive Board.
5. Admission of New Members.
6. Election of Officers.
7. Reports of Officers.
8. Reports of Committees.
9. Unfinished Business.
10. New Business.
11. Installation of Officers.

Section 2. All meetings of the association shall be governed by Roberts' Rules of Order when not in conflict with the By-Laws.

ARTICLE 2.

APPLICATION FOR MEMBERSHIP

Section 1. Application for membership in the association shall be made on blank forms approved by the Executive Board. The application blanks filled out and signed by the applicant in his own hand writing shall be mailed or delivered to the Secretary, who shall present the same to the Executive Board for final action. An application to be considered must have been endorsed by two members in good standing, one of whom shall be a resident of his own state and must be accompanied by the membership fee and one year's dues. If the applicant is a practitioner he shall have satisfied the legal requirements for practice in the state in which he resides.

Section 2. Except as provided in Sections 3, 4, and 5, of this Article, only those veterinarians may be admitted to active membership who have spent not less than three collegiate years in the study of veterinary medicine and have been duly graduated from an accredited veterinary college conforming to the requirements of regulations 1 to 19 inclusive of Bureau of Animal Industry, Circular No. 150, as printed on pages 175 to 182 of Proceedings of the forty-ninth annual meeting of the A. V. M. A., 1912.

Section 3. A graduate of a veterinary college which, at the time of his graduation, did not maintain an educational standard in conformity with the active membership requirements of this association, may upon recommendation of the Executive Board, be elected to membership, provided he has been duly graduated not less than five years prior to the date of application, and further, that the college has ceased to graduate veterinarians contrary to the standards now fixed by this association.

Section 4. Except as provided for in Section 3, only those veterinarians may be elected to active membership who have spent not less than 28 months in not less than four collegiate years in the study of veterinary medicine, beginning with the session 1916-1917, and have been duly graduated from an approved veterinary college.

Section 5. The matriculation requirements of an approved veterinary college, beginning with the collegiate year 1914-1915, shall be one year of high school work or equivalent studies taken in other preparatory schools. Beginning with the collegiate year 1918-1919, said requirements shall be two years of high school work or equivalent studies taken in other preparatory schools.

Section 6. All candidates for membership favorably reported to the association by the Executive Board, shall be balloted upon and a three-fourths vote in the applicant's favor will entitle him to active membership.

ARTICLE 3.

Section 1. Notice of the time and place of holding the regular meeting shall be announced at least three months before the date fixed for the meeting.

Section 2. Notice of the time and place of holding a special or adjourned meeting shall be mailed to each active member at least twenty days before the date fixed for the meeting. No business shall be transacted at special meetings which was not clearly and definitely stated in the call convening such meeting.

Section 3. The general sessions of the association shall be held at 2:00 P. M. each day, except the first. On the first day of the annual meeting there shall be a session at 10:00 A. M.

The sections of the association shall hold their meetings at 9:00 A. M. each day, except the first day, when they shall convene at 2:00 P. M. Night sessions may be convened by consent of the membership of any section.

ARTICLE 4.

QUORUM

Section 1. Twenty-five percent of the members of the association registered at any meeting shall constitute a quorum for the transaction of business.

ARTICLE 5.

DUES

Section 1. There shall be an initiation fee of five (\$5.00) dollars. The annual dues shall be five (\$5.00) dollars, payable in advance on the first day of January. Honorary members shall pay no dues.

ARTICLE 6.

DELINQUENCY

Section 1. Any member who for two years fails to pay his annual dues shall forfeit his membership thirty days after notification from the Secretary has been mailed to his last known address.

ARTICLE 7.

REINSTATEMENT

Section 1. A member who has forfeited his membership for non-payment of dues, may be reinstated by the Executive Board upon payment of his entire indebtedness to the association.

Section 2. A member who loses his membership for a reason other than non-payment of dues may be reinstated only by application as in the case of new members.

ARTICLE 8.

NOMINATIONS

Section 1. Nominations for office, except as otherwise provided for shall be made orally. A nominating speech shall not exceed two minutes and the nominations shall not be closed until every member present has had an opportunity to present his candidate.

ARTICLE 9:

ELECTION OF OFFICERS

Section 1. A majority of all the votes cast shall be necessary to elect. If no nominee receives a majority of the votes on the first ballot, the nominee who receives the lowest number of votes shall be dropped and a new ballot shall be taken, and so on until a nominee receives a majority.

Section 2. The officers of the association shall be elected at the afternoon session the second day of the annual meeting.

ARTICLE 10.

ELECTION OF MEMBERS OF EXECUTIVE BOARD

Section 1. Six months before the annual meeting at which a member of the Executive Board is to be elected, the Secretary of the association shall send to each member in that district a statement that a member of the Executive Board is to be elected and ask for a nomination to be sent to the Secretary at least four months before the annual meeting. The Secretary shall make a list of the names of the highest five, who shall constitute the nominees for membership on the Executive Board in that district. Each member of the district must send his ballot for the nominee of his choice to the Secretary two months before the annual meeting. The nominee shall be voted upon by mail ballot. A plurality only shall be necessary to a choice. In case of a tie the members from the district attending the annual meeting shall decide by ballot at a meeting of the members from the district called by the President.

The member at large shall be elected by ballot at the regular annual meeting.

ARTICLE 11.

INSTALLATION

Section 1. The officers of the association shall assume their duties at the close of the annual meeting at which they are elected.

ARTICLE 12.

SECTIONS

Section 1. The association shall be divided into the following sections:

- A. Practice and Surgery.
- B. Sanitary Science and Police.
- C. Veterinary Colleges and Examining Boards.

The Executive Board may make additional sections as deemed expedient.

SECTION OFFICERS

Section 2. The officers of each section shall consist of a chairman and a secretary. They shall be elected by the members of the section. They shall serve one year and until their successors are elected and have assumed office.

CHAIRMAN OF SECTION

Section 3. The chairman shall preside at all meetings of the section and shall perform the usual duties belonging to such office. He shall co-operate with the Secretary of the section in arranging the program and shall see that proper arrangements have been made for the carrying out of the same.

SECRETARY OF SECTION

Section 4. The secretary shall keep an accurate record of the proceedings of the section. He shall, in co-operation with the Chairman, arrange the program of the section for the annual meeting. He shall send the program to the Secretary of the association at least forty days before the annual meeting for insertion in the program of the association.

LENGTH OF PAPERS

Section 5. A maximum of twenty minutes will be allowed for the presentation of a paper, and five minutes for each speaker taking part in a discussion. The author will be allowed a reply to questions and criticisms at the end of the discussion.

PAPERS READ BY TITLE

Section 6. No paper shall be published as having been read before a section unless it has actually been read, or unless the section shall vote to have it read by title.

PROPERTY IN PAPERS

Section 7. All papers and reports of any nature presented to the Association or to any section shall be the property of the association, if approved for publication. Consent from the Execu-

five Board must first be obtained to permit the author of any paper to publish his paper prior to its publication in the official Journal.

ARTICLE 13.

EDITOR AND BUSINESS MANAGER

Section 1. The Editor and Business Manager, which positions may be held by the same individual shall perform the usual duties of such positions in connection with the official organ of the association.

The Journal of the American Veterinary Medical Association shall publish the proceedings, transactions, papers, etc., and such other matters as the editor may select.

ARTICLE 14.

INVITED GUESTS

Persons not eligible to membership in the association may be invited by any member to attend the annual meeting of the association, or the meetings of a section.

ARTICLE 15.

REGISTRATION

Section 1. No member may vote at a regular meeting until he has registered and paid his entire indebtedness to the association.

ARTICLE 16.

HONORARY MEMBERS

Section 1. Nominations for honorary membership shall be made in writing and submitted to the association not later than the second day of the annual meeting. An interval of at least twenty-four hours shall elapse between the nomination and the election.

ARTICLE 17.

STANDING COMMITTEES

Section 1. There shall be the following Standing Committees consisting of five members each except as otherwise provided:

1. Budget.
2. Intelligence and Education.
3. Legislation.
4. Necrology.
5. Resolution.
6. Audit.

The Committee on Budget shall consist of the President, Secretary, Treasurer and Chairman of the Executive Board. It shall

be the duty of the committee to consider the financial resources of the association and proposed expenditures. This committee shall report its recommendations to the association for ratification before the close of the meeting.

The Committee on Intelligence and Education shall consist of five members to be appointed by the President to serve for a period of five years, except at the outset one member shall be appointed for a period of one year, one for two years, one for three years, one for four years, and one for five years. This committee shall elect annually its own chairman. It shall be the duty of the committee to report annually upon the progress and needs of veterinary education. It shall inspect veterinary colleges as it may deem necessary or as directed by the association; and shall annually recommend a list of veterinary colleges for recognition by the association.

The Committee on Legislation shall consist of five members to be appointed in the same way and for the same terms as the Committee on Intelligence and Education.

ARTICLE 18.

RESIDENT SECRETARIES

Section 1. Each state, territory, province or country may have a Resident Secretary appointed by the President.

Section 2. Each Resident Secretary shall co-operate with the Committee on Intelligence and Education and shall aid the President and Secretary in such a manner as they may direct.

ARTICLE 19.

ETHICS

Section 1. Members of this association are expected to conduct themselves at all times as professional gentlemen. Any flagrant violation of this principle shall be considered by this association as unprofessional conduct, and on written charges filed with the Executive Board, may subject the violator to suspension or expulsion as provided in Article 5, Section 7, of the Constitution.

ARTICLE 20.

AMENDMENT TO BY-LAWS

Section 1. The By-Laws of this association may be amended at any annual meeting by the same procedure as provided for amending the Constitution.

Section 2. The By-Laws may be suspended temporarily by

a vote of three-fourths majority, but such suspension shall not apply to Section 1, Article 19, and Section 1, Article 20.

Section 3. Officers elected under the old Constitution and By-Laws shall constitute the first set of officers under the new organization in so far as provided for in the new Constitution and By-Laws.

Section 4. The Secretary of the association shall proceed at once to take the necessary steps for the nomination and election of the Executive Board as provided in Section 1. of Article 10. of the By-Laws.

C. A. CARY, Chairman.

TAIT BUTLER,

M. H. REYNOLDS,

JOHN BLATTENBERG,

P. A. FISH,

Committee on Reorganization.

REPORT OF THE COMMITTEE ON THE SALMON MEMORIAL FUND

DR. J. F. WINCHESTER AND DR. W. HORACE HOSKINS

DR. WINCHESTER: Mr. President and Members: At the last meeting in California, as you all know, there was a committee elected to be known as the Salmon Memorial Fund Committee. The object was, or is, to raise money enough, the income from which will be used for a scholarship for somebody to be selected by this association. When that money is raised, probably in the vicinity of \$10,000, the activity of this committee ceases.

The money that is received should not, and will not, be used for the expenses of this committee. At the present time what expense we have been put to has been met by us as individuals, and anticipating that this organization would reimburse us for the outlay up to date. There was no vote taken, as I understand it, or on the records that I can read, that the expenses should be met by the association. You do not feel like giving up your money for an object and having that money used by the committee, and I don't feel as though I should be a party to that, and I will not. If the association does not agree to pay the necessary expenses—and they are not large—I for one, will get out. That is the way I feel about it.

The members composing this committee, you can ascertain, by looking at your program. Our friend Hoskins is secretary and treasurer and he has the figures and the data, and there will be an opportunity now for what information he desires to give. I hope this association will, before anything else is done, permit or order the expenses of this committee to be paid, and the bills contracted will be approved by a majority of that committee before being presented to the association for payment.

I have no right to make that motion, and I shall not make it, I trust it will come from the floor before or after Dr. Hoskins and Dr. Rutherford get through talking.

DR. HOSKINS: I did not know that the report of the Salmon Memorial Committee would be called for this afternoon, hence, I did not bring the data along which I have prepared of the work so far done. You will remember that we started out with the hope in the period of three years of raising the sum of at least \$10,000 from the veterinary profession of North America. Unfortunately for the committee, so much of my time was taken up along other lines the first six months that we were not able to get the plans in working order as rapidly as we would have liked. Up to this writing we have raised \$3,000 or nearly one-third of the amount. We have the work organized in about fifteen different states. At a very late date the secretary of this association sent out instructions to the state secretaries that they would undertake a part of this work in co-operation with the Salmon Memorial Committee, so that within the last three or four months we have been able to invoke the activity of the resident state secretaries in a number of the states.

At the present time New York State leads the amount in subscriptions by something over \$300. Pennsylvania follows with about \$300, and these amounts go down until they reach the sum of \$2 from one state.

Seven different state organizations have appropriated \$100 from their treasuries. There has been some little misunderstanding among some of the state organizations that when this money was appropriated it was necessary to turn it over immediately to the Salmon Memorial Committee. As I stated before we planned to get this sum of money, \$10,000, in a period of three years, so that state associations which desire to take action need not feel it is incumbent upon them to pay over at once the money that they may appropriate from their treasury. We hope and expect that we will

raise in each of the states of our Union the equivalent of \$1 for each veterinarian registered in the state. We believe that the largest number who may contribute to this fund will add very materially to the success and to the purpose of the fund in memorializing in the future profession, as it is fixed today very definitely in the minds of those who are living, the wonderful services of Dr. Salmon, and we trust that when you make your appeals in your state you will make them very forcibly for the very smallest contribution that anyone may see fit to make is just as much desired as a large contribution from those who are well able to give. The value and the force and the purposes of this amount will be enhanced by the great number of small contributions rather than by a limited number of large contributors.

From one source the committee has received an appropriation of \$800, and there is a prospect that this amount may reach \$5,000 from similar sources, but this is a source outside of the profession, although one which the work of Dr. Salmon made possible, and made great in our country.

I do trust that everyone will interest himself personally in the work of the completion of this fund and co-operate with the committee in making it secure within the next three years, so that the interest of that fund when invested by direction of this association, may be the means of aiding someone through college or may be the means of carrying out some special work so much of which is demanded today, and is visible to our eyes as needing to be done for the profession and that the good work he has done for 25 long years will be perpetuated through this memorial fund to so good a man of our profession. I will file with you tomorrow, as I stated, in typewriting, a form showing the contributions and the amount we have received and also the sources, as well as the expenses that the committee has been put to. I will say up to the present time we have not utilized any money for the expenses that have been incurred for this fund, even to the extent of a dollar.

REPORT OF THE COMMITTEE ON EMBLEM

To the President and Members of the American Veterinary Medical Association.

Gentlemen :

Immediately following the organization of this committee steps were taken to ascertain so far as possible the desires and sentiments of veterinarians throughout the country relative to the adoption of an official emblem by this association.

With this object in view letters were addressed to all resident state secretaries and so far as this committee has been able to obtain an expression of opinion, sentiment is in favor of adopting the blue cross as an official emblem. Several modifications have been suggested, such as a white background, gray background, blue cross set in a red V, etc., but all, with few exceptions, included the blue cross in their designs. Resolutions have been adopted by several state associations either to adopt the blue cross as their emblem or recommending its adoption by this association.

Several individual designs of merit have been submitted; one from Dr. F. A. Crandall, New York, being a circle containing the words "*Fonus habet onus humanum est errare*" in the center of which are the initials A.V.M.A. A suggestion from Dr. H. J. Hammond of California for a combination of the letters A.V.M.A. arranged in a manner similar to the emblem of the A.M.A., thus: AA. Two designs were submitted from Canada which are included with the various designs forwarded to the committee and presented here today. With these four exceptions all designs submitted include the blue cross in some form.

Frequent reference has been made to the blue cross as used by veterinarians in the English Army and this committee has made every effort to gain authentic information relative to insignias being used by veterinarians on the battlefields in European countries. It was learned that the International Alliance of Societies to Aid Animals upon the Battle-Field, organized in Geneva, Switzerland, has adopted as its seal and insignia a Red Star, underneath which are the words "*Inter Arma Misericordia*," meaning "Mercy Between Arms." The Red Star flag is being used by the Field Veterinary Hospitals of the German and Austrian armies, while on the Franco-British lines the Blue Cross is being used by the London Society for the Prevention of Cruelty to Animals, which we under-

stand, is very active at the front in assisting the British Army Veterinarian.

This information would indicate that both the Red Star and the Blue Cross are being used for identical purposes, the Red Star as the insignia for an International Alliance of Societies, and the Blue Cross for a purely local British Society.

Since the Red Star has already been adopted by an international society and bids fair to parallel the Red Cross in popularity and world-wide usage, your committee believes it would not be a suitable emblem for this association to adopt.

We, as your Committee on Emblem recommend the Blue Cross as an insignia for this association, the cross to be the same shape and of the same proportions as the Clara Barton Cross, either plain or set in a gray or white circular background.

D. M. CAMPBELL,
DAVID S. WHITE,
O. A. LONGLEY, Chairman,
Committee on Emblem.

ATTENDANCE AT THE A.V.M.A., DETROIT, MICH.

MEMBERS

Alabama—C. A. Cary; E. D. King, Jr.; W. W. Webb.

California—R. A. Archibald; P. H. Browning; B. J. Cady; C. M. Haring; G. H. Hart; O. J. Kron; J. F. McKenna.

Colorado—G. H. Glover; I. E. Newsom; C. G. Lamb.

Connecticut—H. E. Bates; T. G. Bland; C. L. Colton; A. T. Gilyard; F. A. Ingram.

Delaware—H. P. Eves.

District of Columbia—D. E. Buckingham; A. Eichhorn; M. C. Hall; F. Hicks; J. R. Mohler; G. M. Potter; J. P. Turner; A. R. Ward.

Georgia—W. M. Burson.

Illinois—A. H. Baker; T. M. Bayler; F. F. Bushnell; D. M. Campbell; L. E. Day; C. G. Glendinning; J. T. Hershheim; W. L. Hollister, W. B. Holmes; L. B. Huff; Jos. Hughes; J. V. LaCroix; F. J. Leith; A. R. Luzader; G. B. McKillip; A. M. Mair; D. G. Marks, N. S. Mayo; L. A. Merillat; W. R. Michael; W. J. Morgan; J. T. Nattress; E. L. Quitman; Jas. Robertson; J. F. Ryan; H. R. Ryder; W. H. Shaw;

Indiana—R. C. Applegate; W. J. Armour; J. Black; F. A. Bolser; D. K. Buzzard; C. V. Connell; R. A. Craig; W. B. Craig; L. DeMott; L. C. Finley; J. O. Greeson; C. E. Heflich; R. C. Julien; H. J. Kannal; T. F. Kryer, J. W. Klotz; B. H. Largent; A. F. Nelson; C. W. Power; J. D. Reardon; G. H. Roberts; J. C. Rodger; P. Schian; T. A. Sigler; O. G. Whitestone.

Iowa—H. E. Bemis; H. D. Bergman; J. D. Grossman; W. F. Guard; C. H. Hays; S. K. Hazlet; L. R. Himmelberger; G. A. Johnson; L. W. McElyea; P. Malcolm; H. S. Murphey; W. L. Nelson; G. A. Scott; G. M. Williams.

Kansas—J. H. Burt; R. R. Dykstra; L. W. Goss; C. B. Kern; J. E. McCoy; C. J. Sihler.

Kentucky—J. K. Ditto; C. A. Miller; F. O. Schneider.

Louisiana—W. H. Dalrymple; J. L. Drexler; H. Moore.

Maine—W. L. Mebane; W. H. Robinson; H. B. Wescott.

Maryland—G. H. Grapp; G. A. Jarman; T. H. Mackie; C. E. Poe.

Massachusetts—E. A. Cahill; W. H. Dodge; W. J. Hennessy; L. H. Howard; H. Lukes; B. D. Pierce; W. S. Plastell; J. W. Robinson; W. M. Simpson; J. F. Winchester.

Michigan—T. H. Attridge; W. N. Armstrong; C. F. Birmingham; F. M. Blatchford; W. L. Brenton; S. Brenton; S. Brown; H. T. Carpenter; G. H. Carter; E. B. Cavell; F. W. Chamberlain; W. Coxe; W. R. Cox; C. C. Dauber; J. S. Donald; J. Drury; G. W. Dunphy; M. E. Elzinga; G. F. Ewalt; W. A. Ewalt; G. D. Gibson; W. Giltner; H. M. Gohn; E. Hallman; W. Hansen; J. Hawkins; F. H. Hicks; H. P. Hoskins; J. P. Hutton; S. Irwin; J. J. Joy; T. F. Krey; R. P. Lyman; J. S. McDaniel; A. McGercher; L. A. Maze; M. H. Mendenhall; C. C. Mix; A. H. Moody; C. L. Osgood; H. F. Palmer; E. E. Patterson; R. D. Rice; E. P. Schaffter; H. L. Schuh; A. B. Sexmith; M. J. Smead; F. A. Spach; H. E. States; C. C. Stevens; H. Stevens; B. H. VanBrussel; C. A. Waldron; J. E. Ward; J. C. Whitney; R. H. Wilson.

Minnesota—W. L. Beebe; S. D. Brimhall; C. E. Cotton; M. H. Reynolds; C. S. Shore; S. H. Ward; M. S. Whitecomb.

Mississippi—W. L. Gates; O. M. Norton; F. L. Parse; E. M. Ranck.

Missouri—F. M. Cahill; J. W. Connaway; J. G. Eagle; H. Jensen; A. T. Kinsley; F. C. McCurdy; R. C. Moore; C. J. Norden; C. E. Salsbery; J. H. Slater; S. Stewart.

Nebraska—J. S. Anderson; A. A. Munn.

Nevada—H. W. Jakeman.

New Hampshire—A. L. Edmunds; S. T. Law; C. E. Swail.

New Jersey—L. D. Horner; W. Runge; G. B. Vliet.

New York—G. H. Berns; R. R. Birch; W. R. Blair; R. G. Bose; D. B. Comstock; D. W. Cochran; J. F. DeVine; R. W. Ellis; O. Faust; P. A. Fish; C. P. Fitch; E. W. Fitch; F. D. Fordham; J. N. Frost; C. E. Hayden; W. G. Hollingworth; F. Hunt; W. H. Kelly; W. W. Kennedy; R. F. Knight; F. E. McClelland; J. A. McCrank; W. J. McKinney; H. D. Martin; H. J. Milks; V. A. Moore; C. R. Perkins; E. Rafter; E. Sunderville; D. H. Udall; P. V. Weaver; H. E. Wende; J. L. Wilder; W. L. Williams; J. G. Wills.

North Carolina—J. I. Handley; G. A. Roberts.

Ohio—F. E. Anderson; W. A. Axby; N. D. Backus; J. E. Bard; R. I. Benath; G. Biddle; J. H. Blattenberg; W. A. Brown; S. Burrows; C. H. Case; W. E. Clemmons; G. W. Cliffe; A. S. Cooley; A. E. Cunningham; E. A. Downs; B. H. Edgington; J. D. Fair; P. Fischer; C. W. Fogle; C. B. Frederick; G. L. Frese; H. Fulstow; J. P. Gardner; P. T. Gillis; B. W. Groff; J. T. Gruber; C. G. Hershey; R. C. Hill; R. Hilty; E. R. Hinkley; M. W. Howett; A. J. Kline; W. E. Kreeder; J. H. Lenfestey; H. E. Myers; J. V.

Newton; H. B. Ropp; W. H. Redhead; E. J. Renter; R. C. Roueche; C. H. Sater; W. Shaw; E. H. Shepard; C. D. Turney; W. B. Washburn, D. S. White; W. F. Wise.

Oklahoma—G. T. Cole; R. F. Eagle.

Oregon—B. F. Simms.

Pennsylvania—J. W. Adams; E. P. Althouse; E. L. Cornman; H. B. Cox; G. A. Dick; D. B. Fitzpatrick; J. B. Hardenbergh; J. Helmer; W. H. Hoskins; L. A. Klein; G. C. McLean; C. J. Marshall; I. Mitterling; T. E. Munce; O. G. Noack; E. C. Porter; J. Reichel; W. L. Roswell; C. A. Schaefer; F. H. Schneider; H. W. Turner; F. Weitzel; W. E. Wight.

Rhode Island—J. M. Armstrong; T. E. Robinson.

South Carolina—F. P. Caughman.

South Dakota—G. A. Edmiston.

Tennessee—Tait Butler; M. Jacob.

Texas—F. E. Barnes; B. O. Bethell; R. C. Dunn.

Vermont—E. H. Bancroft; G. R. Welch.

West Virginia—J. J. Cranwell; C. L. Hall; S. E. Hershey; H. B. Langdon.

Wisconsin—A. E. Behnke; F. E. Burnham; B. L. Clarke; L. S. Crump; H. F. Eckert; O. H. Eliason; T. H. Ferguson; H. Greeder; F. B. Hadley; A. N. Lawton; H. D. Pattison; J. F. Raub; W. A. Wolcott; L. A. Wright.

Wyoming—S. V. Lewis; H. R. Millard.

CANADA. *Alberta*—J. G. Rutherford.

British Columbia—S. Hadwen, C. D. McGilvray.

Manitoba—J. A. Stevenson.

New Brunswick—L. S. Doyle; D. McCuaig.

Ontario—W. J. R. Fowler; E. A. A. Grange; C. H. Higgins; J. B.

Hollingsworth; F. Torrance.

Quebec—A. A. Etienne.

VISITORS

Alabama—H. C. Ayer; D. E. Sawyer; H. P. Sims.

Colorado—G. H. Oliver.

District of Columbia—G. A. Prevost.

Illinois—M. H. Bohreen; I. C. Brenner; F. H. Burt; W. F. Christiansen; J. P. Dunn; M. E. Gavin; A. Eger; J. J. Ferguson; G. G. Florine; R. P. Frans; E. G. McCoy; Elinor McGrath; L. R. McKinley; J. W. Ranson; J. C. Rasmussen; C. P. Shaughnessy; H. C. Schults; D. E. Sisk; P. O. Summers; J. P. Thiry; C. F. Vincent; W. H. Welch; O. F. West; C. A. White.

Indiana—O. H. Brubaker; H. E. Bryan; O. A. Carson; W. E. Carter; O. E. Crossey; J. B. Current; A. J. Devenish; E. Ferree; C. E. Haflich; T. M. Hall; F. V. Hawkins; S. C. Irwin; G. C. Juday; C. P. Kime; F. E. Kling; W. H. Lane; L. Levens; M. H. Lidibey; J. S. McLaughlin; C. T. Meyer; G. W. Musselman; O. E. Ragsdale; V. O. Redick; J. T. Redman; H. S. Sailors; C. E. Sharp; F. W. Silberg; H. Stoffs; E. C. Test; C. C. Winegardner.

Iowa—J. S. Barber; W. I. Calkins; C. H. Hays; T. B. Huff; C. E. Juhl; N. A. Kippen; H. A. McIntire; J. G. Schoenenberger; J. H. Spence; R. D. Wall.

Kansas—W. A. Hagan.

- Kentucky*—H. L. Blackburn; R. L. Pontius.
- Louisiana*—E. I. Smith.
- Maine*—W. H. Lynch.
- Maryland*—G. H. Grapp.
- Massachusetts*—J. A. Viles.
- Michigan*—J. L. Ackerson; F. P. Allen; A. H. Motley; C. N. Anderson; H. M. Armour; R. Armstrong; H. L. Attridge; E. Austin; L. F. Baldock; A. F. Bartlett; J. D. Bell; S. H. Buck; J. C. Buckley; C. M. Carl; W. M. Chase; C. H. Clark; W. H. Clark; H. H. Clement; J. A. Clements; H. Corneli; A. T. Cowell; F. F. Consaul; G. B. Cash; F. E. Coswell; D. D. Cranston; E. I. Crawford; A. C. Curtis; F. H. Davidson; O. G. Davidson; L. Davisson; R. H. Drake; C. B. Dunphy; H. Dunphy; W. H. Erwin; J. Euth; W. H. Ferguson; G. Fitchett; M. C. Fitznate; W. E. Gates; M. J. Gerger; G. H. Gorden; C. H. Greenfield; D. M. Hoge; H. H. Halladay; R. S. Hamilton; P. Harrison; W. R. Harper; W. A. Haynes; J. Hooker; W. J. Howden; I. F. Huddleston; M. P. Hunt; B. S. Hyman; B. Japink; F. S. Kedzie; D. T. Kemp; W. Kensler; Wm. Kindig; T. H. Kingston; E. L. Krieger; T. B. Ludington; T. S. McConnell; A. A. McDowell; A. I. McIntyre; G. D. McIntyre; H. H. McIntyre; R. S. Marshall; W. B. Massie; A. W. Mebert; G. C. Moody; C. E. Morford; A. V. Moore; H. M. Newton; H. W. Nobles; T. Olinger; Jas. Patterson; L. V. Patterson; B. A. Perry; H. E. Rea; O. Rice; H. F. Roberts; Schubel; G. H. Scoville; L. E. Starr; J. B. Stevens; H. E. Stiles; G. R. Switzer; B. N. Thomas; L. Thorburn; W. W. Thorburn; G. M. Thorndike; A. L. Tiffany; C. E. Turnbull; R. J. Vedder; E. J. Walter; W. D. West; L. A. Wileden; W. H. Wilkinson; C. F. Wilson.
- Minnesota*—B. L. Cook; L. C. Huff.
- Missouri*—G. G. Clark; J. B. Gingery; L. R. Harkins; C. F. Hatfield; C. V. Hover; J. H. McLevy; A. E. Morrow; C. W. Scott; J. J. Stephens.
- Nebraska*—G. B. Russell.
- New Jersey*—G. F. Harker.
- New York*—F. E. Cleaver; H. W. Hawley; J. F. Kane; G. C. Kesler; W. W. Otto; E. J. Soratkin; W. C. Smead; J. A. Wende; W. W. Williams; F. E. Wilson; V. H. Zahn.
- Ohio*—W. G. Adams; H. N. Beeman; M. Borsos; F. Brickley; A. Broerman; H. D. Campbell; E. H. Callander; J. B. Considine; W. L. Cook; S. R. Craven; G. R. Daunley; E. M. DeTroy; F. H. Detmar; N. Dock; W. A. Fany; P. H. Fulstow; R. H. Gittins; R. A. Greenwood; A. C. Hart; R. D. Heller; T. B. Hinkle; S. R. Howard; C. E. Hanawalt; C. E. Inskeef; E. H. Jewett; C. A. Johns; M. J. Jones; T. L. Kelly; N. W. Kreuder; T. F. Kimball; G. H. Lasher; R. R. Laughlin; W. O. Longfellow; D. M. McCully; F. C. Meckstroth; A. E. Metzger; H. W. Miller; O. F. Nugent; C. B. Perkins; D. R. Powell; J. W. Reeder; G. L. Schneider; F. W. Seebert; A. Slough; J. H. Snook; H. H. Sparhawk; C. D. Turney; F. M. Vosburgh; C. C. Wadsworth; R. D. Way.
- Oklahoma*—W. P. Shuler.
- Pennsylvania*—E. E. Bittles; C. W. Brown; J. C. Elviage; J. O. Eyman; H. Hauptfuhrer, Jr.; A. McCloskey; L. J. McCloskey; T. F. Nugent; H. F. Pegan; W. Rubenwald; R. Reynolds; J. P. Schmidt; A. C. Wight; H. K. Wright.

South Carolina—W. F. Burleigh.

Tennessee—W. M. Bell.

Texas—P. P. Starr.

Vermont—J. Thomas.

West Virginia—J. Challander; E. Jones.

Wisconsin—L. H. Allen; H. A. Arpke; W. W. Arzberger; G. B. Bleecker; E. C. Humke; E. J. Pease; L. C. Taube.

CANADA. *Manitoba*—A. T. Folger.

Ontario—T. S. Biggar; H. Boyd; L. A. Brown; J. C. Buchanan; C. Elliott; L. H. Eckert; C. J. Johannes; B. D. Kennedy; C. N. Kramer; G. A. McLevey; J. A. McNish; G. W. Orchard; J. N. Pringle; W. W. Stevens; W. Sweet; A. M. Wilson.

NOTE:—A separate list of the ladies was incomplete. According to our count, there were 321 ladies in attendance.

SECRETARY'S OFFICE, A.V.M.A.

The following presidential appointments have been made during the month of October:—

Executive Board—(To serve until their successors have been elected). F. Torrance, 1st District; Jos. Hughes, 2nd District; J. R. Mohler, 3rd District; H. E. Bemis, 4th District; R. A. Archibald, 5th District; V. A. Moore, member-at-large. Acceptance lacking from Dr. Hughes.

Committee on Intelligence and Education—(Chairman to be elected by the committee.) S. H. Ward, Louis A. Klein, George H. Hart, R. C. Moore, and N. S. Mayo. The members of this committee are appointed to serve from five years to one year in the order named.

Committee on Legislation—(Chairman to be elected by the Committee. W. Horace Hoskins, J. P. Turner, S. J. Walkley, M. Jacob, A. T. Kinsley. The members of this committee, like the preceding, are appointed to serve for five years to one year in the order named.

Committee on Resolutions—John Reichel, Chairman, Adolph Eichhorn, Charles G. Lamb, W. G. Hollingworth, C. H. Stange. To serve for one year.

Audit Committee—A. S. Cooley, Chairman, George B. McKillip, H. Jensen, W. H. Robinson, Edward M. Ranck. To serve for one year.

Necrology Committee—Edward A. Cahill, H. Fulstow, H. R. Ryder, C. C. Mix, C. D. McGilvray. To serve for one year.

Section on Sanitary Science and Police—(To serve until their successors are elected at the next annual meeting). J. G. Wills, Chairman, T. Edward Munce, Secretary.

Section on General Practice--Thos. H. Ferguson, Chairman, J. H. Blattenberg, Secretary.

Budget Committee—(Ex-officio membership). Charles E. Cotton, L. A. Merillat, F. H. Schneider, and the Chairman of the Executive Board. The Chairman of the Executive Board will be elected by the Board at its meeting in December at Chicago.

The greatest number of complaints about not receiving the *Journal* and other mail sent to them, comes from veterinary inspectors of the Bureau of Animal Industry, and the cause is usually traced to changes of address not reported to the Secretary's or Journal office. If members who move, even temporarily, will advise us promptly as to their whereabouts, the complaints will become exceptional.

Registrations due to the increase of annual dues from three dollars to five dollars are surprisingly few.

The cost of the postal-ballot for the election of the members of the Executive Board will be about thirty cents per member. A saving of fifty-one dollars, however, was made by enclosing the bill for dues with the ballot.

When the present administration took over the affairs of the association there were outstanding bills amounting to more than \$2500.00 to meet on demand. This fact shows plainly that the perfunctory audit of the association's affairs that does not include a careful inquiry into the liabilities is worthless and dangerously deceptive.

The ballots for the nomination of candidates for the offices of District Member of the Executive Board, created by the new constitution, are dropping into the office in large numbers. The large number of scattering votes shows the need of concerted action on the part of the membership. Municipal, state and other local associations should take a hand in this election by recommending a candidate to their members.

In order to save a great amount of useless correspondence, it seems necessary to announce that the secretary is but the clerk of this election and cannot act as adviser to the members as to the qualification of candidates.

The voting for the nomination will close on November 27th, instead of November 20th, as stated on the ballots. This change is due to an unavoidable delay in mailing the ballots after the latter date had been printed upon them.

L. A. MERILLAT, Secretary.

MEMBERSHIP DATA

(Revised to September, 1916)

1. Members who have paid dues of 1915 or 1916.....	1716
2. New members, 1916.....	450
	2166
3. Honor Roll including 1916.....	59
4. Members who have paid dues for 1914.....	60
5. Delinquents who should be suspended.....	134
	2419
6. Members whose names are in 1916 Directory but not found listed in Card Index Ledger.....	19
	2438
Grand total	2438

L. A. MERILLAT, Secretary.

NEW YORK CITY VETERINARY MEDICAL ASSOCIATION

May, 1916.

The regular monthly meeting of this association was called to order by the President, Dr. Goubeaud, at 8:45 p. m.

The reading of the minutes, owing to the lengthy program, was suspended.

Dr. Cassius Way then read a very instructive and interesting paper entitled "The Production and Handling of Clean Milk."

Dr. Way's address was illustrated by moving pictures which vividly portrayed the modern way of producing and handling milk through all the different stages from the cow to the consumer.

Dr. Way said in part that the milk question had been greatly agitated in the last few years.

It constitutes 16% of the daily diet. It is a food product which spoils quickly and is a very important one on account of its price. One quart of milk has a food value equivalent to $\frac{3}{4}$ lb. of sirloin steak, 2 lbs. of chicken, eight eggs, one pound of halibut, or one pint of oysters.

Dirty milk is due to negligence, as dirty cows and improper handling.

The veterinarian is best qualified for dairy inspection and many of the largest and best equipped milk corporations employ a competent corps of veterinarians. These men are valuable not only for their knowledge of proper sanitary conditions, but also in the

control and eradication of bovine tuberculosis, various acute infections of the udder, diseases of the genito-urinary tract, such as metritis and contagious abortion.

Transmissible diseases such as scarlet fever, diphtheria, septic sore throat, typhoid and tuberculosis in children, may be carried through milk.

H. E. Cook, Dean of the St. Lawrence School of Agriculture, Canton, N. Y., was then introduced and gave a very interesting address on "The Veterinarian, the Clean Milk Producer."

Dean Cook said that he had been interested in the production of milk all his life and the milk business as a whole is one of the most complicated. Milk is the most important food product and still if, for any reason, a small advance in the price of the same is made or even suggested there is a general popular protest.

Not one quart in ten can have the whole cost of production charged against it or it would bankrupt the producer. Milk is generally the product of the work of the whole family.

Believes that the dealers are working on a small margin and the natural conclusion is that the consumer must pay more or new economies be discovered. Cheaper methods of distribution are possible but cheaper production would be difficult. Is trying to determine if the railroads are getting too much for transporting milk.

Dean Cook went into this matter very thoroughly. (His address was published in the *Journal* of the A.V.M.A., September 1916).

Dr. Harris Moak of the Brooklyn Certified Milk Commission, was then introduced.

The doctor said, in part, that in reviewing the milk situation in twenty cities he found the veterinarians doing excellent work in the production of clean milk and have taken a leading place in this important work.

Mentioned that in a great many stables dry methods are now being used in preference to scrubbing and flushing with water. Cornstalks and shavings are used for bedding and lime stone used to absorb moisture.

Condemned the common manger and watering trough as a means of spreading tuberculosis. Also discussed garget at some length and recommends dipping the teats in mild antiseptics after milking.

Dr. Jas. McDonough of Montclair, N. J. spoke of perfecting the system of delivering milk and explained the method employed in New Jersey.

Dr. W. H. Hoskins of Philadelphia was present and stated that he took a deep interest in the milk question.

He quoted the late Dr. Leonard Pearson as saying twenty years ago that the milk supply of Philadelphia, to obtain the best results, should be in the hands of a very few large companies and not handled by the many, and should be under municipal control.

Dr. H. D. Gill spoke in favor of subduing dust by moisture and stated that the bacterial count is lowered by plenty of washing. Also said that animals that fail to show post-mortem lesions, that have been reactors to the tuberculin test, does not prove that no disease exists. The proper and safe method to keep a herd free from tuberculosis is to maintain a breeding herd.

Purchasing animals to replenish a herd is the principal source of infection.

Dr. E. B. Ackerman spoke of moisture in stables and was of the opinion that heat and moisture would help to produce the tubercle bacilli. Indorsed the individual trough and pail.

Dr. J. F. DeVine, of Goshen, N. Y., also took part in the discussion.

Dr. J. G. Wills, Chief Veterinarian, Dept. of Agriculture, N. Y. State, referred to Dean Cook's allusion to the producer and the labor involved and said that if the dairy man sees a fair cash return for his labor and outlay it will stimulate him to produce a clean, wholesome milk.

Considers the common drinking trough a great source for distributing disease and cited a case of a virulent spreader in support of his statement.

Referring to the statement of Dr. Moak, that animals suffering from garget simulate a tuberculin reactor, he said that this simply emphasizes the necessity of making a careful physical examination. It is also important to give the complete data on the charts submitted to the authorities.

The Program Committee reported that they had decided to withdraw the motion to change the dates of the meetings. This report was duly accepted.

Dr. Griessman submitted a resolution on preparedness, which after some discussion was, on motion, laid on the table.

A letter from Dr. W. H. Kelly of Albany, relating to pending legislation, was read.

It was regularly moved, seconded and carried that a committee draft a letter to the Governor and Board of Regents opposing the passage of this bill.

Dr. Hoskins stated that it was a source of pleasure and satisfaction to him to be able to report that on the 17th day of April the Army Bill had become a certainty and the rank of Major recommended for the veterinarians in the army.

A hearty vote of thanks was extended to Dean Cook, Dr. Way and all others who took part in the program of the evening. Adjourned.

ROBT. S. MACKELLAR, Secretary.

BRITISH COLUMBIA VETERINARY ASSOCIATION

The annual general meeting of the British Columbia Veterinary Association was held at Vancouver, B. C. September 20, 1916.

The President, Dr. S. F. Tolmie, expressed his regret at not being able to be present, having to appear on that date before the Royal Commission on the Resources of Canada, but he forwarded his address which was read by the secretary.

In it he briefly reviewed the activities of the association for the past year, complimenting the secretary in his work, stating that action had been taken under our Act against members more than four years in arrears, and that 14 members were at the front, whose fees were remitted while away, and that a committee had been appointed to bring a recommendation before this meeting to amend the by-laws to admit honorary and associate members to the association.

The President also stated that five candidates had been admitted to membership during the past year, and that two very successful public meetings had been held in Vancouver and Victoria on matters relating to Public Health, the speakers at both meetings being veterinary surgeons, members of this association, mentioning Dr. Jervis for the active part he had taken, and expressing a wish that more would be held during the coming year. Also a number of stock owners had made application to the secretary that veterinary surgeons be sent to their districts, which requests had been complied with. The address concluded with the President's best wishes for the success of the association for the coming year.

After the reading of the address various matters were discussed by the members present and adjournment was taken for lunch at the Castle Hotel. On reassembling an interesting address was given by Dr. L. D. Swenerton of Vancouver describing the work in general of the Royal Army Veterinary Corps in England and France, and the various hospitals there, and his work in particular, having just returned from France on leave. Veterinary surgeons in the British Canadian Forces rank as Lieutenants and are promoted to Captains after one year's active service. Dr. Taylor of Ladners, B. C. read a newspaper clipping of a speech of Senator Cummings, given in the United States Senate in support of the bill to make veterinary surgeons rank as officers in the United States Army.

Dr. Bruce of Agassiz, B. C. then gave a very instructive address on "Poisonous Plants of British Columbia", illustrated by specimens prepared by himself.

Election of officers then took place, resulting as follows:—President, Dr. S. F. Tolmie; Vice-President, Dr. George Howell; Secretary-Treasurer, Dr. K. Chester; Council:—the above officers together with Drs. Alton, Pickering, Jagger, and Jervis.

A resolution was passed that as most of the annual meetings had been held at the coast it would be a good thing to hold the next annual meeting in the Upper Country and the secretary was instructed to write to the Upper Country members and ask them to get together and choose a suitable town convenient to all and the coast members will come up and attend.

The social committee was appointed by the Vice-President, in the absence of the President, as follows:—Drs. Jervis, Jagger and Swenerton.

This brought a very successful meeting to a close.

KENNETH CHESTER, Sec.-Treas.

MASSACHUSETTS VETERINARY ASSOCIATION

The October meeting of the Massachusetts Veterinary Association was held in Springfield on October 18. The meeting was held in conjunction with the National Dairy Show, and as was expected, the combination of the two proved a very great attraction.

After the arrival in Springfield, all journeyed toward the Eastern States Exhibition, where the National Dairy Show was being held. After registering at the temporary headquarters of the association, which were in the Coliseum, the members spent

the day according to their own inclinations, endeavoring to see some of the many attractions which were presented. All were agreed in declaring it the greatest event of its kind that they had ever seen, and we were forcefully impressed with the beauty and permanency of the buildings which had been erected to house this show. We were considerably interested after forming this opinion, to hear the opinion of some of the prominent western veterinarians who were in attendance, and who have always attended the show which heretofore had been held in Chicago. They seemed to be agreed that it was the greatest Dairy Show ever held in this country, and greatly surpassed the previous shows at Chicago. It was impossible to see more than a few of the many attractions of the different places as they were being exhibited. However, the time spent there was very profitable to all of us.

At seven o'clock, members and friends met at the Hotel Worthy, where an unusually good banquet was served. Following the banquet, a short business meeting was held, during which eighteen applications for membership were received. One hundred fifty-two members and guests partook of the banquet. After dinner, and before the speeches began, fully twenty more arrived who were unable to be present at the banquet.

Dr. James B. Paige of the Massachusetts Agricultural College acted as toastmaster. The first speaker of the evening was Dr. V. A. Moore, Dean, New York State Veterinary College, Cornell University. Dr. Moore's subject was "The Practical Application of the Tuberculin Test". It proved to be one of the best addresses to which the association has ever had the pleasure of listening. It was exceedingly practical, and at the same time included many scientific aspects of the disease. Many of the common errors which are made in applying the test were spoken of, and many mistaken ideas regarding the disease and its control were discussed in detail. It was indeed a scholarly presentation of the entire subject, and was listened to with rapt attention by all persons present.

Dr. W. Horace Hoskins, Philadelphia, Pa., was the next speaker, and forcefully addressed us on the subject of "Associations and Association Work". Dr. Hoskins was, as is always the case, very well received by the members, who thoroughly enjoyed his remarks. He impressed us with the advantages of associations and of some of the present aspects of the association work, to-

gether with a wonderfully brilliant review of the profession in this country.

Dr. Thomas Maloney of Fall River responded to the toast "The Ladies", in his usual skillful manner, and needless to say he made a wonderful impression, particularly on the ladies, in spite of the fact that he admitted several things which we have always suspected him of, but of which we were never certain.

The last speaker of the evening was Dr. E. C. Schroeder of the Bureau of Animal Industry, Washington, D. C. Dr. Schroeder's paper was on "Infectious Abortion", and proved to contain all that was new and interesting on this very important disease.

It is doubtful if any two subjects could have appealed to those present more than the ones presented by Dr. Moore and Dr. Schroeder. Dr. Schroeder most successfully extracted from the maze of misunderstanding and uncertainty which surrounds infectious abortion, the factors which are known to be of practical and certain application, so that we were able to discard much of the unimportant. His entire paper was masterful, and was greatly appreciated by all present.

Our chief regret was that the hour had become so late that we were unable to hear from the many noted veterinarians who were present. There were many present from other states whom we greatly respect and seldom see, and from whom a few remarks would have been greatly appreciated. A large number of veterinarians were present from New Hampshire, Connecticut, Rhode Island, New York, Vermont, and Maine.

EDWARD A. CAHILL, Secretary.

REVIEW

SHEEP DISEASES

E. T. BAKER, D.V.M.

Published by the American Journal of Veterinary Medicine, Chicago, Ill.

This book of 228 pages is published as No. 12 of the Veterinary Medicine Series, edited by D. M. Campbell. It contains the following sections or chapters: History of the Breeds; Anatomy; Hygiene; Medicines and their Administration; Acute Infectious Diseases; Diseases of the Blood; Diseases of Metabolism; Diseases of the Urinary Organs; Diseases of the Circulatory Organs;

Diseases of the Respiratory Organs; Diseases of the Digestive System; Diseases of the Liver; Diseases of the Peritoneum; Diseases of the Brain and Spinal Cord; Diseases of the Organs of Locomotion; Non-Parasitic Diseases of the Skin; Diseases of Obscure Origin; Diseases of the Lamb; Diseases of the Ewe; Diseases of Rams and Wethers; Surgical Diseases; Parasitic Diseases; Poisons; Predatory Animals; Quarantine and Transportation Regulations.

The above classification indicates the comprehensive list of subjects treated. In a book of this limited size, conciseness is a matter of necessity. Some of the chapters are only a page or two in length. So long as the essential facts are given, conciseness is a virtue which the busy practitioner readily appreciates.

Of particular importance are the internal diseases, parasites and, in some localities, poisoning by plants. These subjects are discussed more extensively. The author states that larkspur does not cause so much loss among sheep as among cattle, and among the symptoms notes a stiff and trembling gait with frothing at the mouth, and that the victim often dies before reaching the nearest watering place. A recent report by investigators from the U. S. Department of Agriculture states that sheep eat larkspur with impunity and recommend, as a protection to cattle, that sheep be allowed to graze over the infested area in order to clear it of the noxious substance before the cattle are allowed to feed there.

Although the book is written largely from the western viewpoint, where range grazing predominates, it is none the less useful for those in the east, where sheep raising has, for some time been a minor portion of the livestock problem. That this branch of the industry needs and will receive greater attention in the East, there can be little doubt. We can heartily endorse the author's statement in his prefatory note, that "As economical producers of those prime necessities of civilized man, good food and good clothing, sheep are destined to increase in numbers, and sheep raising will speedily attain and maintain a more important place in the animal industry of this country."

The book is printed upon high grade paper, contains excellent illustrations, including some colored plates of plants poisonous to stock, and is a credit to the publisher.

P. A. F.

COMMUNICATIONS

DIOCTOPHYME, NOT DIOCTOTHYME

In the September number of the *Journal* of the American Veterinary Medical Association, I presented a summary of the available cases of the occurrence of the giant nematode, *Dioctophyme renale*, in the United States and Canada. In the interests of stability of nomenclature, I used the generic name *Dioctophyme*, proposed by Collet Meygret in 1802, instead of the widely used name, *Eustrongylus*. Unfortunately, the erroneous spelling of Dioctothyme slipped through proof and thus if uncorrected, I have added to, rather than lessened confusion of nomenclature.

WM. A. RILEY.

THE BALKAN RELIEF FUND

Editor "American Veterinary Review":

Dear Sir:

Starving Albania, without even a newspaper of its own to make public its need, is dying in silence, its tragedy passed by unheeded.

Will "The American Veterinary Review" open a door through which its appeal for help may reach the people of the United States?

A number of distinguished gentlemen in New York—mostly clergymen and editors of newspapers—will co-operate in an appeal for a relief cargo for the ship. The treasurer selected to receive contributions is the Rev. Frederick Lynch, D.D., Editor of the *Christian Work* and Secretary of the Carnegie Church Peace Union. Contributions in any amount—from the price of a loaf of bread upward—may be sent to the Balkan Relief Fund, 70 Fifth avenue, New York City.

Yours truly,

WM. WILLARD HOWARD, Secretary.

Dr. W. H. Meadors, veterinary inspector of the Bureau of Animal Industry, has been transferred from National Stock Yards, Illinois, where he has been stationed for a number of years. He has been placed in charge of the meat inspection work of the Bureau at Birmingham, Alabama.

Dr. Russell A. Stephens, veterinary inspector on the Bureau of Animal Industry force at Cincinnati, Ohio, has been transferred to Calexico, California, where he has been detailed to inspect meats for the United States Army.

Dr. H. G. Hodges has removed from Sidney Center to Worcester, N. Y.

The marriage of Miss Catherine D. Seamon and Dr. D. B. H. Dalrymple occurred at Ithaca, N. Y. October 2. They will take up their residence at Otselic, N. Y., where Dr. Dalrymple will practice.

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OF THE

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PIERRE A. FISH, Editor

ITHACA, N. Y.

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No. 3.

Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary L. A. Merrillat, 1827 S. Wabash Ave., Chicago, Ill. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

THE SOUTHEASTERN STATES VETERINARY MEDICAL ASSOCIATION

This is a new association, toward the organization of which steps were taken by some of the southern veterinarians while in attendance at the Detroit meeting of the American Veterinary Medical Association last August. It is expected that the organization will be completed at the first meeting to be held at Atlanta, Ga., December 27 and 28. An interesting and important program is being prepared. The temporary officers elected at Detroit are Drs. Tait Butler, Tennessee, chairman; G. A. Roberts, general secretary and resident secretary for North Carolina; C. A. Cary, Alabama; W. H. Burson, Georgia; F. P. Caughman, South Carolina; F. W. Porter, Florida. With such men behind it, the future would seem to be assured.

Of the various sections of our country, none has received less recognition from the A.V.M.A., so far as meetings are concerned, than the South. Twenty years ago (1897) the association ventured as far as Nashville, Tenn., and in 1914 arranged plans for a meeting at New Orleans, but cancelled it because of the prevalence of the foot-and-mouth disease. This section of our country

has as great a claim upon us as any other. In its fifty-three years of existence the A.V.M.A. cannot be accused of showing any undue partiality for the South. If there is any section entitled to a grievance, it is the South, but we venture to express the belief that the new association is being organized entirely independent of any such spirit.

Organization, whether it be local, state, inter-state or national, is a good thing for the profession. It develops, fosters and strengthens community of interest and coincidentally the interest of the community. State or interstate associations do not retard the growth of a national organization; they promote it. There should be a spirit of cooperation for the good of the profession and the public it serves. We trust that the organization of the new association will stimulate the A.V.M.A. to recognize more generously the just claims of the South. We trust the Southeastern States Veterinary Medical Association will succeed—that it may live long and prosper.

P. A. F.

DIET AND ABORTION

It is probably a natural and common belief that all of the requirements have been met when a balanced ration for the animal has been prepared. So long as the proper proportion of digestible protein and energy producing material is present, little thought is given as to its source or that it should have anything but a beneficial effect upon the processes of growth and reproduction. It might be expected that just as vigorous offspring should result, no matter where the material of the diet came from, so long as it was arranged in a balanced form.

That this view needs some modification has been pointed out by Professor E. B. Hart, in a paper* presented at the last meeting of the Wisconsin Veterinary Medical Association. Experiments were tried on a group of grade Shorthorns while they were at an approximate weight of 300 pounds. Balanced rations were prepared from the corn, wheat and oat plants and a mixture of the three. It was observed that the animals grew fairly well on all the rations but it could be seen that those receiving wheat were not as vigorous or well developed as the other lots.

*The Influence of Certain Natural Feeding Materials on Growth and Reproduction.

Another experiment upon some young grade Holsteins with corn and wheat rations showed that those receiving the corn ration grew well, matured, showed early estrum and were physically strong in every respect; while those receiving the wheat ration grew only at a fair rate and when they attained the weight of 1000 pounds, they ceased to grow. They began, in fact, to lose weight and showed no vigor. There were evidences of physical weakness and even blindness ultimately resulted. They showed no estrum and to have continued them for breeding purposes was utterly futile. So pronounced was the emaciation it was deemed advisable to kill them.

Because of the prevalence of contagious abortion in this country, it might naturally be asked if this affection might not enter into and complicate the results of the experiments. Such a contingency was considered and during the course of the experiments the animals were placed under the observation of, and tests made by, a competent veterinarian, who declared the animals to be free from the disease.

With an oat ration or a mixed ration, the offspring were good but in no case did they appear to be quite so vigorous as those fed upon a corn ration. While it may appear, in general that a mixed ration is safest it may, nevertheless, be shown that a restricted ration may be physiologically perfect and a mixed ration may contain something deleterious to its physiological value. When a corn fed animal was changed to a wheat ration, it became exceedingly stiff and if the wheat ration was continued too long prostration would result.

Attempts to locate the trouble in the wheat ration showed, for one thing, a deficiency of a proper salt mixture. If an animal was fed upon corn grain and wheat straw the offspring were weak and sometimes born dead. When to the same ration a suitable salt mixture was added, perfect offspring resulted. If the corn grain of the ration was displaced by wheat grain and the salt mixture added, disaster again resulted. Evidently something more than the salts was responsible. The second factor appears to be an inherent toxicity in the wheat grain. This toxicity was not apparently affected by heat; for when baked wheat was fed there was no improvement. The addition of butter fat to the wheat ration, to supply the growth promoting factor was not uniformly successful. There was failure as well as success.

When wheat grain was mixed with a legume hay, such as alfalfa, so that the alfalfa formed but 20% of the ration, there was perfect success and normal offspring were produced.

Later work has shown that the toxic material is very largely present in the embryo of the seed. When wheat embryo was imposed on corn stover so that the ration contained four to five times the amount of embryo as would ordinarily be present when whole wheat was fed, an early abortion resulted—the calves being dropped at six or seven months.

In the process of milling the embryos pass into the wheat bran in small amount, but in wheat middlings they appear in much greater quantity.

Histological study of the spinal cord of animals fed on the wheat ration revealed an edematous condition of the motor cells and an appearance of compression and partial degeneration of the cells. The effect upon the nervous system would suggest a cause for the blindness which occurred in some cases.

The experiments are of great interest in showing the limitations of the theory of a balanced ration; they indicate the importance of factors other than the presence of protein and latent energy in the successful diet; the necessity for the proper balance of inorganic salts in directing the metabolic processes of the body, is well illustrated; the presence or absence of vitamins (growth promoting substances) concerning which our knowledge is yet too limited, and their relation to deficiency diseases; all emphasize how really complex the problem of nutrition is and how fundamental it is in attaining the best results.

Aside from its great physiological interest, the work of Professor Hart should also have a very direct interest in relation to abortion disease—the disease which, at present, is such a menace to the cattle industry of this country. It is possible, in some instances, that abortion may be an affair of nutrition rather than of the *Bacillus abortus*. In the wheat growing districts, it may be expected that wheat in some form may serve as a portion of the ration. If to this the abortion bacillus be added, the course of the disease should be facilitated. On this ground contagious abortion might be expected to be more prevalent in wheat growing districts. Statistics would be interesting. Since the experiments indicate that strong, vigorous offspring are produced when a corn ration is fed, it might be expected that abortions might be less frequent in corn

raising districts. Even when the problem is complicated by the presence of the abortion bacillus, it might be expected that a corn ration might assist in conferring increased resistance to the ravages of the disease. Again statistics would be interesting.

All of this should be of interest to the practical veterinarian. Physiological as well as pathological factors in conjunction with sanitation should be considered. In the light of the experiments, the least that can be done is to inquire into the diet.

P. A. F.

OKLAHOMA STATE VETERINARY MEDICAL ASSOCIATION

The profession throughout the United States will be glad to know that the two associations of graduate veterinarians that have existed in Oklahoma have passed into "innocuous desuetude". Under the able leadership of Dr. R. F. Eagle a new association has been formed that is going to put Oklahoma on the veterinary map. The first meeting of this new association was held in Oklahoma City, October 23rd, 24th and 25th with about one hundred of the leading veterinarians of the state attending. Mr. Overholser, mayor of Oklahoma City, John Field, editor of the *Oklahoma Farmer*, and T. P. Martin, president of the Oklahoma Stock Yards National Bank gave their hearty support and showed their interest, not only by addresses but by attending the sessions. Drs. Lewis Crabb of Ft. Worth, Texas, D. F. Luekey, state veterinarian of Missouri, R. C. Moore of St. Joseph, Mo., A. T. Kinsley and H. Jensen of Kansas City, J. A. Kiernan of the B. A. I., and N. S. Mayo of Chicago were present by invitation to take part in the program and assist in launching the new association. The first and second days were devoted to the literary part of the program while the third day was occupied by a clinic and visit to the stock yards, where the Bureau of Animal Industry had an exhibit of pathological specimens.

The first meeting of the new association was a success in every way. Every member is going to boost as only Oklahomians can and they promise to send a delegation of "Sooners" to the next A.V.M.A. meeting that will make some other states much older "sit up and take notice"

Owing to the removal of Dr. Eagle to Chicago, he tendered his resignation as president and Dr. J. S. Grove was elected to suc-

ceed him. We shall take some liberty with Rip Van Winkle's classic toast and say "Here's to the success of the O.S.V.M.A. May she live long and prosper."
N. S. M.

EUROPEAN CHRONICLES

Bois Jerome.

RELIEF FUND FOR BELGIAN VETERINARIANS.—The manuscript of my September contribution to the *Journal* had just been mailed when the following letter was received:

Dear Dr. Liautard:

To-day marks the close of the meeting of the N. Y. State Veterinary Medical Society. It has been an interesting and I hope, profitable meeting. There were about 100 in attendance and apparently they enjoyed themselves quite thoroughly. Your work in connection with the League for the Relief of the Belgian Veterinarians was spoken of. Dr. W. G. Hollingworth of Utica, N. Y. circulated a subscription list and about \$100.00 in cash were paid in. I am enclosing a draft on Paris for 584 francs. Much credit is due Dr. Hollingworth for taking hold of the matter so energetically and for the success obtained.

Trusting there may be more subscriptions and assuring you of my best personal regards, I am

Very truly yours, P. A. FISH.

The check was received and handed to the treasurer of the funds who, while and until it is officially acknowledged, wishes me to address to the N. Y. State Veterinary Medical Society. Doctor Fish and Dr. Hollingworth for their initiative in this subject the gratitude of all, for the handsome evidence of professional solidarity. Who will be next?

THE TOXICITY OF SOYA BEANS.—This is the subject of a communication from Sir Stewart Stockman relating to a report of the death of many cattle fed with meal from the beans after extraction of the oil contained in them. While there are several members of the order Leguminosae, to which Soya belongs, which have poisonous properties, there can be but little doubt about the non-poisonous character of Soya, which for many years has been used for human food and is widely employed in the feeding of stock all over

the globe. Soya is very rich in oil and it is after this has been extracted that the residue is sold in the form of meal or as cakes for feeding cattle.

Sixty-seven cows had been reported sick and fifty-four of them had died.

The symptoms can be summarized as follows: first, falling off of the milk, then nasal trickling of a bright red-colored blood; visible mucous membrane congested and sometimes bleeding in spots. Rumination suspended, coat staring: temperature 105°F. to 109°F. Dung normal at first, later coated with blood-stained mucus: urine normal, some abdominal pain. Nodules varying in size from that of an egg to that of a child's head felt under the skin and extending into the muscles: sometimes lameness by intermuscular hemorrhage.

If the animal retained a tendency to eat and ruminate a possible recovery might be looked for. Death generally was sudden or after the animal had become weaker and weaker.

Post-mortem showed the lesions of hemorrhage through the tissues and organs.

There was hemorrhage in the larynx, trachea and bronchial tubes, the lungs being pale. The pleura, visceral and parietal showed patches of hemorrhage. There was also hemorrhage in the pericardium and the heart substance. The alimentary tract and the lining of the abdominal walls also showed many. In the fourth stomach the mucous membrane was also covered with hemorrhagic spots. The small and the large intestines also. Towards the rectum, the blood vessels were engorged. Many of the abdominal lymphatic glands were also hemorrhagic. Yet the liver, spleen and kidneys showed no marked alterations.

Careful consideration of the lesions recalled some of the conditions of cattle plague, East Coast fever, bracken poisoning, hemorrhagic septicemia or anthrax, brought out the conclusions, after attentive inquiries, that the trouble was due to Soya beans, some of which, it was reported, had been prepared in a different way than usual.

Material, from different places of preparation, was obtained and a series of experiments was carried out on different species of animals.

The conclusions offered in the communication of Sir Stockman are:

1st.—The cases produced at the laboratory by feeding on extracted Soya cakes and meal are identical in symptoms and post-mortem lesions with the cases occurring in the fields among cattle which were fed on similar material.

2nd.—In both cases, the animals were receiving other food-stuffs, (some went out to grass). This discredits the possibility of the trouble being due to a deficiency in vital constituents, as in the scurvy type of disease.

3rd.—In most cases the trouble some times did not show itself until one or two weeks after the extracted soya or cake had been discontinued and the animal had been turned out to grass. This is a curious feature and points to the conclusion that the poison is one which requires some time to act, although a poisonous dose is present in the system. It might also mean that the actual poison is manufactured inside the animal by a slow process from extracted Soyas.

4th.—The extracted Soya in no case (practice or laboratory) produced a sudden effect: in all, a considerable amount was consumed and a considerable time elapsed before signs of illness appeared. The smallest amount consumed at the laboratory before the disease began was 172 lbs. (36 days); the shortest time in which the disease appeared was 29 days (201 lbs.)

5th.—No species, other than cattle, suffered from feeding on the meal or cake, either in practice or at the laboratory.

6th.—The very high temperature (106° to 109° F.) accompanying the illness seems to exclude the ordinary poisons, but does not exclude a poison of the ricin class. Specific bacterial infection was excluded by test inoculations, microscopical and bacteriological examinations made by the fact that a sterilizing temperature was used in the process of manufacturing. No castor seed could be traced in the meal.

7th.—From inquiry (very wide) whole Soya bean is not poisonous.

8th.—From inquiries among manufacturers, there is plenty of evidence that Soya extracted with naphtha does not cause poisoning, and it would appear that the trouble followed the use of Soya extracted with trichlorethylene.

9th.—Trichlorethylene itself, however, is not poisonous when given to cattle in comparatively large doses, 1 to 3 ozs., and for long periods. It may be (a) that the products from trichlore-

thylene obtained by heat are poisonous (this is doubtful.) (b) that the trichlorethylene in contact with the Soya and heat used to drive off the former, forms a poison: or (c) that some of the trichlorethylene was impure and contained other bodies.

10th.—It would appear from what occurred in practice that all bovines are, at least, not badly affected by the poison.

11th.—If it be that, in order to obtain a poisonous quantity of the active agent, some 200 lbs. or more of the material must be extracted, it would hardly seem to be a process which could be undertaken in an ordinary laboratory but would require a small manufacturing plant.

12th.—If it be that the active agent is elaborated from the extracted Soya in the digestive organs of bovines, the problem of isolation becomes still more difficult.

13th.—If this be assumed, the most promising method of search might be to produce cases experimentally and then try to extract a poison from their organs.

14.—Extracted Soya meal constitutes an excellent auxiliary food-stuff for cattle, but it is not advisable to use trichlorethylene as extractor.

EPIZOOTIC LYMPHANGITIS—TREATMENT.—In a previous communication I have already spoken on this subject. I may be allowed to do it again as I find that it has attracted the serious attention of our French confreres, the disease having taken extensive footing among some of the regiments of cavalry at the front where it has been undoubtedly imported by horses from North Africa.

From Professor Douville of the Lyon Veterinary School, who now occupies the rank of Major veterinarian I read a communication which he made to the Societe Centrale in which he relates his experience, which is substantiated by his observations on quite a number of lymphangitic horses. Several of them he has handsomely illustrated in plates showing the very peculiar aspect presented by the ulcerated abscesses of the leg, of the face and neck, of the sides of the thorax and of the pit of the arm. The very great resemblance that the ulcerated abscesses, with their extending lymphatic cords, have with those of cutaneous glanders, explains, to a great extent, the errors of diagnosis, which an incomplete investigation would have permitted.

In his communication, Professor Douville alludes to the old classical treatment: actual cauterization. For many cases he has found it impracticable, on account of its risks, as for instance, in the cases where the lesions are around synovial sacs or blood vessels such as the saphena, the jugular, the glosso-facial, etc. To remove the lesions, cords, abscesses, etc., the cautery is better than the bistouri. The cauterization must be deep and free, care being taken not to leave the slightest nodule or the smallest cord. Even with this care, the possibility of the infection is not entirely removed.

It is probable that such have recurred and for that reason internal treatment has been tried.

Professor Douville has used *Galyl*, a chemical compound, an organic arseno-phosphorus compound, a therapeutic study of which has been made by several therapeutists and found to be very active in some specific infections.

Galyl is not very toxic and is perfectly tolerated. It is a vasodilator and does not give rise to congestive manifestations. It has no neurotopic action, nor any coagulating effect on the albumins of the blood or on the red corpuscles, the liver or spleen. It is easily dissolved in water and forms a clear solution of a clear brownish yellow color. The dose is 0.90 centig, or one gram in a 1 per 100 or 150 solution. The injection is to be repeated every eight days but the solution must always be freshly made. These doses were used only at the beginning. Afterwards and with some experimenting, Douville found that to a horse of medium size, say weighing 500 kilogs, 3, 4 and 5 grams of *galyl* could be injected in the vein very slowly. A slight elevation of temperature may be observed during the day but it soon passes off. The size of the dose varies according to the condition of the lesions and can be reduced, if improvement is noticed in the fifteen days between the dates for the injections.

By this treatment, applied to 15 horses, exclusive of any other therapeutic interference, 11 were cured with doses varying between 5 and 6 grams, the treatment having lasted between one and three months.

The other four horses were destroyed on account of the extent and the severity of the lesions.

Galyl is not the only agent that Douville has experimented with, the medication with iodine has also been tested. To three horses, he has given potassium iodide. Two were cured. The

third had to be destroyed after a long and severe treatment. He had received 400 grams of the iodide and cauterization had also been freely applied.

Novarsenobenzol has also been resorted to. The results which may follow, are not yet complete. As in the treatment with iodide, Douville will communicate later.

In concluding for the present, the consideration of this subject, the treatment of epizootic lymphangitis, I may also pay some attention to the report made by Major Veterinarian Velu, who has used quite extensively the novarsenobenzol in intrajugular injections.

The report of Major Velu summarizes principally the history of three cases, but in neither of them has he obtained results superior to those obtained with colloidal iodine and iodide of mercury. In one of the cases the generalization of the disease was not prevented. In the second, recovery was not obtained. In the third, which was only a mild case, it would have been necessary to resort to surgical interference.

Velu seems to believe that little dependence can be placed on the use of novarsenobenzol, contrary to the opinion of Douville and of Bridre to whom I have already alluded.

AMEBIC DYSENTERY IN DOGS—EMETIN TREATMENT.—This is quite an interesting record of the success obtained by Indian Veterinarian F. Ware, M.R.C.V.S.

In a hill station of the Madras Presidency a pack of hounds was kept, in which for some years past dysentery had been a great source of trouble. Before deciding on the treatment which might give relief, it was essential to find out if the disease was really amebic dysentery, and if so, to try *Emetin* treatment. Seven hounds were affected, one being particularly bad.

Smears were taken from fresh feces and examined immediately, the slides being kept warm during examination, a necessary condition, as cold inhibits the movements of any amebae present and thereby renders them difficult of recognition.

In the feces of the one that was the sickest, one or more amebae were present and were pronounced extremely like *entamebae histolytica*, the cause of the disease in man.

Smears from another dog revealed the typical movements of the amebae, such as the protrusion of the pseudopodia, which were

distinctly seen, while the slide was warm. In several amebae, ingested red corpuscles were visible.

As it was not always easy to have an opportunity to examine thoroughly smears which contained few amebae and the difficulty in obtaining fresh feces, when wanted, as dogs have the habit of licking each other about the mouth and anus, it was supposed that very likely all the dogs that were sick, had the same cause as those from which smears had been taken. All the sick dogs were submitted to the same treatment of emetin.

One-half grain of emetin hydrochloride was, after a little thought, considered the proper dose. Tried on two hounds and having produced no ill effect, all the others were submitted to the one-half grain dose. Later this was raised to one grain and it seemed to have more effect, although it gave rise to vomiting in two of the dogs.

The emetin was given in subcutaneous injections, hypodermic tabloids being dissolved in distilled water.

Nine dogs altogether were treated in the same manner and received from 2 to 4 injections, according to their indications. Milk diet and a small dose of magnesia sulfate were given daily. The sick dogs were isolated.

While the report of Mr. Ware does not definitely settle the point that there is an ameba, capable of causing dysentery in the dog, it certainly is a strong evidence that at least such is the case among dogs in India.

The writer's conclusions are: that the chief point appears to be in the finding of the amebae before the injections of emetin are given, the marked effect of a few injections of emetin had on most of the cases, the inability to find living amebae in the feces of animals which showed signs of recovery.

If it be proved that such amebae pathogenic to the dog, exist there is the further interesting point as to whether it may be identical with that causing dysentery in man.

ADYNAMIC AND ANEMIC TYPHOSUS IN AMERICAN HORSES.— Since the beginning of the war a large number of horses have been brought from America to the continent. Many were landed in France and among them, typhosus has been probably the disease which has given the largest records of deaths. Major Bringard has published in the *Revue* an article upon it, he having had the op-

portunity to witness a great number of cases in his function as Director of the Veterinary Service and as Chief of the Depots.

The cause of the disease was a state of debility due to the long journey from America and to the bad hygienic conditions under which the animals were conveyed.

The symptoms are given as follows: very high fever with a temperature of 40° C.; chills, extreme prostration and staggering gait; accelerated pulse, difficulty in feeding; mucous membranes dark yellow. Respiration, irregular and accelerated; heart palpitations from the slightest exercise; venous pulse. Auscultation reveals the presence of centers of lobular pneumonia with tinkling sound of pleurisy and pericarditis. By percussion, dullness is found over almost all the thorax. Diarrhetic enteritis may also be observed and death is then more rapid. The urine is of a dark red color, due to the elimination of cholepyrrhine: it also shows a greater accumulation of phosphate crystals.

The prognosis is generally serious, and fatal with the animals which were intoxicated by the air breathed during the trip.

Among the lesions there are noticed: discoloration of the muscles, brick colored serosity under numerous false membranes in the thorax. Inflammation of the pleura and pericardium. Hypertrophy of the heart with softened structure. Lesions of acute enteritis with desquamation of the intestinal mucous and hypertrophic mesenteric lymph glands. Uncoagulated blood in the vessels, coloring the fingers strongly, reddening and coagulating in contact with the air. The red corpuscles are agglutinated and star-like. They are diminished in number in the animals which died with progressive anemia. The lungs often contained old cavities of pulmonary abscesses in which pus had escaped through the bronchia. There were also lesions of chronic induration indicating lobular pneumonia recently recovered.

The treatment prescribed and recommended by the writer consisted in slight purgation with calomel as a preventive, or on animals only suspected of becoming sick. When the disease is developed, mustard sinapisms, pilocarpine and salicylate of soda. The application of strong liniments was made above the swelling of the sinapism, four fingers wide and renewed once or more according to the case. Abscesses of fixation recommended by some are said to be dangerous, notwithstanding the good derivation that they procure, because they give rise to too debilitating suppuration and

dangerous sloughings of muscular tissues. Intravenous injections of oxygenated water are not without danger. Tallianine would be better. During convalescence arsenical medication is indicated. Physiological serum strengthened with a small dose of cacodylate of soda has brought recovery in desperate cases. Of course, good hygiene, good food, moderate exercise in the fresh air, are also essential conditions. Although the dangers of contagion are not serious, it is better to take precautions and have the animals isolated and resort to disinfection.

SUMMARY OF PUBLICATIONS RECEIVED.

Those marked "X" will be analyzed. Those marked "O" will appear in abstracts.

RECUEIL DE MEDICINE VETERINAIRE—(X) Serum Osmosis—Treatment of Wounds with Blood Serum Obtained by Osmosis, by Chatelain.

(X) Dr. P. Chausse, An Observation of Tuberculosis of the Vesiculæ Seminalis, Efferent Canal and Urethra in a Steer.

(O) Velu—Note upon a Lesion of Intestinal Myasis in the Horse.

BULLETIN DE LA SOCIÉTÉ CENTRALE—(X) Piettre—Bovine Onchocerosis in South America.

Belin—A Case of Localized Tetanus—Oxydotherapy.

Dr. Roger—Some Observations of Nervous Colics.

(O) Dr. Detmer—Clinical and Therapeutic Notes.

(O) Descazeau—Treatment of Mange.

VETERINARY NEWS—Aug. 3d. Remarks on Castration by E. W. Hoare, F.R.C.V.S. Local Anesthesia by Prof. G. H. Wooldridge, F.R.C.V.S.

August 12. Joint Ill by Prof. Wooldridge.

VETERINARY RECORD—Aug. 5-16. Two Unusual Cases of Milk Fever.—Umbilical Hernia by A. Spier, F.R.C.V.S.

Aug. 19.—Epsom Salts by W. R. Davis, M.R.C.V.S.

(O) Cow Poisoned by Strychnine, by Country Vet.

Loss of Hoof by V. S.

(O) Aug. 26—Unsuspected Dental Trouble in a Cow by C. A. Squair, M.R.C.V.S.

REVUE GÉNÉRALE DE MÉDECINE VÉTÉRINAIRE—August 15.—Original Instruments Used During the Campaign 1914-15 by Major Veter. Freer.

(X) Treatment of Lumbar Myelitis (Dog's Illness) with Neurostenic Serum by Veloppe.

ANNALES DE L' INSTITUT PASTEUR.—Aug. 16. Studies on the Bacillus of Shiga by Nicolle, E. Debains, G. Loiseau.

(X) Upon the Etiology of Infectious Anemia of the Horse by Carre and Vallee.

Experiments on the Destruction of Schisto-cerca Verigina by the Cocobacillus—of Dr. Herelle by H. Velu and A. Drouin.

SUNDRIES RECEIVED—The Antigenic Value of Spirochaeta Hyos in Complement-Fixation Tests on Hog Cholera Sera by Walter E. King and R. H. Drake.

A. LIAUTARD.

THE PRESENT STATUS OF THE ABORTION QUESTION*

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The great and ever increasing importance of abortion and the confusion which exists, not alone in the lay mind, but also among veterinarians, concerning this disease renders this topic a fruitful one for our consideration. Abortion, if it has not yet reached first place in point of economic loss, is fast approaching that bad preeminence. A few years ago an annual loss of \$20,000,000.00 was attributed to it, but when one has access to the correspondence from all parts of our country, as have the authors, and can see how extensive the disease has become, then that estimate seems altogether too small. Our knowledge concerning its distribution has rapidly increased, but its spread outruns our knowledge, and when viewing the whole field, one is appalled at the loss inflicted on the animal husbandry of this country.

It has been the habit of investigators to write only of their local situation, and of dairy cattle, kept under intensive conditions, but the disease has already extended to the range cattle, where it is proving even more destructive than among the former. Losses of 50% or even more of the entire calf crop are frequently reported, and in beef production the calf represents all. In general the losses are both direct and indirect. The direct loss is of course represented by the dead fetus, and in dairy cows the consequent loss of milk. The indirect losses, however, are probably just as great. The attendant conditions of sterility, and retained after-birth, and of white scours and calf pneumonia, matters which cannot be discussed in this paper, together with the cost of combating these affections, and the interference with cattle traffic must represent an enormous loss.

The existing confusion in regard to this disease results from the many conflicting theories, few of which in the present state of our knowledge can be verified. Different groups of organisms, causing abortion in the various species, add their share to this confusion, and then the fact that there is no generally accepted line of treatment makes confusion worse confounded. Each investigator

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advances a treatment, and insists that his is best: there are numberless antiseptics, bacterins, the carbolic acid and methylene blue treatments, and worst of all the proprietary remedies for which unwarranted claims are made. It is not to be wondered at that the busy practitioner, who has no time to investigate these things for himself is unable to decide on the best course.

DIFFICULTIES OF INVESTIGATION. The difficulties connected with the study of abortion are many and varied. The chief difficulty lies in the fact that the disease is chronic, requiring, where abortions occur, an incubation period varying from a few months to almost the full term of pregnancy, according to the time and method of infection, and the virulence of the infecting organism. If acute, the affection would be more readily recognized and possibly more easily controlled. Abortion is very indefinite in its manifestations. The pregnant animal may and usually does appear to be in perfect health, and without any very noticeable premonitory symptoms the fetus may be expelled. On the other hand, abortion may be preceded by the usual signs of parturition, accompanied by a more or less characteristic discharge. The name "Contagious Abortion" is somewhat of a misnomer, as the affected animal does not necessarily abort. The disease may manifest itself as retained placenta or as sterility, or the calf may be born weak, and succumb later to white scours or pneumonia. Furthermore, it is not at all unusual for an animal to harbor the infection and be a disseminator of disease, yet show no symptoms whatever. The name "Abortion Disease" would seem, therefore, to be a more appropriate designation.

The *Bacillus abortus* of Bang, which is generally conceded to be the cause of the disease, itself adds to the difficulty of investigation. Requiring as it does from three to six days to produce an appreciable growth, even after having been accustomed to growing on artificial media, and being fastidious as to its oxygen requirements, it is easily outgrown and overwhelmed by other organisms. Its growth is very tardy and sparse when the attempt is made to transplant it from tissues to media and when contaminating organisms are abundant, this attempt usually results in failure.

MUTATION FORMS. An additional perplexity has recently been added, in that there is a possibility of mutation forms. Alice C. Evans of the Dairy Division has discovered, in the milk of certain cows, an organism which culturally and morphologically seems to

be the *B. abortus*. But when these organisms were tried in our laboratory against pathogenic strains by the agglutination and complement fixation tests, they failed to react. Feeding and inoculation tests were also inconclusive. These organisms possess the power of decomposing butter fat, and therefore have been given the name "*B. abortus*, var. *lypolyticus*."

The most interesting of Evans' findings, however, is that a strain of *B. abortus* from pathogenic sources, furnished by the Pathological Laboratories, after having grown from nine and a half months in a medium containing butter fat has acquired the same fat-splitting property. Limited space prevents a detailed discussion, and a report at this time would be premature, but the work will be continued and important results are hoped for.

These findings by Evans and the subsequent work, raise several interesting questions. Several herds where abortions occur occasionally, are under observation of the Pathological Division, but repeated serological tests fail to demonstrate the presence of *B. abortus*. Can it be that these organisms play a causative role in such cases, or are they entirely harmless? Are they attenuated forms of the pathogenic variety, which have lost some of their characteristics as they acquired the fat-splitting property? If this is so, may they not, under certain circumstances, regain their pathogenic properties? Are they detrimental to human health?

The statement has been made, in advertising matter of firms who manufacture biologic products, that 5% of abortions are normal or natural. Abortion is an unnatural phenomenon, for which there is a definite cause, and therefore any abortion from specific causes cannot logically be considered normal. There can be no doubt that the Bang bacillus is responsible for by far the largest percentage of cases, and 5% of non-specific abortion would seem excessive. Our experience, however, would lead us to believe that there may be some other organism, of which we know nothing at present, which may eventually be found to cause abortion in at least part of these cases. For this reason, importance is attached to Evans' findings, and this possibility will have to be considered in future work.

IMMUNITY. The question of immunity is of the utmost importance, and when a working knowledge concerning its principles and means for inducing it artificially shall have been obtained, a great step toward the control of the disease will have been taken.

Some investigators claim that no immunity is established and one claims that whatever of immunity there is partakes of the nature of age immunity. But the literature records numerous instances where cows as old as fifteen years have aborted, and if there is an age of immunity, they surely should have been protected. In favor of this contention is cited the fact that heifers in first pregnancy most frequently abort. One would naturally expect the heifers to abort when placed in an infected environment, just as older cows do. In an infected herd, the older cows have doubtless already acquired immunity, leaving the oncoming generation as the only susceptible material, and for this reason the higher percentage of abortion in the young animals is more apparent than real. It is moreover a very significant fact that even among young cows abortion occurs but once in much more than 50% of the cases. Whether this be called immunity or by some other name, there is unquestionably some protective agency, and for all practical purposes we must recognize this condition as an acquired resistance against the disease. For the above reason, therefore, there is a constant tendency for the disease to die out in an infected herd, provided susceptible material is not introduced into the infected environment. A striking illustration is furnished by the herd at the Government Hospital for the Insane, at Washington. Dr. J. P. Turner has had charge of the veterinary work for sufficient time to make his observations valuable. While cows were being purchased, and susceptible material thus added abortions were frequent, but as this practice was discontinued and the calves born in the herd were raised, the disease progressively decreased, until at the present time abortion is rare. A definite herd immunity seems to have been established. This has an important bearing upon control measures, and is the principle underlying one of our recommendations which will be referred to later. Moreover, the work of the English commission has shown that a serviceable degree of immunity can be induced by the injection of living organisms several weeks before breeding.

SEROLOGICAL TESTS. The agglutination and complement fixation tests are to-day accepted as the only reliable means for detecting in a routine way the presence of the infective agent. Bacteriological examination and guinea pig inoculation may be used, but negative findings in the one are inconclusive, and the other requires too long a period for the development of lesions. The lat-

ter are useful, therefore, only in experimental work. The serological tests are not infallible. The difficulty lies in the fact that both the infected animal and the immune one, which no longer harbors in its body the causative organism, may react. Nor does a reaction indicate that an animal has aborted or that it will abort. Immunity may have been acquired, without the occurrence of any visible manifestations. Also an aborting cow may sometimes fail to react. The use, then, of these tests as diagnostic agencies for detecting the presence of the infection in individual cases, for the purpose of sanitary police control, cannot be relied upon. They are valuable as an indication of the presence of the disease in a herd, and in experimental work, but all other factors must be considered in arriving at a correct diagnosis.

The part played by the bull in the dissemination of the disease is at the present time a very vital question. The papers presented this afternoon have undoubtedly shed some light upon this subject, but much remains to be discovered. Mechanical transmission is accepted, but whether a bull with systemic infection, i. e., assuming that a bull which reacts to the serological test is systemically infected, is capable of injecting the organism with his semen must be determined not only with a few experimental animals, but by extensive breeding experiments.

TIME AND METHOD OF INFECTION. The time when infection takes place, whether in calfhood, before, or after conception, is also important, and some light may be thrown on the subject by a study of results obtained by the Pathological Division in testing large numbers of animals.

A report of the examination of a herd consisting of more than two thousand head of Jerseys may be of interest. It is a mixed herd consisting of approximately one-third purebreds and the remainder grades. An office force is maintained and careful records of pedigrees, breeding, calving, etc. are kept, all of which facilitates investigation. The owner called on the Bureau for assistance in combating abortion, and placed his herd at our disposal for experimental purposes. The herd is located in the southwest and is kept under semi-range conditions. It is divided into units, each unit having a pasture of several hundred acres. The cows are kept in the open except when driven to the milking sheds twice a day. Pasturage is supplemented by ensilage and cottonseed cake. Blood samples were taken from all female cattle of breeding age, the

serum poured off and carbolized to one-half of 1% and forwarded to the pathological laboratories at Washington, where the agglutination test was applied. In addition a study was also made of the herd records to determine such points as the number of abortions, difficulty in breeding, number of live calves, etc., and the following is a résumé of the results noted:

Of the 413 cows which have produced calves, 159 or 38.5% aborted, and of these, 120 aborted once, 35 twice, and four three times. An explanatory statement should be made here. Fifty-one of these cows were of an age to have produced one calf, 56 two calves, and 53 three calves, so that there has not been opportunity in all cases for repeated abortions. Fifty-eight of the 120 cows which aborted once gave a positive reaction and eight were questionable, and of these 66, nine showed difficulty in breeding. Fifty-four aborters gave negative reactions and three showed difficulty in breeding. Thirty-five aborted twice, 27 being positive and three questionable, and of these, two showed difficulty in breeding; five gave negative results and showed no difficulty in breeding. Four cows aborted three times, three of these reacting positively and one negatively, but no difficulty in breeding was recorded. Twenty-five cows showed difficulty in breeding without aborting, and of this number ten gave positive reactions, 12 negative and three questionable. Sixty-six reacted positively without showing other evidence of infection. These figures are not absolutely accurate, as, according to our custom in infected herds, all difficulties attending parturition, whether they be premature birth, weak calves which died a short time after birth, etc. are classed as abortions. Furthermore, these cattle are tick-infested, blackleg prevails, and conditions which are found in arid regions may have had an influence, so that if each individual case could have been investigated by an expert, some would doubtless have been attributed to these causes, rather than to the infection of abortion. These factors would also account for our failure in numerous instances to get positive reactions in cases classed as abortions. In many instances the negative reactions are doubtless due to the long period intervening between the abortion and the application of the test. A study of records of aborting cows which reacted negatively shows that much the larger percentage aborted at from one and one-half to four or five years before the application of the test. Evidently the agglutinins have disappeared from the blood, but this is not a constant occurrence, as some give a reaction even after three and a half years.

In regard to time of infection, particularly in reference to infection shortly after birth, the cows born during 1911 offer interesting information. It is the practice on this ranch to separate the heifer calves from the herd as soon as they can sustain themselves, and thereafter they are kept in pastures apart, where they are bred. They do not rejoin the herd until they are about to calve. They are thus kept in an environment free from the infection of abortion, after having had ample opportunity to acquire it by association with infected mothers and the ingestion of infected milk. There were 41 in this group and 15 aborted. Nine of this number aborted in 1915, after having produced two normal calves each and one three calves. One aborted twice, having produced one calf, and one aborted three times, and one once, without living offspring. Three aborted in 1914, after having calved normally. If it is a fact that calves acquire the infection shortly after birth, and the organism remains latent in the animal's body, awaiting the period of pregnancy to produce its specific action, it is strange indeed that abortion should not have occurred before the second, third or even the fourth pregnancy. These facts seem to contradict strongly the contention that infection is to a considerable degree acquired during calthood. If additional evidence is desired on this point, it is furnished by the results of the agglutination test applied to other young animals of the herd raised under the same conditions. Beginning with those born after July 1st, 1913, which were therefore not old enough to have produced living calves, and had not rejoined the producing herd, 163 were tested, of which only eight reacted and five were questionable. In addition, there were five abortions. All of these reactors but one had been served by bulls which were not known to be clean. Approximately the same ratio of reactions occurred in the larger herd of young grade animals.

The question of time of infection having been considered, the figures may give an indication of the avenue of infection. The young animals, bred to infected bulls, reacted and aborted to but a limited degree, and even after the second copulation with bulls which had been serving infected cows, abortions seldom occurred. On the other hand, it would seem that cohabitation for a considerable period, where opportunity for ingestion is afforded, is necessary for the maximum production of abortion.

The question of the infection of calves and of bulls, being considered very important, yet another attempt was made to obtain

information. Numerous samples of blood were collected from calves and bulls at the abattoirs of Philadelphia, Baltimore, Washington and Richmond. Instructions were given to choose animals of dairy breeding only, and from nearby points so far as possible, in order to get material from infected areas.

One hundred eighty-two bulls over one year of age were tested, of which 10, or 6%, were positive and six were questionable. Out of five hundred twenty male calves, up to one year of age, seven gave positive and four gave questionable reactions, while of 299 female calves of like age, two positive and two questionable reactions were obtained. The fact is recognized that these animals were from unknown sources, yet in view of the wide distribution of the disease in those sections, it is assumed that most of the animals had come into contact with the infection. The results of the test therefore gave an indication of the degree to which those classes of animals harbor the infection.

IMMUNIZATION. For many years efforts have been made to devise means by which animals may be immunized against this disease, and Bang, Jensen, Holth, M'Fadyean, and Stockman have expressed the view that it is possible to establish an immunity against abortion infection by artificial inoculation. A large amount of experimental data has failed to establish a definite result.

The injection of live abortion organisms either intravenously or subcutaneously gave promise of effective immunization, especially when the same had been administered weeks or months before impregnation. If intravenous injections are made less than two months before breeding such treatment may become dangerous, since the animal may become infected to such an extent as to cause an abortion. The intravenous injection is usually accompanied by a febrile reaction, which lasts for several days. The subcutaneous injection has a much milder action, and experience has proved that the subcutaneous injection is not sufficient to protect the animals against heavy feeding of infectious material. Neither of the methods proved effective in immunizing animals to such a degree that they would resist an intravenous infection, but it must be recognized that under natural conditions the animal does not become so heavily infected.

In considering the literature on the results of immunization the reports are very conflicting, although more recent investigations in immunizing with live cultures are especially encouraging,

and it is understood that this method is now being employed on a large scale in England. It must be recognized, however, that the injection of live cultures would be advisable only in more or less severely infected herds, since the animals injected may possibly become disseminators of the infection, at times even for a period of years. This is the main reason why the treatment with live organisms should be cautiously undertaken. It appears that if the disease in a herd is thoroughly established, and the number of abortions, together with the serological tests of the animals show a great proportion of infection, the treatment with live organisms might be justified. On the other hand, where abortion makes its first appearance, and good results might be obtained by isolation of aborting animals, together with the enforcement of strict sanitary precautions, this procedure should be preferred. At any rate, our knowledge as to the effect and results from the injection of live cultures is not sufficient to warrant its unrestricted application.

Immunization with abortion bacterins is now being widely advocated by manufacturers of these products. The results obtained do not warrant the confidence which is expressed in the literature and advertising matter. Considerable experimental work has been conducted by the Bureau of Animal Industry on the effectiveness of bacterin treatment, and while the results were somewhat encouraging, nevertheless generally good results cannot be claimed for such a procedure. In view of our findings, and also those of other investigators, the claims made for the bacterins are unwarranted, and will not serve any good purpose in the control of the disease. Veterinarians will be prone to accept the statements made by the manufacturers at their full value, and possibly disregard other effective means by which the disease might be combated. It is possible that further investigations will establish a more effective method of immunization, but at present the bacterin treatment should be regarded as second in importance to proper sanitation.

We are also preparing immune serum with a view to applying the same in infected herds, either in the form of a simultaneous treatment with dead and living organisms, or in other combinations.

From time to time, medicinal preparations are exploited as effective cures for abortion. Thus carbolic acid has been widely recognized as an efficient remedy, and more recently methylene blue was also heralded as a certain preventive and cure. Proprietary remedies are also extensively advertised, both for prophylactic

and curative purposes, accompanied by glaring testimonials from veterinarians and stock breeders. Up to date there is no supporting evidence available for any of these preparations, and it must be acknowledged that there is no therapeutic treatment known at present, which would either prevent or cure infectious abortion. Accordingly attention should be primarily directed towards prevention by sanitation.

SUGGESTIONS FOR THE CONTROL OF ABORTION. The herd should be tested and all reactors should be kept under special observation. Any animal showing signs of abortion should be immediately removed from the herd and kept under strict isolation until all evidence of uterine discharge has ceased.

The disinfection of animals is performed as follows: To prevent the bull from carrying the infection from a diseased cow to a healthy one, first clip the tuft of long hair from the opening of the sheath, then disinfect the penis and sheath with a solution of one-half per cent of liquor cresolis compositus, lysol, or trikresol, or 1 per cent creolin or carbolic acid, or 1 to 1000 potassium permanganate in warm water. The only apparatus necessary is a soft rubber tube with a large funnel attached to one end, or an ordinary fountain syringe and tube would serve the purpose. The tube should be inserted into the sheath and the foreskin held with the hand to prevent the immediate escape of the fluid. Elevate the funnel as high as possible, and pour in the fluid until the preputial sack is filled. In addition to this, the hair of the belly and inner sides of the thigh should be sponged with the antiseptic. This disinfection should invariably precede and follow every service.

The aborted fetus, membranes, and discharges are particularly dangerous and should be gathered up and destroyed immediately by burning or burial in some safe place, and this followed by thoroughly disinfecting the stall. The uterus of the aborting cow should be irrigated daily with one of the antiseptics mentioned for the bull, using the same apparatus, and the irrigation should be continued until the discharge ceases. Irrigation which does not cleanse the uterine cavity is useless. The irrigation should be discontinued, however, when the os uteri becomes firmly closed, as forcible entry may do more harm than good. In addition, the external genitals, root of tail, escutcheon, etc., should be sponged daily with a solution twice as strong as that used for irrigation. Should the preliminary symptoms of abortion be detected, the animal should be removed from the herd and treated as above.

After abortion, breeding should not again be attempted within two months, or until the discharge shall have ceased, as the uterus would not be normal and the animal would either not conceive or would abort again in a short time.

Great care should be used in purchasing cattle, and cows not known to be free from the disease should be kept in separate quarters until this point is determined. If a herd bull is not kept, then great care should be exercised to know that the animal used is free of disease and to see that he is properly treated both before and after service.

Whenever it becomes necessary to separate diseased and healthy animals, it is especially important that different attendants and utensils be provided for the two groups.

It is not advisable to dispose of cows which have aborted. Such a practice, aside from spreading the disease, is economically unprofitable in view of the fact that the proportion of second abortions is relatively small, and because the animals which have acquired a resistance are more valuable, in an infected herd, than newly introduced, susceptible animals.

Should an aborting animal prove unprofitable as a result of sterility, repeated abortion, or otherwise, it should be utilized for food purposes.

With our present knowledge of the disease, the inauguration of restrictive measures with regard to interstate or intrastate movement of affected cattle for breeding purposes, is not practicable, but such movements of cattle should be discouraged by veterinarians.

DISINFECTION. Premises known to be infected should be periodically and thoroughly disinfected, and this practice should also be repeated after each abortion. The following procedure is suggested:

1. Sweep ceilings, side walls, stall partitions, floors, and other surfaces until free from cobwebs and dust.

2. Remove all accumulations of filth by scraping, and if woodwork has become decayed, porous, or absorbent, it should be removed, burned, and replaced with new material.

3. If floor is of earth, remove four inches from the surface, and in places where it shows staining with urine a sufficient depth should be replaced to expose fresh earth. All earth removed should be replaced with earth from an uncontaminated source, or a new floor of concrete, which is very durable and easily cleaned, may be laid.

4. All refuse and material from stable and barnyard should be removed to a place not accessible to cattle or hogs. The manure should be spread on fields and turned under.

5. The entire interior of the stable, especially the feeding troughs and drains, should be saturated with a disinfectant, as liquor cresolis compositus (U. S. P.), or carbolic acid, six ounces to every gallon of water in each case. After this has dried, the stalls, walls, and ceilings may be covered with whitewash (lime wash), to each gallon of which should be added four ounces of chloride of lime.

The best method of applying the disinfectant and the lime wash is by means of a strong spray pump, such as those used by orchardists.

This method is efficient in disinfection against most of the contagious and infectious diseases of animals, and should be applied immediately following any outbreak, and, as a matter of precaution, it may be used once or twice yearly.

6. It is important that arrangements be made to admit a plentiful supply of sunlight and fresh air by providing an ample number of windows, thereby eliminating dampness, stuffiness, bad odor, and other insanitary conditions. Good drainage is also very necessary.

Recent investigations on the germicidal value of various disinfectants on the abortion germ demonstrated that a combination of hydrochloric acid and salt solution in a concentration of one part of hydrochloric acid, eight parts of salt to 100 parts of water, proved most effective. This combination kills 48 hour agar cultures of the Bang bacillus in one-quarter of a minute, whereas other disinfectants are much slower in their action.

A proper and careful execution of the outlined procedure will, in most instances, insure the eradication of abortion from infected premises. In this regard, however, it should be emphasized that spasmodic efforts are of no avail, and a persistent systematic attention to details is essential in the effort to subdue this great scourge. Veterinarians should direct their most earnest efforts towards giving stock owners proper advice for the control of the disease, and they should especially instruct owners of infected herds of its dangerous character, and urge them to spare no efforts in carrying out minutely all sanitary measures which with our present scien-

tific knowledge of the disease have proven the effective weapons against this contagion.

SUMMARY. Abortion is one of the most destructive of animal diseases.

It is spreading rapidly and has extended to the open range, where its control is especially difficult.

The difficulties connected with its investigation have prevented the solution of many questions which must be settled before further progress can be made.

The question of immunity and methods for inducing it is attracting most attention at this time.

There seems to be a definite tendency toward herd immunity where the increase is drawn from the herd itself and susceptible animals are not introduced.

The serological tests are our most reliable diagnostic agencies for routine work, but they are not infallible and in the present state of our knowledge cannot be used in sanitary police control.

The part played by the bull and the time at which infection takes place are problems which have not been solved satisfactorily.

The infection of female calves shortly after birth, and the persistence of this infection until parturition, seems to be a negligible factor.

The use of biologic products is still in the experimental stage, and veterinarians employing them should not neglect proven methods.

Claims made for so-called curative and preventive preparations are largely unfounded and extravagant.

Sanitary measures and control of breeding are still our most reliable means of overcoming the disease.

DISCUSSION OF THE PAPERS ON ABORTION

DR. V. A. MOORE: I feel very sure that what you need at this time is either a philosopher or a prophet to interpret the results and the findings that have been so carefully presented to you this afternoon. I do not believe that it is desirable to attempt to summarize the very large amount of data that has been presented, the results of observations and experiments that have simply tended to accumulate information bearing on the phenomena of infectious abortion. This disease certainly is one of the most important that the veterinarian has to meet. It is one of the most serious diseases of cattle, and the one that threatens the cattle industry of the country most of all.

I am sure, from what has been said, that a large amount of careful observation has been made, but I confess that I am still in doubt as to the interpretation of much of this experimental data. I have worked with this disease myself. I came to feel confident through experimentation that I knew how to produce abortion, then I repeated the experiments only to find it could not always be done.

I believe after all that the questions before us are to determine first the general distribution of the abortion organism. We have a tremendous number of hypotheses concerning this disease and its etiology. Is the germ of infectious abortion a widely distributed organism, infesting large numbers of places in such a mild and attenuated form that its presence is unrecognized for long periods of time? Do the outbreaks that occur come from the introduction of virulent organisms at that particular time or have they been lying dormant for a longer period? This is a great biological problem that can only be solved by a long series of careful and fundamental bacteriological investigations.

The next question that we have to deal with is the virulence of the organism. From different outbreaks apparently different strains of the organism are isolated, some being more virulent than others. What are the influences that tend to its acceleration or to its attenuation? These are questions of which we have very little knowledge. Then there is the method of infection. How are the animals infected? We have heard much of the various methods today, but which is the one, or is there *the* one? Is this organism introduced through the generative tract solely, and if so, at what time? Is it introduced through the digestive tract solely, and if so, when?

The experiments with the feeding of milk are most interesting. The observation Dr. Williams has made that calves fed upon milk from cows that have aborted, abort in their first pregnancy is significant. These are phenomena that have been observed. What is the interpretation of them?

Then there is the question of the bull. When I hear this topic mentioned I am always reminded of the farmer who lives in our vicinity and who comes to see me once a year to discuss this disease. He has a herd of cattle, and his brother on an adjoining farm has a herd of cattle. He does not have abortion in his herd, but his brother is constantly troubled with it, and yet they use the same bull for both herds. More knowledge is needed on this part of the subject.

Then we have the question of immunity. Do animals possess an immunity to this disease? Do heifers that abort in their first pregnancy and perhaps, second one also, cease to abort? If they do, has immunity been established by means of or through the agency of infection, or is it an age immunity? It does not make much difference which position we take on this subject for we can find plenty of data to support it. However, these are the ques-

tions that are before us; and it seems to me that, serious as the problem is, the work that must be done must be basic and fundamental in connection with the etiology of the disease, and with the reaction of the animal body to the infection.

I do not believe that I am able to give you any further information on this subject or any interpretation of the many facts that have been presented in the excellent papers that you have heard this afternoon. We are simply confronted with a very serious phenomenon and with a large amount of data. The solution of the problem rests in the united effort and cooperation of clinicians and laboratory workers.

DR. ROBERTS: The problem is with the practical side. For three years we have been investigating this subject in our state of North Carolina. We have been hearing of a few abortions, of a few retained placentae, and a few sterilities. If a maximum quantity were in one herd then the owner would be sufficiently interested, and would try to do something for it. He is unable to associate these different entities belonging to the same trouble. Therefore, he is not willing to undertake any means of control. On the other hand, in many instances, we believe it would be wise for him to do so from a financial standpoint. We recognize that it is very hard in our State to control these things. Some abortions we believe are due to the specific infection of the abortion organism. In most instances the limited numbers of cases are such as to make it of financial importance for him to let it alone; because if he undertakes to treat it and go through with what has been and what is recommended, it will be of more financial loss to him, in many cases, than will the abortion and the retained placentae and the sterilities. This is not speaking for all, but this is the general average. We have some of our veterinarians actually reporting from 50 to 75 per cent of their herds as temporarily or permanently sterile. In such cases, they are necessarily interested. Likewise, there are others having from 50 to 75 per cent of their offspring abort, and they are sufficiently interested to do something for it. But the biggest percentage of our people are having the limited number of abortions, retained placentae or metritis, and sterilities. From a financial standpoint, it is a question with me as to how far we could go in advocating what has been stated here, and what has been given before along the line of cleaning up the premises and cleaning up the animals that are themselves infected.

DR. WILLIAMS: I would like to explain the use of one word in which Dr. Hadley has apparently misunderstood me. In my writing I have said that cohabitation does not readily cause the spread of the infection of abortion. In the use of that word I have taken it in its fundamental and etymological significance, as the cohabitation of animals in a given stall or in a given enclosure, and has nothing whatever to do with sexual contact. Dr. Hadley has misinterpreted the meaning which I attached to the word.

There has been much said during the discussion this afternoon, and there is much said in our literature regarding the reaction of the serological tests. I would like to ask Dr. Hadley what constitutes a positive reaction?

DR. HADLEY: I mean that the blood serum of the animal under test, in the case of the agglutination test, agglutinates the corpuscles, used as an antigen. In the complement fixation test, I mean fixation of the complement by the specific antibodies.

DR. WILLIAMS: You did not get my question. In speaking of the reaction of the agglutination tests, what is the proportion that you consider a positive reaction?

DR. HADLEY: We have interpreted the positive reaction in the agglutination test when one-thousandth c.c. of undiluted serum agglutinates one cubic centimeter of the suspension or agglutinated antibody. Is that your understanding, Dr. Eichhorn? How do you interpret it?

DR. EICHORN: The quantity presented by Dr. Hadley is somewhat higher than the one they accept.

DR. WILLIAMS: I would like to follow that with another question. What scientific foundation have you for fixing that basis? Why is it not just as good evidence, why is it not just as positive a reaction if you get a reaction at one to ten, as if at one to one-thousandth? What is the difference? What scientific basis have you for differentiating?

DR. HADLEY: As in other cases of this kind, I think it is largely the result of experimentation, not altogether I am frank to say on my part, but on the part of the pathologists of the Bureau of Animal Industry; and men like Drs. M'Fadyean and Stockman and investigators of the New York State College of Veterinary Medicine. I think it is generally accepted that the reaction is positive when we get a certain agglutination with a certain amount of serum. I have no specific information to show that a smaller or a larger amount would not be accepted as a positive reaction any other than that based on experience.

DR. EICHORN: I would like to answer the question of Dr. Williams as to the titre which is considered as a positive indication of the infection; I think we have to accept the word as applied to other infectious diseases. For instance, in glanders, we know that an animal normally will give an agglutination titre of say .125 in glanders, or somewhat higher; and only in exceptional cases will this titre exceed or approach 1-2000. In the same way the normal agglutination titre for the other organisms is also determined. And for abortion, we generally concede that an agglutination titre of 1 to 50 is highly suspicious of the infection, and 1 to 100 is considered invariably as indicating abortion. This is, of course, determined by thousands and thousands of tests not only in

one laboratory, but by all other investigators throughout the world. We ought to accept the data which amounts probably, by this time, to many millions of cases as satisfactory for the determination of a titre which should be accepted as an index.

DR. MERILLAT: I have nothing to say on this question particularly, except, as one of the promoters of this symposium, I want to suggest, at this time, before the discussion closes that these papers, which are too voluminous to digest in a few moments, be published in one or at least two consecutive numbers of the *Journal*. Then they would be more available for reference by those who are here, as well as the 1700 members of the association who will want to analyze very carefully all of these splendid papers and discussions that will follow them.

DR. J. P. TURNER: After hearing this discussion, from a bacteriological standpoint, and from the standpoint of the investigators, it has seemed to me that the average practitioner will go home with the most pessimistic ideas and that he had better lay down on this question; that contagious abortion has really beaten him. It occurred to me just prior to my departure from home to look up the records of a herd that I have had under observation for 16 years, a herd of about 200 grade cows, the herd from which Mohler and Traun made their original investigations of contagious abortion, and the herd from which Schroeder and Cotton made their experiments along the milk lines. That herd did not breed its own calves and did not raise any heifers until 1908; and from 1900 to 1908, cows were purchased each year. Each June, at the end of the fiscal year when money was available, about 25 to 30 cows were purchased. Those cows were close springers or fresh. Those cows would abort about March or April. They would be bred the following September, and abort in April. At that time, we had 25 to 35 abortions a year, and with the usual accompaniments of retained placenta, septic metritis and scours in calves. The high price of cows, and the scarcity of good milk cows forced us in 1908 to begin raising our own heifers. We immediately proceeded to raise every heifer that was born healthy, and used full blood bulls, of course. At that time the herd consisted of about 150 cows and it now consists of about 200 cows and about 100 heifers. I will say that abortion has existed in this herd for over 20 years. It is interesting to note that in 1910, we had 18 abortions. Most of these were tested by the Bureau, that is, the blood was tested, and in all those cases we considered them as contagious abortion cases, and so treated the cows. In 1911, we had 14 abortions, and it is interesting to note that 1911 was the last year we purchased any cows for increasing this herd. In 1912, we dropped to 13, just one less in our abortions. In 1913, we had 9 abortions. In 1914, 6 abortions. In 1915, 3 abortions; the herd gradually increasing until it has reached its maximum of about

200 cows and about 100 heifers of all ages. Up to the date of my departure this year with 200 cows and 100 heifers we have had 3 abortions; 2 of those three were cows aborting at eight and a half months. The calves were both alive, but died. One of them was a three and a half months abortion. Blood was drawn from all of those cows, those three by Dr. Potter, and put through the complement fixation, with negative results.

That is interesting from the standpoint that I believe we will always have abortion in a herd as long as we continue to bring in fresh material.

As to the abortions among the heifers which we have raised. We have raised now 168 heifers which have been in milk from the first calf to the sixth. Contrary to the opinions offered this afternoon, our abortions among those cows raised in the herd have not occurred with the first calf. We have had 14 abortions among these 108 heifers raised with the herd, and of those 14 abortions, three occurred with the first calf. Of these three, all have calved successfully since, and none of these three have been sold. They have turned out to be very good milch cows. With the second calf we had four abortions. One of these had a live calf before this abortion, and after it aborted the second calf was sold as unprofitable; that is, we figured that unless they make two and a half to three gallons after the abortion, we had better sell them. Another one of those four has been sold as unprofitable, but the other two have been kept as profitable cows. With the third calf, five have aborted. All of these five have been retained in the herd as profitable cows. With the fourth calf we have had one abortion. With the fifth calf none, and with the sixth, we have had one abortion. This cow was unprofitable and sold.

This has absolutely no scientific interest, except to draw out these conclusions which have always obtained with me that the control of abortion in a herd lies in just these facts, that as long as we buy cows we will have abortions. New cows will always keep the disease in your herd. It is also interesting to note that all these heifers received and were raised on abortion milk. Certainly Schroeder's and Cotton's experiments showed that the herd was permeated; that all of the samples of milk showed contagious abortion. Ten years ago when we were raising heifers, we had five or six aborters at one time in the quarantine pens. We could not throw that milk away. We fed it to the heifers; and whether or not we got a self immunization of that herd, I do not know, but we do not have any more abortions. We have not used any of these radical measures of disinfecting cows for a month or so before breeding. I dare say that some of you would think these cows were not cared for very well. They have been brought in, some of them, in a rather dirty condition, but we have paid special attention to cows which have aborted. We have burned the abortions; we have separated the cows; we have kept them separated in concrete

yards for a month or two, sometimes three months; we have disinfected them thoroughly; we have disinfected the stables. We have not paid any attention to disinfecting the bull. We kept one bull for that purpose, because it was too much bother to keep constantly disinfecting this bull. This old bull is now ten years of age, and this last year, after cleaning him up thoroughly and disinfecting him, I put him back into the herd, and his impregnations have been coming along regularly. I have bred him to these aborted cows. It has impressed me that we may get some self immunization in our cows in these herds. Another thing which has impressed me is the fact that, when we raise our own heifers, those of us who do not have to depend upon the market, we will certainly solve this question. I believe that it is necessary to thoroughly disinfect and keep a place clean in order to produce these results.

DR. ROBERTS: In that particular herd in North Carolina, the big thing with us is that sterility more than anything else is the cause of 99 per cent of our losses.

DR. TURNER: As I said, you notice the figures of the 14 which had aborted. I sold three because they were unprofitable. We have had some sterility, but as the herd has disappeared from the purchased herd into the raised herd and they are young cows now, we have had very little sterility.

Another interesting fact. Dr. Williams is well acquainted with the herd; and we have no abortion at the present. I believe we had one case last year. Dr. Potter drew 115 samples of blood recently, and found one positive reaction. It is interesting to note that that cow was purchased in New York 8 years ago; had a calf about four or five months after being purchased, and has since produced a live calf each year; and, since the sample of blood was drawn, has had a good, big, husky calf, which has been sold for \$150. We are very well pleased with the situation as far as contagious abortion is concerned in these two herds.

We have had some other trouble which goes along with contagious abortion, one or two outbreaks of infectious metritis, with the loss of five or six cows, but in this herd we have had very little sterility. The sterility last year was practically nil. I think that 72 calves, in the one fiscal year, out of 82 dams is a fairly good record of production. I think it can be said that we have not very much sterility; and I feel very well satisfied that if the veterinarian has absolute charge of veterinary matters in a herd, and if he is not interfered with by the herdsman, or by owners with superficial ideas, he will be successful; but, if the veterinarian is simply called in by the visit, or if he is simply paid a little sum by the month, and little or no attention is paid to his efforts, there will be no success. If owners of fine herds wish success, they must put this matter entirely into the hands of their veterinarian and get the proper results.

DR. MERILLAT: One author in this paper, recommended the immediate removal of the placenta when it was not too stubbornly attached. I would like to know what is his management of the stubbornly attached placenta? I do not remember which one of the papers stated that, but I think it was Dr. Cotton's.

DR. COTTON: I made that statement. I think I am the guilty man. We all know that in contagious abortion, the afterbirth is retained: oft-times it is almost impossible to remove the placenta except by severe traction, pulling and separating of the cotyledons; and when we do that, we leave trouble with the uterus afterwards; and I think we have all been a little bit too anxious in the past to tear and pull at the placenta. I know I have been. Sometimes we wait for a week, and then undertake to remove it. I think this is a mistake, because the cervix contracts, the walls of the uterus remain flaccid, and we cannot get at it. But, I do believe if we can take it away without too much force, we should do it.

When we are unable to remove it, in order to prevent any increase of infection, I think we should flush the uterus and continue it weekly at least, oftener if possible, until such time as the placenta separates itself and comes away with the discharges. I think it is wrong to put too much traction on it.

DR. ———: (Utah): A word might be added in reference to the placentae that are retained and will not come away with ordinary traction. I think the same holds true here, as with the handling of the proposition as a whole, that there is no one rule or procedure that will apply by any means. There is no one rule that will apply in regard to the strength of the disinfectant, or the times of disinfecting. One disinfectant seems to work marvels in one case, and does not in the next. If it does not irritate one cow, it does another. It works better on one cow than it does on another cow. Where the placenta does not come away, we find, in our experience, that it is best to leave it alone, unless it will come away very easily. Where it is retained, place an iodoform capsule in the uterus, and leave it entirely alone; it will come away and take care of itself. That has been our experience in a few cases, and I am inclined to think that we will have no occasion to change the procedure. I am not certain but that it is the best way to follow where they do come away easily, simply insert an ordinary ounce capsule half full or full of iodoform; that seems to prevent putrefaction; and you go back in three or four days or a week, and have no evidence of putrefaction existing. We did that the other day with a cow that had a fetid fetus, which was removed, and there was no irritation whatever. The iodoform capsule was introduced and in about four days afterwards the cow was in good condition. There was no dropping off of the milk, no evidence of any bad effects from infection. We have had some extremely bad results from filling up the uterus with a disinfectant with the idea

that this liquid disinfectant would take care of it. It does take care of it in a great many cases, but in some cases the uterus is so flaccid, so torpid, and the cavity is so great that the fluid seems to stay in there, and something happens, I don't know what; cases treated that way go on to a fatal termination in a short time. Whereas, since we have used the iodoform method alone, without any introduction of fluid, except that which was removed immediately, these unfavorable results have not followed.

DR. TURNER: When you introduce this iodoform capsule, do you open the capsule or spread it out?

DR. ———: (Utah): As a rule we just put it in, as far down as we can reach.

DR. TURNER: That was my practice. I don't do it any more. I had a cow die last year that had a capsule—we had three capsules put in the cow, and I found all three of those capsules accumulated in one corner of the uterus. Some mucus had gathered them together. There was no spread at all. The gelatine had not dissolved. Since then I have decided unless I can spread the iodoform through the cow's uterus, it is rather foolish to use the capsules. Contrary to the ideas of most practitioners the uterus is not an intestine that twists and spreads and turns. It is an organ that stays in place, and your capsule stays right there.

DR. DEVINE: It seems to me that pure bred cattle have become such an important factor in our agricultural sections, that this very topic is just as important to the young men as any one thing I know of.

Some 7 or 8 years ago I wrote an article for the *Review*. Dr. Turner wrote me about it afterwards, as did several others, deploring the fact that our colleges turned out young men who would go out and manipulate the interior of the uterus of a pure bred cow the same as they had been accustomed to do on a scrub. To every man I got as an assistant after that, I said in big type that was one of the things he should not do. It cost me a great many nights' sleep, and a good bit of criticism until I found out that men were apt to do that unless I cautioned them otherwise.

I want to say from experience among thousands and thousands of pure bred cattle, and I was built for that business, that any man, who would attempt to manipulate or put traction upon the fetal membranes of a pure bred cow, where there was already infection, is making a serious mistake. If he ruptures one capillary, 99 per cent are liable to go off feed, go down in their milk, and get hemorrhagic septicemia in a more or less developed form, and probably die from it. Any procedure that has ever been suggested to me, or that I have read of, including Dr. Williams' iodoform capsule, has been unsatisfactory in general practice. As Dr. Turner says, we find the capsule undissolved after making the examination. You want to remember that where the membranes are re-

tained, the uterus does not have its normal contraction, and you can readily introduce your hands two or three or four days afterwards into the uterus, and examine and see what your capsule has done, or has not done, about dissolving. In some cases it has dissolved beautifully, where there has been an amount of serum in there, but in some cases it has not. On the other hand, where it has dissolved most beautifully, it has been objectionable in high class stables because of the odor which comes with it, so I had to abandon it.

As to irrigation, some say a week, some say three or four days, but to my mind, that amounts to nothing. A cow with a fetid membrane which is decomposing, needs to be douched at least three times a day, in order to keep down infection and lessen the decomposition, and bring away the membranes: get them out before dripping commences. Another serious thing is that we are all apt to make our disinfectants too strong. You can burn the inside of the uterus very easily. As a matter of fact, if you use only a common salt solution, often enough, perhaps you would get along just as well. But the important thing is to keep the exterior clean with disinfectants, and then when you attempt to irrigate, or teach others to irrigate, be sure you are clean, that they are clean, before they attempt to introduce the solution. I think Mr. Smith's records will show you that I have bought some six or seven dozen stomach pumps within the past four or five years. On every farm I attempt to have one and I attempt to show the herdsmen how to use it. I am not afraid that he will steal my business. If he will irrigate those cows regularly, conscientiously and scientifically, he will do a great service to me and my profession, as well as his own.

DR. CONNAWAY: As Dr. Turner remarked, it seems that at a certain stage, we are all up in the air. I think the report which Dr. Turner gave of his experiences teaches us a very important lesson, one we can take home and apply, and one which the farmers and many of the breeders would like to hear. It is this: Don't disperse a herd that is infected with contagious abortion. The practice in the past has been, when this disease gets into a herd, to hide it, not let anybody know anything about it at all, but proceed to get rid of those animals which have aborted one by one, or later on if it got bad, to hold a sale and disperse the whole herd. I have known many men to do this who ought to be in the pure bred business today, and would be if they had had the proper advice at the right time. I did not know what to advise them, nor did any other veterinarian at that time. Investigations have shown this, observations have shown that this is a disease that tends to immunization of the herd, and if we don't do anything, bye and bye we will have a herd which will raise its calves, and that is what the breeder wants; that is what the dairyman wants; he wants a herd that will raise calves. I know of herds that have had this

disease for 15 or 20 years which at the present time are not losing very many calves. Those old cows still respond, and will show a complement fixation reaction, whatever that may mean, or however little faith Dr. Williams may have in this test, or our methods of applying it. I believe that is a good test, and that we ought, our experiment stations ought, to make this test useful to the breeders to detect the infected herds of the state; to detect in infected herds those individuals that are infected, so they can apply these sanitary measures, segregating these animals and applying those old time remedies, which Liautard and others of his day, 25 years ago, recommended, and which have been recommended here today.

I think finding out where the disease is, the isolation of infected animals, the isolation of the calves, and thorough disinfection of the premises or buildings where they are housed, that by these methods bye and bye we will get rid of this disease. I am quite sure of it. I know of herds that do not have the disease, and the disease has been kept out of those herds simply by being careful in buying the bulls, or probably not so much that, as not introducing any new females into it. That was brought out here, I think by Dr. Turner and probably by others.

I think we are making progress along this line. I believe these scientific investigations, although we have not enough facts established yet, and our interpretations may be at fault, should go on until we find enough facts, and presenting those facts before this association where another man can get up and say that his experience is different, and he does not believe that is a fact; why, we may be convinced bye and bye that some of the things that we think are facts, are not facts; these discussions will help us to get at the whole truth of this matter. Let these investigations go on. Let us come here with our facts or what we think to be facts, and swap them with the other fellow; set them up and let the other fellow knock them down, if he can.

I believe this to be a fact in regard to contagious abortion, a scientific fact of which we have some evidence; that much of this disease is transmitted through the calf. We know that fetuses from cows that abort contain the germs of that disease. We get the cultures from these sources. We also know that some of these calves that are dropped are under-sized; some of them have been carried longer than their due time, and dropped as little, runty calves. Those calves, I have no doubt, carry the germs of that disease. We know that they will show the complement fixation reaction before they ever drink any milk. So I think there is pretty good evidence that the calf has it. We know this in some experiments that have been made at the Missouri Experiment Station, and probably have been made at other experiment stations, that those calves will retain that infection, or at least the antibodies, for 100 days or longer. We have had some that reacted 180 days after birth. Of course, there is a possibility that some of these may have kept up that infection by drinking infected milk, but we

know that they had the infection at birth, and we know that many of them have lost it in five or six weeks, and that some of them will lose that reaction in about 180 days. I think the average on some 15 or 20 calves that were tested was about 120 days. The question is, has that calf lost that infection, or is it simply lying there in a dormant condition awaiting the period of gestation in the case of the female, when the breeding period comes on? In the case of the bull, some of these little bull calves will show that reaction at the time of birth. They lose it. The question is, does the bull retain that infection in its body in a dormant condition, and later on at breeding time, does it creep out again?

We had in some of our experiments this peculiar circumstance. We bought a bull in Massachusetts for an experiment, to breed to some non-reacting heifers; and after we bred him a time or two to cows that had never been bred before, he showed a positive reaction. Where did it come from? This bull had never been bred to any infected animal; never had been bred to an animal that had been served before, and was kept isolated away from infection. So there is this possibility, that it may hold the infection in some organ of his body, possibly in the sexual organs, and along at the breeding period it will break out again. We have much to learn about this, but let the good work go on: and let us bring our facts or supposed facts here and discuss them. One word as to the question of sterility. Here is one of the big questions that is up to the farmers and breeders today. I know of one herd where the man is not raising many calves, and he has no abortion in his herd. His cows simply won't conceive. What are the reasons? I think the work which Dr. Williams has done along this line is going to help us out a great deal on this matter; and that some recent work done in Chicago along human lines may lead us in the right direction. Other infections may be responsible for sterility. In the work of Rosenau and one of his men in one of the hospitals in Chicago, you may recall, they found in cystic ovaries in the human a certain coccus quite constantly along with other bacteria; and they came to the conclusion that these things may have something to do with the sterility in women. One important case was a virgin that had an imperforate vagina, and consequently could not have received the infection through the vaginal tract; on an operation for the removal of the ovaries in that case they found a certain condition—I don't just recall it exactly, but they found some streptococcus in these organs. They made some experiments with these, reproducing the same trouble in rabbits. I brought this up because it is in line with some observations I have made on sterile cows. In one herd where four cows did not conceive, one never had raised a calf, although she had been bred many times. The other cows had raised a few calves and had quit. In every one of these cows we found nails in the reticulum. It is not an uncommon thing to find them frequently in the reticulum. But we found in those four cows evidences of pus infection, perforations in the liver, or

in the diaphragm, and abscesses formed in different parts of the body. So it is possible that we may have in this case the transference through the blood stream to the ovaries, some selective organism that finds its habitat for growth best in the ovaries and in the ovarian cysts.

We may have some of these cases of sterility due to organisms that get to these organs through the blood stream, just as Rosenau and his men have found in the case of the human. Dr. Roberts has asked a question and nobody wanted to answer. The doctor lives down in a region where they feed a large amount of cottonseed meal. Another man from down south told me this story just last night, so I am going to tell it to you now. He said an acquaintance of his up north told him to send up a sack of cottonseed meal. He said he got it and sent it up. The lady of the family ground that up into an emulsion and drank it. The result was an abortion in that case, and with serious results. There is an old notion down south regarding the cotton root. They say old nigger mammies used to use that for abortive purposes. I do not know what success it gave.

DR. ROBERTS: It hasn't any effect on them down there.

DR. CONNAWAY: I think the question of feed is one that we must investigate in relation to sterility.

DR. POTTER: There is one question in reference to this abortion proposition which has not been sufficiently emphasized, and that is, that the man who has no abortion in his herd should be instructed in methods which will keep his herd clean. I believe that this information should be disseminated as widely as possible in order to prevent the dissemination of the disease. The fellow who has it extensively in his herd will take the necessary means of getting rid of it, but we ought to instruct the man who does not have it, how to keep his herd clean.

DR. CASE:—I would like to ask Dr. DeVine a question. He spoke about irrigating the placenta two or three times a day if it is not taken away. I want to ask him how much fluid he injects into a uterus, and whether he has that fluid withdrawn. It has been my experience when I put fluid into the uterus and left the placenta in, that I could not get that fluid out, and I have had several fatal results. I would like to ask how much fluid he puts in there, and whether he tries to get it out again.

DR. DEVINE: I have had that question asked before. One young man last night told me that he feared that from douching a cow he had ruptured the uterus. I would like to see the man that could rupture a normal cow's uterus by simply pumping in water. That simply cannot be done. As to taking out the fluid, that depends. If you have occasion to see a cow that has a mucous membrane that has been held two or three days perhaps, you find it pretty ripe. Of course, we irrigate that, irrigate it and siphon it out until we think we have it clear, or until it repairs. It doesn't matter whether it takes one pailful or ten pailfuls. If there are

any shreds in there, we take them away with our hands. Sometimes the membrane is ready to come out, but we don't attempt to pull it. I say, use just as much water as you choose. I have sometimes used six or seven ordinary bucketfuls, pumped in and then siphoned out. In case, of course, where you have putrefied membranes, you use disinfectants, making each pailful perhaps lighter and lighter. Then finally in such cases you always try to leave in a pretty fair bucketful of normal salt solution, carry those ordinary salt tablets, put them in the pailful, let it stay in unless she rejects it; of course, she does more or less. But we like to leave it in there some time for the purpose of observation. I have never seen a case, and I cannot conceive how clean, sterile water, or water of normal salt solution, or water with a mild antiseptic, can be accused of killing a cow. I cannot conceive of a condition that would lead a man to suspect it.

Dr. ———: It has been our experience that they generally die. I do not know why it is.

Dr. COTTON: I do not want to see the practitioners leave this meeting today with the understanding that, if they have infectious abortion in a herd, all that is necessary is to advise the owner not to buy any more cattle and leave it alone and they will get a natural immunity and the disease will subside. I do not want them to go away from here with the idea that within a week or a few days after an abortion has occurred, that they can give a stomach tube to the herdsman of a high class, high priced herd of breeding dairy cattle and tell him he can continue to flush the uterus with impunity or immunity. I have killed cows by introducing a hose into the uterus to try to flush it.

I want to tell you again that when four days to a week have elapsed after an animal has aborted, the cervix is so contracted, that it is dangerous to give to a layman any instrument to introduce into the uterus. I also want to state that in my opinion all fluids that are put into the uterine cavity under those conditions should be siphoned out, and if you are unable to get them out that way, put your arm into the rectum and see that you get all of the fluid out of the uterus before you leave it.

Dr. DEVINE: I would like to say to Dr. Cotton that no man can get his tube or his hand into the uterus four or five days after the placenta has been removed or has come away without tearing the os open again.

Dr. COTTON: Even when the placenta is retained, and the cervix is contracted, I want to still insist that it is bad practice to give a stomach tube to a herdsman with the idea that he will flush the uterus out two or three times a day, or even once a month or once a week. It is dangerous. A practitioner, a qualified man who will go carefully into that cervix, perhaps may be able to introduce a common soft rubber horse catheter, but look out for that stomach tube, or you will have fatal results.

SOME FACTS ABOUT ABORTION DISEASE*

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Most bacterial diseases have two prime or main factors, a pathogenic microparasite and a susceptible host, but infectious abortion disease of cattle is more complex; it has three prime factors, a pathogenic microparasite and two hosts. How imperfect our knowledge about this perplexing evil has remained at once becomes apparent when we stop to think that it has not been certainly determined which of the two hosts, the cow or the fetus, is primarily attacked by the microparasite. That is to say, we do not know whether the abortion bacillus primarily causes a disease of the cow's uterus which leads to the expulsion of the fetus, or whether, in the first place, it causes a disease of the fetus which subsequently impels the uterus to expel its contents.

One of the superlatively important facts about abortion disease is that cows often remain carriers of abortion bacilli long after they have ceased to abort, and that cows which have never aborted and regularly and normally produce seemingly healthy calves, may be chronic carriers and disseminators of abortion bacilli.

As far as we have been able to learn, the abortion bacillus is an obligatory parasite. It may live and retain its virulence a long period of time, as this can be measured through bacteriological cultivation and guinea pig inoculation tests, in infected material expelled from the uteruses of infected cows, but we have no data to support the belief that it can maintain itself or multiply under natural conditions as a saprophyte. Hence, the chronic persistence of the microparasite in the bodies of infected cows probably is the most important among the causes responsible for the propagation, the perpetuation and wide prevalence of the disease.

Another fact is that the favorite habitat of the abortion bacillus in the bodies of cows is the udder, and that the udder is seemingly its only habitat in the bodies of non-pregnant cows. Our work regarding this fact includes hundreds of carefully made tests with milk from numerous cows. Some of the cows had aborted and others had not: the milk of some was infected with

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abortion bacilli continuously and that of others intermittently; that of some cows remained infected year after year and that of others shorter periods of time. In one case, a cow that remained under observation seven years, periodic tests proved the milk to be infected continuously.

There is a fact, related to the expulsion of abortion bacilli with milk from the udders of cows, which is interesting and important not only on its own account, but also because it serves as strong circumstantial evidence to prove that our work on the occurrence of abortion bacilli in the milk of cows is trustworthy. The fact is this, in the numerous tests made, with milk from many different cows, the abortion bacillus was never found in the milk of a cow unless both her milk and her blood serum possessed agglutinating properties for suspensions of abortion bacilli. This does not mean, however, that the milk of all cows which react with the agglutination test for abortion disease is infected; as we have repeatedly tested milk from reacting cows without detecting abortion bacilli.

Regarding reacting cows with uninfected udders we may say, though we wish to have the statement taken cautiously as the evidence behind it is not yet sufficient to give it the rank of a proved fact, their blood serum gradually loses its power to agglutinate suspensions of abortion bacilli.

If this statement on further study should prove true, it, together with other facts, will justify the conclusion that the persistence of agglutinating and complement fixing substances in the blood of cows, relative to abortion disease, is intimately associated with the abortion bacilli that enter the body through the lymphatics from infected udders, as abortion bacilli do not maintain themselves in the bodies of cows elsewhere than their udders and gravid uteruses.

That abortion bacilli do not maintain themselves in the bodies of cows elsewhere than the named regions, is a fact for which we have obtained fairly convincing proof. It was found that abortion bacilli injected into the veins of normal, non-pregnant cows disappeared from their circulating blood in the course of a few hours, and when such cows were killed sometime afterwards, though their blood had become positive with agglutination tests, the germs could not be found in their bodies unless it was in their udders and associated lymph glands. One case in our records of experiments

is remarkably impressive as an illustration of the tendency of abortion bacilli to lodge in the udder. The case is that of an adult, virgin, female animal, a heifer approximately four years old, which was given an injection of abortion bacilli into one of her jugular veins. Later it was found that the infection had established itself in her virgin udder, which was not functioning and never had functioned. We use the term infection here and elsewhere in this paper as signifying the discoverable presence of abortion bacilli, and not as implying the development of observable lesions of disease.

Another series of tests, probably even more convincing than the foregoing, was a careful search for abortion bacilli in the bodies of naturally as distinct from artificially infected cows. The cows were killed and their blood, spleens, livers, kidneys, brains, ovaries, uteruses, udders, milk, synovial fluid from various joints, nerve tissue, lymph glands from all portions of the body, etc., tested for abortion bacilli through animal inoculation and cultural methods, with the following results: In all cases two or more quarters of the udder, the milk from the infected quarters, and one or more supra-mammary lymph glands, and in one instance some of the pelvic lymph glands were infected. All other organs and tissues were invariably free from infection.

When we inject abortion bacilli into the non-pregnant uterus of a cow they disappear in the course of a few days; when we test the discharge from the uterus of a cow which has aborted we may find abortion bacilli for twenty, thirty or even forty or fifty days, but they eventually disappear, and it is our impression that their abundance and period of persistence is intimately related to the magnitude of the lesions in the uterus attendant upon an abortion.

It is our belief that the evidence we have supplied is sufficient to prove the two facts, one, that the udders of cows are a common habitat of abortion bacilli and, two, that abortion bacilli do not maintain themselves in the bodies of non-pregnant cows elsewhere than in their udders. This occurrence of the bacilli in the supra-mammary, and in one instance in pelvic lymph glands, and no further into the body, merely proves that the germs tend to penetrate into the body from the udder through the lymph channels, but that they cannot go very far before they are destroyed.

When we inject abortion bacilli into the udder through the teat, using a method which avoids trauma, we establish the bacilli in the udder, and the cow, according to all available tests, becomes an infected cow.

Now, we have a remarkable and truly important fact concerning the production of calves by cows with infected udders. Such cows, irrespective of whether they have at some time in the past aborted or not, may give birth to seemingly normal calves in a seemingly normal manner associated with the occurrence of abortion bacilli in their uteruses and the afterbirth. We have quite a number of records to prove this: it does not occur every time a cow with an infected udder calves, but is far from uncommon. As we have stated, it may occur with a cow which has never aborted, and it may occur with the third seemingly normal parturition after an abortion. In our experience, though we have made quite a number of tests, this remarkable fact has never been observed in connection with cows which react positively with the agglutination tests but the udders of which were free from infection, and the fact becomes all the more remarkable when we view it in the light of another fact, namely, that numerous careful tests of the uteruses of non-pregnant cows, irrespective of whether their udders were infected or not, tests made both between and during periods of oestrus, in no instance revealed the presence of abortion bacilli.

Another fact which merits consideration in this connection was derived from tests with newly-born calves. A number of calves produced by cows with infected udders, were killed immediately after they were born and their bodies tested for the presence of abortion bacilli through guinea pig inoculation methods. These calves were not permitted to come in contact with their mothers or other sources of infection that would tend to introduce germs into their bodies not present at the moment of completed parturition. It was found that such calves, and we are speaking about calves that were delivered alive and seemingly vigorous and healthy, may harbor abortion bacilli in their stomachs and gastro-hepatic lymph glands, but, invariably, when the calves were infected the afterbirth and the uteruses of their dams were also infected. In aborted fetuses the stomachs, intestines, lymph glands, spleens, livers and blood and subcutaneous extravasations of serum may contain abortion bacilli.

One of our records concerning the injection of abortion bacilli into the udder of a cow, through the teat without trauma, is particularly interesting. The cow was well advanced in pregnancy and according to all tests that could be made was free from abortion disease prior to her injection. We will give this record with

considerable detail, because it impresses us as being very instructive and may, moreover, illustrate the laborious application the investigation of abortion disease requires.

Cow No. 1154. Sept. 9, 1914. Received at the Experiment Station from an abortion-free herd. About 8 years old. Was negative with all tests for abortion disease and was carefully protected against exposure to infection.

Sept. 21, 1915. Served by bull No. 1150 and conceived. The bull was received at the station on the same day on which the cow was received, and was and is now negative with all tests for abortion disease, and has been carefully protected against exposure to infection.

Dec. 10, 1915. Agglutination tests with blood serum from the cow and the bull were made. Negative in both cases.

Mar. 27, 1916. Agglutination tests with blood serum from the cow and the bull were made. Negative in both cases.

You may observe that we speak of the agglutination test over and over again and say little or nothing about the complement fixation test for abortion disease. The reason for this is quite simple. We convinced ourselves that the agglutination test for abortion disease is fully as reliable as the complement fixation test, but far less complex, and, hence, in the hands of those who have many and varied duties, more reliable.

Mar. 27, 28, 29, 30 and 31, 1916. On each of the five days material was obtained from the udder of the cow and injected into guinea pigs. The guinea pigs were subsequently killed and examined post-mortem and found to be free from lesions of the kind caused in guinea pigs by abortion bacilli. In fact, they had remained perfectly healthy and showed no lesions of any kind.

Apr. 3, 1916. The growth on two culture tubes of abortion bacilli was scraped off and suspended in 30 c.c. of sterile normal salt solution and injected into the right front teat of the cow. The method of injection was through gravity, and the pressure used did not exceed that exerted by a column of fluid 12 inches high.

Two guinea pigs were injected with samples of the suspension, and both later showed typical lesions of the kind caused in guinea pigs by abortion bacilli.

Apr. 8, 1916. Five days after the injection, agglutination tests with blood serum from the cow were negative.

Apr. 17, 1916. Two weeks after the injection, agglutination tests with blood serum from the cow were positive with dilutions of 1 to 400, which must be regarded as a very strong reaction.

Apr. 22, 1916. Material from the infected quarter of the cow's udder was injected into guinea pigs, which subsequently developed typical abortion bacillus lesions.

May 3, 1916. Material from each quarter of the cow's udder was injected separately into guinea pigs, all of which subsequently developed typical abortion bacillus lesions, showing that the infection originally introduced into one quarter had spread to the other three quarters. On the same day material from the udder agglutinated suspensions of abortion bacilli in the following dilutions:

Right front, or injected quarter.....	1 to 6400
Left front quarter.....	1 to 1600
Right hind quarter	1 to 800
Left hind quarter	1 to 1600

It is interesting to note how much higher the agglutinating value of material from the injected quarter is than from the other quarters. We do not speak of material obtained from the cow's udder as milk, because the cow was practically dry, and it is questionable whether the material which can be stripped from a practically dry udder shortly before parturition can reasonably be looked upon as milk.

On May 9, the agglutinating value of material from the injected quarter of the udder was positive in a dilution of 1 to 12,800, and on May 15, 19 and 24, in a dilution of 1 to 25,600. On these days the agglutinating value for suspensions of abortion bacilli of material from the other quarters of the udder remained constant for a dilution of 1 to 1600, and that of the blood serum of the cow for a dilution of 1 to 400.

May 26, 1916, or 279 days after service by the bull, the cow produced an undersized, weak calf, which, however, rapidly gained strength and is now a normal healthy, vigorous animal. On the day of parturition the following agglutination tests were made.

Colostrum, injected quarter of udder, positive, dilution	1 to 25600
Colostrum, other 3 quarters of udder, positive, dilution	1 to 1600
Blood serum cow, positive, dilution.....	1 to 400
Blood serum calf, positive, dilution	1 to 400

It is common for newly-born calves of infected cows, when agglutination tests are made with blood serum to react in the same dilutions or quite as strongly as their mothers, but this power to react does not persist, it is a rapidly declining phenomenon, as is well shown by the following tests of the blood serum of the calf concerned in this record.

On the day of its birth, as we have recorded, the agglutination value of the calf's blood serum and that of its mother were identical; positive in dilutions of 1 to 400. June 2, the agglutinating value of the calf's blood had already declined to positive in dilutions no higher than 1 to 200; June 7, it had fallen to 1 to 100; June 9, it was still at 1 to 100, but on July 10 all agglutinating power for suspension of abortion bacilli had disappeared.

Contrary to this, the agglutinating power of the cow's blood serum remained constant for dilutions of 1 to 400. Not so, however, with the agglutinating power of material from her udder. Colostrum, we have seen, agglutinated in dilutions, injected quarter, 1 to 25600; other quarters 1 to 1600. The milk, as early as June 8, a little more than two weeks after parturition, was positive in dilutions no higher than, injected quarter, 1 to 200, and the other quarters, 1 to 50, at which points it remained fairly constant.

Now for the most interesting fact about the cow. Parturition was associated with retention of the afterbirth, which, on removal, was found to contain much abnormal material of a yellowish color, and this was proved to be infected with abortion bacilli. Vaginal discharge from the cow was also proved to be infected with abortion bacilli on June 1, 3, and 12, and free from infection on and after June 20.

This one cow illustrates a number of abortion disease phenomena. First, we see that the introduction of abortion bacilli into the udder through the teat, though a method of injection was used which almost certainly precluded mechanical injury, positively infected it and caused the gradual development of agglutinating power for suspensions of abortion bacilli in the blood serum. In other words, the udder is a possible channel through which abortion bacilli may penetrate into the body.

Secondly, we see that the passage of abortion bacilli from the udder to the uterus is an experimentally demonstrated fact. We have already stated that, in all cases in which we found abortion bacilli in the uterus after seemingly normal parturitions, it was in cows with infected udders, and it is only necessary to add, in practically half of the cows with infected udders we have examined relative to this matter, we found the uterus and placenta infected with abortion bacilli.

One is almost inclined to ask whether abortion disease may not perpetuate itself through abortion bacilli that enter the udder

through the teat. If you will stop to think how cows are milked, and how the milker goes from cow to cow without disinfecting his hands, and that the udders of cows are the commonest and a very common habitat of abortion bacilli, you will not regard the mode of infection suggested by the question too lightly, or as an untenable supposition. We are in no position to claim that a question of this kind is likely ever to receive an affirmative answer, but it is now equally far from a negative answer, and serious investigation must consider all possibilities.

The record of cow No. 1154, in the third place, illustrates another fact: namely, the high agglutinating power of colostrum from cows with infected udders. This phenomenon, together with the rapid decline of agglutinating power of material from the udder as milk takes the place of colostrum, has been repeatedly observed.

In the fourth place, the rapidly declining agglutinating power of the blood-serum of the calf of an infected cow is shown, and this also is a repeatedly observed phenomenon. We have found that we can engender agglutinating properties in the blood of calves by injecting them with abortion bacilli, but such injections must be repeated from time to time otherwise the agglutinating properties of the blood serum disappear.

In the fifth place, as the calf was suckled by its mother, whose udder we know was heavily infected, we may judge from the rapidly declining agglutinating value of its blood that abortion bacilli in ingested milk do not seem to penetrate deeply or abundantly into a calf's body. The records of other cows and calves give similar data.

But we must not impose too much on your patience and good nature by multiplying our presentation of phenomena which, whatever of economic importance they may eventually lead to, still require the most careful study, singly and in their bearing on each other, before they can be woven into a clearly understandable entity.

But there is one other matter to which we wish to call a few moments of attention. We know that it is rare for male and virgin cattle to react positively with abortion tests, and it has been pointed out that the bodies of cows do not harbor abortion bacilli elsewhere than in their udders, associated lymph glands and pregnant uteruses. It does happen occasionally that bulls do react

when they are tested for abortion disease, and what such reactions may signify remains decidedly questionable; hence, the two following cases, may be both instructive and interesting.

Sometime ago we found two bulls which reacted when their blood serum was tested with suspensions of abortion bacilli. In one case the reaction was positive in a dilution of 1 to 200 and in the other in a dilution of 1 to 100. Where the bulls got the infection our knowledge of their history does not reveal.

One of the bulls, the one with the higher reaction, was immediately killed and examined post-mortem. The only lesions found in his body was an abscess involving the epididymis of one testicle, and this abscess was definitely proved to be infected with abortion bacilli. Tests, including all other portions of the sexual organs and various other organs of the body, failed to reveal abortion bacilli.

Was this apparently healthy bull qualified to serve as an active disseminator of abortion disease? We leave you to answer the question, we are not ready to do so.

The other bull was permitted to serve a cow which, according to her history and all tests we could make, was free from abortion disease. Immediately after the service seminal fluid was recovered from her uterus and injected into a number of guinea pigs, one of which subsequently showed abortion bacillus lesions. We still have this bull and are testing whether he will introduce abortion disease into a small herd of non-infected cows which is being carefully guarded against all other sources of infection.

A few years ago one of us, on the basis of our work on abortion disease, expressed the view that the abortion bacillus seemed to have a peculiar affinity for embryonic tissue. Today we are still inclined to this view, which brings with it the question whether the disease is not in fact primarily a disease of the embryo or fetus rather than of its mother. The mother, to be sure, is the source of infection, and possibly, if a large enough number of virulent abortion bacilli are poured into her body from her udder, antibodies of sufficient potency may develop in her blood to protect her fetus. Should this prove true, good results in the treatment of infected herds may be expected from injections, into the mother, possibly a short time before she conceives or early during pregnancy, of cultures of abortion bacilli, and it is possible in this case, that the more virulent the cultures are and the more abundant the material

injected, the better the results will be. But we must not wander off into hypothetical speculations.

For the time being, from our standpoint, the best we can do to prevent the further spread of abortion disease is to teach owners of uninfected cattle to have careful agglutination tests for abortion disease made of all cattle they propose to introduce into their herds, and owners of infected herds must be taught that aborted fetuses, and the afterbirths and discharges from the vaginas of infected cows, are infected with abortion bacilli and must therefore be disposed of with care. The treatment of individual cows which have aborted or failed to clean properly after parturition must be left largely to the good judgment of the practicing veterinarian, but we would like to make one suggestion regarding the douching of cows' uteruses. If the uterus is given a proper chance to heal after it has been damaged by an abortion or a retained afterbirth, the abortion bacilli in it need occasion little worry, as they will rapidly disappear of their own accord, and it is very questionable whether reparative processes are not retarded rather than facilitated by douching with germicidal solutions which are strong enough to kill bacteria in a reasonable length of time, or the length of time during which they may remain undiluted in the uterus.

Douching is no doubt good practice, but the object we should have in mind is a flooding out, a washing out, a real physical cleaning of the uterus, and this can best be done with solutions which are healing rather than germicidal, soothing and not irritating.

It is reported that the Veterinary Examining Board of Kentucky has already examined more than 250 applicants for licenses in that state and that another meeting of the board will be held at Frankfort early in December, in order that those who have passed the examinations may obtain licenses before January 1.

At the September meeting of the Northwest Iowa Veterinarians' Association at Sioux City, Dr. C. F. Nord, of Onawa, was elected president; Dr. Charles Parks, of Merville, vice-president; Dr. W. F. Hodam, of LeMars, secretary-treasurer. A clinic was held at the hospital of Dr. G. P. Statter.

The annual meeting of the B. C. Veterinary Association was held September 20, at Vancouver, B. C.

VACCINATION AGAINST INFECTIOUS ARTHRITIS OF FOALS DUE TO *B. ABORTUS EQUI**

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Enzootic, epizootic, or as at present more commonly termed infectious abortion has been recorded since the earliest time, but far more has been written regarding infectious abortion of cattle than concerning this disease in other animals. During the latter part of the nineteenth century, various foreign authorities and our own investigators noted severe outbreaks among the mares in different studs, in many cases spreading over and affecting a large percentage of the mares in certain localities. Most notable among these outbreaks in our country is that which occurred in the Mississippi Valley in 1866, the infection spreading and increasing in virulency to the extent that it caused enormous losses with a remarkably high percentage of abortions in some of the affected districts.

The horse-breeding areas in Illinois and adjoining states suffered the most, while in Kentucky in 1892, it is reported that seventy-five per cent. of the trotting and thoroughbred brood mares were either barren or had lost their foals. Bourbon County sustained a loss of over \$50,000, Fayette County even greater losses, and Madison and other counties experienced similar misfortune. The disease also inflicted much damage on the horse ranges in Montana in the same year.

The infection was first observed in South America in 1891 in the State of Buenos Ayres, Argentine Republic where the outbreak was described as the most destructive of any that had hitherto been observed in any part of the world and where the losses were incalculable.

At the time of these earliest outbreaks the cause was not known. Twenty-three years ago, or in 1893, following an outbreak of abortion among mares in a large stud in Pennsylvania, Kilbourn & Smith, (1) succeeded in the isolation, from one of the mares which had aborted, of an organism closely resembling the hog cholera bacillus and classified as such by Smith.

*Presented at the meeting of the A.V.M.A., Detroit Mich., Aug. 21-25, 1916.

The transmission experiments on pregnant mares and sows, although producing a catarrhal discharge from the vagina for a time, were not successful, the experimental animals dropping healthy offspring.

Turner (2) in 1894, with a bacterium isolated from the placenta and aborted fetus, succeeded in producing abortion in pregnant mares with inoculations of the cultures and the living foals showed typical joint affections.

In 1901, Ostertag (3) reported the isolation of a Gram negative streptococcus from the heart-blood, thoracic cavity and the intestinal tract of a fetus, but was successful in producing only a small percentage of abortions in artificially infected animals.

Numerous other investigators, including Lignieres and Zabala (4), Good (5, 6, 7, 8 and 9), Van Neelsbergen (10), de Jong (11), Dassonville and Riviere (12), Meyer and Boerner (13), and Schofield (14, 15), working over a period from 1897 to 1915, have all succeeded in isolating and have reported a bacillus belonging to the para-typhoid-enteritidis group and inoculation experiments on different animals were, with few exceptions, successful. The work of Good, and Meyer and Boerner, working independently in their bacteriological investigations was exceptionally thorough and added much to our knowledge concerning the biology of the organism, designated by them as *Bacillus abortivo-equinus* and *B. abortus equi*, respectively.

It was not the idea of the writer to report fully the work done by the different investigators in connection with equine abortion, nor do we have anything new to report regarding the biology of the organism. Our work in the outbreak herein reported, established the causative agent as identical with the before-mentioned *B. abortus equi*. We desire, however, to report certain findings in connection with an outbreak of abortion in a stud containing a large number of thoroughbred mares, which was brought to our attention by reason of the fact that several mares had dropped premature dead foals.

Some of the other foals, which were carried to full time developed when from twenty to twenty-three days of age, typical cases of arthritis or joint evil, which did not yield to treatment by the veterinarian in charge, employing anti-streptococic and anti-staphylococic bacterins.

On January 27, and on February 4, 19, and 27, respectively, four mares in a brood stable containing thirty horses dropped dead fetuses; three of these were abortions which occurred between the ninth and tenth months, and the fourth was carried over eleven months. No report of these were received at the State Laboratory at the time and consequently we were unable to hold autopsies. Following the dropping of the fourth fetus at the ninth month, however, a very small piece of placenta was forwarded for examination and diagnosis. This was, of course, badly contaminated with numerous rapid-growing microorganisms and it required several platings before we were able to isolate and identify the *Bacillus abortus equi*. In the meantime other foals were beginning to develop joint affections and as we were reasonably certain that the abortions were of an infectious nature, blood samples were collected from fifty-four animals, including the thirty brood mares. Twenty-four of these were thoroughbred brood mares, twenty-two were light harness mares, five were stallions, and three were draft mares. Eight of the thoroughbred mares from the brood stable gave reactions to the complement-fixation test.

Table No. 1 shows results of serum tests on all the animals in the various stables, excepting ten yearlings which were in distant stables and from which blood was not collected for the first test. Serum in the amount of 0.2 and 0.1 ccm. only were used. The plus marks indicate complete fixation, and the minus marks indicate 25%, 50% or 75% hemolysis in the tube containing the amount indicated. The antigen used (0.25 ccm.) was a forty-eight hour bouillon culture of *B. abortus equi*, destroyed by heating in the water bath for one-half hour at 60 degrees C. and preserved by adding 0.5% carbolic acid. The hemolytic system was freshly titrated to the complement. The control tube carried on each horse and the positive and negative controls used to check the tests were all correct. The same numbers given these mares are carried throughout the test and correspond to the same horse when mentioned in other charts.

In order to arrive more definitely at some idea regarding the agglutination of *B. abortus equi* by normal horse serum, we carried out an agglutination test on a number of sera received for glanders diagnosis. These sera were collected in city stables and horses most unlikely to have been used for breeding or exposed to abortion infection for years. Results on over 100 of these tests

TABLE No. 1

Horse No.	Complement Fixation.	Agglutination 48 hours.	Diagnosis.	Horse No.	Complement Fixation	Agglutination 48 hours	Diagnosis.
1	N	N	N	38	0.1+	800—	Pos.
2	N	N	N	39	0.1+	500—	Pos.
3	N	N	N	40	0.2=	N	V. S.
8	N	N	N	41	0.1+	1-1000+	Pos.
15	N	N	N	42	N	500—	S
16	N	N	N	43	N	N	N
17	N	N	N	44	N	N	N
18	N	N	N	45	N	N	N
19	N	N	N	46	N	N	N
20	N	N	N	47	N	N	N
21	N	N	N	48	N	N	N
22	N	N	N	49	N	500—	S
23	N	N	N	50	N	500—	S
24	0.1+	1-1000+	Pos.	51	N	N	N
25	N	N	N	52	N	N	N
26	N	N	N	53	N	N	N
27	N	N	N	54	N	N	N
28	N	N	N	55	N	N	N
29	N	N	N	56	N	N	N
30	0.1+	500—	Pos.	57	N	N	N
31	N	N	N	58	N	N	N
32	N	500—	S	59	N	N	N
33	N	N	N	60	N	N	N
34	N	N	N	61	N	N	N
35	0.1+	800+	Pos.	62	N	N	N
36	N	N	N	63	N	N	N
37	0.2+0.1≡	N	Pos.	64	N	N	N

N.—Negative

Pos.—Positive.

S.—Suspicious.

V. S.—Very Suspicious.

emphasize the fact brought out by others workers along this line: namely, that normal horse sera but rarely gives an agglutination to *B. abortus equi* of over 1-300, the majority agglutinating less than 1-100.

Table No. 2 shows the results of the serum test on the mares in the brood stable, and it will be noted that of the eight reactors, four had dropped dead foals, two were barren, one of the mares, No. 35, (also a reactor) dropped a living foal which had a bad joint affection at the time of the test and the eighth, No. 30, had not foaled at the time of the test. In addition to showing the results of the serum tests on these mares, the table also gives other data

collected, including age, breed, year of first foal, and breeding results of the past two years of 1915 and 1916. It was in the stable holding these mares that all the reactors were found, here also it was that the foals developed the joint inflammation. Mares recorded as barren are those which failed to conceive after being repeatedly covered during the given year.

Of the thirty mares, ten failed to foal during the Spring of 1916, of these ten, seven were thoroughbreds, two were three-quarter bred Hackneys, and one a pony mare. Six of these thirty mares dropped healthy foals that have never shown joint affections

TABLE No. 2

No.	Foaled.	Class.	First Foal.	Due 1915.	Result 1915.	Due 1916	Result 1916	Lost Foals.	1st Compl. Fix. test.	Aggl. test 48 hours.
23.	1903	T.	1909	5-16	5-16	Barren	Barren	1909		
24	1903	T.	1909	3-25	3-28	3-29	3-29	Twins	N.	N.
25	1898	T.	1911	2-25	3-7	2-23	3-19	Dead	0.1+	1000+
26	1904	T.	1915	4-1	4-12	4-8	4-12		N.	N.
27	1906	L.H.	1915	Barren.	Barren	3-29	4-4		N.	N.
28	1904	L.H.	1911	4-7	4-7	3-16	3-16		N.	N.
29	1906	T.	—	4-6	4-9	Barren	Barren.		N.	N.
30	1909	T.	1909	4-30	4-6	3-15	3-15		0.1+	500-
31	1909	T.	1915	3-29	4-2	Barren	Barren	1915	N.	N.
32	1904	T.	1909	Not bred	—	3-13	3-28		N.	500-
33	1912	T.	—	Not bred	—	Barren	Barren		N.	N.
34	1895	T.	1906	Barren	Barren	3-22	3-17		N.	N.
35	1906	T.	1916	Barren	Barren	1-22	2-9		0.1+	800+
36	1905	T.	1911	3-28	3-28	2-2	2-12		N.	N.
37	1900	T.	1905	Not bred	—	Barren	Barren		0.2+	
38	1905	T.	1909	Barren	Barren	1-17	2-4	1916	0.1≡	N.
39	1907	T.	—	—	—	3-14	1-22	1916	0.1+	800-
40	1912	T.	—	—	—	Barren	Barren		0.1+	500-
41	1907	T.	1916	—	—	5-1	2-27	1916	0.2=	N.
42	1905	L.H.	1914	—	—	5-21	O.K.		0.1+	1000+
43	1900	L.H.	1908	—	—	4-7	O.K.		N.	500-
44	1899	T.	1906	Barren	Barren	3-23	O.K.		N.	N.
45	1912	L.H.	—	—	—	3-1	3-5		N.	N.
46	1903	L.H.	1908	—	—	3-13	O.K.		N.	N.
47	?	Pony	—	—	—	—	—		N.	N.
48	1909	L.H.	1913	—	—	—	—		N.	N.
49	1896	L.H.	?	?	—	?	?		N.	500-
50	?	L.H.	?	?	—	1-23	1-26		N.	500-
51	—	T.	—	—	—	Barren	Barren		N.	N.
52	—	T.	—	—	—	3-21	3-23		N.	N.

N Negative.

+ Complete Fixation or Agglutination.

— 25, 50, or 75% hemolysis or incomplete agglutination,

and of these six it is interesting to note that but one was a thoroughbred mare and foal. We may also mention here that the foal from this mare, No. 44, has not done so well nor attained the growth of other colts of the same age. Subsequent serum tests shown in Chart No. 3, show suspicious reactions in both mare and foal. As already mentioned, four mares, Nos. 24, 38, 39 and 41 dropped dead foals. The problem therefore was not as to what might be done for the reacting mares and their offsprings, but rather what was to be done for the other foals which had at this time or were later expected to become affected.

VACCINATION EXPERIMENTS. On March 23, we forwarded to the veterinarian in charge of this farm a vaccine. This vaccine was prepared from agar cultures of *B. abortus equi*, grown in the incubator for forty-eight hours at 37.5 degrees C. The cultures were washed off in normal saline solution and killed in the water bath for one hour at 60 degrees C., then shaken rapidly for thirty minutes in a bottle with glass beads to break up the growth. The thermal death point as determined by Meyer and Boerner was reported to be 60 degrees C. for eight minutes. To this killed vaccine was added 0.5 ccm. carbolic acid as a preservative. Sterility tests of the vaccine showed no growth in three days.

The approximate number of organisms per ccm. was estimated to be about eight million.

CASE No. 1.—(Thoroughbred). The first foal treated was from mare No. 30, which table No. 1 shows as having given a positive reaction to the serum tests. This foal was dropped on March 15th, and received on March 31st, April 1st and 2nd, 1 ccm. injections of the vaccine, subcutaneously. On April 3rd, 2 ccm., and on April 5th and April 6th, 3 ccm., a total of eleven cubic centimeters, or 88,000,000 killed organisms. This foal showed no local or systemic reactions following the injections: the temperature remained normal, varying from 102. to 102.8 and to date shows no indications of joint evil.

CASE No. 2.—Foal (thoroughbred) from mare No. 25, was dropped on March 19th, received on March 31st, April 1st and 2nd, respectively, 1 ccm. injections of the same vaccine subcutaneously. On April 3rd and 5th, two more injections of 2 ccm.—a total of 7 ccm. or approximately 56,000,000 killed organisms. As in case No. 1, this foal showed no severe local reactions, or systemic disturbances, and has not to date developed any joint inflammations.

CASE No. 3. Foal (Thoroughbred) from mare No. 26, dropped April 12th, received when three days old 5 ccm. and when 5 days old 5 ccm. of the vaccine. Had no swelling at point of injection nor rise in temperature, nor has it developed joint affections.

CASE No. 4. Foal (Thoroughbred) from mare No. 45, dropped March 5th, received on March 31st, April 1st and April 2nd, three injections of 1 ccm. each, and on April 3rd and 5th two injections of 2 ccm. each, subcutaneously. The foal to date has been absolutely O. K. in every way, and never showed local reactions to the vaccine.

CASE No. 5. The foal from this mare, No. 50, a light harness mare, showed rheumatic symptoms in the front quarters and in the neck some days prior to the first injections on March 31st, April 1st and 2nd of 1 ccm., subcutaneously. On April 3rd and 5th two more injections of 2 ccm. each were given. In this case the injections were followed by local swellings, increased stiffness and accentuated rheumatic symptoms to such an extent that they were discontinued, but within ten days the colt was again all right, the stiffness having left the forelegs and neck and it has never shown further indications of joint affections.

CASE No. 6: Thoroughbred foal from mare No. 32, dropped March 28th, received on March 31st, April 1st and 2nd—1 ccm. injections and on April 3rd and 5th, 2 ccm. injections. On May 12th, 45 days after the first injections, or double the period of incubation for foals showing affections before treatment, this colt developed symptoms of infectious arthritis, with swellings on the near stifle and immediately following in both hocks and on the near shoulder. Injections of 2 ccm. were again made on May 16th and 17th, with 3 ccm. injections on May 18th, 19th and 20th. All these injections caused severe local swellings. The colt was so stiff that only with difficulty could it get up to feed and it is hard to say that the vaccine increased the stiffness, although this appeared to be the case. For several days it was helped to its feet regularly for its milk; the swellings were not opened and began to subside within a week, with the result that it fully recovered and is today healthy and apparently none the worse for this severe attack.

CASE No. 7.—Thoroughbred foal from mare No. 36, a non-reactor stabled between two positive reactors. This colt was foaled on February 12th and 21 days later developed hot, painful inflam-

matory swellings of both hocks, the right stifle, left shoulder, forearm and knee. After developing the first symptoms and before our vaccine was prepared the veterinarian gave this foal two injections of anti-streptococcic vaccine and reports that the colt continued to grow worse and appeared to have but little chance for recovery. On March 24th he received the vaccine prepared and gave an injection of 1 ccm., continuing injections of this amount daily to and including April 2nd, getting severe local swellings at the point of injection and increased stiffness in the legs; but as the colt seemed brighter and had a good appetite they were not discontinued. After injections of 2 ccm. on April 3rd and 5th, the injections were stopped, the colt having received 14 ccm., or approximately 112,000,000 killed organisms. The veterinarian's report of April 15th showed much improvement, the swelling leaving the hock and stifle, temperature and appetite normal, and it continued to improve until by July 1st he was in good shape. Today the joints show no increased thickness or swellings whatever.

CASE No. 8.—Thoroughbred foal from mare No. 35, dropped Feb. 9th, developed twenty-one days later, joint affections in the hock, stifle and one knee, and later a diarrhea. It received two injections of anti-streptococcic vaccine, but continued to grow worse, and on March 24th, 25th, 26th and 27th, after having been sick for over three weeks, received four 1 ccm. injections of *B. abortus equi* vaccine subcutaneously. These injections caused severe local reactions and on March 24th the swelling on one stifle broke and discharged a thin, flaky exudate. This foal died on the night of March 27th. Owing to a misunderstanding we did not receive the carcass until the evening of March 28th, 24 hours after death, and the autopsy consequently showed decomposition changes. Notes taken at the autopsy table were as follows:

Carcass emaciated: anus, tail and hind quarters stained with feces. Both hock joints swollen, the left one greatly enlarged; over the right hip a discharging abscess; slight rigor mortis present; blood coagulated and showing traces of hemolysis due to decomposition. Both body cavities free from fluid.

Heart: Myocardium presented a cooked appearance, auricles and ventricles filled with blood. Lungs: hypostatic congestion, slight edema, no petechiae. Liver: Congestion of blood vessels, cloudy swelling, parenchymatous degeneration, capsule stripped easily, friable, decomposition. Spleen: Capsule wrinkled, trabe-

culae prominent, pulp soft, decomposition changes. Intestines: presented a greenish discoloration throughout, catarrhal enteritis, yellowish semi-liquid content with considerable mucus. Mesenteric and body lymph glands greatly swollen, soft and edematous. Kidneys: Soft, friable, parenchymatous degeneration. In the abdominal cavity, directly over the xyphoid cartilage, an abscess about two inches in diameter, contained a yellow, creamy pus.

Cultures were taken on plain and glycerine agar and in bouillon from the heart-blood, axillary arteries, spleen, liver, kidney, lungs, intestines, hock-joints, coxo-femoral articulation, hip abscess, and supra-sternal abscess. Pure cultures of *B. abortus equi* were obtained from the spleen, liver, kidney, hock-joints, coxo-femoral, articulation, and supra-sternal abscess. The organism was also present from the heart-blood, axillary arteries and lungs, but was contaminated with other organisms and had to be replated before it was obtained in pure cultures.

CASE No. 9.—Thoroughbred from mare No. 34, dropped March 17th, developed when 23 days old swellings of the hock and knee joint. On March 31st, April 1st and 2nd received 1 ccm. injections of vaccine. On April 3rd, 5th and 30th, it received injections of 2, 2, and 4 ccm. of the vaccine, respectively. From the very first injection on March 31st, or nine days before the joint swelling appeared, this colt showed local swellings at the point of inoculation, stiffness of the neck and all joints.

This stiffness continued to such a marked degree that the veterinarian in charge discontinued the vaccine after the fifth injection, and although the stiffness disappeared, joint swelling appeared and increased until the right hock was about the size of a man's head. In the meantime the colt developed a prolapse of the rectum and a bad diarrhea which was hard to control, and died on May 10th, receiving during this time but one further injection, 4 ccm. on April 30th.

AUTOPSY NOTES:—Carcass emaciated, right hock greatly enlarged, when opened showed pus sac containing chocolate-tinted fluid with honeycombed tissues. Interior of joint filled with chocolate-tinted fluid, synovial membrane highly congested. Large amount of connective tissue around the epiphyses of bones; yellowish, gelatinous infiltration along tendon sheaths to stifle joint. Right stifle joint shows abscess cavity just anterior to joint and holding about one pint of chocolate-colored fluid with flakes of

fibrin, some fluid within joint, cartilage of condyle excoriated and chain of abscesses along muscle which attaches to internal tuberosity contained creamy pus. Left carpal joint: synovial membrane congested and fluid increased in amount, mass of connective tissue around joint with fistula leading into lower end of ulna, bone honey-combed and purulent. Third rib enlarged at cartilage, and on cross section swelling is soft and filled with creamy pus. Lungs: Small petechiae well distributed, anterior parts of both principal lobes pneumonic, show on section abscesses well encapsulated and size of pea. Heart: Vessels congested, myocardium pale and friable, no petechia. Liver: Congested, dark in color and very friable. Spleen: Size $5\frac{1}{2}$ " by 10", capsule speckled with petechiae. Kidneys: Capsule attached, friable. Intestines: Catarrhal enteritis, mesenteric lymph glands swollen, soft and edematous.

Numerous cultures from the various organs and joints enabled us to isolate easily *B. abortus. equi*.

CASE No. 10.—Foal (Thoroughbred) from mare No. 52, foaled March 23rd. On March 31st, April 1st, 2nd and 3rd, received 1-, 1-, 1- and 2-cm. injections, subcutaneously, and showed severe local reactions.

Thinking to use this as another control on the vaccine in small amounts, the injections were discontinued and when forty days old the veterinarian reports a development of well-defined swellings of one knee and hock and within two or three days a bad diarrhea.

The foal grew gradually worse, developed another swelling on the right shoulder which was hot and painful, both stifles were swollen and on the inside of the left thigh a cold abscess developed and was opened. The discharge was thin, blood-stained, slightly flaky fluid in large amounts. The right front leg and shoulder continued swollen and very painful and on May 31st the foal died.

AUTOPSY NOTES.—Both hocks, stifles, knees and elbow joints were swollen, the right shoulder was enlarged, synovial membrane, highly congested, joints filled with chocolate colored, reddish brown fluid. The tendons and muscles at points of attachment were thickened, the muscles were degenerated and the bones, especially at joints, were soft and readily cut with a knife. Straw-colored gelatinous edema in the subcutis over the elbow of the right shoulder and half way up the neck. The right knee slightly enlarged, synovial fluid greatly increased and thickened. Synovial membrane highly congested. The left elbow was enlarged, synovial fluid of

reddish brown content, edema between muscles extended up the shoulder and part way down the knee. The left knee was apparently normal, with the exception of a deep redness of the synovial membrane. Both hocks were enlarged with connective tissue formation surrounding the tendon attachments. Muscles of cooked appearance, lymphatics greatly enlarged, edematous and in places purulent; reddish fluid in excess in both hocks, synovial membrane thickened and reddened. Both hips affected, the left to a greater extent than the right, with pus cavity size of an egg, just anterior to joint and between the musculature. Pus of creamy, yellowish color. The lymph glands throughout the whole body were greatly enlarged, edematous, in the majority of cases filled with purulent material; the most notable of these enlarged glands were the pre-cural which were the size of an egg, the sub-lumbar the size of a walnut, and the mesenteric, the most pronounced of all, resembling a mass of tumors throughout, the size of walnuts. Heart: Cooked appearance of muscles, very friable, few pericardial hemorrhages. Lungs: Passive congestion. Liver: Enlarged, friable, rich in blood, light patches on right lobe resembling fatty degeneration. Spleen: Swollen, congested, trabeculae prominent, pulp protruding, capsule studded with few petechial hemorrhages. Kidneys: Friable, capsule adherent, alternating red and yellow streaks throughout the medulla. Intestines highly congested, catarrhal and hemorrhagic in places, small hemorrhagic suffusions over the surface of the mucous membrane of large colon.

OTHER INVESTIGATIONS. Unfortunately, the laboratory force was exceptionally busy on a large amount of necessary routine work during the months that this experiment was conducted and we were unable to follow many details as we had hoped to do. For example, serum tests on all the affected colts, which should have been made at regular and frequent intervals, to show the appearance and duration of immune bodies produced, were not carried out.

On April 6, the agglutination and complement fixation tests were applied to the serum of foals from mares Nos. 36, 44, 45, and 50. Both foals from mares Nos. 36 and 50 were infected at the time and gave complete fixation of complement with 0.1 ccm. of serum. No. 44's foal, given special mention earlier in this article, showed no reaction to the complement fixation test, and No. 45's foal, showed no fixation to the complement after three injections of 1 ccm. of the vaccine, which, of course, was to be expected. None of

these foals agglutinated at a dilution of 1-500, which was the lowest dilution run in the test.

Bacteriological examination of cultures from vagina of mares Nos. 24, 30, 35, 37, 38, 39, 40 and 41, failed to show in any instance *B. abortus equi*. Only two of these mares, Nos. 39 and 41, were showing traces of the typical chocolate-colored discharge which had existed.

Milk specimens were collected on March 30th from mares Nos. 35 and 36, both of which had badly affected foals. The bacteriological examinations of this milk were negative to the specific organisms.

Sera from three mares, Nos. 24, 38 and 39, were included in a test of sera from a dairy stable, suspected of harboring *B. abortus* Bang, and in all the instances were entirely negative to this antigen.

Thinking to possibly trace the source of this infection, and also determine whether or not outside mares might have been infected on the farm, the owner wrote to various breeders who had shipped mares to him within the past year for service and asked to have blood specimens submitted to us. Twenty-five different sera from mares and stallions were collected in this manner and all gave entirely negative reactions when subjected to the serum tests.

On August 3rd, the ophthalmic test was applied to all animals on the place and at the same time blood was drawn for serum retests. The "abortin" was made from a bouillon culture of *B. abortus equi*, grown for several weeks in the incubator at 37.5 degrees C. After killing by heat it was concentrated to one-tenth of its volume and the concentrate precipitated by adding twenty parts of absolute alcohol. The precipitate was removed from the filter paper, dried in a desiccator on porcelain plates, ground to a fine powder and when used made into a five per cent. solution with normal saline solution.

Table No. 3 shows the results of the serum tests and ophthalmic reactions. Comparison of the first and second serum tests demonstrates the fact that the anti-bodies produced by *B. abortus equi* are not as stable as those found in cattle infected with *B. abortus* Bang, or those found in horses infected with glanders, approximately five months only having elapsed since the first test.

The work done on this, the second outbreak of infectious abortion in mares in Pennsylvania brought to our attention since 1913, we regard as pointing to the following conclusions:

TABLE No. 3
OPHTHALMIC REACTIONS

No. Hor.	1st C. F.	1st Agg.	2nd C. F.	2nd Agg.	4 hr.	6 hr.	9 hr.	Phy. Con.
8	N	N	N	N	N	N	N	X
15	N	N	N	N	N	N	N	X
16	N	N	N	N	N	N	N	X
19	N	N	N	N	N	C	N	X
20	N	N	N	N	N	N	N	X
23	N	N	N	N	L	S	N	X
24	0.1+	1-1000+	0.1+	400-	N	N	N	X
25	N	N	N	N	N	N	N	X
26	N	N	N	N	N	N	N	X
27	N	N	N	N	N	N	N	X
28	N	N	N	N	N	N	N	X
29	N	N	N	N	N	N	N	X
30	0.1+	500-	N	N	N	N	N	X
32	N	500-	N	N	N	P	P	X
33	N	N	N	N	N	N	N	X
34	N	N	N	N	N	N	N	X
35	0.1+	800+	0.2-	N	N	N	N	X
36	N	N	N	N	N	N	N	X
37	0.2+, 0.1=	N	N	N	N	N	N	X
38	0.1+	800-	N	N	N	N	C	X
39	0.2=	500-	0.1+	N	N	N	N	X
40	0.1+	N	N	N	N	N	N	X
41	0.1+	1-1000+	0.1+	N	N	N	SC	X
42	N	500-	N	N	N	N	N	X
43	N	N	N	N	N	N	N	X
44	N	N	0.2-, 0.1=	N	N	N	N	X
45	N	N	0.2=	N	N	N	N	X
46	N	N	N	N	N	N	N	X
47	N	N	N	N	N	N	N	X
48	N	N	N	N	N	N	N	X
49	N	500-	N	N	N	N	N	X
50	N	500-	N	N	Eyes gummy and suspicious			X
57	N	N	N	N	C	C	C	X
58	N	N	N	N	N	N	N	X
59	N	N	N	N	N	N	N	X
60	N	N	N	N	N	N	N	X
61	N	N	N	N	N	N	N	X
62	N	N	N	N	N	N	N	X
63	N	N	N	N	N	N	N	X
64	N	N	N	N	N	N	N	X
65	(65 to 70 yearlings	N	N	N	N	N	N	X
66	not in first test)	0.1+	N	N	N	N	N	X
67		N	N	N	N	N	N	X
68		N	N	N	N	N	N	X
69		0.2+, 0.1=	N	N	N	C	N	X
70		N	N	N	N	N	N	X
71	(See Case No. 7)	0.2-, 0.1=	N	N	N	N	C. & P.	X
72	(See Case No. 6)	S. R.	N	N	S	P	N	XXX
73	(See Case No. 1)	0.1+	N	N	N	N	N	X
74	(See Case No. 2)	0.1+	N	N	N	N	N	X
75	(See Case No. 3)	N	N	N	N	N	N	X
76	(See Case No. 5)	0.2-, 0.1=	N	N	N	N	N	X
77	(See Case No. 4)	0.2-	N	N	N	N	N	X

"N"—Negative

"C"—Conjunctivitis

"P"—Pus, small amount

"S"—Suspicious

"X"—Good condition

"XX"—Fair condition

"XXX"—Poor condition

CONCLUSIONS. (1) The outbreak was due to an infection with the same organism belonging to a sub-group of the paratyphoid enteritidis group, which has caused numerous outbreaks of abortion in mares in both United States and Canada, and which has been isolated by various authorities here and abroad.

(2) The complement-fixation and agglutination tests are reliable for determining the extent of the infection in the stable, but the best results can be obtained by repeating these tests at intervals of three to four weeks. Animals giving an agglutination reaction of 1-500 or over, with no complement-fixation reaction, should be watched and retested in three weeks. Immune bodies in some cases disappear rapidly.

(3) One ophthalmic test with the purified "abortin" is of no value in determining the infected animals. Whether or not a different preparation of abortin or a retest, after the eye has been sensitized with one dropping, would give better results, has to be determined.

(4) The fact that all of the colts, either infected or later developing affections of the joints, gave marked local reactions to the bacterin may indicate such a preparation to be of diagnostic value when injected or rather vaccinating foals against joint evil, which do not at the time give serum reactions.

(5) Vaccination of exposed foals with a specific bacterin appears to confer some immunity to the disease, and may also have some curative properties, as seven out of ten foals, either thoroughly exposed to the infection, or badly infected, failed to develop or completely recovered from a severe attack of infectious arthritis. Owing to the fact that we were unable to try the vaccine on a large number of animals experimentally, we hesitate to base our conclusions too strongly on results obtained, and they should be confirmed.

(6) It appears to us that two or three injections of 50,000,000 to 100,000,000 organisms, followed by more if necessary, would be much better than numerous injections of small amounts as given by us, and we also feel that if we had given continuous injections of this bacterin to two of the three foals mentioned in the following paragraph, both would have been saved.

(7) Of the three foals not saved, foal No. 35, had been sick for over three weeks and died after the fourth injection; another, No. 34, received only 88,000,000 organisms and the condition was aggravated by a profuse diarrhea and prolapse of the rectum,

while the third, No. 52, received but 40,000,000 bacteria and did not develop articular swellings until seven weeks old. The other foals (except No. 34, 40 days) developed in from 20 to 23 days of age.

(8) Thoroughbred mares and foals in this outbreak appear to be much more susceptible than the Hackney and draft mares and foals exposed, although we recognize the fact that another season may show the infection in these also.

(9) Information received regarding the aborting mares in the Stud reported by Meyer and Boerner in 1913, shows that the following year all dropped healthy foals, while another mare purchased and added to the stable aborted in 1914. This would indicate an acquired immunity in aborting mares, also that one or more of them continued to spread the infection.

In the outbreak herein reported the source of infection could not be determined, nor did the records point to any one stallion on the farm as having carried or spread the infection. As the colts were born, the navel was carefully treated and tied. There seems to be little doubt that the infection of the foals may occur *in utero*, and we are also inclined to believe there is a strong possibility of a feeding infection, due to the stable becoming contaminated with the infective discharges.

I herewith wish to acknowledge my appreciation and thanks to the owner of this stable, through whose courtesy and assistance we were allowed to carry out this work, and to Drs. Bartholomew, Stubbs and Boerner, who worked in assisting with the tests and supplying information and records which have proven invaluable.

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DISCUSSION

DR. GILTNER: I would like to ask Dr. Hardenbergh if he has done anything in connection with vaccines in the way of preventing abortion in mares?

DR. HARDENBERGH: We have not had any opportunity of trying out these vaccines on mares in order to prevent abortion. I believe that Dr. Ostenberg tried these experiments and was not very successful and that Dr. King of Kentucky made a serum which he tried, but which did not prevent abortion.

EXPLANATION OF CUTS

- No. 1. Foal and mare No. 36, non-reactor, stabled between two reactors. Developed joint evil when twenty-one days old. Note swollen hocks. (See Case No. 7).
- No. 2. Same as No. 1. Showing swelling and edema of shoulder and forearm.
- No. 3. Foal and mare No. 52. Swelling of left shoulder, stifle and hock. Left forefoot drawn off ground at heel. (See Case No. 10).
- No. 4. Same. Showing hock swellings.
- No. 5. Foal and mare No. 34, showing joint inflammation. Received small amount of vaccine. Swelling developed at forty days. (See Case No. 9).
- No. 6. Same foal showing great joint swellings.



FIG. 1.
FIG. 2.



FIG. 3.

FIG. 4.



FIG. 5.
FIG. 6

WHAT CAN BE DONE TO IMPROVE THE MILK SUPPLY IN PENNSYLVANIA?*

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My acceptance of the invitation of your president to present a paper on "What Can Be Done to Improve the Milk Supply in Pennsylvania?" is not to be construed as an indication that I think I possess the only solution to this problem but rather as evidence of a willingness to enter into a discussion of the subject in the hope of bringing out useful facts and helpful suggestions.

It is encouraging to know that those who are familiar with the conditions previously existing on dairy farms and in distributors' plants in Pennsylvania are of the opinion that in general there has been a considerable improvement in the methods of producing and distributing milk in the last 10 or 15 years. Stables and cows are more generally cleaned, herds containing clinically tuberculous cows are less common, more attention is given to cleanliness in milking and to cooling the milk, distributors are better equipped to care for and deliver milk, there are fewer arrests for skimming, watering or the addition of preservatives, and samples of milk collected in cities and towns test better as a rule in regard to the number of bacteria and the presence of pus cells and streptococci. All this is very encouraging, but there is still need for further improvement. During the years 1911, 1912 and 1913, about one-fifth of the 190,000 dairy farms in Pennsylvania were visited by agents of the State Livestock Sanitary Board, who made an examination of the cattle for health and cleanliness and inspected the sanitary conditions of the premises and the methods of producing and caring for the milk. (No inspections could be made in 1914 and 1915 because the resources of the Board were taxed to the limit by the prevalence of foot-and-mouth disease [aphthous fever]). The farms inspected were classified, according to the conditions found, into four groups: "excellent," "good," "fair," "bad." A few farms were classed as "excellent," from 30 to 40 per cent. were classed as "good," 50 to 58 per cent. were scored "fair" and 8 to 15 per cent. fell into the "bad" group. On the dairy farms classed

*Read before the Pennsylvania State Medical Society at Scranton, Pa., Sept. 21, 1916.

“excellent” or “good,” the conditions were favorable to the production of milk of good hygienic quality; on those classed as “bad” the conditions were quite the opposite, while the farms classed as “fair” stood on the border line between these two classes. Although these figures cover only a small portion of the dairy farms of the state, they can probably be accepted as representative of the conditions in general throughout Pennsylvania because the farms inspected were located in all parts of the state.

“What Can Be Done to Improve the Milk Supply in Pennsylvania?” is therefore a very pertinent question. Three groups of individuals are involved in this question, namely: (1) the producers and distributors, (2) the public health officials, and (3) the consumers. What is the attitude of these different groups toward the proposition under discussion?

Producers who are really dairymen, i. e., those whose chief business is the production of milk, have changed their attitude toward dairy inspection in recent years. They have discovered that many of the methods recommended for sanitary reasons are also good economically. Brushing the cows, wiping the udder, removing the manure from the stable, light and ventilation in the stable, sterilizing the milk vessels, and cooling the milk are all now regarded as good dairy practices, and are taught in the dairy schools, because experience has demonstrated that they increase production, help to maintain the cattle in health, facilitate the work, and avoid losses and complaint on account of spoiled milk. These discoveries have overcome to a considerable extent the prejudice and suspicion which formerly existed in regard to dairy inspection, but there are other conditions which do not meet with the approval of dairymen. The most important of these are duplication of inspections by different municipalities or by different departments of the state government, multiplicity of regulations, untrained inspectors, frequent changes in regulations involving alterations in buildings or equipment, requirements in regard to buildings or equipment which are expensive and not absolutely essential, careless or ill-founded statements regarding the effect of milk on the health of the consumer, and the drawing of regulations by men who have no practical knowledge of the dairy business. Finally, the dairyman considers it an injustice that he should be required to adopt methods which involve additional work or added cost for labor or material without a corresponding increase in the selling price of his

product. He points out that while sanitary requirements have in recent years increased his cost of production, everything he buys has also advanced in price. Statistics compiled by disinterested men show that this is true. In the last 5 years, the cost of farm labor in Pennsylvania has advanced 12 to 17.5 per cent., and the price of milk cows has increased 38 to 52 per cent. By-products like cotton seed meal, dried brewers' grains, dried beet pulp and malt sprouts, which are used for feed, are from 20 to 40 per cent higher today than 10 years ago and the prices of other feeds have advanced from 10 to 15 per cent. The market value of home grown feeds has also increased very much. Clover hay has shown an advance of 58 per cent. since 1906. Within the last 8 years the freight rates on milk shipped into Philadelphia, which the dairyman usually pays, have increased 50 per cent. in general and in some instances 77 per cent. And during this same period the price which a dairyman receives for his product has remained stationary or advanced very slightly.

The position of the distributor is similar to that of the producer. Sanitary regulations requiring the bottling of milk, pasteurization, etc., have added to his expenses, while wages and the cost of horses, feed, wagons, etc., have also increased, but in most cities and towns the retail price of milk has remained the same.

The economic conditions affecting the production of milk have driven many general farmers, with whom dairying was a side line, out of the business. At the same time, an undesirable foreign element has taken up dairying in the neighborhood of some of the large cities. These people are able to produce cheap milk at a profit because they occupy a small piece of land with very cheap and inadequate buildings in districts where they can graze their cows on vacant lots; in some cases they feed their cows on various kinds of refuse, and they usually have large families, all of whom work in the dairy. Their standard of living is low and they have little or no conception of cleanliness.

The attitude of local health officials toward the milk supply of their own town is very variable, ranging all the way from total indifference to over-zealousness. The attitude may also change very suddenly. A local health board which has for years entirely ignored the conditions of the milk supply will sometimes be stirred up by some unpleasant occurrence and will then adopt the most stringent regulations for the guidance of dairymen and expect con-

ditions to be changed at once from the undesirable to the ideal. Sometimes, elaborate regulations are promulgated without any means of enforcing them. In such cases, the dairymen who obey them are likely to think that the men who ignore them are being favored by the health officials. The consumer is also given a false sense of security. Regulations are sometimes adopted requiring expensive alterations or equipment which are not absolutely essential to the production of wholesome milk. Very few local health boards seem able to employ properly qualified men as dairy inspectors. Dairymen very naturally resent being advised in regard to their business by one who knows little or nothing about it. Local health officials do not always show sympathy for the difficulties of the dairyman. This is not due to any disposition to be inconsiderate but rather to an inability to appreciate the technical and economic problems with which the dairymen have to contend. Perhaps the principal cause of the errors of local health boards is the absence from the membership of any one with a practical knowledge of the dairy business.

Consumers in general seem to be less interested in the condition of the milk supply than the individuals in the other two groups concerned. Many consumers do not recognize hygienic quality in milk. They seem to be interested only in the price and the amount of cream. If these are satisfactory and the milk holds together until it is used, they are usually contented. People who buy the best grades of other articles do not usually buy the best grade of milk. Comparatively few wealthy people buy certified milk. A Philadelphia milk dealer states that he has been told by well-to-do physicians and other people in comfortable circumstances that they would not pay the price of certified milk. The bulk of this grade of milk is sold to people who purchase it for their children on a physician's order and they usually buy it only as long as this special need exists. This general indifference of consumers in regard to the hygienic properties of milk has made it possible for the careless or ignorant producer with unsuitable equipment to compete with the careful dairyman who is trying to produce a high grade of milk. Consumers are being slowly but steadily educated, however, in regard to the hygienic properties of milk and the demand for a safe milk supply is gradually growing. The ability of the general public to distinguish between good and bad milk is limited. Milk which spoils or which has an abnormal taste or odor can be read-

ily recognized but milk may be possessed of some very undesirable properties and still have the appearance and taste of good milk. The consumer alone cannot always distinguish between good and bad milk or between milk of good or poor hygienic properties. His city or state government must do this for him, or help him to do it himself. Some of the indifference of milk consumers to the hygienic properties of milk may be only apparent and may be due to this fact.

These are the conditions as they exist today. How can they be improved?

One of the requirements indicated by the present conditions is a single uniform system of inspection, directed and carried out by men who are qualified by training and experience for the work. This would avoid duplication of inspections and multiplicity of regulations and would also provide the means for efficient but reasonable regulations. At the same time, it would prevent a producer whose milk is shut out of one municipality from sending it to another; it would provide small as well as large communities with competent inspectors, and would overcome many other defects of the present system.

A uniform inspection system could be most readily established by placing the work in charge of one of the departments of the state government. The department which appears to most fully meet the requirements of the situation is the State Livestock Sanitary Board. This Board consists of the Governor, the Secretary of Agriculture, the Dairy and Food Commissioner and the State Veterinarian. All of the groups of individuals concerned in the problem of a good milk supply are represented in its membership except the public health officials, but the work of inspecting the dairies would necessarily have to be taken up in consultation with the local health officials of the municipality in which the milk is sold, so that this group would also be represented.

Another requirement which seems to be indicated is the grading or classification of milk, i. e., certain well-defined grades should be established by state authority, based on the conditions existing on the dairy farm and the bacterial count, and all milk offered for sale should be labeled according to this classification. At the present time in Pennsylvania there is no official definition of the names under which milk may be sold except in Philadelphia and even in that city the indiscriminate use of terms like "baby's milk," "nursery milk," etc., is not prohibited.

Under the present conditions, outside of Philadelphia, milk produced under good sanitary conditions is sent to a distributor who also receives milk produced under objectionable conditions and the two kinds of milk are mixed before delivery to the consumer. The entire milk supply is reduced in hygienic quality to the level of the lowest. There is no incentive for a dairyman to produce good milk under these conditions.

The grading of milk, if properly carried out, is just and equitable to all parties concerned. The product of the careful, conscientious dairyman will be graded higher and can be sold for a higher price than the milk produced by the careless and indifferent man. Milk consumers will be able to distinguish between good and bad milk; those who desire good milk and those who are satisfied with milk of a low grade at a low price will find it convenient to purchase the kind of milk they prefer. The distributors who deal in a high grade of milk and those who deal in a low grade will be classified accordingly. Milk will be sold according to quality, like other commodities.

Grading milk is not an untried proposition, but has been in operation for several years. In New York City, where the system has been in use since 1912, the results have been entirely satisfactory. It has stimulated dealers and consumers to put forth greater efforts to produce a high grade of milk and has improved the general character of the city's milk supply. A law which went into effect in November 1914 requires that all milk sold in the state of New York shall be labeled according to certain specified grades. This law has brought about a very marked improvement in the milk supplies of the various communities of the state, especially in cities having a population of over 10,000. Milk has been graded in Philadelphia since 1914 and has brought about a general improvement in the milk supply of the city. Under the Board of Health of Radnor Township, Delaware County, the grading of milk has improved the dairies in that district, bringing about improvements which placed dairies formerly scored "poor" in the "fair" and "good" classes.

In some of these places, the producers and distributors were at first hostile to the grading of milk but after they became acquainted with the operation of the system they regarded it with favor. There was also some difficulty in regard to labeling the different grades of milk until the distributors became familiar with the regu-

lations and had an opportunity to arrange to comply with them. At the present time, everybody concerned seems entirely satisfied, although in some localities consumers are indifferent.

It is not possible, within the time allowed for this paper, to enter into detail regarding the specifications of the different grades of milk. In conclusion, therefore, in answer to the question, "What Can Be Done to Improve the Milk Supply of Pennsylvania?" I would say establish a uniform system of inspection under state control and require milk to be graded and sold according to an officially defined classification.

A SYNOPTICAL KEY TO THE ADULT TAENIOID CESTODES OF THE DOG, CAT, AND SOME RELATED CARNIVORES

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It is believed that this key will be of value to students who have occasion to make identifications in this group, perhaps the most economically important group of tapeworms known, more important even than the strobilate tapeworms of man. While there have been some excellent studies dealing with one or a few of the dog tapeworms, notably that of Deffke (1891), it is nevertheless difficult to identify, with any certainty, the various tapeworms of the dog without consulting a number of papers. Matters are naturally even worse as regards the parasites of wild carnivores, although these are also of considerable importance, since the dog tapeworms may be found in wild carnivores, and tapeworms of wild carnivores may be found in the dog, as in the case of *Taenia balaniceps*, which was reported by Hall (1910) from the dog from the lynx.

SYNOPTICAL KEY

The tapeworms of the dog, cat and some related carnivores may be separated into groups and identified by the use of the appended key, which is intended to designate the relations and im-

†Resigned September 19.

portance of the tapeworms as well as to distinguish them from one another. The key does not cover the species in the family Diphylobothriidae.

1. Head provided with two slit-like suckers, and segments with a rosette-shaped uterus having a special aperture in the midventral line for the discharge of eggs. Larvae in fish. Rare in the United States and of little economic importance hereDiphylobothriidae
 Head with four cup-shaped suckers.....2
2. Follicular yolk glands in the lateral fields. Accidental parasites reported from the dog only once*Ophiotaenia punica*.
 Yolk glands in median field, never in lateral fields.....3
3. Genital pore located on the ventral surface near the median line. Eggs in gravid segments contained in a single thick-shelled egg capsule. Life history unknown. Rare in the United States and of little economic importance*Mesocestoides lineatus*, *Mesocestoides litteratus* (probably identical species).
 Genital pore lateral. Eggs in gravid segments contained in a uterus or in numerous egg capsules.....4
4. Usually large forms. Genital pores irregularly alternate. Rostellum usually well developed and usually armed with a double crown of hooks, rarely with a single (?) crown of hooks or unarmed. Suckers unarmed. Uterus with a median stem and lateral branches. Eggs thick shelled.Taeniidae. 5.
 Usually small forms. Genital pores single or double; if single, regularly or irregularly alternate. Rostellum present or absent; if present, armed with one to numerous rows of hooks. Suckers armed or unarmed. Uterus sac-like and persistent, or a single or double uterus with one or several parauterine organs to which the eggs pass in the final stage of development. Eggs with thin transparent shells.....Hymenolepididae. 19.
5. Strobila less than 1 cm. long and composed of a head and 3 segments, only one of the segments being gravid at a time. Lateral uterine branches often quite indistinct. Yolk-gland globular. Larval stage an echinococcus with thick laminated wall, and developing brood capsules containing the larval scolices. Of considerable medical and economic importance*Echinococcus granulosus*.
 Strobila at least several centimeters long and composed of a head and numerous segments, from 10 to hundreds, with a number of segments usually gravid at one time. Lateral uterine branches usually distinct, at least in early stages of formation. Yolk gland posterior of ovaries and elongate or triangular, with one side parallel to the posterior margin of the segment. Larval stage a bladderworm with thin walls and never containing brood capsules6
6. Strobila without a neck and with a double circle of many and very large hooks, the large hook over 300 μ long, or with only a single circle of hooks (?). Bladderworms, so far as known, with a small caudal bladder and with a long segmented structure connecting the bladder and

- head. Parasitic in Felidae 7
- Strobila with a neck and with a double circle of hooks, the large hook less than 300 μ long. Bladderworms with a caudal bladder, a head and a moderate sized neck. Parasitic in Canidae 10
7. Rostellum with a single circle of hooks of rose-thorn shape. Reported from *Lynx lynx* (*Felis lynx*) *Taenia monostephanos*
- Rostellum with a double circle of hooks, the large hooks over 300 μ long. 8
8. Large hooks 60 to 75 in number; 320 to 355 μ long; the large hooks arranged so as to form in effect 2 circle of large hooks, being alternately nearer to the center of the rostellum and farther from it. *Taenia macrocystis*.
- Large hooks not over 60 in number 9
9. Hooks 26 to 52 in number. Well developed sphincter vaginae. *Taenia taeniaeformis*
- Hooks 38 to 60 in number. Probably identical with the preceding species. *Taenia laticollis*
10. Vagina with a reflexed curve near the lateral excretory canals. Large hooks 135 to 180 μ long and usually with a sinuous handle. *Multiceps* spp. 11.
- Vagina without a reflexed curve near the lateral canals. *Taenia* spp. 13.
11. Mature segments wider than long; the lateral margins of each segment often scalloped as a result of a number of constrictions or furrows passing around the segment transversely; the posterior margin of each segment prolonged posteriorly to overlap the anterior margin of the succeeding segment like a cuff. Small hook with short, blunt curving handle. Genital papilla very narrowly conical and in posterior half of segment, often near posterior margin. Larva a coenurus with daughter bladders, found in the connective tissue of rodents (including the Lagomorpha) *Multiceps serialis*
- Mature segments longer than broad; the lateral margins of each segment smooth and not scalloped; the posterior margin of each segment prolonged very little or not at all to form a projection over the following segment. Small hooks with long slender handle. Genital papilla posterior of middle of segment but never near posterior margin. Larva a coenurus without daughter bladders found in ungulates, especially ruminants 12
12. Small hooks with long curving handle terminating in a blunt distal extremity. Large hook with tapering handle with sinuous outline. Testes do not extend posterior of the ovaries to the vicinity of the vitellarium or between the vitellarium and the ovaries. Larva a coenurus in the central nervous system of ungulates, especially ruminants, and of considerable economic and medical interest. *Multiceps multiceps*
- Small hook with long straight handle terminating in a blunt distal extremity. Large hook with the handle not tapering, and either straight and blunt or bent dorsally just at the tip. Testes extend posterior of the ovaries almost to the vitellarium and between the vitellarium and the ovaries. Larva a coenurus in the central nervous system, paren-

- chymatous organs and connective tissue of ruminants
 *Multiceps gaigeri*.
13. Forms in which the vagina crosses the ovary on the pore side in some segments, and other forms in which the very large genital papilla is practically as long as the margin of the narrow segments. Tapeworms of comparatively restricted geographic distribution and occurrence, not cosmopolitan. Bladderworms in the edible musculature of important food animals. Parasites of some economic importance14
- Forms in which the vagina does not cross the ovary on the pore side, and in which the genital papilla is never nearly as long as the margin of the segments15
14. Gravid uterus with 20 to 25 lateral branches on each side of the median stem. Vagina crosses the ovary on the pore side in some segments. Genital papilla much shorter than the segment margin. Bladderworm in musculature of sheep *Taenia ovis*.
- Gravid uterus with not over 10 lateral branches on each side of the median stem. Vagina does not cross the ovary on the pore side of the segment. Genital papilla practically as long as the lateral margin of the narrow segments. Bladderworm in the musculature of reindeer....
 *Taenia krabbei*.
15. Forms with the large hooks from 170 to 294 μ long. Tapeworms of cosmopolitan distribution and common occurrence. Bladderworms attached to omenta, mesenteries, or peritoneal serosa.....16
- Forms with the large hooks 135 to 145 μ long. Rare tapeworms only reported once and under conditions indicating that they are accidental parasites of the dog. Life histories unknown.....17
16. Large hooks 225 to 294 μ long. Testes extend posterior of the vitellarium. Mature segments approximately square. Gravid segments with 8 to 14 lateral branches on each side. Vagina only slightly dilated and curved near margin of segment. Bladderworm in rabbits, rarely in mouse or beaver *Taenia pisiformis*.
- Large hooks 170 to 220 μ long. Testes do not extend posterior of the vitellarium. Mature segments distinctly wider than long. Gravid segments with 5 to 10 lateral branches on each side. Vagina forms a sort of crescent by dilation and curvature near lateral margin of segment. Gravid segments with a median longitudinal groove terminating in a notch posteriorly. Bladderworms usually in ruminants, also reported from monkeys and rodents..... *Taenia hydatigena*.
17. Guard of small hooks twisted so that its flat surface tends to lie in the plane of the blade and handle *Taenia brachysoma*.
- Guard of small hook not so twisted.....18
18. Head acorn-shaped, with hooks far anterior of the suckers. Mature segments approximately square *Taenia balaniceps*.
- Head not acorn-shaped, and hooks not far anterior of suckers. Mature segments distinctly broader than long *Taenia brauni*.
19. Strobila not over 25 mm. long; rostellum with 4 circlets of hooks, the hooks 45 μ long and with a handle and guard; the cirrus pouch opens

- ventral of the vagina; 1 egg to each egg capsule.....
 *Dipylidium trinchesei*. 20
- Strobila 5 cm. long or longer; hooks rose-thorn-shaped20
20. Head with 16 circlets of hooks; strobila 12 to 20 cm. long; 45 to 50 small testes; cirrus pouch 250 to 260 μ long and crossing the longitudinal excretory canals; vitellarium roughly spherical and smaller than the ovarian lobes; 1 large egg, 52 to 53 μ in diameter, in each egg capsule *Dipylidium chyzeri*.
 Head with not over 6 rows of hooks; 90 or more testes; 2 or more eggs in each egg capsule21
21. Heads with 6 circlets of hooks; strobila 10 to 23.5 cm. long; 130 to 140 testes; cirrus pouch extends to the longitudinal excretory canals; the median ovarian lobes crescentic, the lateral spherical; the vitellarium reniform and as large as an ovarian lobe; egg capsules with 2 to 15 eggs and at times extending lateral of the longitudinal excretory canals *Dipylidium sexcoronatum*.
 Heads with 3 to 5 circlets of hooks; cirrus pouch extends across the excretory canals regularly or occasionally; vitellarium smaller than the ovarian lobes or smaller than the median ovarian lobes.....22
22. Head with 5 circlets of hooks; strobila 5 to 11 cm. long; 90 to 100 large testes; cirrus pouch curved, convex posteriorly and extending distinctly across the longitudinal excretory canals; vitellarium smaller than the ovarian lobes; spindle-shaped receptaculum seminis present; vagina opens posterior of the cirrus pouch aperture; eggs 25 μ in diameter *Dipylidium oerleyi*.
 Head with 3 to 4 circlets of hooks; strobila 15 to 40 cm. long; 100 to 200 testes; cirrus pouch piriform and extending to and occasionally across the longitudinal excretory canals; no receptaculum seminis present, the oviduct showing a compensatory dilation; vagina opens ventral of the cirrus pouch aperture; eggs 43 to 50 μ in diameter.....
 *Dipylidium caninum*.

Very successful reports are given of the Practitioner's Short Course in Veterinary Medicine, held at Ames, Ia., September 4 to 9. Aside from the local faculty, assistance was rendered by Dr. J. W. Adams of Pennsylvania and Dr. D. S. White of Ohio.

The meeting of the Massachusetts Veterinary Medical Association was held at Springfield, Mass., October 18, during the National Dairy Show. Among the speakers were Doctors V. A. Moore, E. C. Schroeder and W. Horace Hoskins. A very successful meeting was reported.

Dr. Percy Lamb of Englewood, Colorado, is planning a trip to England.

ARE UNIFORM REGULATIONS FEASIBLE AMONG THE DIFFERENT AMERICAN COUNTRIES FOR THE PREVENTION OF THE INTRODUCTION AND DISSEMINATION OF DISEASES OF ANIMALS?

Abstract of paper by DR. A. D. MELVIN, Chief of the Bureau of Animal
Industry, Washington, D. C.

The growth in commerce in live stock and animal products has greatly increased the danger of the spread of contagious animal diseases. The need for protection against this danger has led to the formation of live stock sanitary police organizations in most countries where the live stock industry has been developed. The object of such organization is (1) to protect domestic live stock from foreign contagion, (2) to prevent the spread of animal diseases within the country, and (3) to eradicate such diseases as may be present.

The nations of the western hemisphere are being drawn closer together by ties of common interest and growing commerce, and it seems very desirable for them to enter into some kind of cooperation for the exchange of information with regard to contagious diseases of animals, and so far as practicable to adopt uniform regulations for preventing the spread of such diseases.

The different conditions in the different countries would probably make an absolutely uniform set of regulations for all American countries impracticable. It should be possible, however, to have uniformity in certain fundamental features. Without attempting to formulate an exact plan we may point out certain fundamentals that should and doubtless can be followed.

1. As a first step, each country engaged in commerce in animals and animal products with other countries, or that wishes to engage in such commerce, should organize a competent veterinary sanitary service, if not already provided with such a service.

2. The veterinary service should make a thorough survey of the country so as to determine what contagious diseases of animals are present and the regions where they prevail. The collection of such information should be continued as a routine feature so that the service may be constantly informed of live stock sanitary conditions throughout the country.

3. Laws and regulations, if not already in existence, should be carefully framed and adopted with the object of preventing the spread of contagious diseases within the country and preventing the transmission of such diseases to other countries with exported live stock. If meats are to be exported there should be regulations and an inspection system insuring their wholesomeness. There should also be laws and regulations for the inspection and quarantine of imported animals to prevent the introduction of diseases and parasites.

The foregoing features are already in effect to a greater or less degree in many countries.

4. A further very desirable step would be a system for the interchange between the various governments of information regarding the presence or absence of contagious diseases of animals. In order to establish such a system, as well as to bring about greater uniformity in regulations, it would be well to have a commission of representatives from the various countries. Such a commission might endeavor to formulate regulations that would be generally applicable and serve as a model for adoption by the several governments. Such a draft of regulations should be as brief and simple as practicable and should deal mainly with fundamentals or essentials, leaving details to be developed according to local conditions in the various countries.

The veterinary service of each country should endeavor to eradicate the diseases existing there. The proposed plan for the interchange of information might very well include the exchange of information as to methods successfully followed in combating animal diseases.



DR. JULIO BESNARD, Chief of the National Veterinary Service, Chile.

There are no reasons within our knowledge which oppose themselves to the establishment of uniform general regulations to be adopted by the different American countries with the object of impeding the penetration of contagious diseases of animals into territories up to this time protected against one or the other of such diseases.

If there are any American countries which owing to certain reasons of a special nature are particularly menaced by one or more of its neighbors with the invasion of diseases which it specially fears, that country can conclude an agreement with such neigh-

bor or neighbors with the object of making the existing regulations more severe.

We will explain with more precision this idea, applying it especially to Chile.

There is no treaty between this country and Chile in the matter of sanitary police, and for that reason general regulations are acceptable to-day without impediment. We avail ourselves of this opportunity to declare that we are certain that we interpret the opinion of the Chilean Government and of the Chilean farmers when we say that they would experience the greatest satisfaction if given the opportunity to collaborate in the adoption and application of such important measures of mutual protection.

The Republic of Chile has only three neighboring countries—the Republics of Peru, Bolivia, and Argentina. The first two are not producers of cattle in the more or less arid regions which form their frontiers; only the Argentine exports animals to Chile by the land route across the Andes. All the others make their importations by way of the sea.

It would therefore be in accordance with our suggestion to establish a special convention between these two Republics at the same time that both of them adhere to the general regulations.

CONCLUSION. We may admit that Chile would enthusiastically support an American convention which had for its object the prevention of the introduction and propagation of the diseases of animals.



DR. RAFAEL MUNOZ JIMENEZ

The importance of the stock industry in the American countries and the increased number of diseases which tend to destroy the source of wealth have obliged the majority of nations of the continent to pass laws to prevent the introduction and propagation of animal diseases. But in order that such results may be obtained, a harmonious plan of continental scope should be adopted. Such uniform regulation would bring not only advantages of a sanitary nature, but would contribute also to the freedom of commercial exchange; for confidence in such measures would result in the removal of restrictions on the free importation of live stock.

Moved by these considerations, the Republic of Uruguay convened an International American Conference of Veterinary Police

which met in the city of Montevideo in 1912, and in which the Governments of Uruguay, Argentine, Brazil, Chile, and Paraguay took part. A convention was signed by the representatives of the several countries mentioned, providing for the organization on their borders of a veterinary police sufficient to prevent the passage of diseased animals across their respective frontiers. In this convention we have the beginnings of a system of regulation. But the regulations adopted at Montevideo ought to be improved and extended. The adoption of such a project as the author's, presented by the delegation of Uruguay, to the conference of 1912, and meeting with the general approval of that body, would effect the desired result.

The project of regulation proposed by Dr. Rafael Munoz Jimenez is set forth in great detail under the following heads: (a) Sanitary measures to be employed on the frontiers, (b) internal police regulations, (c) special police measures of an international character.

In order that the extensive scheme proposed should be carried into effect, the author suggests that a second international conference should be held, in which all or at least a majority of the American nations should be represented.



DR. FRANCISCO ETCHEGOYEN

Veterinary medicine has enjoyed great progress in American countries. Their action, however, is impeded when the appreciation of the Governments is lacking in matters relating to sanitary police.

In Cuba the subject began to receive attention in the first American intervention, and much progress has been made since then.

The tendency of the human race to multiply faster than the means of subsistence imposes the necessity to conserve, augment, and improve the breeds of cattle. It is not sufficient to line the frontiers with inspectors to refuse admission to diseased cattle. The avoidance of disease is not solely a question of sustaining health; it is the most important factor in the propagation of species. Thus considered, the cattle problem is the great problem of the world. Is it possible to realize the solution of this problem by cooperation between the Pan American countries? No, if each country simply confines itself to defending itself behind a Chinese wall against infection from the outside. Yes, if the different coun-

tries can arrive at an agreement about sanitary methods of developing and breeding domestic animals. Something similar to this has been done in human medicine with yellow fever. Yellow fever has ceased to be a source of anxiety in the United States, and our population has duplicated in a short time.

The same campaign against other epidemics would arrive at identical results, and applied to zoology the effects would be more rapid.

In the present advanced state of medical science we can say that there is not a human pathology and a veterinary pathology, but a comparative pathology. The same diseases attack both the lower animals and man, their action being determined rather by the regions than by the animal species.

From the time that the germ theory of disease has been accepted, not all the contagious diseases have been listed. There are lacking some diseases transmissible to man, many others contagious among animals, and others which, without being transmissible from animal to animal, produce great mortality in them. Lack of agreement concerning the cause and modes of transmission of diseases among animals, including man, implies lamentable carelessness in the prophylaxis and extinction. Action should be extended to all those diseases which produce abnormal states in the same species or distinct species. Each country will have to revise a study of these diseases and consider the methods convenient for combating them, submitting the result of their investigations to a directive international committee charged with the duty of unifying the results. The author then gives a list of the diseases of his country, Cuba, transmissible by parasites, microbes, and filterable virus.

The endozoarians and ectozoarians indicated are identical with those of Europe and America where our cattle originated.

What measures do we oppose to so many ravages? The most efficient is that employed against glanders. Anthrax is combated with vaccination, hog cholera with the simultaneous use of virus and serum, rabies with the Pasteur treatment in the human species. These sole prophylactic means are not sufficient to destroy the foci.

The medico veterinary body of Cuba would see with pleasure that the Pan American Congress recommend uniform methods for the defense of *cattle*.

The author concludes that the importance of the subjects of the breeding of cattle and their defense against disease merits the

consideration of a treaty concerning joint sanitary action. These commissions would realize experimental investigation and send results to the directive committee. It should be the obligation of such committee to formulate the prophylactic and curative regulations. The author quotes from Dr. Monlau, finally saying, "Sanitary codes *** are as urgent and important as civil and criminal codes, with which they have more than one point of relation and contact."

EPITHELIOMA CONTAGIOSUM OF QUAIL

BERNARD GALLAGHER

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Epithelioma contagiosum Avium or bird pox is an infectious epizootic disease, which has been shown by recent investigators to be identical with avian diphtheria, the causative organism being capable of producing either the hyperplastic epithelial nodules characteristic of the former or the croupous and diphtheritic pseudo-membranes on the mucous membranes of the head associated with the latter. The disease is one of the most common and destructive affections of fowls, and occurs to a lesser extent in turkeys, pigeons and several other species of birds. The writer has failed to find pox or diphtheria of quail recorded in the literature, and reports this case because of the large number of birds affected and the severity of the attack. Four hundred birds were under observation, and the mortality during a period of five weeks amounted to 85 per cent.

Approximately 15,000 live quail were received from Mexico during December, 1915, and January and February, 1916, principally for the purpose of stocking game preserves. Each shipment is quarantined at a designated point on the border for a period of ten days under the regulations of the Bureau of Biological Survey, of the Department of Agriculture, and under the direct supervision of a veterinary inspector of the Bureau of Animal Industry. The lot of 400 referred to in this paper were received during January, and showed no indication of pox during the period of quarantine. They were shipped to Kansas City, where they developed a condition which made them unsalable, and were for-

warded by the importer to the Pathological Division for diagnosis, and experimental purposes.

Quail are found in large numbers, in the wild state, in Mexico, and are captured by Mexican trappers. They are shipped in crates holding about 75 to 80 birds, and although these crates are specially designed to guard the birds against injury, frequently a large percentage of the shipment will show skinned heads from jumping against the roof and sides of the crates when frightened. In the present instance a great many had lost feathers and skin from the top of the head, and had also injured the flesh at the tips of the wings. Frequently, the top of the head was completely denuded of skin, the surface of the skull being exposed over an area as large as a dime. The abnormal conditions to which the birds were subjected, especially the close confinement during transit and change of climate during the winter season, no doubt lowered their vitality and rendered them more susceptible to disease. Also the areas where the skin was lacerated served as good points of entrance for the virus of bird pox.

SYMPTOMS AND LESIONS. All manifestations of the disease were exhibited during the course of the outbreak. In some cases the eyes alone became affected, in others the diphtheritic exudate was found in the nasal passages and in the mouth. In the majority of the birds typical bird pox lesions were observed on the skin of the body, especially on the wings and around the lacerated skin of the head. In many cases all lesions mentioned were present in the one individual.

Externally the disease was manifested by the presence of nodules similar to those found in chicken pox, but with a tendency to spread out over the skin to a greater extent. The upper surface of the head and the tips of the wings showed the most severe involvement, due to the previous traumatic injuries sustained by the skin at these points. In some cases where no injury was present about the head, no wart-like process had developed. The scabs were closely adherent, and on removal left an abraded surface, except in the event that the nodules were old when the scab came away readily leaving a well formed scar. In a fairly large per cent of the birds, one or both eyes were the seat of cheesy deposits beneath the eyelids, the pressure being so great in some instances as to destroy the eye.

Internally marked diphtheritic patches were present on the hard palate, around the base of the tongue and on the wall of the pharynx. Small patches, the size of a pin-head, were distributed over the mucous membrane of the mouth. The nostrils were often closed by necrotic material, necessitating breathing through the mouth. Also the infra-orbital sinus was occasionally involved, the accumulation of cheesy exudate giving the head a swollen appearance. The croupous membranes in the mouth were usually closely adherent to the mucosa and when removed left uneven inflamed surfaces.

TRANSMISSION EXPERIMENTS. *Non-Filtered Virus.* A number of animal inoculation experiments were carried out to determine the relation between bird pox as observed in quail and bird pox of chickens. Quail pox nodules and also quail diphtheritic material from the mouth were rubbed into emulsions with small amounts of normal salt solution. In one series of experiments, the emulsions were spread on slightly scarified surfaces of the combs and wattles of young fowls. In each case characteristic pox nodules developed at the points of inoculation after a period of six to eight days. It was noted, however, that the lesions were not as extensive or as pronounced as those which the writer has produced by artificial inoculation of chicken pox from fowl to fowl. This would suggest that the virus was more highly specialized for quail, although it may have been originally derived from fowls and become attenuated by passage through the quail.

In a second series of experiments the pox and exudate emulsions were rubbed on slightly scarified areas of the oral mucous membranes of half grown fowls. Typical croupous patches appeared after a period of seven days.

In a third experiment two fowls were given 0.5 c.c. of each of a diluted emulsion of pox and diphtheritic exudate intravenously. No results followed the injection, possibly as a result of the diluted virus, or a natural degree of resistance on the part of the birds to this method of inoculation.

Filtered Virus. To determine whether the causative agent of quail pox is a filterable virus as has been demonstrated for the causative agent of chicken pox, a highly diluted emulsion of pox lesions and oral exudate was passed through a Berkefeld filter by vacuum aspiration. The resulting filtrate was determined to be

free of visible organisms by microscopic examination, and cultural media inoculated with the filtrate remained sterile.

A series of experiments similar to those conducted with the non-filtered emulsions were carried out. No results followed inoculations of comb and wattle, or intravenous injections. In one of the fowls which received an oral inoculation two patches about the size of a pin head appeared on the mucous membrane of the pharynx after an eight day intermission. It is quite likely that these lesions were due to intercurrent causes as a result of the slight scarification of the membrane. Assuming that the virus of quail pox is identical with that of chicken pox, failure to transmit the disease to fowls with a Berkefeld filtrate of quail pox material may be due to the high dilution which was used to facilitate the passage of the fluid through the filter and to a greater resistance on the part of fowls to a virus which was more or less specialized for quail.

Further experiments with filtered and non-filtered emulsions of quail pox material were attempted with material which had been kept in the dried condition, and also in glycerine, for a period of six months. No results followed and it is concluded that the virus had become greatly attenuated or destroyed during that time.

Dr. R. F. Eagle, superintendent of the Oklahoma City plant of the Wilson Packing Co. has been promoted to be assistant general superintendent of the whole Wilson Packing Company with headquarters at Chicago. Dr. Eagle attributes his success to his veterinary training. The veterinarians of the United States congratulate Dr. Eagle and wish him continued success.

TORONTO MAN WINS CROIX DE GUERRE. Flight Sub-Lieut. Rochford Grange Decorated by French Government. The news that Flight Sub-Lieut. Rochford Grange, Royal Naval Air Service, has been awarded the Croix de guerre by the French Government has been received by his father, Principal E. A. A. Grange, of the Ontario Veterinary College. Lieut. Grange was graduated from the School of Practical Science in 1915. He underwent a course of training at the Curtiss School of Aviation at Long Branch in the summer of 1915 and left for England in October of that year. He completed his preparation for service with the Royal Flying Corps in England and was sent to France in February, 1916.

AMERICAN RECORDS OF *DICTOPHYME RENALE*

By MAURICE C. HALL, Ph.D., D.V.M.

Parasitologist, Research Laboratory, Parke, Davis & Co., Detroit, Mich.

Just recently Riley (1916) has compiled the record of American cases of the giant kidney worm, *Dioctophyme renale*, from the dog in connection with the publication of some new cases which came under Professor Riley's observation. On looking over my reprints I find two other records which were published in places where Professor Riley would hardly be likely to find them. In order to complete his list—if this does complete it—the two records noted are summarized here, and another case recorded.

Halsted, (1909) in an article on transplantation of parathyroid glandules in dogs, covering work done at Baltimore, Maryland, notes in the case of one animal, an old dog, the following:

“*Autopsy.* Made and dictated by Dr. Hennington. Heart and lungs normal. On opening the peritoneal cavity an extravasation of blood into the omentum was observed and, on more complete exposure, a large round worm (*Eustrongylos gigas* or *Dioctophyme renale*) (?), 90 cm. long and 1 cm. in diameter, presented itself free in the peritoneal cavity in the neighborhood of the spleen. It was still alive and on being placed in warm water, executed slight movements. The intestinal peritoneum was thickened and granular looking. The parietal peritoneum presented in places small, indefinitely circumscribed, roughened areas. More careful examination of the omentum showed that the extravasated blood followed the ramifications of the blood vessels. The liver presented on its surface whitish nodules one to three millimeters in diameter. ***The surface of the spleen was slightly roughened. ***Kidneys quite normal in appearance.”

When females of *D. renale* occur in the kidney of the dog, the eggs produced by the worms pass out in the urine. On the other hand, when these females occur in the peritoneal cavity, and Halsted's case is undoubtedly such a case, the eggs are passed to the peritoneal cavity where they act as irritants and become attached to the peritoneal surfaces by small adhesions which are visible macroscopically as roughened areas. It is probable that the roughening of the parietal and visceral peritoneum noted by Halsted was due to this cause.

The other record of *D. renale* from the United States is that of Baker (1916) and consists of remarks made before the Twentieth Annual Convention of the Indiana Veterinary Medical Association as follows:

"That suggests an interesting discovery that we made in our dissecting room a few days ago. We sent over to the dog pound for thirty-six dead dogs for the juniors to dissect. Floating free in the abdominal cavity of one was the longest specimen of the *Eustrongylus visceralis* I ever saw. It was about $\frac{5}{8}$ of an inch in diameter and twenty-nine inches long and blood red. I measured it myself. Twenty-five years or more ago I found two on post-mortem in the same place, in the abdominal cavity of a dog. One was about 12 inches long and the other was 14. The short one was $\frac{3}{8}$ of an inch in diameter and the other was $\frac{3}{4}$ of an inch in diameter and blood red. You will find it described in the books."

Baker's records undoubtedly deal with cases of *D. renale*. Riley has noted that not all of the published cases listed by him can be accepted. He very properly rejects all the human cases. Breeder's case must be listed as doubtful. The number of worms present, 21, and their length, 9 to 12 centimeters, is more suggestive of lumbricoid worms present in the abdominal cavity as the result of perforation of the intestine. The kidney lesions are puzzling. They are not the typical lesions due to *D. renale*, but in the absence of adequate data as to the worms themselves, it is perhaps as well to regard the case as unproved one way or another.

An unpublished case of the occurrence of *D. renale* has just come to my attention. While at Ann Arbor, Michigan, recently, Doctor La Rue of the University of Michigan showed me a large male of this species which had been collected at Ann Arbor about a year previous.

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CLINICAL AND CASE REPORTS

“Knowledge is born in laboratories and in the experience of the thoughtful. It develops form in the journals and ‘when dead it is decently buried in books’.”

TABULATED RECOMMENDATION FOR METHODS OF CONTROL OF WHITE SCOURS (DYSENTERY NEONATORUM) IN CALVES.

A. T. KINSLEY, Kansas City, Mo.

White scours is the name of a fatal disease of new born animals, the principle symptom of which is diarrhoea in which the discharge is white or whitish in color. This disease affects all animals, but is most common in calves. It has been investigated in Denmark, Holland, Germany, Belgium, Italy, France, England, Ireland and America.

All investigators agree that the disease is of bacterial origin. The following bacteria having been identified with this disease: *B. coli communis*, *B. aerogenus*, *B. paracoli*, *B. pyocyaneus*, *B. proteus*, *B. bipolaris* and various pyogenic micrococci. The *B. coli communis* is the most common bacterial invader in these cases. All of the bacteria before mentioned are found in the discharges of cattle and other animals and therefore infection of the new born is easily accomplished. The most common avenue of entrance of infection is through the digestive tube or the umbilicus, more rarely through other channels, as respiratory or genito-urinary organs.

Knowing the causative agents and the avenue of infection it would not seem to be difficult to control this disease, however, its ravages have continued almost unabated. The following suggestions are offered as a possible means of combating this disease:

A. Sanitary measures.

1. Properly located barns and yards in order that there is good drainage.
2. Construction of barns and other buildings that facilitate cleaning and keeping clean.
3. Frequent hauling out and proper disposal of manure.
4. Clean wholesome water provided.
5. The cow maintained in a cleanly condition prior to and for some time after parturition.
6. Cleaned and disinfected stall or pen for parturition and for occupancy of cow and calf for from 1-3 days thereafter.
7. Cleaned and disinfected stall or pen for calf if pasture land is not available until the calf is one month of age.

8. Diminish possibility of infection of suckling calves by keeping teats and udder of cow clean.
 9. Prohibition of infection of hand fed calves, by preventing infection of milk.
 10. Quarantine of all affected animals.
- B. Preventive measures.
1. Immunization of cow just prior to parturition by the injection of two or more doses of a mixed bacterin.
 2. Immunization of calf with mixed bacterin first day of life.
 3. Provision of colostrum milk for new born calf.
 4. Provision of proper food and feeding at proper intervals.
 5. Use of intestinal antiseptics persistently.
 6. Isolating of animals at the first indication of disease.
- C. Curative measures.
1. Production of temporary immunity by use of polyvalent serum. This has not given universal satisfaction.
 2. Immunization by use of mixed bacterin. This line of treatment has proven of value in all except very acute cases.
 3. Using of intestinal antiseptics and when indicated, laxatives, stimulants or other medicaments.
 4. Careful regulation of the diet.

ARTERIO-VENOUS ANEURISM OF THE SPERMATIC CORD IN AN OX.

BESNOIT AND CULLÉ

Arterio-venous aneurism, characterized by a permanent communication between an artery and a vein, though not altogether exceptional in domestic animals, is not by any means of frequent occurrence. Interesting reports on this subject have been made by Chauveau (1863), Collin and Lesbre (1881), Moreau (1895), Dubois (1907) and others. In bovines the lesion is usually located on the face, near the vessels of the forehead; frequently on the limbs, at the level of the collateral vessels of the cannon. It may be found almost anywhere, especially where the vessels are exposed to trauma, contusions, etc. It has frequently been found in the scrotal region and Collin and Lesbre especially, have described a very remarkable example of typical arterio-venous aneurism of the spermatic cord. A recent case which we describe is practically identical with that of Collin and Lesbre.

The affected animal was four years old. It puzzled the attendants greatly and because of certain symptomatic peculiarities, was nicknamed the "motor ox." On the right, at the level of the

scrotum, there was an enormous pulsating tumor, animated by strange, violent, rhythmical movements, which recalled to the eyes of the "vulgar", the regular shocks and trepidations of the motor of an automobile.

The symptoms were those of the classical arterio-venous aneurism. There was a scrotal tumor, of the volume of two fists, almost cylindrical in form, about 30 centimeters long, hanging vertically between the posterior limbs, like the testes in a bull. It was not sensitive, but soft, very elastic and reducible to the pressure of the fingers. It was animated by violent pulsations, synchronous with the cardiac systole, which were perceptible even to the eye, and shook the entire scrotal mass. Palpation disclosed the characteristic, almost pathognomonic sign of arterio-venous aneurism; the vibratory trembling of the French writers, or the thrill of the English writers. This sign is composed of two sensations: the one a tactile, giving the hand the impression of a fine and rapid vibration, similar to the shaking of windows by the passage of a heavy vehicle; the other, auditory, like the humming of bees or a spinning top. It was continuous, but with a considerable reinforcement, corresponding to the cardiac systole. Attaining its maximum intensity at the base of the scrotal sac, it was propagated through the entire height of the lesion, and was still distinctly perceptible at the inguinal ring. Finally, compression exercised at the base of the sac diminished the concussions and trembling, but they did not disappear entirely.

An anatomical study of the lesion was made, post mortem. The animal, in remarkably fine flesh, did not seem to have suffered from the lesion. A minute dissection of the scrotal region entirely confirmed our diagnosis, and disclosed the following: The lesion was limited to the spermatic cord and involved only the spermatic artery and vein. The two vessels were not equally affected. The artery, very dilated, had an average diameter of a small finger; its walls seemed to have conserved their normal resistance and were not thinned. The vein, on the other hand, was profoundly altered. When injected with water it seemed stretched, sinuous, and extraordinarily dilated. Its diameter varied from 3 centimeters at the narrowest parts up to 6 and 8 centimeters toward the lowest parts of the scrotum, where it formed two enormous ampoules separated by a slight constriction, and which contributed in forming the large cylindrical tumor, observed in the living animal.

The dilation was not limited to the scrotal part of the vein, it was 4 centimeters in diameter 50 centimeters from its extremity, it could be noticed in the abdominal cavity and sublumbar region. The walls of the vein were not thinned, they were, perhaps, somewhat reinforced by a thin layer of sclerotic connective tissue. In order to demonstrate the communication between the two vessels water was injected into the artery, instantly the liquid passed into the vein and dilated it to its former dimensions.

PATHOGENESIS. There can be no doubt about the aneurism originating from castration. The cicatrices on the scrotal sac showed that castration by the "bloody method" had been performed, although castration by torsion is the usual method in Central France. The pathogenesis is easily understood. After the castration, a small quantity of arterial blood diffused into the intrascrotal connective tissue, forming a small hematoma which formed a cavity with which the open ends of the cut vessels communicated. Then, by the progress of the cicatrization and the retraction of cicatricial tissue, the connecting cavity became smaller and smaller, until it finally disappeared, bringing about the adjustment and finally the union of the two neighboring vascular trunks.

In this way three regular anatomical stages of arterio-venous aneurism succeeded one another. First—in the beginning, the varicose aneurism, characterized by the presence, between the artery and vein, of a newly formed sac developed around a clot. Second—after the disappearance of the sac by cicatricial retraction, the simple phlebartery or aneurismal varix, an arterio-venous fistula; characterized by the absence of the sac and the approximation of the artery and vein at the level of the orifice of communication. Third, and finally—as the result of the progressive dilation of the venous walls under the influence of the augmented venous blood pressure due to the incessant pounding of the arterial blood, there results a varicose aneurism by dilation, in which the sac is represented by a distension, more or less pronounced, of the vein. This was the last term in the curious process that took place in our patient.

What should be done in such a case? The lesion had existed for several years and seemed to exert no untoward effects on the animal. Undoubtedly, it would have remained stationary indefinitely, and even if it had developed very slowly, its progress would have had no serious consequences. No intervention is indicated,

although ablation has been performed successfully on bovines, it is perfectly useless.—*Revue Générale de Médecine Veterinaire* XXV. 1916.

BERG.

AN UNUSUAL CASE

C. B. PERKINS

February 6th. Was called at noon to see a nine year old gray mare which was too lame to be backed out of the stable and had fallen once in the attempt.

History—Owner said that the mare had been in the best of health the day before, was not lame and ran and played when turned out to water. On going to the farm February 6th, he found her too lame to be backed out of the stall. He remembered that on February 4th he had made her jump forward quickly to start a gasoline tractor to which she was harnessed but no lameness was noted to follow the attempt.

Symptoms—Temperature 101.2, pulse 60, respiration 16. Skin showed patches of sweat and was very wet and cold. When urged to move she exhibited great pain. After a great deal of effort we were able to get her out of the stall. She walked to the water tank but with great pain and effort. Most of her weight was thrown on the left leg. I made a close examination of the foot but found it in good condition. Examined the entire limb and found nothing until reaching a place on the inner aspect of the thigh at a point on a line with the patella. Here the mare exhibited sensitiveness. There was some heat and swelling but very little. I next made a close examination of the pelvis per rectum but found nothing. The mare then walked into a shed and began to eat hay, resting on the right toe on the ground. I again felt of the tender spot which caused her to flinch and hold up the foot.

I instructed the owner to bathe the part well and left some white liniment (strong) to apply after the hot water. I left directions to be called if there was no improvement.

February 8th. The owner called me and reported improvement, so I dismissed the case.

February 15th. The owner again called and said the mare was down and worse. I put in slings and drove out. When I arrived I found her up eating. She had evidently laid down to rest

and got up unassisted. I made a second rectal examination and as before found nothing. The spot on the thigh was still sensitive but not more so than before and she was not quite so lame.

Temperature 100.5° F., pulse 42, respiration 12. Stood eating hay although she would at times raise her right foot up and look around at it. I examined the foot again but found nothing. Left liniment as before and as condition was good gave no internal medicine.

February 28th. Owner called and said mare was down and could not get up. Took out slings and tried to raise her but could not. Temperature 101° F., pulse 42, respiration 12. The mare was greatly reduced in flesh and the entire right limb had become greatly atrophied: the lower portion was cold and slightly swollen. I endeavored several times to raise her but failed. She would not bear any weight on her right leg and seemed to have no use of it, and the left was but little better.

Diagnosis—I made none the first trip but offered the opinion that there was a "strain of the group muscles about the stifle." On the last trip I decided that there must be a thrombus in the iliac arteries, as the arteries on rectal examination seemed to have a peculiar feel, the pulse in them was weak, feeble, and the condition of the limb cold and swollen. I had not taken into consideration that she had laid on the right leg for twenty-four hours.

Prognosis—I told the owner on the last trip that I could do nothing and asked for a consultation. He said he had faith in me and would destroy her the next day if I advised it. I insisted that he call another man, some legal practitioner.

Dr. R. was called and his diagnosis was "fracture of the distal end of the femur just above the stifle joint." Some crepitation could be heard we thought.

The mare was destroyed and the findings were as follows:

There was no pus in the stifle joint although it contained a bloody, brownish fluid which filled the joint capsule. I found no fragment of bone or even sediment which might have been broken off. There was apparently very little congestion or inflammation about the joint. Post mortem diagnosis was "Acute Gonitis."

—*The Veterinary Alumni Quarterly, O. S. U.*

POISONING WITH SOLANUM DULCAMARA? BITTERSWEET

D. H. UDALL AND F. F. KOENIG, Ithaca, N. Y.

During the past year a small farmer has lost two cows and a horse after a sickness of about two weeks, with symptoms of fetid bloody diarrhea and prostration.

According to the owner the present case, a grade milch cow, had been eating bushes at pasture. On examination these were found to be *Solanum dulcamara* (bittersweet; blue nightshade). She was taken sick on the 17th, showing depression, stiffness, and diminished milk secretion.

Symptoms. Depression, good condition, skin normal. Pupil dilated; m.m. pale. P. 45-50. R. 30. T. 100.6 *Dig. Sys.* No appetite for food or drink; salivation present; peristalsis normal; percussion painful over right abdomen, left normal; feces contained numerous gas bubbles; grunting with each breath.

Treat. Ammon. carb. $\bar{5}$ iv, ol tereb $\bar{5}$ i, creolin $\bar{5}$ i. Prescribed R Liq. acidi arsenosi, liq. strychninae aa xii, tr. ferri chlor. i. M. Sig. $\bar{5}$ i three times per day. Acid tannic $\bar{5}$ iv daily. Creolin $\bar{5}$ iv once daily in a quart of water. July 20 owner reported a marked improvement. An infusion of a small bush given to a cow as a drench proved negative. Further experiments are contemplated.

Discussion. The symptoms of enteritis in this case—diarrhea, pain, pain on percussion in region of abomasum, harmonize with the usual form of enteritis due to faulty feed. The past history of similar cases in animals having access to blue nightshade in the same pasture, combined with the knowledge that this cow ate the nightshade is very suggestive. Our literature on the subject is brief. Halsted¹ mentions its relation to black nightshade, and states that it abounds in *solanine*, the narcotic poisonous principle. No reference is made to its effect upon stock. A similar brief description is found in Farmer's Bulletin No. 86, by Chestnut. Lander² refers to poisoning in sheep with symptoms of a small intermittent pulse, temperature 104° F., quickened respiration, dilated pupils, staggering gait, and greenish diarrhea. Fröhner³ states

1. The Poisonous Plants of New Jersey.
2. Veterinary Toxicology.
3. Lehrbuch der Toxicologie.

that animals are poisoned with solanin obtained from eating potato vines, and that *Solanum nigrum* (black nightshade) is also a cause of poisoning, but that poisoning has not occurred from eating *Solanum dulcamara* (blue nightshade).—*Cornell Veterinarian*.

A SUGGESTION IN CONNECTION WITH THE OVAR-IOTOMY OPERATION ON THE BITCH AND CAT

HARRY FREDERICK, Suffern, N. Y.

The procedure I describe here has no doubt been used by many beside myself, but as there are probably many others to whom it has not occurred, I feel certain it will do some good. If you have had the misfortune to have a nice operation set back several days by the stitches being torn out and the wound breaking open, you can easily prevent this by a simple method.

You may say at this point—"that is easy—just bandage": but it is not enough to bandage, unless you use the right kind of bandage. The ordinary bandage we used at college, before I graduated, I have never found sufficient.

Here is what I do. Procure a piece of clean white linen, muslin, or any cloth for that matter. Just before the operation, cut it to fit the animal by measuring from its head to the lumbar region, for the length and have it wide enough to a little more than go around the body. Cut out two holes for the front legs and it is ready to use when the operation is completed. When in place, it can be fastened over the back, either by safety pins or by tearing it into several tails and tied as any "many-tailed" bandage. I place a liberal sized piece of cotton with powdered boric acid upon it, next to the wound and when the bandage is drawn up against it, much strain is taken off the stitches, and the wound kept clean. The animal cannot get at the stitches.

If anyone has tried some other method that he considers better, I would be glad to hear from him through the *Journal*.

Dr. H. W. Willis has removed from Columbia, Tenn. to Richmond, Ind.

Dr. T. M. Bayler has removed from Chicago to Perry, Iowa.

ABSTRACTS FROM RECENT LITERATURE

TREATMENT OF STRANGLES, ANASARCA, AND INFLUENZA BY INTRAVENOUS INJECTIONS OF PHENOL AND GUAIACOL. Poret. *Recueil de Médecine Vétérinaire*, Vol. 92, pp. 261-267, 1916.—There is a tendency to proclaim the uselessness of antiseptics. I cannot believe this in view of the clinical results, and furthermore, because of the considerable difference in the action of a medicament in vitro and in close contact with the organic elements where it is brought by the blood circulation.

For this reason, the following observations are communicated, confirming the good results obtained by the intravenous injections of solutions of phenol and guaiacol.

What is guaiacol? It is a constituent of creosote, four times as active as phenol, less toxic, sparingly soluble in water, soluble in alcohol and in glycerin; the last of these seems to remove its antipyretic action.

The therapeutic doses of guaiacol per os, are 5 to 10 grams for a horse; 5 to 15 grams for cattle. None of the horses that received guaiacol showed symptoms of poisoning. All that I could notice was a slight sleepiness during the injection; frequently this occurred shortly after. In only one case, a horse had difficulty in getting up on the night following the first injection; I suspect this to be a case of founder.

Guaiacol is more easily handled in intravenous injections than phenol: no inflammation results, if, by error, it passes under the skin or over a vein. It does not cause muscular tremors like phenol does, when injected for the first time. It may be stated, in passing, that the phenol injection did not cause syncope; probably because of the very small dose used. (40 c.c.)

Insofar as guaiacol lowers the internal temperature, even when applied externally, is it not probable that this action will be accentuated when it is in contact with the pulmonary mass? Veterinarian Desjacques noticed a drop from 41 to 38.5 degrees, in Mare 25,733, following an injection of 400 grams (of guaiacol solution), the change taking place in an hour. In similar injections, lowering of the temperature to 38 was noticed, but the temperature in no case fell below 38. If it had, glycerine would have been added to the guaiacol water or guaiacol serum.

With regard to the analgesic action, I believe that this is ex-

erted in intravenous injections, for in all the pneumonia cases treated, coughing was rarely heard.

Guaiacol—10 to 15 grams to 1 liter of water.

2526. Pneumonia—Aug. 18. Nasal discharge red. Tubular breathing, groans. T. 39.7; P. 64; R. 40. 420 grams of guaiacol water.

Aug. 19. T. 39.8; P. 72; R. 40.

Aug. 20. T. 38.6; P. 58; R. 24. In afternoon received 250 grams guaiacol water.

T. 39.7; P. 64; R. 38.

Aug. 21. T. 39.4; P. 68; R. 34. 300 grams guaiacol water.

Aug. 22. T. 38. ; P. 54; R. 30. 200 grams guaiacol water.

Aug. 23. T. 37.5; P. 54; R. 24. Crepitant rales; nasal discharge pale.

Aug. 25. T. 38.2; P. 44; R. 40. A very hot and stormy day.

Aug. 26. T. 37.5; P. 40; R. 16.

Guaiacol in water and in serum.

2529. Pneumonia—Nasal discharge red, groans.

Aug. 25. T. 39.6; P. 56; R. 32. 400 grams of serum containing 15 parts guaiacol per 1000.

Aug. 25. T. 41. ; P. 82; at 2 P. M. 400 grams of guaiacol water, and mustard friction. T. 37.8 three hours later.

Aug. 26. T. 38.3; P. 44; R. 18, in the morning. No treatment.

Aug. 26. T. 39.5; P. 56; R. 26, in the afternoon. 200 grams guaiacol water.

Aug. 27. T. 38.7; P. 66; R. 28; nasal discharge red; groans; received 500 grams of guaiacol serum (15 parts per 1000).

Aug. 27. T. 39.5; P. 72; R. 46, in the afternoon.

Aug. 28. T. 38.3; P. 58; R. 28. 300 grams of guaiacol water and 10 grams of camphorated ether intravenously.

No treatment on the days following

Sept. 6. T. 38.2; P. 56; R. 13. Nasal discharge normal.

Guaiacol and phenol.

2593. Anasarca.—Aug. 29. Morning, edema of the limbs, especially the posterior; petechiae on the Schneiderian membrane. Received 250 grams guaiacol water in the morning; 400 grams in the evening and 8 grams of camphorated ether intravenously.

Aug. 30. Engorgement reaches the elbow and patella. Sanguinous serous transudate from pastern joint. 400 grams guaiacal water in the morning, 600 in the evening.

Aug. 31. Edema less pronounced. Enormous tumefaction of the nose. Received 500 grams phenol water (pure phenol 25 parts per 1000) and 400 grams more in the evening.

Sept. 1. Edema of nose and lips less pronounced rendering petechiae more visible. Received 500 grams phenol water; evening; T. 40.3; 88 feeble pulse. Artificial serum, caffein.—Dead.

Autopsy showed hepatization of the anterior pulmonary lobes and small purulent collections in the left lung.

Phenol water (pure phenol 25 parts per 1000).

2530. Anasarca. Aug. 15. Schneiderian membrane strongly injected; engorgement reaching to the stifle joints and metatarsus. Few drops of bloody transudate from posterior pastern joint. T. 39. Received 440 grams phenol water in the morning and 250 grams in the evening.

Aug. 16. Petechiae more pronounced; 500 grams phenol water in the morning; 800 grams in the evening.

Aug. 17. Petechiae attenuated; 500 grams phenol water.

Aug. 18. 0.05 gram caffein; 25 grams potassium nitrate.

Aug. 19. 0.05 gram caffein; 25 grams potassium nitrate.

Aug. 20. Engorgement disappeared. Schneiderian membrane clean. T. 39. P. 44.

(Several other cases are given in detail. The above are typical. Intravenous medication seems to be more practised abroad than here. For intravenous injection of chloral hydrate, see this *Journal*, May, 1916, p. 268. For intravenous injection of camphor in diseases of the respiratory tract, see this *Journal*, July, 1916, p. 528; both from foreign journals. Recently Meltzer (New York) produced generalized anesthesia by intravenous injection of magnesium sulfate solution. See abstract following.)

BERG.

ANESTHESIA IN HUMAN BEINGS BY INTRAVENOUS INJECTION OF MAGNESIUM SULFATE. C. H. Peek and S. J. Meltzer. *Journal American Medical Association*, Vol. 67, pp. 1131-1133, 1916.—In this preliminary communication we wish to report briefly the course of anesthesia in three operations performed on human beings exclusively under the influence of an intravenous injection of mag-

nesium sulfate. Some of the writers insisted that magnesium exerted only a curare-like action, that is, the salts paralyze the motor nerve endings to such a degree that the animal is incapable of responding to any stimulation; in other words, that the animal which appears to be anesthetized is actually conscious during the operation and feels all the pain inflicted on it, but is incapable of manifesting its sensations on account of the complete paralysis. The operations performed clearly demonstrated that the magnesium solution exerts a genuine central effect which is entirely independent of any peripheral action which may or may not be present. The state of anesthesia produced is actually anesthesia, that is, sensation as well as consciousness is temporarily more or less completely abolished.

In one operation on a 160 pound man, 180 c.c. of a 6% magnesium sulfate solution were infused into the cubital vein in 45 minutes.

BERG.

POISONING WITH STRYCHNINE. By Country Vet. *Veterinary Record*.—A big, strong, cross-bred cow, heavy milker, was suffering with impaction of the rumen, loss of appetite, constipation and difficulty in getting up. A purgative was given, which operated well, and the next day the animal was convalescent. She then received hypodermically 2 grs. of strychnine hydrochloride, which were repeated the next day. It was observed that each time about an hour after the injection, she showed muscular tremors which soon passed off. On the following day her appetite was good, rumination regular, bowels acted well and the animal moved normally. Two more grains of strychnine were administered with the result that violent tetanic spasms took place and she died in ten minutes. The writer says that he has used strychnine in such dose for years and even in larger quantities but has never met with such unpleasant experience before.

LIAUTARD.

UNSUSPECTED DENTAL TROUBLE. Charles A. Squair. *Veterinary Record*.—An aged short horn cow had calved; two days after she could not get up. Yet she was in perfect health, eating and drinking well. She had no milk fever, but could not raise herself. Purged, liniment over the spine and the udder was inflated. In two hours she was up and well. Six weeks after, the writer was called to see her again. She was unable to eat. Anxious for her food,

she took it in her mouth but immediately dropped it. She salivated abundantly. The mouth was carefully examined for an offending molar or a foreign body, but nothing was detected. The molars, the tongue and the pharynx were explored as far as possible and everything was normal. Even a probang was resorted to and pushed into the stomach. Notwithstanding renewed exploration, no explanation was found. A blister was applied over the pharyngeal region without improvement. Finally another exploration of the mouth was decided upon and in placing the gag to keep it open a congested appearance was noticed around an incisor, which was loose. It was pulled out and a teaspoonful of pus escaped. The next tooth was also diseased and extracted. Immediate recovery resulted.

LIAUTARD.

EXPERIMENTS ON THE IMMUNIZATION OF HORSES AGAINST GLANDERS. W. Pfeiler. *Berl. Tier. Woch.* Year 31, No. 45, pp. 532-533, Nov. 11, 1915. *Abst. International Review of the Science and Practice of Agric.*, Year VII, No. 1, January 1916, p. 97.—The object of the writer was to obtain experimental evidence as to the possibility of rendering horses immune to glanders, thereby disproving the majority of German veterinary practitioners. Of the six animals (horses and donkeys) employed, two were inoculated as controls with cultures of the specific bacillus (1,2400 Oese). Both contracted the disease. The remaining four animals were first rendered immune by means of a special vaccine and subsequently injected with the same amount of the culture as had been introduced into the control animals. In no case was the disease produced. The same negative result was obtained on injecting the same four horses with an amount of the culture 2, 4, or 8 times stronger than that used in the first experiment.

The writer concludes that it will be possible to confer immunity against glanders and intends to continue his experiments.

REICHEL.

JOINT ILL IN FOALS. F. W. Schofield. *Second Report on the Investigation Into Joint-Ill in Foals Existing in the Province of Ontario.*—In a previous investigation no specific organism was isolated to which the disease could be ascribed. Several organisms were found that might be the cause. Streptococci were the organisms most frequently isolated from the lesions except in the re-

gions where contagious abortion was prevalent. There the *Bacillus abortivus equinus* was frequently isolated. A vaccine (bacterin) prepared from the organisms most commonly associated with the disease gave very promising results in treatment. The use of a vaccine had reduced the mortality from 66% to 25%. The purpose of the second investigation was to test the use of the vaccine as a prophylactic.

Five veterinarians, in as many different districts, inoculated, as far as possible, all the foals dropped in their respective territories. Only those foals apparently normal were inoculated. When temperature was subnormal or above normal the vaccine was withheld.

The vaccine was a polyvalent mixed infection vaccine. Two kinds of vaccines were employed. One contained *Streptococci*, *Staphylococcus aureus* and *B. coli*. The other contained in addition the bacillus of equine abortion to be used in territories infected with abortion. Original strains of streptococci used came from diseased joints, the *Staphylococcus aureus* from various suppurative lesions, and the *B. coli* from cases of Joint-ill. The virulence of the organisms was assured by the author in preparation for the bacterin. Each cubic centimeter of the bacterin contained streptococci enough to cause a slight local lesion in young guinea pigs; colon bacilli 100 million, staphylococcus aureus 200 million.

The dosage for prophylactic purposes was 1.0 c.c. injected a few hours after birth. One injection was adopted as the dose so as to make the test practical in that it would be inexpensive to the owner. A brief summary of the experiments carried out with the vaccine as a preventive measure shows that in the five districts the

Total number of foals inoculated was.....458

Approximate number of foals not inoculated.642

Total number of foals born1100

Total number of cases of Joint-ill among inoculated foals 14 or 3.0%

Total number of cases among uninoculated foals40 or 6.2%

There was greater evidence of protection in some districts than in others and although the vaccine did not generally confer a very satisfactory immunity the case rate in all districts was greatly reduced. However, the decrease in the case rate was nearly as much in the unprotected district as in the protected. The inoculated foals were on farms where Joint-ill occurred regularly or ir-

regularly for years. The decreased percentage of cases on these farms points to a definite prophylactic value for the vaccine.

The curative dosage is 0.5 c.c., 1.0 c.c., 2.0 c.c., 3.0 c.c., 4.0 c.c. to be given subcutaneously at intervals of five or six days. Age, size and condition of the foal must always be considered. Local reaction, a slight swelling over an area as large as one-half the palm of the hand and passing away in a day or two, and progress of the case also helped to determine subsequent doses. Symptomatic treatment, both surgical and medical, should always be observed. With these precautions the use of the vaccine is more effective. The vaccine should never be used in moribund cases.

Bacteriological findings from blood and synovia of twenty-three cases of Joint-III showed the constant presence of streptococci. There is a predominating hemolytic streptococcus classed as Types II, III, and C. Type II has great pathogenicity for rabbits, less for guinea pigs. Type III has slight pathogenicity for either rabbits or guinea pigs. Type C shows irregular pathogenicity and lack of vitality on culture media. Every case from which type II was isolated proved fatal. Type II was found in milk from three out of four mares whose foals had died of Joint-III and was not found in the milk from seven mares having healthy foals. From this fact ingestion infection is considered to be quite probable.

HAYDEN.

BOVINE ONCHOCERCOSIS IN SOUTH AMERICA. Mr. Piettre. *Bulletin de la Soc. Cent.*—Onchocercosis is frequently observed in cattle killed for the fabrication of preserves. In the Argentine Republic 70% of the animals killed had massive lesions on the cervical ligament, 25% had localizations on the internal face of the great trochanter. In Uruguay, 90% had cervical and 18% had trochanterian lesions.

The parasites are located on both faces of the cervical ligament, between the fifth and first dorsal vertebrae, and also on the trochanter between the tendinous fibres which attach to it. The ligaments of the femoro-patellar ligaments are exceptionally infected: 16 cases out of 1000 bodies.

The parasites are longer than the European. The females sometimes reach 70 centimeters in length. The lesions these worms promote are more serious than those of the French type. They give rise to extensive congestion, formation of large pockets in the

inflamed connective tissue and frequently to encysted purulent collections.

LIAUTARD.

A LESION OF INTESTINAL MYIASIS IN HORSES. Major Veterinarian Velu. *Rec. de Med. Véter.*—The author refers to an animal, in the stomach of which he found an extraordinary number of larvae of oestri, (bots), viz: 1250 in the left sac of the stomach, 80 in the right, 120 in the duodenum. The parasites belonged to different species, *Gastrophilus equi*, *G. veterinarius*, *G. hemorrhoidalis*. The larvae of the *veterinarius* were the only ones that had given rise to serious lesions. After perforation of the duodenal mucosa, they had promoted an irritation of the sub-mucous connective tissue and the formation of tumors, looking somewhat like those of the *Spiroptera megastoma*. Some were as big as a nut and again as large as an egg. They could scarcely be detected in the cavity of the stomach but by examination of the visceral serosa, they could be easily detected. Some of these tumors were hard and others were undergoing softening and suppuration.

LIAUTARD.

ON CERTAIN RELATIONS OF THE LOWER ANIMALS TO HUMAN DISEASE. David John Davis, Chicago, Ill. Read at the Quarter-Centennial of the University of Chicago, Departmental Conference in Pathology, June 6, 1916. Abst. from *Science*, Vol. XLIV, No. 1132, Sept. 8, 1916, pp. 337.—“The study of comparative pathology, it would seem, should occupy a more prominent place in the curricula of our universities and medical schools than it has in the past. When we consider the fundamental character of the studies in this field of pathology—the work of Jenner, of Pasteur, of Koch, of Theobald Smith and especially of a great group of investigators in recent years on cancer and on tropical diseases in man and animals—the truth seems evident that in the study of disease and in its presentation to students, such an important field should not be slighted. Our study of disease in medical and veterinary institutions should be at least as broad and as comparative as is the study of zoology or botany. In order to understand the natural history of many diseases comparative studies are absolutely necessary. It would undoubtedly be advantageous both from a human as well as from a scientific standpoint if our medical schools and hospitals, our veterinary hospitals and even our cat and dog hospitals and

other places for the care of sick animals could all be concentrated in one institution for the broad study of disease. This indeed is now being attempted in certain institutions and no doubt will result in a broader conception of pathology."

Modes of transmission are summarized as follows:—

"1. Infection in man may occur through simple contact with diseased animals.

"II. The infectious agent may be carried mechanically from person to person or from animal to person through food or otherwise by a second animal.

"III. The animal may, through a bite, produce a lesion into which the infectious agent is transferred, as in rabies and especially in the blood-sucking insect diseases.

"IV. The parasite may be transmitted to man through the meat of lower animals used as food.

"V. The infectious agent may be transmitted to man through the secretions of the lower animals.

"VI. The infectious agent may enter one of the lower animals in which it passes through a regular phase or completes a cycle and then, usually through a bite of the animal, is transmitted to man."

HUMAN DISEASES CARRIED

1. By the dog:

- Rabies.
- Foot-and-mouth disease.
- Helminthiasis.
- Flukes.
- Tapeworms (especially *Taenia echinococcus*)
- Infantile splenomegaly (from dogs through fleas).
- Trypanosomiasis (*T. gambiense*).
- Mange.
- Fleas and ticks.
- Ringworm.
- Favus.

2. By the cow:

- Tuberculosis.
- Actinomycosis.
- Anthrax.
- Cowpox.
- Tetanus (through vaccine).
- Foot-and-mouth disease.
- Septic sore throat.
- Rabies.
- Pus infections.

- Tenia saginata.
Milk sickness .
Paratyphoid fever.
3. By the horse:
Glanders.
Rabies.
Tetanus.
Sporotrichosis.
Anaphylaxis.
Serum disease.
Odor of horses.
 4. By swine:
Trichiniasis.
Tuberculosis.
Anthrax.
Cestodes (especially *T. solium*).
Trematodes.
 5. By sheep:
Anthrax.
Tuberculosis.
 6. By goats:
Malta fever.
Tuberculosis.
 7. By the antelope:
Sleeping sickness.
 8. By the cat:
Rabies.
Cestodes.
Trematodes.
Favus.
Ringworm.
 9. By rats:
Rat bite fever.
Bubonic plague (through fleas).
Trichiniasis (through hog to man).
 10. By ground squirrels:
Bubonic plague.
 11. By birds:
Psittacosis (from parrot).
 12. By fish:
Tape worms.
 13. By arthropods, chiefly insects:
Mosquitoes:
Yellow fever.
Malaria fever.
Dengue fever.
Filariasis.

Fleas:

- Bubonic plague.
- Infantile splenomegaly.

Ticks and mites:

- Rocky Mountain fever.
- Relapsing fever (African).
- Tick fever of Miana.
- Japanese flood fever.

Lice:

- Typhus fever.
- Relapsing fever (*Spirochaeta obermeieri*)

Bed bugs:

- Kala azar.

Flies:

- Sandfly fever.
- Sleeping sickness (tse-tse fly).
- Typhoid fever and other infections carried mechanically.

Crustaceans (water flea):

- Guinea worm infection (dracunculosis).

Oysters, clams, etc.:

- Typhoid fever.

Snails:

- Trematode infections (especially bilharziosis).

The control of diseases transmissible from the lower forms of life to man must include a careful consideration of the following points:—

“1. A lower animal may be the only agency in the spread of a disease.

“2. Several different species of lower animals may be concerned in the transmission of the disease.

“3. The lower animal may be a “healthy” carrier. That is, the infectious agent though perhaps highly virulent to man may not cause the animal to become sick.

“4. The lower animal may be a diseased “carrier”; that is, the infectious agent may cause the lower animal to become sick.”

REICHEL.

Dr. S. O'Toole has removed from Agricultural College, N. D. to Atlanta, Ga.

Dr. C. Hays has removed from Burkeville, Va. to 301 Douglas Ave., Kalamazoo, Mich.

Dr. F. F. Meads has removed from Enid to Cherokee, Oklahoma.

ASSOCIATION MEETINGS

AMERICAN VETERINARY MEDICAL ASSOCIATION

REPORT OF THE COMMITTEE ON LEGISLATION

During the term of this committee the consummation of the hopes and labors of many years was realized, and the granting of an officer's rank was bestowed upon our confreres in the U. S. Army after a struggle of many years.

The Army Reorganization Bill became a law and was approved June 3, 1916, and the Act is now officially known as the National Defense Act. It became operative on July 1, 1916, and provides for a Veterinary Corps which shall be a part of the Medical Department of the Army. It also provides for rank, pay and allowances of veterinarians from 2nd Lieutenants up to and including Major, and it further provides for those veterinarians now in the army, giving them active rank as high as Captain and retiring with Major rank. At least that is the way it is supposed to be, and will be decided by the first veterinarian to retire under the new law.

For four years more the U. S. Army in all its branches will be increased one-fifth until the new strength provided for by the Defense Army Act is attained.

The great rush of business and the concentration of our troops on the border have partly prevented the rapid change that was generally expected to take place in the management of veterinary affairs of the Army, but the Medical Corps by which we are to be controlled and directed called for an examination of candidates to be held by the U. S. Civil Service Commission, July 17, 1916. This examination was prepared by the Surgeon General, U. S. Army. A board of Medical Corps officers was convened at Fort Sam Houston, San Antonio, Texas, August 17, 1916. It was composed of Capt. Thomassen, presiding and two medical officers and veterinarians, Griffin and Schwartzkopf.

Successful candidates will be ordered to report before the board for physical examination and if passed will then go into the army veterinary corps as second lieutenant.

The great help given by the members of the A.V.M.A., through their congressmen and senators, is hereby acknowledged. The committee desires to show its appreciation to the invaluable assistance and unchanging loyalty of Chairman James Hay of the House Committee on Military Affairs. Through his efforts and masterly

direction, the veterinary clause of the Army Reorganization Bill was twice passed unanimously by the United States House of Representatives and this committee urgently recommends that proper recognition be given to Chairman Hay of Virginia by this association.

D. E. BUCKINGHAM, Chairman.

REPORT OF THE COMMITTEE ON INTELLIGENCE AND EDUCATION

All the veterinary colleges on the accredited list of this association have been visited by one or two members of the committee with two exceptions. These are the Veterinary Department of the State College of Washington and the Veterinary Division of the Alabama Polytechnic Institute. On account of the expense involved, arrangements were made with Dr. E. T. Baker of Moscow, Idaho, to visit and report upon the Veterinary Department of the Washington State College; and with Dr. H. C. Hutchins, Assistant State Veterinarian of Georgia to visit the Veterinary Division of the Alabama Polytechnic Institute.

There are approximately 20,000 practicing veterinarians in the United States and Canada. During the past year, there were in the veterinary colleges of the United States and Canada 3160 students, of whom 835 were seniors. America is now fairly well supplied with veterinarians. The demand is not for more, but for veterinarians with a more thorough training, not only in strictly professional lines, but in related lines that shall not only make him more efficient as a professional man, but more useful to humanity. The importance of veterinary science to the welfare of the people has never been so evident as at the present time, and realizing this, there is a demand not only within the profession, but also from the public for thoroughly and broadly trained veterinarians.

Most of the veterinary colleges are making an earnest effort to strengthen their courses, by adding new subjects to the curricula, by giving more laboratory work, and by newer and more efficient methods of teaching. The training given veterinary students is better now than it has ever been before, but there is still room for improvement in all, and in some colleges the need is great. As a rule, the greatest weakness is in the smaller private schools. This

is natural as their income does not permit the development that they desire or need.

The committee believes that it is the desire of this association to increase the efficiency of veterinary colleges and the suggestions made are intended to be constructively helpful. Consequently, we shall emphasize only a few points where improvement is most needed.

The greatest defect in veterinary education at present is the lack of a thorough preliminary education upon which to build the professional training. This is necessary, not only that the student shall be able to get the full benefit of the veterinary training, but to meet the demands that come to professional men. At present there is a wide difference of opinion in the different colleges as to what our present entrance requirements mean. Prospective students who fail on the entrance examination at one college go to another and pass the same, or a similar examination. Most of the entrance examination questions are simple, and the grading too liberal.

The Dean of the St. Joseph Veterinary College informed us that all of the seventy applicants for admission passed, and that no students had failed to pass their college examinations the previous session. This variation in entrance requirements is most marked in the private veterinary schools, but the veterinary department of the Kansas State Agricultural College admits students to the veterinary course who have not passed the standard college entrance requirements of fifteen units. Such students are called "specials", and are required to pass the regular class examinations. On the completion of the course, they are granted a "veterinary certificate", instead of a degree. No certificates have yet been granted, but in the class of 1917 there are nine "specials", and in the class of 1918 four. In the freshman class there are twelve specials, one with 13 units one with 10; two with 8; one with 7; one with 5; one with $4\frac{1}{2}$; five with none. Nine students have dropped out. Four of these had no units. The indications are that the other one with no units will go in the near future, as his work is poor.

This association has adopted certain requirements that are susceptible of widely different interpretations. To overcome this difficulty and secure uniform entrance conditions, we recommend that the Committee on Intelligence and Education be authorized to confer with the deans of the private veterinary schools and ar-

range a plan by which entrance examination questions shall be prepared, the examinations held, and the papers graded to meet the requirements of this association.

We also recommend that this association urges the inauguration of short courses for graduate veterinarians that shall enable practitioners to become familiar with the latest and best methods of veterinary science and practice. These courses to be conducted by veterinary colleges or veterinary associations.

We also recommend that the Committee on Intelligence and Education be instructed to correspond with the examining boards of the various states and provinces to urge upon them the importance of thorough examinations conducted so as to place each candidate upon his own responsibility, and that the committee render to state examining boards all the assistance possible to secure uniformity and efficiency. With uniformity of state and provincial examinations, the question of reciprocity between them will be advanced.

We also recommend that the committee prepare an outline schedule for a four-year veterinary course that can be used as a guide by the various colleges.

Your committee wishes to emphasize the importance of establishing what may be called an ethical professional atmosphere in some of the private veterinary schools. This can be done by those in charge and practically at no expense. There is a tendency among some to pose as bold rough veterinary students. A profession is judged very largely by superficial impressions, hence it is very important that the veterinary schools train students in social and ethical lines that are so important in elevating our professional standards.

There is much work to be done for the improvement of veterinary education in America. The veterinarian of the future must have a thorough technical and broadly human training. Calling ours a learned profession does not make it so. We are judged by the public, and we shall only be recognized as a learned profession when we meet the standards set by similar professions.

N. S. Mayo, Chairman; A. S. Cooley; F. Torrance; S. H. Ward; W. B. Mack.

REPORT OF THE LIBRARIAN

Mr. President and Members: The report of the Librarian covers the period from August 1st, 1915, to August 8th, 1916.

The number of copies of the proceedings on hand August 1st, 1915, together with those distributed and those now on hand is shown by the following table:

	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13
On Hand	7	12	82	4	150	136	176	245	38	390
Copies Returned										2
Copies Distributed	1	1	1	1	1	1	2	3	7	15
Books on hand										
August 1, 1916	6	11	81	3	149	135	174	242	31	377

I believe at the meeting last year someone suggested that the editor of the *Journal* take over the office of Librarian. I think that is a very good suggestion, as from now on the editor of the *Journal* has practically all of the work of the Librarian to do. I think it would be a good suggestion for you to act upon.

J. N. FROST, Librarian.

REPORT OF THE INTERNATIONAL COMMISSION IN THE CONTROL OF BOVINE TUBERCULOSIS.

A meeting of this commission was held at Chicago, December 1, 1915, in connection with the United States Live Stock Sanitary Association. Careful consideration was given to available information concerning the newer tuberculin tests. It was the unanimous conclusion of the commission at this meeting that public statement endorsing either of the newer tests or the simultaneous (thermal and intradermal) was at that time inadvisable, because available information was inconclusive and because of official difficulties that would arise in public work from premature statement.

A committee of three, Torrance, Mohler and Moore was appointed to compile data and make a critical study of available evidence as to the reliability of the newer tuberculin tests.

Another meeting of this commission was held in Detroit on August 23, 1916. The special committee previously mentioned reported a considerable amount of data concerning the newer tuberculin tests which appeared to show that the intradermal test

has no advantage in accuracy over the usual thermal test under ordinary conditions, but may have important advantages under special conditions. A limited amount of data was reported on the complement fixation test which showed an average accuracy of 81.6 per cent.

Careful consideration was given to the future work of the commission. It was the unanimous opinion that its future work should be that of correlating more closely the technical knowledge of this disease with the practical work of control.

This commission feels that there are possibilities of important constructive action along the line of working out a practical scheme of co-operation between federal, state and other authorities in following to the point of origin tuberculosis infection discovered by official inspection of meat animals before or after slaughter. This commission also recognizes the possibility of important service in furthering such lines of work as official recognition and registration of tuberculosis-free herds of pure bred cattle.

This commission deems it important that in this work and in kindred lines of effort, the American Veterinary Medical Association should take a prominent part.

While the commission feels that there is at present but little benefit to be derived from its further study of bovine tuberculosis from the strictly technical or professional point of view, its members are convinced that much good may result from an endeavor to correlate the practical with the scientific aspects of the problem.

The commission would therefore suggest that the association should make such provision as may be necessary to undertake this new and promising line of work either by continuing the commission as at present constituted, or with such changes in the personnel as may be considered advisable.

J. G. RUTHERFORD, Chairman.

M. H. REYNOLDS, Secretary.

REPORT OF THE JOURNAL COMMITTEE

In accordance with the action taken by the American Veterinary Medical Association at its meeting in Oakland, California, to establish a *Journal* for the association, the sub-committee on *Journal*, carrying out the arrangements already made with Dr. Ellis by the Committee on *Journal*, Doctors C. J. Marshall, R. P.

Lyman and Dr. A. Eichhorn, met with Dr. Ellis and his attorney F. L. Mayham, at Dr. Ellis's home September 25, 1915. Dr. P. A. Fish was present by invitation. Arrangements were made for the taking over of the *American Veterinary Review* as the official Journal of the American Veterinary Medical Association, for the sum of \$2500.00. Dr. Fish was appointed editor. The *Review* became the property of the association, October 1, 1915. The October number was prepared and published by Dr. Ellis at New York City. The subsequent numbers have been prepared by Dr. Fish at Ithaca, N. Y.

The expenses of the *Journal* have been paid from its earnings outside of the association so far as possible. When these have not sufficed the membership subscriptions have been drawn upon through the treasurer. Approximately one-third or slightly less of the circulation is among non-members. The postal regulations require that members must be *bona fide* subscribers and that a portion of the dues must be used for the payment of the subscription. On this basis, there should be a fund for the *Journal* in the hands of the treasurer, which can be drawn upon as needed.

The following is a statement of the receipts and expenditures of the *Journal* for ten months ending July 31, 1916.

Receipts and expenditures. 10 months, ending July 31, 1916:

RECEIPTS

Renewals and Subscriptions	\$2110.02
Advertising	2327.76
Miscellaneous	116.89
Binders	23.00
Sundries (unaccounted for)95
Journal Fund from Treasurer	1860.34
	<hr/>
	\$6438.96

EXPENDITURES

Printing Journal to Aug.	\$4363.60
Miscellaneous for Journal	194.48
Postage	455.88
Office and Assistance	427.15
Miscellaneous	171.73
Miscellaneous paid by Treasurer	15.56
	<hr/>
	\$5628.40
Excess of receipts	810.56
	<hr/>
	\$6438.96

There are 1726 members whose dues have been paid. This means a fund of \$3452.00 for the *Journal* from subscriptions of the members. In addition to this should be considered the subscriptions from applicants for membership of which, there are 421. This means a further addition of \$842.00 to the *Journal* fund. From the members and applicants' subscriptions, there should be a total of \$4294.00 to the credit of the *Journal*. From this there should be deducted the \$1860.34 already received from the treasurer, leaving a balance of \$2433.66. There should be a still further reduction for the items of salary and the \$150.00 paid Dr. Ellis for members' copies of the October number of the *Journal*. This would reduce the amount to \$1283.66.

While the previous itemized statement of receipts and expenditures refers only to the *Journal* office, there should be considered, from the association's standpoint, the item of \$150.00 paid by the treasurer to Dr. Ellis for the additional copies of the October 1915 number. This, with the editor's salary, paid by the treasurer, would bring the total of the expenditures for the ten months to \$6778.40. While we cannot assume the accuracy of the figures outside of our own office, our records and general information indicate that the following general statement would be conservative and approximately correct:

JOURNAL OFFICE

Receipts, 10 months\$4578.62 Receipts from Treasurer.... 1860.34 Journal Fund still with Treas. (paid by members) 1591.66 Journal Fund still with Treas. (applicants) 842.00 <hr style="width: 100%;"/> \$8872.62		Expenditures, 10 months....\$5628.40 Paid by Treasurer to Dr. Ellis for Oct. 1915 No..... 150.00 Salary paid by Treasurer.... 1000.00 <hr style="width: 100%;"/> \$6778.40 *Excess of Receipts 2094.22 <hr style="width: 100%;"/> \$8872.62
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*Made up of balance of \$810.56 in Journal office Aug. 1, 1916, and \$1283.66 estimated balance with treasurer.

Considered in the expense to the association should be reckoned the price of \$2500.00 paid to Dr. Ellis for the *American Veterinary Review*. At the close of the year ending September 30, it would appear that there will be a balance which might be applied upon the original cost of the *Review*. In this event, it would appear

that the *Journal* has paid its own expenses, the salary of the editor and a portion of the original cost of the *Review*.

The amount paid for the *Review* is materially less than that paid, of late years, for the publication of the former proceedings which brought no direct financial return to the association.

During the year there were 266 subscribers who, up to date, have failed to renew their subscriptions. To offset this, there have been 159 new subscribers, not members of the association, and 421 new applicants for membership in the association.

The average circulation of the *Journal* for ten months has been 2770. The mailing list for August was 2936 and on August 12, reached 3,003.

It is hoped that the *Journal* has been a factor in bringing new members into the association and that it may grow in usefulness to the profession at large. It is also hoped that it may grow in usefulness in the advertising field; that advertisers will appreciate an impartial and uniform rate for space and that there may be a spirit of cooperation between advertisers and members in that the advertisers are contributing to the support of the association and members by patronizing them, are also contributing to a certain extent to this end. Members may cooperate by contributing articles to the *Journal*, by helping to increase the membership, subscribers and advertisers and build the *Journal* into one of the strongest veterinary periodicals in the world.

RECOMMENDATIONS

It is recommended that the association subscribe for the *Journal* at the regular membership rate for the honorary members.

That the members of the Honor Roll shall pay the subscription price of the *Journal* if they continue to receive it.

That the business proceedings of the association together with the constitution and list of members be printed in a supplementary number of the *Journal*.

That when an article is accepted for publication in the *Journal*, the author be notified and 50 reprints will be furnished free of charge, should he express a desire to have them. Additional copies at the regular rate.

That the editor be allowed \$75.00 a month for assistance and office expenses.

The members are to be congratulated upon the success of the operation of the *Journal* and urged to do all in their power to promote its welfare.

F. TORRANCE, Chairman.

REPORT OF THE COMMITTEE ON NECROLOGY

During the past year the following named members have been taken from us. We have, in preparing this list, endeavored to get every one in. Sometimes we have not been able to get the names until after the convention. We have, from the publishers of the various journals, endeavored to get in touch with the names that they knew of, and I trust that the list is complete, and that no one has been omitted. After reading this list, if any person should be familiar with the death of others, we desire to know about it.

The following is the list:

Dr. Francis Abele, Jr., 18 Spear St., Quincy, Mass. He graduated from the Ontario Veterinary College in 1893; admitted to membership in this association in 1900; and died March 26, 1916.

Dr. Fred Barclay Carter, 21 W. Torrance Street, Norristown, Pennsylvania. He graduated from the University of Pennsylvania in 1912; was admitted as a member of this association the same year; and was killed in the spring of 1916 in an automobile accident.

Dr. J. B. Desmond, 77 Currie Street, Adelaide, South Australia; died during the year. He was a graduate of the Melbourne Veterinary College in the year 1887; was admitted into this association in 1903. Dr. Desmond was quite a familiar character to this association, at least his writings on this side of the water are. For a number of years he contributed articles to the *American Veterinary Review*; I think also to Dr. Campbell's journal and others. He was a member of this association, although he lived quite a distance from us, and he was quite interested in the work going on in this part of the country.

Dr. B. G. Dill, of Charleston, South Carolina was a graduate of the Kansas City Veterinary College in the year 1908; was admitted to membership in this association in 1910 and died on the 17th of September, 1915.

Dr. Roy N. Drake of Reno, Nevada; a graduate of the Ohio Veterinary College in 1896; admitted to membership in this association in 1909; died April 11, 1916.

Dr. John J. Gallagher of Lovelock, Nevada, was a graduate of the New York State Veterinary College in 1904; was admitted to membership in this association in 1915; and died on July 22, 1916.

Dr. W. C. Holden, of Delphos, Ohio, graduated from the New York College of Veterinary Surgeons in 1880; was admitted to membership in 1902; and died on the 16th day of April, 1916.

Dr. D. Arthur Hughes, of Chicago, Illinois, was a graduate of the New York State Veterinary College in 1903; was admitted to membership in this association in 1904; and died on the 15th day of February, 1916. I believe that it is pretty generally conceded that in Dr. Hughes we lost one of our very prominent members. He was a gentleman of rare literary attainments, an ardent worker for the uplift of the veterinary science, and I presume that I am safe in stating that he was one of the most active men in the association, and in the general uplift of the veterinary profession in this country.

Dr. David McKibbin, Jr., of Philadelphia, Pa.: a graduate of the University of Pennsylvania in 1906; admitted to membership in this association in 1910. I have not the date of his death here, but he died in California. I received from Dr. Klein a copy of a San Francisco paper, and from that I inferred that Dr. McKibbin was one of the very prominent men on the Pacific Coast, and a gentleman of very wide experience. He had traveled a great deal in foreign lands; had been to China; and had been investigating diseases of cattle. He had also been to the Philippine Islands and had made a great name for himself. A great deal more about the achievements of this good doctor could be mentioned, but I have not the copy here.

Dr. W. H. McKinney, 308 Bumbel Building, Kansas City, Missouri; graduate of the Chicago Veterinary College; admitted to membership in 1891; died on the 23rd day of February, 1914. He should have been included in last year's report, but through some oversight was omitted.

Dr. W. F. Meyers, of Fort Wayne, Indiana, was a graduate of the Chicago Veterinary College in 1889: was admitted to member-

ship in this association in 1900; and died on the 17th day of January, 1916.

Dr. Harry W. Rike, 735 Lincen Avenue, Burlingame, California, was a graduate of the Ontario Veterinary College in 1889; was admitted to membership in 1909; and died on the 6th day of April, 1916.

Dr. U. S. Springer, of Grand Rapids, Mich. We have been unable to ascertain the date of his death. Mail was returned marked deceased.

Dr. F. D. Weisse, 46 W. 20th Street, New York City, was a graduate of the New York Veterinary College, and was admitted to membership in 1871. He was an honorary member of this association or rather on the honor roll. He was once upon a time a member of the faculty of the Veterinary College of New York. The doctor died in 1915. This is another case that was overlooked at the last meeting.

Dr. John Scott, of Peoria, Illinois. I have no data further than that.

Dr. Theodore Kitt of Bavaria, Germany. I presume we are all more or less familiar with the great work that this man has done. He was perhaps one of the foremost pathologists of Europe. I have no dates on the case, although I can say that Dr. Kitt was an honorary member of this association.

H. JENSEN, Chairman.

SECRETARY'S OFFICE A.V.M.A.

Resignations due to the increase of the annual dues to five dollars are surprisingly few. In the November issue this announcement read "registrations" instead of "resignations".

There will be a meeting of the Executive Board at the Secretary's office on the evening of December 5th, 1916 to consider some questions that have arisen under the new Constitution and By-Laws. It was thought advisable to convene a session at this time because a quorum will undoubtedly congregate in Chicago to attend the annual meeting of the United States Live Stock Sanitary Association.

In order to complete the working organization of the association at an early date the Resident State Secretaries appointed by

President Cotton are again requested to accept their respective appointments as soon as possible.

The following prominent veterinarians have recently visited the Secretary's office.—Robt. Prior, North Yakima, Wash.; J. H. Crawford, Harvard, Ill.; John H. Blattenberg, Lima, Ohio; J. A. Anderson, Seward, Neb.; Adolph Eichhorn, Washington, D. C.; E. B. Ackerman, Brooklyn, N. Y.; O. E. Dyson, Springfield, Ill.; A. C. Worms, Chicago, Ill.; A. C. Tillman, Earlville, Ill.; and Thos. H. Ferguson, Lake Geneva, Wis.

The president has been requested to appoint tellers to count the ballots for the nomination of candidates for the several offices on the Executive Board. While the Constitution leaves this matter solely to the Secretary, the importance of this particular election which includes the whole Board, places a responsibility upon the shoulders of one officer that is great enough for a whole committee of tellers to carry.

As the day for closing the nominations draws near (Nov. 27th) it is becoming apparent that only a small vote will be cast. Less than 25 per cent of the electors have voted to date (November 11th). The cause seems to be due to the fact that this sudden change of the Constitution is little understood and the importance of these offices is under-estimated by a majority of the members.

THE SOUTHEASTERN STATES VETERINARY MEDICAL ASSOCIATION
MEETING, ATLANTA, GA., DECEMBER 27, AND 28, 1916.

The nucleus of this new organization was formed at Detroit during the recent A.V.M.A. meeting.

The need of such an organization is apparent when it is realized that a very large per cent of the veterinary practitioners of the section included will seldom have opportunity to attend meetings of the A.V.M.A. It should, however, be one of the numerous feeders of the latter organization. Again, it is felt that such an organization will give opportunity to develop much latent force in many of our better but more reserved practitioners. It will serve to bring the veterinarians of the section together and to get acquainted and it is hoped it will tend to popularize and elevate the profession in the eyes of their clients and public.

The size of the territory included in this organization is to be such that all veterinarians within it can easily attend by holding the meetings near the center of it. It has been thought best to hold the meetings in the most central state and ask those to join which bordered on this state or are no further off than bordering states. A glance at the map will show the Southeastern territory logically to include Georgia as the center surrounded by North and South Carolina, Florida, Alabama, and Tennessee with Mississippi being no further away than parts of Tennessee. Others wishing to join, however, will not be barred.

Temporary officers elected at the Detroit meeting were: Drs. Tait Butler, Chairman; G. A. Roberts, General Secretary and Resident Secretary for North Carolina; C. A. Cary, Alabama; Dr. W. H. Burson, Georgia; Dr. F. P. Caughman, South Carolina; and Dr. F. W. Porter, Florida.

A splendid program for the Atlanta meeting is being arranged, at which time also the permanent organization will be formed.

All qualified veterinarians of the Southeastern States are urged to attend and support their new organization.

G. A. ROBERTS, Temporary Secretary.

OKLAHOMA STATE VETERINARY MEDICAL ASSOCIATION

The first meeting of the O.S.V.M.A. was held at Oklahoma City, October 23, 24, 25, 1916. The association was assisted in the program by several of the leading veterinarians of the United States, which gave the members a chance to learn of the progress made in the control of infectious diseases.

One of the things which the association regretted was that the president, Dr. R. F. Eagle was leaving the state, having received a promotion and will now be located in Chicago as assistant superintendent of all of Wilson & Co. Packing Establishments. To fill the vacancy made by the withdrawal of Dr. Eagle, Dr. J. S. Grove, inspector in charge of the U.S.B.A.I., was chosen as president.

This was the initial meeting of the O.S.V.M.A., and thanks to the assistance of those veterinarians who came to assist us in getting it started right, we have the prospect of becoming one of the best state veterinary associations in the United States.

The program opened with an address of welcome by Mayor

Overholser of Oklahoma City, to which an able response was made by Dr. J. A. Kiernan of Washington, D. C. Following the president's address papers were given as follows:

"The Control of Animal Diseases from the Viewpoint of a Layman"—John Fields, Editor Oklahoma Farmer; "Live Stock Sanitary Control Work from the Viewpoint of a Financier"—T. P. Martin, Jr., President Oklahoma Stock Yards National Bank; Address—F. M. Gault, President Oklahoma State Board of Agriculture; "Legislation Necessary to the Proper Control and Eradication of Infectious Animal Diseases"—N. S. Mayo.

"The Veterinarian's Part in Live Stock Sanitary Control Work"—D. F. Luckey.

"Cooperation of Practicing Veterinarians with the U. S. Bureau in the Control and Eradication of Contagious Diseases in Live Stock"—J. A. Kiernan.

"A Résumé of Various State Live Stock Sanitary Regulations Found to be Effective in Control of Hog Cholera"—Discussed by Non-resident Veterinarians.

Night Session with Oklahoma Co. Medical Society. Address—J. W. Duke, President Oklahoma State Board of Health; "Infant Mortality a Result of Contaminated Milk Supply"—M. E. Gilmore; Standardizing a Municipal Milk Supply"—Lewis Crabb; "Meat Inspection in its Relation to Public Health"—J. S. Grove; Hemorrhagic Septicemia"—W. P. Schuler; "Bovine Tuberculosis and Proper methods for its Control"—D. F. Luckey; "The Prevalence of Cattle Abortion and its Economic Relation to the Live Stock Industry"—A. T. Kinsley; "Relative Merits of Intradermal, Ocular and Subcutaneous Tuberculin Tests"—Lewis Crabb; "Glanders and its Control"—C. C. Hooker; "Diseases Common to the Canine"—J. E. Nance; "The Value of Biologies as Therapeutic Agents"—A. T. Kinsley; "Requisites Necessary to Successful Veterinary Surgery"—R. C. Moore; "The Newer Therapeutic Agents"—H. Jensen; "Reports of Cases"—Drs. Anthony, R. C. Smith, C. R. Walters, Geo. Pugh; Display of Pathological Specimens, U. S. Bureau of Animal Industry; "Technique of Swine Vaccination", Hospital of Dr. C. C. Hooker—Drs. D. W. Gurber and J. G. Eagle; Clinic at Hospital of Dr. C. C. Hooker—Dr. R. C. Moore in charge.

The following men in addition to those on the program were present and entered into the discussions: Dr. G. Ditewig, Washing-

ton, D. C.; Dr. A. O. Lundell, Fort Worth, Tex.; and Dr. John Eagle of Kansas City, Mo.

About twenty new members were taken into the association at this meeting.

R. C. SMITH, Secretary.

NEW YORK CITY VETERINARY MEDICAL ASSOCIATION—JUNE MEETING

The regular monthly meeting of the N. Y. City Veterinary Medical Association was called to order by the president, Dr. Geo. Goubeaud, at 9 P. M. The minutes of the May meeting were read and approved.

The committee on legislation reported that they had written the Governor and asked for a hearing on the Bill before he signed it. Reported that the Bill had been signed.

The Prosecuting Committee reported progress.

The Judiciary Committee also reported progress.

The Prosecuting Committee, on request, amended their report.

Dr. Cochran said that \$640 had been subscribed to the prosecuting fund.

Dr. Gannett stated that eight arrests had been made. All had pleaded guilty and were held for Special Sessions. More money is needed to carry on the work.

This report was duly accepted.

Dr. J. G. Wills, Chief Veterinarian, Department of Agriculture, State of New York, then presented an able and instructive paper entitled "State Veterinary Police Work With Special Reference to Laws Governing the Control of Infectious Diseases."

Dr. Wills spoke of the countries and states which have been lax in taking up veterinary control work.

The authority of a state is confined to its own borders. Federal control is under the Bureau of Animal Industry.

Veterinary control work affects not only the health of the people but the economic conditions as well.

Said that a state meat inspection service would be of great value and it is to be regretted that New York State has no such service.

Formerly the control of animal diseases was vested in the State Health Department but is now handled by the Veterinary Bureau of the Department of Agriculture.

The co-operation of stock owners is a great help especially in a sudden outbreak of some disease.

The head of the department should be allowed a certain amount of laxity to meet special cases.

A meat inspection law would aid in the detection of contagious diseases. The present Agricultural Law is in certain ways unsatisfactory. There should be laws regulating the use of biologic products especially the virus of hog cholera.

Also mentioned the proposed registration of herds free from tuberculosis.

It is difficult to obtain sufficient funds to reimburse owners whose stock has been destroyed under the provisions of the agricultural law and this may make it necessary to curtail the work.

Great good may be done by the profession at large in the line of Veterinary Police work and regrets that there is not better organization along these lines.

Our legislators as a rule are not conversant with conditions and it is therefore necessary to educate them before favorable and intelligent action can be had.

Mentioned the movement to replace the Chief of the B. A. I. with a layman which would have proved disastrous to the interests of the country.

Dr. W. Reid Blair, eulogized Dr. Wills' paper and in part said that it is essential that the State Department have the support of the owner and veterinarian to obtain the best results.

The education of the legislators has to be repeated often as changes are frequent.

Dr. H. D. Gill stated that he considered this paper the most important that had been presented in some time and that also the legislators should be educated, along certain lines, by the veterinarians.

Dr. E. B. Ackerman said he was highly interested in Dr. Wills' paper and regrets that there is no state meat inspection law.

Dr. T. E. Smith of Jersey City said that Dr. Wills had covered the subject very thoroughly and that administrative officers should have the support of the practicing veterinarians. The practitioner should prepare the way and educate the owner to co-operate.

Mentioned the glander quarantine law as being of great benefit to the State of New Jersey.

Dr. Goubeaud, in speaking of Dr. Wills' paper, advocated a plan to establish a fund to reimburse owners of animals condemned by the State Department of Agriculture, viz: a tax of one dollar per head on horses, fifty cents on cattle and twenty-five cents on sheep and hogs. Advocated the establishment of a Veterinary Bureau with county veterinarian in each county.

Dr. Chase said that he was deeply interested in this subject and commended the work of the state veterinarians. There are too few state veterinarians in certain localities and in support of this statement cited a case in which hogs had been brought to Long Island from one of the best up-state hog farms with the result that hog cholera was introduced to a previously un-infected district.

All stock before being moved should have veterinary inspection and there should also be a State Law requiring the inspection of all animals killed for food purposes. In the rural districts there is no meat inspection.

Also mentioned tuberculin testing, stating that there are a million and a half of cattle in the state to be tuberculin tested, and recommended that a competent person under the supervision of the qualified veterinarian be allowed to take temperatures as in most instances it is difficult or impossible to obtain the assistance of qualified men.

Dr. Gill said in answer to this that it was inconsistent to have a layman do part of the test and the state will not allow it.

Dr. Wills, in closing the discussion, also said that he would not ask the Commissioner of Agriculture to change the rules regulating the test as official and accepted tests must be made in conformity with the rules of the department.

Letters from Dr. Hoskins were read regarding the Army Bill and the Salmon Memorial Fund. Copies of Senator Hughes' speech in support of the Army Bill were distributed to the members.

The secretary was instructed to write the Hon. Wm. Hughes and express the appreciation of the association for his efforts in behalf of the Army Bill.

The same action was directed in the case of Hon. Julius Kahn of the House Military Committee.

Dr. Slawson made an unqualified denial of any connection with the bribery charges recently made by the Dept. of Health. He tendered his resignation and was suspended May 1st, 1916.

Dr. Smith announced the Alumni dinner to be held at the Hotel Astor, June 15, 1916.

A vote of thanks was tendered Dr. Wills for his valuable paper.

The following delegates were appointed to represent this association to the A.V.M.A.: Dr. D. W. Cochran, Dr. E. B. Ackerman, and Dr. W. Reid Blair. To the N. Y. State V.M.S.: Drs. R. W. Gannett, H. D. Gill and Cassius Way.

The program committee announced that at the next meeting, in October, a surgical clinic would be held and it was expected that Prof. Adams of the U. of P. would be present. No further business appearing the meeting adjourned.

ROBT. S. MACKELLAR, V.S., Secretary.

UNITED STATES LIVE STOCK SANITARY ASSOCIATION
TWENTIETH ANNUAL MEETING

This meeting will be held at Hotel La Salle, Chicago, December 5, 6, and 7, 1916.

This association includes leading Federal and State Live Stock Officials, farmers, stockmen and many persons interested in various lines of Live Stock work in this country.

The program for this meeting combines a variety of topics of the greatest interest and importance to everyone concerned in the prosperity of the Animal Industry of the United States.

The regular sessions of the meeting will be open to the public. Farmers and stockmen are especially invited to attend.

Anyone desiring additional particulars regarding the meeting or program should write the Secretary, John J. Ferguson, Union Stock Yards, Chicago.

CHICAGO VETERINARY SOCIETY

At the annual meeting of the Chicago Veterinary Society, October 10, the following officers were elected: Dr. John B. Jaffray, president; Dr. George Frost, first vice-president; Dr. C. A. Zell, second vice-president; Dr. James Robertson, treasurer; Dr. A. A. Leibold, secretary. Board of Censors: Dr. A. C. Worms, chairman; Dr. L. A. Merillat; Dr. E. L. Quitman.

A very successful meeting was held November 14, the annual banquet being given at this date, the attendance numbering twenty-seven.

A. A. LEIBOLD, Secretary.

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TENNESSEE VETERINARY MEDICAL ASSOCIATION

As retiring secretary of our association, I wish to make a report of our meeting which was held at Humboldt, Tenn., November 8th and 9th.

We had the greatest meeting in the history of the association, taking in twenty new members, many valuable papers and an entire day clinic. A theatre party and a dinner was given the members by the local veterinarians.

Our next meeting will be at Columbia, Tenn., in the early part of November.

Officers elected and appointed as follows:—

OFFICERS, 1917:—President, Dr. F. W. Morgan, Chattanooga, Tenn.; Vice-President, Dr. J. M. Jones, Lewisburg, Tenn.; Second Vice-President, Dr. G. W. Shaw, Knoxville, Tenn.; Secretary, Dr. F. R. Youree, Lebanon, Tenn.; Treasurer, Dr. A. C. Topmiller, Murfreesboro, Tenn.

COMMITTEES:—Executive Committee, J. H. McMahon, J. W. Scheibler, S. H. Woods. Legislative Committee, M. Jacob, F. R. Youree, Geo. R. White. Finance Committee, Wm. Murray, L. D. Nowell, A. J. Brown. Resolutions Committee, C. D. White, G. A. Metcalf, C. E. Kord. Ethics Committee, Geo. R. White, G. B. Giltner, A. C. Topmiller.

The following program was given.

- Hog Cholera and its Technique as a Standard Adopted by the StateC. Dillon White
- The Production of Serums, Distribution and Results....
.....G. B. Blackman
- The Relation between the Division of Extensions and the Veterinary ProfessionC. D. Lowe
- Transmissible Diseases Among Live Stock in Tennessee...
..... M. Jacob
- The Value of Meat and Milk Inspection.....J. A. Austin
- Castration of Cryptorchids and Restraint.....G. R. White

Infectious Stomatitis in the Dog J. W. Scheibler
 Case Report R. J. Landis

The second day was devoted to the clinic. Among the operators were: M. Jacob, G. R. White, G. B. Giltner, W. M. Bell, J. W. Scheibler, J. H. McMahon, C. Dillon White, G. B. Blackman, C. D. Lowe, F. R. Youree.

F. W. MORGAN, Secretary.

COMMUNICATIONS

The Journal of the American Veterinary Medical Ass'n,
Ithaca, N. Y.:

The Veterinary Division of the North Carolina Agricultural College will offer a One Week's Course for Graduate Veterinarians January 8-13, 1917.

The success of the course last year was such as to warrant giving it again. It will probably become an annual event.

The college force is expected to be supplemented by Dr. R. C. Moore, President of the St. Joseph Veterinary College; Dr. N. S. Mayo, of the Abbott Laboratories; and Dr. T. B. Carroll, practitioner and horse shoer, of Wilmington, N. C.

Yours very truly, G. A. ROBERTS.

CORRECTION: In my paper on "The Bull as a Disseminator of Contagious Abortion", published in the November number of the *Journal of the A.V.M.A.*, page 146, in my reference to Dr. W. L. Williams' article, I inadvertently connected a paragraph on cohabitation as a factor in the transmission of abortion infection with one just preceding it relative to the bull as a disseminator of the disease.

F. B. HADLEY.

NECROLOGY

Dr. John A. Boyd, Mason City, Nebraska.

MISCELLANEOUS

NOTE:—For the sake of accuracy and the convenience of the Editor's office, it is requested that each subscriber scrutinize carefully the name and address upon the wrapper of his *Journal* and report any inaccuracy at once to this office.

Dr. Frank Bowne has removed from Hazleton, Ind. to Paris Crossing, Ind.

Dr. Alexander Plummer has removed to 1215 West 37th St., Los Angeles, Cal.

Dr. R. S. Whitney is working with the Department of Health at Albany, N. Y.

Dr. Earl S. Pickup has removed from Cattaraugus, N. Y. to Union City, Pa.

Dr. H. L. Tate has removed from Portland, Ore. to Stock Yards Sta., Sioux City, Ia.

Dr. H. S. Gilliland of Marietta, Pa. has removed his office to the Widener Building, Philadelphia, Pa.

Dr. G. S. Weaver has removed from Olivia, Minn. to Mitchell, South Dakota.

Dr. G. A. Hawthorne has removed from Blanchard, Ia. to 1322 Tracy St., Kansas City, Mo.

Dr. R. E. Christopher has removed from LaCrosse, Wis. to Mason City, Ia.

Dr. E. R. Rodgers, for eighteen years a practicing veterinarian at St. Joseph, Mich., has retired from active practice. Dr. E. C. Goodrich, who has been associated with him the last two years, will continue the practice.

The meeting of the Central New York Veterinary Medical Association was held at Syracuse, November 28.

Mr. Louis R. Curtis, formerly of St. Luke's Hospital, Chicago, has been elected president of the Frank S. Betz Company of Hammond, Ind. He has had wide experience among hospitals and medical men. Mr. Frank S. Betz will continue as chairman of the board of directors. Other interests are given as reasons for his retiring as active head of the company.

The Western New York Veterinary Medical Association will hold its next meeting December 15, 2:30 P. M. at the Erie Co. S. P. C. A. Building, 121-123 West Tupper St., Buffalo, N. Y.

The next meeting of the Connecticut Veterinary Medical Association will be held at the Hotel Garde, Hartford, Conn., Feb. 6, 1917.

James Gordon Bennett of New York City has presented a sum for the benefit of the New York State Veterinary College at Ithaca, N. Y., the income of which is to be used as a prize for the best work done in veterinary anesthesia.

A VETERINARY FIELD FOR CHRISTIAN SCIENCE.—“The poor little kittens were all born blind, but I prayed and I read Science and Health, and after ten days every little kitten got his eye-sight just as good as anybody’s.—Glory be to Mother Mary Baker Glover Patterson Eddy.” (Quoted by Dr. E. C. Hill in *N. Y. Medical Journal*).

PRACTITIONERS’ SHORT COURSE IN VETERINARY MEDICINE. University Farm, Davis, Cal., Dec. 27–30, inclusive. The following schedule has been approved by a committee of the California State Veterinary Medical Association, in cooperation with the Division of Veterinary Science of the University of California:

- Wednesday, December 27.* 1:15 to 1:30. Address by an officer of the University.
- 1:30—1:45. Address by a California Practitioner.
- 1:45—3:30. Lecture and demonstration in judging farm animals. A rapid survey of breeds and types of the various species of farm animals. Professor Gordon True and assistants.
- 3:30—5:30. Lecture: Abortion in Cattle. Dr. W. L. Williams.
- 7:30—8:15. Illustrated lecture: Sterility in Cattle. Dr. W. L. Williams.
- 8:15. The Bacteriology and Pathology of Infectious Abortion. Dr. K. F. Meyer.
- Thursday, December 28.* 9:00—10:30. Lecture and laboratory demonstration on biological phenomena as related to immunity and infectious abortion, including methods of obtaining pure cultures, agglutination, complement fixation and anaphylaxis. Dr. Jacob Traum and assistants.

- 10:30—12:00. Lecture and demonstration: Recent Developments in the Prophylaxis of Anthrax, Blackleg, and Septicemia Hemorrhagica. (Speaker to be announced).
- 1:30—2:45. Lecture and demonstration in judging dairy cattle. Professor True.
- 2:45—4:30. Clinical demonstration upon handling of Sterility in Cattle. Dr. W. L. Williams.
- 4:30—5:30. Lecture and demonstration on Diseases of Poultry. Dr. J. R. Beach.
- 7:30—8:15. Paper on the occurrence and importance of abortion and sterility in California cattle. Dr. C. M. Haring.
- 8:15. Lecture and demonstration: The Prophylaxis and Therapeutics of Calf Scours and Pneumonia. Dr. Williams.
- Friday, December 29.* 9:00—10:30. Lecture and demonstration of chemical and bacteriological tests of interest to veterinarians as used in public health work. Drs. Haring, Roadhouse and Traum.
- 10:30—12:00. Lecture and demonstration on hog cholera. Dr. B. J. Cady.
- 1:30—4:00. Lecture and clinical demonstration of surgical technic illustrating recent developments in surgery with operations on anaesthetized animals. (Surgeon to be announced).
- 4:00—5:30. Demonstration of a thorough post-mortem on a large animal. Dr. K. F. Meyer.
- 7:30. Smoker, with program consisting of short talks on how the veterinarian can advance his interests in the future.
- Saturday, December 30.* 9:00—10:00. Lecture: Suggestions on the Treatment of Diseases of the Digestive Tract in Cattle. (Speaker to be announced).
- 10:00—12:00. The Specific and Nonspecific Treatment of Intestinal Diseases, illustrated by demonstrations of biological phenomena. Dr. K. F. Meyer.
- 1:30—2:30. Lecture and demonstration on parasites of animals. Prof. W. B. Herms.
- 2:30—5:00. Clinic: (The subjects treated will depend on the material available.) Special features already arranged include demonstrations of intradermal, intrapalpebral and ophthalmic tests on reacting cattle, cattle surgery and the operation for the relief of roaring in horses.

Accommodations are ample and expenses moderate. Considerable interest has been manifested and indications point toward a good attendance from California and adjacent states.

ENROLLMENT OF STALLIONS IN NEW YORK STATE. The veterinary bureau of the Department of Agriculture has sent out blanks for the Enrollment of Stallions in New York State. The new law provides for the examination of all stallions offered for service, by a veterinarian who must certify to the Commissioner of Agriculture concerning the animals' soundness and freedom from infectious incurable diseases. It is required that the owners shall obtain a certificate of the condition of soundness of their stallions, signed by a veterinarian who is approved by the Department of Agriculture. The veterinarian must take an oath before a notary, attesting the certificate. The owner of a stallion must post the certificate of enrollment in a conspicuous place in his stable. Circulars advertising stallions must copy the certificate issued by the Department of Agriculture. The charge for enrollment is \$3, for renewal \$1, and for transfer 50 cents. After Jan. 1, 1917, no stallion shall stand for service in New York State which is not enrolled and certified by the department. The law prohibits the collection of fees for the service of unenrolled stallions.

An important article on the Municipal Abattoir by Dr. W. H. Dalrymple, Baton Rouge, La., appeared in the *Breeders' Gazette* for November 2.

The marriage of Miss Jennie Bertha Kelly of Lyons, Mich. to Dr. James F. Shigley occurred October 25. After December 1, they will be "At Home" at Kenmare, N. D.

The National Association of Bureau of Animal Industry Employees has again selected Secretary Walkley to act as legislative representative at Washington this winter. Other representatives will be sent if future developments show that they are needed.

The next meeting of the Iowa State Veterinary Association will be held at the Iowa State College at Ames, Iowa, Jan. 9, 10 and 11, 1917.

Dr. J. H. McNeil of the Brazil Land, Cattle and Packing Co., Sao Paulo, Brazil, will leave for the United States after January 1.

A NEW VETERINARY PUBLICATION. Arrangements are being made by Dr. O. Charnock Bradley, of Edinburgh, to publish a periodical review of Veterinary Literature, from which the practitioner and scientist will be able to obtain information of the appearance of important papers in the veterinary and allied press of the various countries.

Dr. L. McLean of Brooklyn, N. Y. has given to the Museum of the New York State Veterinary College at Cornell University, his interesting collection of pathological specimens of bone diseases, a number of instruments that were used in surgery more than fifty years ago in Scotland, and also the bones of the head and pelvis of a very distinguished elephant. This collection will be designated as "The McLean Collection".

The United States Meat Inspection Service certified to the wholesomeness of 11,220,958,000 pounds of meat from 61,826,304 animals during the last fiscal year. It condemned 348,945 animals and 738,361 parts of animals, equivalent to about 84,320,000 pounds of meat.

Of 16,700 cows tested through 47 Wisconsin cow-testing associations last year, 3,375 were disposed of as unprofitable.

Dr. I. D. Wilson of Blue Earth, Minn., has been appointed as an instructor in animal husbandry at the Pennsylvania State College, State College, Pa. He will have charge of the veterinary subjects required of the students. Dr. Wilson is a graduate of the Veterinary College at Ames, Ia. with the class of 1914.

Dr. S. B. Elliott of Bell Meade farm, in Fauquier County, Virginia has imported a herd of Welch ponies from the mountainous region of Wales.

The New York Convention of the National Association of Bureau of Animal Industry Employees authorized its executive committee to arrange for the publication of an official organ to be known as "The Inspector". It is to be published monthly.

The Report of the Chief Veterinary Surgeon for Southern Rhodesia, Africa, states that African Coast Fever occupies the largest place on the record. Trypanosomiasis is a constant men-

acc. The number of dipping tanks has increased 168 over the previous year.

Contagious abortion was first discovered in the territory in October 1914. Since then several additional centers of infection have been discovered in certain districts. The disease apparently exists in a less virulent form than in England.

Parasitic gastritis of cattle due to *Hemonchus contortus* is a greater cause of loss than is generally realized.

No cases of tuberculosis occurred during the year. The tuberculin test was applied to 78 imported bulls and heifers.

The territory continues free from glanders.

In the Eastern districts very heavy losses among sheep were sustained through an exceptionally severe visitation of blue-tongue.

UNSOUNDNESS IN STALLIONS. Reports received from 13 of the States having laws regulating the public service of stallions show the following percentages of unsoundness in stallions out of 2,640 reported cases:

	PER CENT
Side bone	35
Laryngeal hemiplegia (roaring)	12
Bone spavin	11
Defective or curby hocks	7
Periodic ophthalmia	6
Cataract	4
Spavin (not classified)	3
Bog spavin	6
Ring bone	4
Stringhalt	3

The remaining 9 per cent consisted of such defects as chorea, general unsoundness, faulty conformation, and scattering imperfections.

These figures do not represent individual stallions, but indicate the number of cases of unsoundness. For instance, a single stallion may be affected with two or more physical defects and others with but one. A report from all the States having stallion license laws could not be secured, as in several no record is kept, but the figures given may be expected as reasonably offering an in-

dex to the most common physical defects among public-service stallions.

In some of these States certain diseases and unsoundness disqualify a stallion for service, while in others the stallion may stand, but the condition of soundness must be noted on the license certificate, a copy of which is required to be posted at the place where the stallion is being stood for service.—*The Rider and Driver*.

Dr. H. W. Graybill, who was recently appointed to a temporary position as research parasitologist in the Bureau of Animal Industry, has resigned to accept a position in the Rockefeller Institute for Medical Research, Department of Animal Pathology, at Princeton, N. J. He will work under the immediate supervision of Dr. Theobald Smith, who is Director of the Department of Animal Pathology.

Drs. W. R. Van Ness, L. B. Ernest and A. A. Crosland have been transferred to the Quarantine Division of the Bureau of Animal Industry with headquarters at Washington, D. C. They will be assigned to duty in connection with the tuberculin testing of dairy and breeding herds of cattle in the vicinity of Washington and in adjoining states.

A meat inspection station of the Bureau of Animal Industry has been established at Jacksonville, Florida, and Dr. Elmer F. Haven, from Nebraska City, Nebraska has been assigned as inspector in charge.

Dr. S. A. King has been designated as inspector in charge of B. A. I. meat inspection work at Waycross, Georgia.

FOOT-AND-MOUTH DISEASE. An Associated Press dispatch under date of November 27, states that the stock yards at Chicago and East St. Louis have been closed against the shipment of cattle, sheep and swine because of news of a suspected outbreak of foot-and-mouth disease in Nebraska, Kansas and Missouri.

A conference for Veterinarians will be held at the N. Y. State Veterinary College at Ithaca, N. Y., January 16 and 17.

JOURNAL

OF THE

American Veterinary Medical Association

Formerly American Veterinary Review

(Original Official Organ U. S. Vet. Med. Ass'n)

PIERRE A. FISH, Editor

ITHACA, N. Y.

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Sub-Committee on Journal

C. J. MARSHALL, *Chairman*, R. P. LYMAN, A. EICHHORN, *Secretary*

The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

Fifty reprints, without charge, will be furnished to authors of original articles accepted for publication, if requested in advance.

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DECEMBER 15, 1916.

No. 4.

Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary L. A. Merrilat, 1827 S. Wabash Ave., Chicago, Ill. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

THE EXTRA NUMBER

At the Detroit meeting, it was recommended by the Journal committee, and ratified by the association, that the proceedings with the constitution and by-laws and directory of members should be published in a separate number, if possible. In acquiring a Journal as a substitute for the old method of printing the papers and proceedings of the association in a single volume, it was necessarily a matter of experiment. During the first year the proceedings were published in installments in eleven numbers of the Journal. This plan involved delay and more or less inconvenience. The present plan enables the proceedings to appear in a reasonably prompt period and should be of greater convenience to the members of the association and others interested in it. P. A. F.

THE EXECUTIVE BOARD MEETING

A meeting of the recently appointed executive board was held at Secretary Merrilat's office in Chicago, December 5, to consider various matters which have arisen in connection with the new constitution and by-laws and the Journal. Dr. V. A. Moore was elected chairman of the board. Arrangements were made for re-

muneration for the secretary, treasurer and editor for the services they render. In connection with the work on legislation, the Lobeck bill for the interest of the U. S. Veterinary Inspectors was discussed. This matter was considered by the executive committee at the Detroit meeting, but through some inadvertence escaped final action. The executive board therefore favored an appropriation of \$500 to promote active assistance for the benefit of the inspectors. The deserved needs of this body of men and the increased value to the service is self-evident.

The committee on Journal, consisting of a former executive committee of the association, is replaced by the present executive board, from which a subcommittee on Journal was appointed. It consists of Doctors Torrance, Mohler and Archibald.

The question of the place for the next meeting of the association was decided in favor of Kansas City, Mo. The time is set for the week beginning August 19, 1917. Earnest efforts have been made by many members throughout the Missouri Valley to have the association again meet within its boundaries after a lapse of ten years. The success of the former meeting at Kansas City and the well known energy and enthusiasm of the veterinarians of the middle west are favorable omens that the next meeting will be one of the most successful yet held. It is none too early for each member to cooperate with the officers and local committee to make this a banner meeting; to arrange individual plans to attend and to interest others who are not members to enter the ranks of the association and join effort, in every worthy way, to promote and strengthen the veterinary profession of this continent.

P. A. F.

The Report of the Ontario Veterinary College for 1915 states that the new college building has been completed and equipped and work of instruction carried on there. At the opening exercises of the college addresses were delivered by Dr. C. C. James and Dr. W. Cowan. The total number of students registered for the year was 290 of which 115 were from Ontario. During the year 87 students were graduated.

Dr. W. H. Hurst has removed from Chadron, Neb. to Sioux Falls, So. Dakota.

FISTULA OF THE WITHERS

H. E. BEMIS, Ames, Ia.

It would seem that there should be nothing new to say upon this time old subject of fistula of the withers but from the number of recent inquiries there seem to be some who think that the writer has an operation which is new and successful. If experience in operating fistulas has anything to contribute toward success, we here in Iowa surely ought to be successful.

Before proceeding with a description of the operation, I should like to say a few words about the difference in the nature of conditions which are found causing enlargements in the region of the withers and all too commonly grouped under the one term "fistula" a good deal as all indigestions are called "colic". I believe the primary condition in the process of fistula formation is in most cases a serous bursitis of the supra-spinous bursa which underlies the ligamentum nuchae at the second, third, or fourth thoracic spine. This bursitis usually develops rapidly and appears as a uniform, rather soft, hemispherical enlargement on one or both sides of the neck just in front of the scapulae. At this stage, the walls are thin, the contents uniformly fluctuating, little evidence of heat or pain, and the surrounding tissues little involved. If such a process is opened, there escapes a thin watery fluid and some coagulum. In this stage there is no tendency toward perforation, although the process may become of considerable size.

If the distended bursa does not become infected, the process develops to a certain point and then remains unchanged for an indefinite period. The fluid may become largely absorbed and the region permanently thickened due to the development of connective tissue around the process. If the process becomes infected, then an abscess develops with the usual acute symptoms and thickening of the walls around the periphery but thinning and perforation at certain high points. This is the only stage which can truly be called a fistula of the withers. Finally one sometimes sees a permanent thickening of the entire region after one of the previous stages has subsided. In this stage the enlargement is the only symptom.

The next question is, what should be done for this condition in the various stages? We have, in a number of cases of bursitis at-

tempted to secure resolution following the application of blisters or tincture of iodine to the surface, or by aspiration of the contents and the injection of iodine into the cavity but all to no avail. We have come to the conclusion that these processes must be treated by giving drainage the same as in the true fistulas but with this difference. The animal should first have its resistance raised by a course of bacterin treatment and the operation at first should be mere drainage through a linear incision for this reason. The process not being infected, nature has walled it off from the rest of the body but little. As soon as it is operated, infection gains entrance from the exterior and if the opsonic index is low and the wound surface large rapid absorption of toxic products takes place from the wound's surface causing extensive swelling in the region and a septicemic condition of the animal. After this stage is passed a more radical operation can then be used if necessary.

If a fistulous process has abscessed but not yet perforated, I prefer again to drain it for several days through mere incision before operating extensively to prevent the great infection of the fresh wound surface which will take place if we operate through pus pockets.

For the radical operation, I claim no originality. I got the form of incision at least from Dr. Adams at Pennsylvania University. I always precede the operation by thorough control of the animal, including general anaesthesia, and thorough preparation of the field, hands and instruments. No matter where the fistulous opening may be, the center of the process and the necrotic base which must be removed is usually over the second to fourth thoracic spine and consequently drainage must be secured in front of the scapula.

In this region, make a triangular incision with the base of the triangle uppermost, three or four inches from the top of the neck and two to four inches in length. The apex of the triangle should be slightly below the lower border of the rhomboideus muscle so that the sides of the triangle may be five to six inches in length. The incision passes through the skin, trapezius, and superficial fascia. When the triangle is removed the rhomboideus is exposed. The operator can now work over the superior border of the rhomboideus into the cavity to trace out fistulous tracts, remove necrotic ligament and determine the depth of the process. If there is extensive

swelling and necrosis an incision may also be made exactly on the median line and tissue removed through both openings.

When all has been cleaned up the next consideration is proper drainage and here is one of the most important steps in the operation. The deep cervical fascia underlies the rhomboideus and overlies the splenius and trachelo-mastioideus. Drainage over this structure is sufficiently low to drain the region of the bursa. It is of great importance, therefore, to leave the deep fascia intact so as to conduct secretions toward the exterior and to prevent their migration between the deeper layers of muscle. To accomplish this, a blunt instrument should be passed under the lower border of the rhomboideus, along its inner surface directly into the pocket above. The passageway can then be enlarged from before to behind and if necessary the muscle partially divided from below outward and a large drainage tube inserted. Sometimes the lowest part of the pocket will not fall in the triangular area. If not, then a linear incision can be made down upon the lower border of the rhomboideus in front of the triangle and drainage provided in the same way. If the process extends far back, counter incisions may be made where needed.

In a few cases, deep tracts will be found between spines at the top of the withers. These in our hands have remained incurable. The third class of enlargements in this region where there is general thickening without discharge, heat, or pain should not be disturbed.

Dr. F. N. Davidson has removed from Petoskey, Mich. to Buhl, Idaho.

The next meeting of the Colorado Veterinary Medical Association will be held at Denver, Col., on Thursday, Jan 25, 1917.

The mid-winter meeting of the Montana Veterinary Medical Association will be held at Missoula, Mont., Jan. 5 and 6. An interesting program is assured.

The next meeting of the Kentucky Veterinary Medical Association will be held at Hopkinsville, Ky., Jan. 10, 1917.

Dr. J. W. Randall has removed from Wauconda, Ill. to East Lansing, Mich.

PROCEEDINGS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

Detroit, Michigan, Monday, August 21, 1916, A. M.

The Fifty-third Annual Convention of the American Veterinary Medical Association was formally opened at the Auditorium of the Detroit Board of Commerce, Monday, August 21, 1916, at 11 A. M., by the President, Dr. R. A. Archibald, who introduced the first speaker as follows.

THE PRESIDENT: The time has come to call the fifty-third meeting of the American Veterinary Medical Association to order. We had anticipated having the Governor of this state, the Honorable Woodbridge N. Ferris, here to welcome us this morning; but it has proven impossible for the local committee to have him here. They anticipate, however, having him here later, and we will have the pleasure of hearing from him then.

We have with us a representative of the Municipal Government of this splendid city of Detroit, who comes here to represent the Mayor, and to give us an address of welcome. I have the honor to introduce to you, Mr. James H. Lee, of Detroit, Michigan.

(Mr. Lee's address was published in the September number of the Journal.)

THE PRESIDENT: Ladies and gentlemen, it seems fitting that a proper response should be made to this splendid address of welcome; and your local committee on arrangements has chosen one of our silver tongued orators who can be depended upon to do it right. I have great pleasure in calling upon Doctor Tait S. Butler from Tennessee to respond to the address of welcome.

(Dr. Butler's address was published in the September number of the Journal.)

THE PRESIDENT: Ladies and gentlemen; the next in order on our program for this morning's session is the President's address, which I shall read to you.

(The President's address was published in the September number of the Journal.)

THE PRESIDENT: Ladies and gentlemen, the next order of business, according to our program this morning will be the roll call.

DR. QUITMAN: Mr. President, I move that the registration, which has been taken at the door, be substituted for the roll call.

DR. MARSHALL: I second the motion.

THE PRESIDENT: It has been regularly moved and seconded that we substitute the registration at the door for the roll call. You have all heard the motion, are you ready for the question? All those in favor of this motion will signify by saying "Aye". Those contrary minded, "No". (The motion unanimously prevailed).

The next item on the program is the submission of the minutes of the previous meeting as published in the Journal.

DR. MARSHALL: Before the minutes of the last meeting are acted upon, I would like to make an explanation with reference to the way the dues were raised from three dollars to five dollars. There is a possibility that this is not entirely clear, and my attention has been called to the matter since I arrived in Detroit. I would therefore like to make a statement of the way I understand the matter before the minutes are accepted.

It appears that the proposition was made at the New York meeting to raise the dues from three to five dollars. At the Oakland meeting the question came before the executive committee, and the executive committee voted to recommend to the association that the dues be raised. It went before the association and it was voted to raise the dues from three to five dollars a year.

My attention has been called to the fact, since I came here, that it required a two-thirds vote to raise the dues or to amend the by-laws. I have been asked if we had a two-thirds majority. It has been a year, and I do not remember. I am of the opinion that it was just a majority vote and not a two-thirds vote. At the San Francisco meeting there was not a very large attendance, and I do not wish any action that is not absolutely right. Some of you have probably been disappointed because you have not received your bill for dues. This is the reason the bills have not been sent. I think, before the final step is taken in regard to this proposition of raising the dues from three to five dollars a year, that it should be resubmitted. I would like to have you all satisfied that the thing is done regularly.

Therefore I would like to make a motion to refer this matter again to the executive committee for their recommendation as to what should be done with this proposition.

DR. HART: I second the motion.

THE PRESIDENT: It has been moved and seconded that this matter be referred to the executive committee; are you ready for the question? All those in favor of this motion signify by saying "Aye". Those contrary minded "No". The "Ayes" have it, and it is so ordered.

The next order of business is the report of the executive committee. Is the chairman of the executive committee ready to report?

DR. MARSHALL: I should have included in the motion before the request that the report of the executive committee be deferred until the question of dues be taken up.

THE PRESIDENT: I think that was understood. The executive committee is not ready to report now.

SECRETARY HARING: I move that we adjourn to meet in the ball room of the Hotel Statler at 2 P. M.

THE PRESIDENT: Before that motion is put I wish to say that the chairman of the local committee on arrangements has an announcement or two to make.

DR. DUNPHY: As the secretary has informed you, all the rest of the meetings will be held in the ball room and parlors of the Hotel Statler. There will be no more meetings in this hall. We believe that everybody can be nicely taken care of at the Hotel Statler.

Any persons wishing dinner can get it in the dining room of this building, nice meals are served there *a la carte*, at reasonable prices, and those who do not wish to go any further to the restaurants or hotels can get their dinners served here.

I think the general program covers any other announcement which it might be necessary to make. Dr. Krey has arranged for the entertainment of the ladies; I think the first general entertainment will be tomorrow afternoon, with the exception of a shopping tour which will be made in the morning.

There is another matter I wish to bring before you. Honorable Woodbridge N. Ferris, the Governor of this State, was to be here this morning to welcome us to the state, but certain business in connection with the executive office kept him away. He has called me up by telephone and informed me that if it is the pleasure of this association he would like to meet them Tuesday evening, any time from seven or seven-thirty on; he will be glad to meet you in the assembly room of the Hotel Statler, and if it is the wish of the association, the Governor will be glad to deliver a short address of welcome. That is the earliest time the Governor can reach Detroit. If it is decided to meet the Governor, I would like as large an attendance as possible. It is rather a rare thing to get the Governor to leave the cares of the state long enough to recognize us and bid visitors welcome to the state.

DR. QUITMAN: Doctor Dunphy got me a little mixed when he announced that the rest of the meetings would be held at the Hotel Statler. Then he spoke about getting dinner down here, implying that there might be a further meeting in this hall today. Will you kindly make that plain, as there are others confused on the matter too.

THE PRESIDENT: We do not come back to this hall. The further meetings of the association will be held at the Hotel Statler.

DR. MAYO: I move that this association extend a special invitation to Governor Ferris to address us tomorrow evening at a time to be fixed by the committee.

DR. HART: I second the motion.

THE PRESIDENT: It has been regularly moved and seconded that we invite Governor Ferris to address us tomorrow evening at a time to be fixed by the executive committee. You have heard the motion, are you ready for the question?

All those in favor of the motion will signify so by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered. Dr. Krey has an announcement to make.

DR. KREY: I just want to say to the ladies that we wish to get them organized so that we can carry on our entertainment without any confusion. If the ladies will be kind enough to meet in the small banquet hall just after luncheon at about one or one-thirty o'clock, we will take this matter up and let them go as soon as possible.

I would like to say that through an unfortunate condition in this city at the present time, owing to the excessively long period of heat, the ice condition is bad. The hotel therefore finds trouble in getting vegetables and provisions enough, so they have to send out of town for them. They have impressed it on

the committee that it is absolutely imperative to know immediately how many will be at our banquet. That is the reason we have been very active this morning trying to sell banquet tickets. It is not that we want to separate you from your money so quickly, but we want to work in cooperation with the hotel to make the banquet a success. In connection with that, I want to say that the banquet is going to be absolutely informal. We want you to come to the banquet and enjoy yourselves. We are going to have a good banquet and we want everybody to come.

I would like to say in regard to the excursion on Thursday that it is planned to have an all day sail. We are going to Algonac, Michigan, which is about forty miles from Detroit. I don't know where you could find a nicer place. We would like to have everybody on the steamer by nine o'clock. The steamer is scheduled to leave the foot of Bates street at nine o'clock in the morning. If some of you happen to be late we will make some arrangements to take care of you, but I simply want to request you to be there in time if you can. We know you are going to enjoy it. We know you will find it very much cooler up there.

DR. ———: I would like to ask what time we are going to go by here?

DR. KREY: You go by Detroit time, which is Eastern time. All clocks in Detroit are set by Eastern time, and everybody runs by Eastern time with the exception of the railroads. I think that is all I have to announce.

THE PRESIDENT: I will entertain a motion to adjourn.

SECRETARY HARING: I move that we adjourn until two o'clock this afternoon.

(This motion being seconded and put to vote prevailed).

Hotel Statler, Detroit, Michigan,
Monday, August 21st, 1916, P. M.

THE PRESIDENT: Gentlemen, you will please come to order. Have we any unfinished business?

SECRETARY HARING: There is the executive committee.

THE PRESIDENT: Are you ready to present the report of the executive committee? Gentlemen, listen to the report of the executive committee.

SECRETARY HARING: On account of the large number of applications for membership in the American Veterinary Medical Association, the executive committee has decided to deviate from the usual custom of reading the names and addresses, the colleges and vouchers of the applicants. Instead, they had a list printed and we have here a list of 414 names. And there is an additional list, I cannot tell you how many, but somewhere between 25 and 100, which will be presented later. This gives the names of the applicants, their addresses, the college and vouchers. The names are on this printed list, and they are recommended to you by the executive committee for election to membership in the A.V.M.A. They are arranged by states, and you are requested to take these sheets and look them over carefully, particularly the names of those in your respective states. If you find any fault with this list we want to know it.

I have canvassed the country for the membership in the A.V.M.A., and I did not take any particular pains to select the men, any veterinarian was good enough so far as literature was concerned; but, when it comes to election for membership, I look to you to protect the association from undesirable members. The secretary or the executive committee cannot know all of these men so we will distribute these printed lists and leave them in your hands until tomorrow morning. There are additional sheets here for any who may come in later.

THE PRESIDENT: They will look at them for an hour. As I understand it, you will have lots of time to study this list between now and tomorrow morning. If there is no objection, we will pass the executive committee's report and go on to the next item on the program. This calls for the report of the secretary.

(Published in the October number of the Journal).

THE PRESIDENT: Gentlemen, what will you do with the report of the secretary?

DR. W. HORACE HOSKINS: I move that the report be received and referred to the Journal for publication.

DR. HIGGINS: I second the motion.

THE PRESIDENT: Gentlemen, you have heard the motion. The motion is that the secretary's report be received and referred to the Journal for publication. Are you ready for the question? All those in favor of the motion will signify it by saying "Aye". Contrary minded, "No". It is so ordered.

The report of the treasurer. Is Dr. Schneider present?

DR. SCHNEIDER: I would like to present my report as printed; you will find copies all over the room.

THE PRESIDENT: Gentlemen, do you want to act on this report now? If so, what is your pleasure?

DR. W. HORACE HOSKINS: I move that the report be received and referred to the finance committee.

DR. MOHLER: I second the motion.

THE PRESIDENT: It has been regularly moved and seconded that this report be received and referred to the finance committee. All those in favor of the motion will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it. It is so ordered.

The next in order on the program will be the report of the Librarian, Dr. Frost. Is Dr. Frost present? (See Journal for December 1916).

THE PRESIDENT: You have heard the report of the Librarian; what is your pleasure?

DR. W. HORACE HOSKINS: I move that the report be received, and the recommendation of the librarian be referred to the executive committee.

DR. HIGGINS: I second the motion.

THE PRESIDENT: It has been regularly moved and seconded that this report be received, and that the recommendation be referred to the executive committee. All those in favor of the motion will signify the same by saying "Aye". Those contrary minded, "No". The "Ayes" have it, and it is so ordered.

We will now listen to the report of the committee on diseases. I believe Dr. Mohler is chairman.

DR. MOHLER: Mr. President, this will consist of a joint report by the chairman with special reference to hemorrhagic septicemia; then there will be individual reports by Dr. Higgins on disinfectants, and Dr. Kinsley on hemorrhagic septicemia, Dr. Giltner on contagious abortion. This paper will be presented before the symposium on contagious abortion on Wednesday, I believe. Dr. Meyer's paper has not been received unless the secretary has it.

SECRETARY HARING: It was delivered to Dr. Eichhorn and he was to deliver it to Dr. Mohler.

DR. MOHLER: I have not received the paper. I will now read my report. (See Journal).

THE PRESIDENT: Gentlemen, we will call upon Dr. Higgins, another member of this committee to report on the efficiency of the various disinfectants. (See Journal).

THE PRESIDENT: The next member of the committee on diseases is Dr. A. T. Kinsley; the title of his report is "Hemorrhagic Septicemia in Cattle in the Middle Section of the United States".

THE PRESIDENT. Dr. K. F. Meyer is not here, but we have his report. If it is your desire the secretary will read it, or it can be read by title and appear in the published proceedings later.

DR. HIGGINS: I move that the report be read by the secretary.

DR. MOHLER: I move that it be read by title, and referred to the committee on Journal for publication.

SECRETARY HARING: I second the motion.

THE PRESIDENT: It has been moved and seconded that the paper be read by title and referred to the committee on Journal for publication. All those in favor of the motion signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it and it is so ordered.

The other member of the committee will read his paper during the symposium on contagious abortion. The report of the committee on diseases is now before you; what is your pleasure?

DR. MOHLER: I move that the report be received and referred to the committee on Journal.

DR. HOSKINS: Second the motion.

THE PRESIDENT: It has been moved and seconded that the report of the committee on diseases be received and referred to the committee on Journal. All those in favor of the motion will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

The next item on the program is the report of the committee on intelligence and education. Dr. N. S. Mayo.

DR. N. S. MAYO: Mr. President, that committee is not quite ready to report. We need a little more time.

THE PRESIDENT: The next item on the program is the report of the committee on Reorganization. I am informed by the chairman of that committee that it is not ready to report.

According to our program that completes the work of the afternoon. Have you anything that you wish to take up, Mr. Secretary?

SECRETARY HARING: We could get rid of some of these committee reports; that would leave us more time for a later session.

THE PRESIDENT: What is the pleasure of the members? If there is no objection I will call for any report that may be ready at this time. Is there any chairman of any committee ready to make a report? We have quite a little time on our hands.

DR. J. F. WINCHESTER: I can make a report on the Salmon Memorial Fund if you desire.

THE PRESIDENT: If there is no objection, that will be next in order. Dr. Winchester. (The report of the Salmon Memorial Committee was published in the November Journal).

THE PRESIDENT: Do you desire that the matter go over until tomorrow before we receive it?

DR. HOSKINS: I would rather refer that to the executive committee or upon the recommendation of the chairman to Dr. Winchester as to the question of expense.

DR. N. S. MAYO: Isn't it understood that the expenses of the committee appointed—I mean to say, the necessary expenses of a committee appointed by this association are to be borne by the association?

THE PRESIDENT: It is customary.

DR. MAYO: It seems to me it follows necessarily that, where a committee is appointed to do a certain work, the necessary expense of this committee is to be borne by this association, but in order to bring it before the association clearly, I move that the necessary expenses of the committee on the Salmon Memorial Fund be borne by this association.

DR. MOHLER. I second the motion.

THE PRESIDENT: It has been moved and seconded that the association bear the expense of collecting the fund for the Salmon Memorial. Are you ready for the question?

DR. TAIT S. BUTLER: Can he give some estimate of the amount of the expenses? I think that in passing a resolution for the purpose of appropriating money, we ought to have some idea of the amount of the expenditure. I think it would be better if Dr. Mayo would indicate some figures, the maximum figure—not that we anticipate that the committee will spend too much, but just as a matter of business. I think we ought to know.

DR. HOSKINS: I do not think it is necessary for Dr. Butler to recommend that. I believe that the expenses which I turn in tomorrow are simply expenses of postage and of printing. All the clerical work has been done in my office by my own clerical force, and I will present no bill for that at this time, but it involves a great deal of work, and I would like some limit on it so that I might feel that some part of this expenditure would be borne by the association. The amount of expenditures that I turn in tomorrow morning will be solely those of printing and postage.

DR. BUTLER: I am heartily in favor of the association bearing the expense; I think that certainly all will agree that in work of that sort the association ought to bear the expense. I think in passing the resolution that we ought to put in a limit to the amount, whether they use that amount or as much thereof as is necessary.

THE PRESIDENT: Would the committee be able to give us some idea of what would be the proper amount?

DR. HOSKINS: I believe if it were not to exceed \$300 it could be conducted on that for the year. I would like to bear some part of the clerical expense, but I don't feel that the committee ought to bear all of it individually. I will say not to exceed \$300 to pay the items of postage and printing until the work is completed.

THE PRESIDENT: Is there any further discussion on the matter?

DR. QUITMAN: We could not hear the estimates that were stated.

THE PRESIDENT: He said \$300 might be the maximum amount that would be allowed to cover some part of the clerical expense as well as printing and postage.

DR. HOSKINS: But it takes a very large part of one man's time.

DR. L. A. MERILLAT: I am rising to ask whether this is the final report of the committee.

THE PRESIDENT: I understand so, Dr. Merillat.

DR. HOSKINS: This matter seems to be one that involves the status of a number of committees, and so we have on our list, and have had for a great many years a finance committee. Wouldn't it be better if all of these appropriations were to go through the finance committee and have everything come through it? Let it make an estimate as to what would be required for each committee during the year, and set apart, if necessary, say \$1,000 for things to allocate to the various other committees. It seems to me that this is the basis upon which this ought to be done, with this committee or any other committee, that is the general policy.

DR. QUITMAN: I would like to say that I am heartily in accord with this memorial fund, but I would like to ask the chairman of that committee, or perhaps the president can inform me, whether any definite plans have been made, or any in view, as to show how the fund is going to be distributed; how the selection is going to be made as to where the intending students are to be selected; as to what college or what class of colleges, by that I mean state universities or private schools. I wish to say to the chairman of that committee that, if that question is ever made plain in this association, the American Veterinary Medical Association pledges itself in regard to the unprejudiced distribution of these scholarships, they will get this fund together very, very much quicker than if it is kept in the background as it has been in the past. I have been asked that question by practitioners time and time again, who are ready to send in a check for various amounts and they want to know whether any one kind of a school is going to be favored. I, personally, am ignorant about it; perhaps the association has some such plan. If they have I would like to know it. If they haven't, I would suggest that before any further

steps are taken in this matter that this association pledge itself to the veterinary profession of America as to how this fund is to be distributed, how the selection is to be made, and by whom. This is an A.V.M.A. matter and I would like to get some illustration of this.

DR. WINCHESTER: That is a point that I am glad to have brought up. I answered that indirectly when I was up before. This committee was appointed to raise this fund, the interest of which would be sufficient for a scholarship. When that fund is raised this committee ceases to exist. It is the business of the A.V.M.A. then as to how it shall be disposed of. We have nothing whatever to do with that and I am glad that you brought the matter up at this time. The association certainly will be broadminded and liberal enough not to be narrowed down to any one thing, except, as I understand it, it will be confined to the North American Continent.

DR. MAYO: I am very glad I heard this statement. I labored under a wrong impression. The greatest obstacle I have found towards the contribution to this fund, (and I have made some efforts along this line through the urgent request of Dr. Hoskins) has been that this committee is a continuous committee. The members being appointed from time to time to fill the vacancies, the expenditure of this money would be in the hands of this committee. I had confidence enough in this committee to be satisfied on that point, but the average contributor over the country is not so well acquainted with these gentlemen as some of us are. That has been one great obstacle standing in the way of getting contributions. If that could be set aside so that we will know positively that the A.V.M.A. is going to spend this money according to the vote of the association from time to time, I think it will give us a good deal of leverage in raising this money.

DR. HOSKINS: At the meeting in Oakland, in the report of the committee one year ago it was stated that it was the opinion of the committee that any one obtaining this sum of money for a scholarship would have the selection of a school himself as to where he will go. We did suggest that if the money was given for a scholarship for a post-graduate course that that post-graduate course would not be in the school in which he was a graduate, and that whether it was a scholarship or a fellowship it should be in a veterinary school of North America; and that the money was to be appropriated on your recommendation for the purpose of doing some special work. It was to be your province to select a man to do that special work and bring back the results of his work to this association. So far as the committee is concerned it has no other province than the raising of this amount of money.

DR. QUITMAN: I still insist that the A.V.M.A. should go on record in line with what Dr. Hoskins has just stated. He stated that there was a statement made by the committee in answer to a simple question, he admits, or the committee admits, that when they collected this fund they will have nothing more to say about it. I still maintain that the association ought to go on record along the lines as mentioned by Dr. Hoskins, that the student or the intending student be allowed without prejudice, to choose his own college. Furthermore, some definite plan should be worked out by which that student shall be chosen. We don't want, perhaps, a favored few in this association to have the say as

to who shall receive that fund. Some definite plan should be worked out, and that should be stated in the literature of the committee. When that is made public, the committee can take my word for it, they will get many a contribution that is now being held up, because the graduates of certain colleges say, "We don't want to support certain other colleges at the exclusion of a certain class of colleges"; that is the way the thing stands. I know a good deal of money myself that is being held up until this thing is made positive and definite. I think this association should lay out definite plans to help this committee out. They will get this fund together inside of another year instead of two years more, and in six months I think that they will get it together and be able to work out a definite plan. Either this committee or another committee, or the executive committee of this association ought to go on record and pledge this fund absolutely and say how it is to be distributed, and how the worthy candidates are to be selected.

DR. R. C. MOORE: In order to get this before the association I would like to make a motion.

THE PRESIDENT: There is a motion before the house. The question is on Dr. Mayo's motion. The motion is that the expenses of the Salmon Memorial Committee shall be paid by the association.

DR. MAYO: I think I specified the necessary expense. Of course, that is understood.

THE PRESIDENT: I will add the words "necessary expenses".

DR. TAIT S. BUTLER: I will move as an amendment that we insert the clause, "The sum of \$300 or as much thereof as may be necessary".

DR. KINSLEY: I second the amendment.

DR. BUTLER: \$300 a year or as much thereof as may be necessary to be appropriated annually, until this sum is raised.

THE PRESIDENT: There is a motion that the sum of \$300 be appropriated to pay the expenses of this committee or as much thereof as may be necessary.

DR. QUITMAN: Per year?

THE PRESIDENT: Is there any discussion on the motion?

DR. HIGGINS: Does that mean that this has to be approved by the finance committee?

THE PRESIDENT: Not necessarily. There is no provision in the by-laws so far as I know. There should be, but there is not.

DR. HIGGINS: May I make an amendment to the amendment, that this be extended under the authority of the finance committee.

THE PRESIDENT: It will anyway; it must be. The question is on the amendment; are you ready to vote on it?

DR. MAYO: Don't all resolutions carrying money appropriations have to be referred to the executive committee?

THE PRESIDENT: I don't think so. Our by-laws are very faulty in that respect. Are you ready to vote on the amendment? All those in favor of the amendment signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

The vote is now on the original motion as amended. Are you ready to vote? All those in favor of the motion will signify the same by saying "Aye". Contrary minded, "No." The "Ayes" have it. It is so ordered.

DR. R. C. MOORE: I would like to move that the Salmon Memorial Committee be requested to formulate a plan and recommend that plan to this association during this meeting for its adoption for the expenditure of this money; so that we will have something definite on record, when we go out to solicit subscriptions.

THE PRESIDENT: Do I hear a second to that motion?

DR. QUITMAN: I second it.

THE PRESIDENT: It has been regularly moved and seconded that the committee on the Salmon Memorial Fund submit to this association at this session a definite plan of action. Is there any discussion? Are you ready for the question? All those in favor of the motion signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

Is there anything else to come up in this report? If not, we will delay the acceptance of the report until it comes to us in proper form. Is that satisfactory, Dr. Hoskins?

DR. HOSKINS: Yes, that is all right.

THE PRESIDENT: Gentlemen, Dr. Fish has a message to submit to us.

DR. FISH: Gentlemen, some days ago I received a message of greeting from Dr. Liautard of France, and I wish to take this opportunity to present it to the association.

"You will receive this letter but a few days before the meeting in Detroit. Of course, I will not be there, and yet my whole thought will be with you. May I ask you to carry to all the members present my most friendly greeting and best wishes for the success of the association? To her continuous grandeur all my thoughts will go on that day; and if I am here alone, I shall certainly drink a good glass to the health and happy prosperity of all those who will be there." (Applause).

THE PRESIDENT: Gentlemen, what will be done with this message?

DR. WINCHESTER: I move that it be acknowledged, and the felicitations of the association be sent to Dr. Liautard.

DR. HOSKINS: I second the motion.

THE PRESIDENT: You have all heard the motion. Are you ready for the question? All those in favor of the motion will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

I will appoint a committee of three, consisting of Drs. Fish, Winchester and Ellis, to convey the greetings of this association to Dr. Liautard.

The following cablegram was sent to Dr. Liautard: "Association sends best greetings to its founder." Signed by Drs. Fish, Winchester and Ellis, Committee.

THE PRESIDENT: Is there any other committee ready to report? The question has been raised that no opportunity was afforded for a discussion on

the report of the committee on diseases. I think the matter was left open; but, apparently, it has not been so understood. Is there any one that would like to discuss the report of the committee on diseases? What is your pleasure, do you desire to adjourn? We have no further business to transact unless there is some other committee to report.

(For discussion, see Journal).

THE PRESIDENT: Is there any further discussion? What is your pleasure in regard to remaining in session? The chair has no business.

SECRETARY HARING: I move we adjourn.

(This was seconded and on being put to a vote was carried and the meeting adjourned until Tuesday, August 22nd, 1916, at 9:30 A. M.)

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Detroit, Mich., August 22, 1916, 9:30 A. M. Ball Room, Hotel Statler. The meeting was called to order by Dr. R. A. Archibald, the President, in the chair.

THE PRESIDENT: Gentlemen, will you please come to order?

The first item on the program this morning is the report of the executive committee. I will call upon Doctor Marshall, who is the chairman of that committee.

DR. MARSHALL: The first recommendation from your executive committee is in reference to the question that was referred to them yesterday, namely, the raising of the dues from three to five dollars. Action was taken on this matter last evening.

The executive committee has reviewed the minutes in respect to the way the dues were raised, and while they feel there may have been a possibility that the thing was not done regularly, they feel that, inasmuch as it was done, it should be considered final.

They, therefore, recommend that the minutes, as they are, should be considered correct, and that the dues remain at five dollars, as stated by the resolution.

The second is in reference to the following resolution:

“*Resolved*, That papers presented at the meetings of the American Veterinary Medical Association are the property of the association; provided, however, that the reports by state and federal employees may be accepted with the understanding that, when possible, arrangements be made with the editor to publish them first.

“2. *Resolved*, That the reports of special and standing committees should be reserved for publication in the Journal.

“3. *Resolved*, That the committee on Journal should have discretionary power to reject papers or to permit their publication through other channels.”

That is all the executive committee has to report with the exception of applications for membership. Do you wish to act on those at the present time?

DR. HOSKINS: I move that we proceed with the report of the executive committee.

THE PRESIDENT: Does that mean, including the names that were submitted yesterday on the printed list?

DR. HOSKINS: Including the names that were submitted yesterday as printed.

SECRETARY HARING: There are certain corrections on the list of names as printed yesterday. Under North Carolina, the last name on the list should not appear, as it is not vouched for by two men resident in the same state. Other than that, the list is correct, provided there are no objections.

THE PRESIDENT: Suppose we act upon the substance of the report first.

DR. MARSHALL: There is one other recommendation, and that is that one-half of the expense incurred by Doctor Haring in making a trip from California to Chicago and return to attend the meeting of the executive committee, held December 3, 1915 be paid. The executive committee recommends that this be paid.

DR. HOSKINS: I move that the report be received.

DR. MAYO: I second the motion.

THE PRESIDENT: It has been regularly moved and seconded that the report of the executive committee be received.

DR. HOSKINS: And that the recommendations be taken up seriatim.

THE PRESIDENT: And that the recommendations so made be taken up seriatim. You have heard the motion. Are you ready for the question? All those in favor of the motion will signify the same by saying "Aye". Those contrary minded, "No". The "Ayes" have it. It is so ordered.

DR. MARSHALL: The first recommendation is in reference to the minutes of the last meeting.

DR. HOSKINS: I move they be approved.

DR. MAYO: I second the motion.

THE PRESIDENT: It has been regularly moved and seconded that the minutes of the last meeting be approved as published in the Journal. All those in favor of the motion will signify the same by saying "Aye". Those contrary minded, "No". The "Ayes" have it. It is so ordered.

DR. MARSHALL: The next recommendation is in reference to the presentation of papers, as set forth in the following resolutions.

(Dr. Marshall read the resolutions again).

DR. HOSKINS: I move the adoption of the recommendation.

DR. HIGGINS: Seconded.

THE PRESIDENT: It has been regularly moved and seconded that this recommendation be adopted.

DR. BUTLER: I rise for a point of information.

THE PRESIDENT: State your point, Dr. Butler.

DR. BUTLER: Do you regard the resolutions committee as a standing committee?

THE PRESIDENT: It is so provided in the by-laws.

DR. BUTLER: I believe it is a mistake to withhold the report of the resolutions committee for publication in the monthly Journal. I believe that the resolutions of this organization are intended to and should be given the very

widest possible circulation, and that they ought to be published in the daily press at the time the report is adopted. I think it is a serious mistake to smother these resolutions for publication in the Journal, because thereby you defeat the very purpose for which the resolutions were intended.

I, therefore, move an amendment that the committee on resolutions only be excluded from that list of committees. I think this should carry.

DR. STEWART: I second the motion.

THE PRESIDENT: An amendment has been offered that the report of the committee on resolutions be exempt from this ruling, should you adopt this recommendation. Are you ready to vote on the amendment? All those in favor of the amendment will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered. The question now is on the adoption of the recommendation of the executive committee as amended. Are you ready for the question? All those in favor of the motion will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered. The next recommendation, Dr. Marshall.

DR. MARSHALL: The next recommendation is in reference to paying one-half of the actual expenses incurred by the secretary in attending the meeting in Chicago on December 3, 1915.

DR. HOSKINS: I move its adoption.

DR. MAYO: I second the motion.

THE PRESIDENT: It has been regularly moved and seconded that this recommendation be adopted. All those who are in favor of the motion will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered. The next, Dr. Marshall.

DR. MARSHALL: The next is some additional applications for membership. Have you acted on these that were already printed?

THE PRESIDENT: No, not as yet.

DR. MARSHALL: Then shall I read these first?

THE PRESIDENT: I think not. I think we had better act on the printed list first. Unless there are objections that will be the order. What is your pleasure in regard to the printed list of applications?

DR. HOSKINS: I move that they be elected to membership, and that the secretary be instructed to cast the ballot of this association in that respect.

DR. MAYO: Seconded.

THE PRESIDENT: It has been moved and seconded that the gentlemen whose names are printed in the list submitted yesterday, with the exception of the one which was challenged by Dr. Haring, be elected to membership, and that the secretary be instructed to cast the ballot.

DR. S. STEWART: I want to object to the election of one man by the name of Hudson Chadwick of Mississippi. Hudson Chadwick has been applying for membership for three consecutive calendar years. He is ineligible on that account. Another point, he is dishonest. He has not paid his college fees in two different colleges. I don't think he is a fit man for membership in this organization. I object to him.

THE PRESIDENT: In this connection, in order to facilitate matters, I would suggest that if any of these names are challenged, that they be withheld for the time being, and be acted on separately. If there is no objection, that will be the order. Are there any other names that are challenged? I believe that makes two names of those on this list. I think this is a very important matter, and I hope that all of you gentlemen have very seriously considered and studied this list. The executive committee worked on these names for about twelve hours more or less. Are you ready to vote on the motion? All those in favor of the motion, will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered. The secretary will cast the ballot of the association for these men, electing them to active membership.

SECRETARY HARING: I have done so, Mr. President.

DR. S. STEWART: I now object to the name of Hudson Chadwick. I move that he be rejected.

DR. CAMPBELL: I second the motion.

THE PRESIDENT: It has been regularly moved and seconded that Dr. Hudson Chadwick of Jackson, Mississippi be rejected. You have heard the motion. Are you ready for the question? All those in favor of the motion will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

SECRETARY HARING: And Braxton M. Weston of Swanquarter, North Carolina.

THE PRESIDENT: Yes. This completes the recommendations of the first report of the executive committee.

DR. MARSHALL: Here are some more names in addition to the printed list.

THE PRESIDENT: The chairman of the executive committee has some more names to submit to you.

DR. MARSHALL: These names were not submitted in time for printing in the list. I will read the name of the candidate, his address, the college from which he graduated, the date, and his vouchers. Unless there is objection, I will read on until I complete the list. If any of you wish to object, speak during the time I am reading the name of the particular candidate.

(Dr. Marshall read the list; there was no objection to the names as read).

THE PRESIDENT: You have heard the report of the executive committee. What is your pleasure?

DR. HOSKINS: I move that they all be elected to membership in this association, and that the secretary be instructed to cast the ballot.

THE PRESIDENT: Wouldn't it be better to accept the report first, Dr. Hoskins?

DR. HOSKINS: I move to accept the report of the executive committee.

DR. MAYO: I second the motion.

THE PRESIDENT: It has been regularly moved and seconded that the report of the executive committee be accepted. Are you ready for the question? All those in favor of this motion will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered. What will you do with the recommendation?

DR. HOSKINS: I move that those men be elected to membership, and the secretary be instructed to cast the ballot therefor.

THE PRESIDENT: It has been regularly moved and seconded that the names read by the chairman of the executive committee be elected to membership, and that the secretary be instructed to cast the ballot. All those in favor of that motion will please signify the same by saying "Aye". Those contrary minded, "No". The "Ayes" have it, and it is so ordered.

Is there anything further from the executive committee?

DR. MARSHALL: Nothing.

THE PRESIDENT: Is the committee on intelligence and education ready to report now? Dr. Mayo is the chairman of that committee.

DR. N. S. MAYO: Mr. President, and members of the American Veterinary Medical Association, the following is the report of the committee on intelligence and education: (See Journal, December 1916.).

THE PRESIDENT: What is your pleasure in regard to the report of the committee on intelligence and education?

DR. HOSKINS: I move that it be accepted.

DR. HIGGINS: I second the motion.

THE PRESIDENT: It has been regularly moved and seconded that the report of the committee on intelligence and education be accepted. All those in favor of the motion will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

Is the committee on reorganization ready to report? I am afraid not.

The next item on the program is the report of the committee on finance. Is that committee ready to report?

DR. E. L. QUITMAN: We are not ready.

THE PRESIDENT: Then we will pass that for the time being.

The next will be the report of the committee on necrology. Dr. Jensen, are you ready to report? (See Journal, December 1916).

THE PRESIDENT: What will we do with the report of the committee on necrology?

DR. HOSKINS: I move that the report be received.

THE PRESIDENT: What was your motion, Dr. Hoskins?

DR. HOSKINS: My motion was that the report be received, and that the usual record be made upon our minutes of the deaths of these members.

THE PRESIDENT: Do I hear a second?

DR. MAYO: I second the motion.

THE PRESIDENT: It has been regularly moved and seconded that the report of the committee on necrology be received, and referred to the committee on Journal for publication. All those in favor will signify by saying "Aye".

DR. HOSKINS: I do not feel that I should hesitate or fail to say a word in regard to the death of Dr. D. Arthur Hughes of Chicago.

Dr. Hughes was one of the very strong men of our profession, one who always had a very deep interest and concern for its advancement, and its wel-

fare. No man was a greater factor in bringing to your attention why the veterinarians of our country should receive recognition at the hands of our Federal Government in the army veterinary service. I am quite sure that there is not one within the sound of my voice but has received some circular or some pamphlet under the *nom de plume* of Garrison Steele which he prepared incident to the work of interesting Congress in this recognition. They were printed in almost all of our veterinary Journals under that *nom de plume*, so those of you who read them carefully will recall with what earnestness, with what great sincerity he appealed to you to support this measure, that our profession might be recognized at the hands of our Federal Government.

His loss was a great loss to the veterinary literature of this country, for he was almost a daily writer for our veterinary journals, and always contributed something that was well considered, well thought out and of the greatest importance to the real true advancement of the profession.

THE PRESIDENT: Are you ready to vote on the motion? All those in favor of the motion will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

SECRETARY HARING: Here is a telegram from Dr. S. J. Walkley, Secretary of the Association of the Bureau of Animal Industry Employees:

"Greetings and best wishes for a successful meeting from National Association of Bureau of Animal Industry Employees. Lobeck Bill, H. R. 16,060, now before House on Union Calendar 258 provides for all veterinary inspectors in U. S. Bureau of Animal Industry, entrance salary \$1,400 per annum, with \$100 annual increase until salary is \$2,400. This bill will be reached for vote during short session of Congress next winter. Approximately 1,250 Bureau Veterinarians affected, many being members of your association; now appeal to your association for financial aid in boosting Lobeck Bill."

DR. MAYO: I move that the communication from Dr. Walkley be referred to the executive committee.

DR. HOSKINS: I second the motion.

THE PRESIDENT: You have heard the motion. Are you ready for the question? All those in favor of referring this matter to the executive committee will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

Is the committee on the Salmon Memorial ready to complete its report?

DR. HOSKINS: There was called for yesterday some specific recommendation as to how this money was going to be utilized. That was offered at Oakland a year ago in the following language, and was accepted and indorsed by the association at Oakland:

First, that the Salmon Memorial Fund shall be undertaken by this body and that a stated committee will be appointed by this organization for the carrying out of the purpose of this movement.

Second, that the form of testimonial shall be of an educational character, that may cover a scholarship, a fellowship, or some advanced or special work

of interest or import to the veterinary profession, as may from time to time be recommended by this committee for action of the association.

Third, that to this end a sum of money not less than ten thousand dollars be raised by popular subscription from the upwards of seventeen thousand veterinarians in North America; this money to be invested under the direction of this association so that the income of four or five hundred dollars may be annually awarded to some one or more along the lines above referred to.

Fourth, that said scholarship or fellowship shall be in an American Veterinary College, and if a fellowship, not to be taken in the college of which the successful person awarded the same shall be a graduate thereof.

These were offered at Oakland, and were approved by the association. I do not know whether there is any need to go further than that, because the time is not ripe yet as to just how we shall reach the decision in the selection of these men. That is a matter for you to think about when the fund is completed, or by the time that the fund is completed.

I did not have the exact figures yesterday, but there is a total of \$3,007.00. the contributions have been as follows: from New York, \$382; from Pennsylvania, \$298; from Massachusetts, \$209; from Michigan, \$190; from Illinois, \$150; from Ohio, \$135; from New Jersey, \$131; from the District of Columbia, \$120; from Wisconsin, \$106; from Virginia, \$51; from Canada, \$26; from Louisiana, \$25; from Minnesota, \$25; from Missouri, \$25; from Washington, \$25; from Mississippi, \$20; from Connecticut, \$71; from Iowa, \$131; from Maine, \$5; from South Carolina, \$5; and then one special subscription of \$800; making a total of about \$3,007.

THE PRESIDENT: What will you do with the report of the committee on the Salmon Memorial?

DR. QUITMAN: I move that it be accepted.

DR. MAYO: I second the motion.

THE PRESIDENT: It has been regularly moved and seconded that the report of the committee on the Salmon Memorial be accepted. All those in favor will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

We are now ready for the report of the committee on selection of emblem. Dr. Otis A. Longley is chairman of that committee, but he is not here. Dr. Campbell, I think, has the data. Are you ready to report, Dr. Campbell?

DR. CAMPBELL: Most of that data is in the hands of Dr. White. He will be here. I could not give you a complete report at this time. I think if you take it up a little later, it will be better.

THE PRESIDENT: We will defer the report for the time being.

DR. CAMPBELL: The report has been prepared, but it is in the hands of Dr. White.

THE PRESIDENT: Then if there is no objection, we will defer the report on this matter until later. The next is the report of the International Tuberculosis Commission. Dr. J. G. Rutherford is the chairman of that committee.

DR. J. G. RUTHERFORD: Our report is not ready as yet. We hope to be able to present it tomorrow.

THE PRESIDENT: I fear you will not have an opportunity to present it tomorrow. As I understand it, the program provides that tomorrow will be devoted to the section meetings, and we will not meet in joint assembly. The only opportunity you will have to submit the report would be on Thursday evening.

DR. RUTHERFORD: We have not met yet. Our meeting is set for this afternoon. It is rather a difficult thing to get the members of this committee together, because they are not all members of the association.

THE PRESIDENT: Might it not be possible to get the report before the association this afternoon?

DR. RUTHERFORD: No, I am afraid not.

THE PRESIDENT: The next is the report of the committee on Journal, of which Dr. Torrance is chairman. Are you ready to report, Doctor?

(Dr. F. Torrance here read the report of the Committee on Journal.) (See Journal of December 1916).

THE PRESIDENT: Gentlemen, you have heard the report of the committee on Journal. What will you do with it?

DR. HOSKINS: I move that it be received, and referred to the committee on publication.

DR. MAYO: I second the motion.

THE PRESIDENT: It has been regularly moved and seconded that we accept the report of the committee on Journal, and that it be referred to the committee on Journal publication. Are you ready for the question?

DR. MAYO: Is this a proper place to make a few remarks on this report now?

THE PRESIDENT: I see no objection.

DR. MAYO: It seems to me that this is a very important problem for the association to consider. I feel it so because it was a favorite plan of mine, and I was very much interested in seeing it carried to a success. I think we owe a great deal to Dr. Fish for the work he has done this past year.

The point I wish to emphasize, or bring home to every one of you is that this Journal is your Journal. It is not the Journal of any one individual, and its success will depend very largely upon the support and the assistance that you give to the editor, in making it the Journal that we want it to be.

I think that every member of this association should feel it his duty to furnish brief case reports and practical things that every practitioner is interested in, and that appeal to him in his every-day work, and to send this to the editor of the Journal. He cannot get those facts himself; they must come from the men in the field, and every one of you should make a special effort along this line to help make this Journal as useful to every individual member of this association as possible.

Another thing: We ought to double the subscription list of this Journal during the next year. I think every member of this association ought to make a pledge to himself and to the association that he will get at least one new member, outside of the membership of the association; get a member for the association if he can; but if he cannot, to get a subscriber to the Journal out-

side of the association. This means a good deal to the association in a financial way. You have just heard this report and know now that instead of expending four or five thousand dollars for the publishing of the proceedings of this association, as they have in years gone by, that we have published them, and we have had a monthly Journal, and a good Journal, and we have a little money to the good.

If this association is going to do the work that it ought to do in all lines, it must have money to do it with; and here is a good place for you to help us to increase this Journal; help further the work of the association in all lines, and help to make it a representative Journal of this great association, that will be recognized, as the committee has said, outside of this country, as one of the leading veterinary Journals of the world. It is up to you to help do this. Dr. Fish is doing his work nobly.

THE PRESIDENT: Are there any further remarks? The question is on the acceptance of this report.

DR. MURPHEY: I would like to know whether the acceptance of this report means the adoption of the recommendations of the committee?

THE PRESIDENT: No; they will have to be taken up later in the meeting. All those in favor of the motion will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

DR. HOSKINS: I move that the recommendation of the committee that the association charge itself with the expense of sending the Journal to honorary members be adopted.

DR. MAYO: I second the motion.

THE PRESIDENT: Are you ready for the question? All those in favor of the motion will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it will be so ordered. What is next?

DR. HOSKINS: I move that we accept the recommendation of the committee that those who are on the honor roll shall pay the annual subscription fee for the Journal.

The motion was seconded.

THE PRESIDENT: You have heard the motion. What is your pleasure in regard to it? Are you ready for the question?

DR. QUITMAN: What is the subscription?

THE PRESIDENT: Three dollars per year.

DR. QUITMAN: Do the dues remain at three dollars?

DR. HOSKINS: The honor roll members do not pay anything.

DR. QUITMAN: I understand that if they want the Journal it is at their discretion.

THE PRESIDENT: You have heard the motion that the honor roll members be required to pay the regular subscription price for the Journal. All those in favor of the motion will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

DR. HOSKINS: I move that the recommendation that seventy-five dollars per month be allowed for clerical expenses in connection with the office of the editor be approved.

THE PRESIDENT: That is in addition to the salary?

DR. HOSKINS: Yes.

THE PRESIDENT: Do I hear a second?

The motion was seconded.

THE PRESIDENT: Are you ready for the question? The motion is that we allow seventy-five dollars a month to pay the office expenses of the editor. All those in favor of this motion will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered. Are there any further recommendations of this committee we should act upon?

DR. MURPHEY: I move that a recommendation allowing fifty reprints to be furnished contributors be adopted.

THE PRESIDENT: Do I hear a second to that motion?

The motion was thereupon seconded.

THE PRESIDENT: You have heard the motion. Are you ready for the question? That fifty reprints be allowed the contributor of original articles, and for any number after that they will have to pay the regular cost. All those in favor of that motion will signify the same by saying "Aye". Those contrary minded, "No". The "Ayes" have it, and it is so ordered. Are there any further recommendations, Dr. Torrance?

DR. TORRANCE: No, I think that is all.

THE PRESIDENT: The next in order on the program is the report of the committee on advertisements of veterinary remedies.

DR. M. JACOB: That committee is not ready to report.

THE PRESIDENT: The next is the report of the special committee on agricultural colleges investigation. Dr. F. B. Hadley is the chairman of this committee. Are you ready to report, Dr. Hadley?

DR. F. B. HADLEY: The report which I will read now is the report of the committee on agricultural college education. It is a special committee appointed by this association some years ago.

(The report was read by Dr. Hadley). (See Journal.)

THE PRESIDENT: What is your pleasure in regard to this report?

DR. HOSKINS: I move that the report be received and referred to the Journal.

DR. HIGGINS: I second the motion.

THE PRESIDENT: It has been regularly moved and seconded that the report be received and referred to the Journal. All those in favor of the motion will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

DR. POTTER: I think this is a good time in connection with this report to bring forward a few points. That is, the credit which is allowed agricultural graduates when they enter veterinary colleges. As I understand it, they are allowed one year's credit, that is, the first year's credit. I think that is a great mistake. From my own experience in entering veterinary work, and from observation of students who have entered veterinary colleges on one year's credit, they do not get the foundation of their veterinary training which is

essential. They need more than anything else the training in anatomy, physiology, bacteriology and such subjects which are usually given in the first year. If they are allowed those things to begin with, they go through the course with an inadequate preparation. I believe that this practice should be discontinued, and if it is necessary to give them credit, give them credit in animal husbandry, milk inspection and agricultural bacteriology, and things of that kind in which they are proficient, but make them get in the very beginning those things which are essential.

THE PRESIDENT: Are there any further remarks on this subject?

DR. HADLEY: The remarks made by Dr. Potter just now are certainly to be commended, but they have nothing in particular to do with this report. I should like to hear the recommendations which our committee has made discussed. They have to do with agricultural students, and not with students who want to take a thorough course, because there isn't one out of a hundred that does that. The question is, are we satisfied with the character of the work as recommended for agricultural students?

THE PRESIDENT: Is there any further discussion on this report? If not, I will refer back and call upon the committee on emblem, as I understand that Dr. Campbell is now ready to make a report.

DR. T. F. KREY: Will you pardon me, if I make an announcement or two here?

THE PRESIDENT: Dr. Krey has some announcements to make. Will you give him your attention, Gentlemen?

(Dr. Krey made announcement as to the official photograph;- securing tickets for the banquet and various meetings of the alumni of different colleges.)

THE PRESIDENT: We will now hear from Dr. Campbell in regard to the emblem: (Published in the Journal, November, 1916).

THE PRESIDENT: You have heard the report of the committee on emblem. What is your pleasure?

DR. MARSHALL: I move that the report be received.

DR. HOSKINS: I second the motion.

DR. MARSHALL: Be received and referred to the executive committee.

THE PRESIDENT: It has been regularly moved and seconded that this report be received and referred to the executive committee. All those in favor of the motion will signify the same by saying "Aye". Those contrary minded, "No". The "Ayes" have it, and it is so ordered.

DR. S. STEWART: Mr. President, may I make an announcement here?

THE PRESIDENT: Certainly, Dr. Stewart.

DR. STEWART: I have an announcement to make to those who are interested in the State Examining Boards and Faculty meeting. The meeting adjourned to meet at the call of the president, and the call to meet is given for Wednesday afternoon, at five o'clock. The meeting place will be in Parlor Henri II. This parlor is around the end of the passageway as you go out. Kindly remember, Wednesday afternoon, at five o'clock.

THE PRESIDENT: The next to be heard from is the committee on glanders, Dr. E. B. Ackerman, chairman.

DR. MAYO: Before that is taken up, I would like to present a short matter to the association, at the request of Secretary Haring, which is quite closely associated with the Red Cross emblem. It will take but a moment.

THE PRESIDENT: If there is no objection, that will be the order. Proceed, Dr. Mayo.

DR. MAYO: At the meeting of the Missouri Valley Veterinary Association in Kansas City last winter, Dr. R. Vans Agnew of the United States Army Veterinary Service brought the subject to the attention of the Missouri Valley Association, and the following resolution was adopted:

“Report of the Special Committee on Army Veterinary Service: In view of the difficulties experienced by and to facilitate the work of the Quartermaster’s Department of the United States Army, the Missouri Valley Veterinary Association recommends that the American Veterinary Medical Association prepare for the use of the Quartermaster General a list of qualified veterinarians available for army service in case of emergency; such a list to indicate the branch of the service for which the veterinarian is best adapted.”

I would also say that I have some other correspondence from Dr. R. Vans Agnew in this connection. It has been the experience of the Quartermaster’s Department of the United States Army, that in an emergency they were not able to get as well qualified veterinarians as they needed. They had to take anybody that turned up, and it is expected that this will be of valuable assistance to the Quartermaster to have this list of veterinarians recommended by this Association.

Dr. Vans Agnew says this will be a great step towards obtaining veterinary efficiency; for at the present we are top heavy, having only commissioned officers, and no enlisted strength.

I also have been in correspondence with Dr. Stillman, the President of the American Humane Association with regard to aiding animals in war. I would also state that there has been founded the American Red Star Animal Relief Association, a civilian association for the purpose of giving relief to animals in war. I have here a bulletin regarding it which I shall not read.

It has been the experience of the nations engaged in the present war that it is absolutely essential that civilian organizations shall be subservient to the military organization. There can be only one military organization, and it is necessary that the civilian association co-operate with that. It is impossible to have two different and separate associations working for the same cause. I have very little information as to what is in this correspondence, which I have not gone through, and I will ask Dr. Buckingham to say a word in regard to the details of this work with which he is familiar.

DR. BUCKINGHAM: Living in Washington, I naturally took an interest in what might be transpiring in the War Department in regard to this veterinary reserve list. I offered my services personally to the Chief of Personnel, Captain Saxton, who asked me if I would serve on the Remount Staff work for

a short time, to which I consented. I did not altogether care to serve in that capacity, so I asked the Captain how about the veterinary reserve list. "Oh," he said, "We are so busy that we will not get to that for a year." I said, "Have you a list of veterinarians who have already offered their services?" He said, "Yes; it is on file, but I have not tackled that as yet." He said, "We are very, very busy." That was true. He was busy.

My secretary in Washington happens in the day time to be the secretary to the Chief of the Recruiting Division in the War Department. He came to my office one night to do some work, about ten o'clock, having worked all day, slipped out for his dinner, and gone back to the War Department to work. I said, "What is the matter with you? You look depressed." He said, "There have been telegrams on my chief's desk since last Thursday", and this was Tuesday. He said, "Those telegrams concern the movement of regiment troops at various places throughout the states who expect to go to the border. Just think of it, Doctor; they have not been acted on for four or five days. It makes me feel humiliated." I said, "How many clerks have you in your office?" He said, "We only have five or six clerks to do the work of fifty or sixty." I said, "What is the matter?" He said, "Unless the President declares war, the chiefs of divisions and Secretary of War will not appoint extra clerks to do this tremendous amount of work." That is an accurate condition, or rather an accurate story of the conditions as they exist in the War Department at Washington.

After my short detail to the front on the Remount Staff, I was then called back to headquarters, and asked if I would go to the Department of the South, General Funston's headquarters. I said, "No; not as a veterinarian." They asked for my reasons, and I said, "I understand the chauffeurs of the trucks are paid one hundred dollars and given their lodging and their board. The contract veterinarian of the army today is given one hundred dollars a month, and nothing other than his transportation from place of hiring to place of work." "Well," they said, "We can readily see why a man of your age and experience, having had experience in the Spanish-American war, would not care to place himself in that position of being a similar employe as a chauffeur." He said, "Doctor, I can make you Quartermaster Corps Inspector. Will you accept that?" I said, "It isn't the matter of money, but I do not care for the humiliation that you place before veterinarians. How about this reserve list? Are you sure you haven't got that list right close at hand so that the veterinarians in Washington who are interested in the A.V.M.A. can act with the War Department as a personal board, and help you to pick out the right kind of men, the men who have the profession most at heart?" No, nothing could be done. A great many were already sent to the border, and more were being sent all the time.

I was curious to see the class of men that had been appointed. Therefore, I accepted the Quartermaster Corps Inspection position. I was sent to Fort Sam Houston. When I arrived there, of course, I felt that I would like to have the Captain Quartermaster, who was going to detail me, know just what I was in civilian life, so I gave him my professional card. He shook hands, and said, "Indeed I am glad to see you, doctor." He said, "We have had some men come down here professing to be veterinarians who could hardly write

their names." Men who could hardly write their names. Think of it! I said, "From where did they come, Captain?" He said, "From Washington." What would you think of that? He said, "I suppose they are political appointees, and they just worked in." "Yes," I replied, "They are men who could not make a living perhaps practicing their profession, and this concentration of troops at the border has given them a chance to get in. I am very sorry indeed. Are there many of those men here?" "He said, "There are." Of course, every man there wasn't of that kind.

There was a great quartermaster corral when I left there about a week ago. It carried 11,000 public animals. Dr. Gerald Griffin of the Regular Army, a veterinarian, is in charge, and under him are ten younger veterinarians. Horses are sent there from all over Texas and the bordering states which have been purchased by the board. They are kept for twenty-one days quarantine; put through the glanders test by these young veterinarians, under the charge of Dr. Griffin; and if everything is favorable, they are shipped out again in the course of twenty-one days.

The purchasing, which first called for about 47,000 animals for the Southern Department, is now about finished. There still remains about 10,000 animals there at the Quartermaster corral at Sam Houston. The work has gone along very well, but there have been a great many discharges among the veterinarians who have been unqualified men. The War Department has not at any time called on our men. Dr. Mohler and Dr. Turner, and others in Washington who are qualified to act as a personnel committee have been consulted, though. The Medical Corps has asked for some information which has been very gladly and cheerfully given. That is about the only assistance we have offered which has been accepted by the War Department. I have had to hold my head in shame at the class of men who have gone forward, especially down on the border.

After finishing with the inspection and purchase board, an outbreak of glanders was reported in the first New York Cavalry. It happened that Colonel Charles _____, the Colonel of the 1st New York Cavalry was my superior officer on this purchase board, and right away he said to me, "I am retiring now, doctor, but I know you after five weeks of close contact, and I am going to impress you into the service, and get General Funston and the Quartermaster to send you down there to investigate glanders. I have two young men whom I know nothing about. They were examined by my officers." "Examined by my officers,"—note that. And he said, "They were taken in as veterinarians." Now, this was the crack cavalry troop of the New York Militia.

I arrived at Fort McAllen on Saturday afternoon. The day before, four horses had been killed, supposed to have been suffering from glanders. The diagnostic symptoms were nasal hemorrhage and general cachexia. There had been an irritating conjunctivitis, but the ocular test had been more or less massed; and the young men had made their diagnosis positive by the characteristic reaction. The animals were posted, but they were buried so deep that I was not able to resurrect them and have another look. The next morning at breakfast, another horse was reported dead with the characteristic symptoms supposedly of glanders. I said, "Now, Gentlemen, we will hold a post mortem." I said "Get your instruments, please, as you will go along to as-

sist." They said, "Why, doctor, we haven't any instruments. The only instrument we have is this dissecting scalpel." Just think of it! Nine hundred horses in the 1st New York Cavalry, and the veterinarians only supplied with a little scalpel. They had a few medicines which they had brought through from New York, but nothing, absolutely nothing had been furnished in the five weeks they had been there by the depot quartermaster at Sam Houston; no instruments at all. However, we did hold the post mortem, and all we found was the pneumococcus; microscopically there were no lesions of glanders whatsoever. This animal had not been posted for glanders at all, so I turned to the young men and said, "Gentlemen, I cannot confirm your diagnosis of the previous days on this examination; you could hardly expect me to." I turned in a pneumonia report to the Colonel and the headquarters at Sam Houston, saying that there was no glanders as far as could be determined by post mortem examination in the camp of the 1st New York Cavalry.

I then looked over the medical supply list, the veterinary supply list, and the instrument list. The Colonel excused me, and I went right back to Sam Houston, went to the Quartermaster's storehouse, drew all the instruments that were necessary; likewise two great big chests of drugs. They are now in place, and being used. But in this list of supplies, there were but two of the double action injection pumps; large pumps that would be so necessary for use in the treatment of sand clots which are quite common on the border, due to the horses eating off the ground and taking up so much sand in their food. There were very, very few surgical implements, and the list was generally a very meagre one. I asked the storkeeper, "Have you no regular list of what is allowed the regular regiment cavalry?" He said, "No, not here." He said, "I wish you would talk to the Captain Quartermaster and see if you can't make up a list." I said, "No, I will not. I have done that before. I was paid quite a neat sum for writing a veterinary supply list for the army just after the Spanish-American war. I don't write any more of them unless I am really an officer, because my list was revised by two young West Pointers, who went right back to the old status and none of the new drugs were accepted that we had suggested," I had an army veterinarian help me on that list, and I was sure it was a good one.

That is a true condition of affairs as they exist at the border. They are not well supplied with veterinarians of our own class; they are young men who have slipped in as political appointees. The contract veterinarians are receiving less than the Packard chauffeurs, and altogether the condition is one that calls for attention. Tomorrow afternoon I believe the remount service is going to be discussed, and at that time I will take it up more in detail.

THE PRESIDENT: The secretary has an announcement to make.

DR. MAYO: Pardon me, Mr. President, I would like to move that the resolution be referred to the executive committee; the resolution which I presented.

DR. HOSKINS: I second the motion.

DR. CAMPBELL: What was the resolution, Mr. President?

DR. MAYO: The resolution was that the American Veterinary Medical Association be requested to furnish to the Quartermaster's department of the

Army a list of veterinarians who would be eligible for army service in case of an emergency in the branch of the service to which they are best adapted.

DR. BUCKINGHAM: I want to second that motion, Mr. President.

THE PRESIDENT: The motion has been seconded. Are you ready for the question?

DR. TURNER: Before the motion is put, I would like to make the statement that this condition of affairs stated by Dr. Buckingham, and brought out by Dr. R. Vans Agnew is absolutely obsolete from now on. We are going to have a reserve of army commissioned veterinarians within a month or two. We won't be the quartermaster's employees any more. We won't be political free agents. We are going to be officers and veterinarians in the United States Army. I want to appeal to you men of this association who are present here this morning, to get some enthusiasm among the younger veterinarians in your districts under the age of 27 who have a properly thought-out and a proper conception of the military veterinary work. I was rather surprised that so few young veterinarians of America took the examination last month. They were not aware of the conditions which now exist in the army, thanks to our good friend Hoskins and Bolser and the other old warriors who have been fighting for fifteen or twenty years.

Another one I saw from Cleveland, Ohio, said that veterinary schools have been asking their men not to take up army service, and very correctly; but, gentlemen, all this condition is changed today. Dr. Mayo's resolution should be out of order, because there will be no more quartermaster's veterinarians. After this examination is corrected by Dr. Griffin of the Medical Board, there will be a list of reserve veterinarians from which those gentlemen passing the high examination will be drawn into the regular service. Therefore, we will not be humiliated any longer by this quartermaster and that quartermaster, through the influence of this senator and that representative, picking up tramps from all over the country and throwing them promiscuously into the army veterinary work as they have been doing for thirty or forty years. From this time on we will have regularly commissioned lieutenants attached to the medical department of the United States Army, and by that great department assigned to duty in the quartermaster's department, in the cavalry, in the artillery and at the mounted service schools. This action is unnecessary. Dr. Vans Agnew had a proper conception of the conditions and the requirements at the time this was written; but as I say this bill passing Congress, this examination held last month throws it all into the background; it is unnecessary, and we will not be humiliated any longer by any such conditions. Within a month or so we will have a properly constructed and properly organized veterinary corps in the medical department, not what we want, gentlemen, but we had to take the best we could get. I have no doubt that the high morale existing in the medical department of the United States Army will be reflected by the veterinary service. I have no doubt at all but that this branch of our service, which is the best educated branch of our military service, the best organized, I dare say, will take the veterinary service in hand and straighten it out and bring it up to its own high level. I have the highest opinion, of the prospects in view of this new veterinary organization which will be in our

ármý. I think myself that instead of having a few applicants, as we had last month, that the next examination, which will probably be held this fall, should draw the very best element of our young men into the army, so that we can prove to the army, as we have been stating to them for thirty or forty years, that we really have good veterinarians in this country, who will make proper commissioned officers.

Therefore, I move that the resolution be floored.

DR. MAYO: Mr. President, I think it would be better to refer this to the executive committee and let them kill it.

THE PRESIDENT: The question is on referring the resolution to the executive committee; are you ready for the question?

DR. HOSKINS: I would like to make one statement that Dr. Turner overlooked and that is, that before the present congress adjourns the age limit will be extended from twenty-seven to thirty. I am sure that that will undoubtedly pass so that men may take the examination up to the age of thirty.

SECRETARY HARING: I would like to explain that your secretary has written many letters to Washington to the War Department, to the Surgeon General, even to the Civil Service Commission, and to the Adjutant General, Quartermaster's Department to get this information which we have just received this morning. Usually I received no reply; lately I have been receiving letters stating that the matter has been referred to the Surgeon General. Just before starting to this meeting I received a letter from the Surgeon General stating that my inquiry had been received and that the information was being prepared and would be printed and a pamphlet would be sent out in due time. I regret very much that we haven't had this information before, because a great many inquiries come into the secretary's office concerning army veterinary matters.

Here is an announcement: The Alumni of the University of Pennsylvania will meet at dinner tonight at 6:30 at the Alt Heidelberg Cafe, 25 Broadway. Those who intend to be present will please notify Dr. States, Dr. Marshall or Dr. Klein by 2 P. M.

DR. ———: I want to make an announcement to all Ontario graduates, that there will be a meeting of the graduates of the Ontario Veterinary College Graduates in the Henri II room at 9:00 P. M. We want every graduate of the Ontario Veterinary College at that meeting if it is possible. There is something of importance that we want to bring up.

THE PRESIDENT: Gentlemen, will you listen to the report of the glanders committee, of which Dr. E. B. Ackerman was chairman.

DR. CHARLES E. COTTON: Mr. President, the chairman of the glanders committee, Dr. Ackerman, is not present, and the members of the committee have requested me to read the report.

(Dr. Cotton read the report.) (See Journal).

THE PRESIDENT: Gentlemen, what is your pleasure?

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

DR. QUITMAN: I would like to ask Dr. Cotton a question. I may have misunderstood him, but do you say the same brush or cotton swab would be used on a number of horses without—

DR. COTTON: In the same stable.

DR. QUITMAN: I understand that, but without any treatment of it?

DR. COTTON: I think so, yes, sir.

DR. QUITMAN: Personally I would like to see you strike that out of your report, Doctor, it is not ordinary cleanliness, let alone hygienic or safe. I think that should be stricken out of your report. This will go in print, and personally I would hate to have some of my medical friends read that. Don't you think so, Doctor, on second thought?

DR. COTTON: This is the report of the committee.

DR. QUITMAN: I understand that, Doctor, and I don't care who may back it up; it is not ordinary cleanliness. With absorbent cotton one can use swab sticks which you can procure all the way from thirty-five to sixty-five cents per thousand. You can put a little piece of absorbent cotton on them or use sterile gauze upon them, between that and your fingers if you are in a stable where you cannot sterilize your hands and you can go ahead then and test a thousand horses and the cost of swab sticks will not be over a dollar all told. There is no good sense for using the same camel's hair brush or the same swab sticks. It is not scientific.

DR. REICHEL: I would like to refer back to that portion of the report (reads report).

THE PRESIDENT: The question is on the acceptance of this report.

DR. QUITMAN: I move that it be accepted with that exception.

THE PRESIDENT: You make that as an amendment?

DR. QUITMAN: I think the suggestion ought to be considered.

DR. HOSKINS: I move that the report be received and referred to the committee on Journal for publication.

The motion was seconded.

DR. QUITMAN: With the exception?

DR. HOSKINS: I am not excepting anything.

THE PRESIDENT: It has been regularly moved and seconded that this report be received and referred to the committee on Journal for publication. All those in favor of the motion signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

Gentlemen, what is your pleasure with regard to continuing this session?

DR. HIGGINS: I move that we adjourn.

THE PRESIDENT: It is twenty minutes to one o'clock and we have one more item on the program.

DR. HOSKINS: I move that we adjourn till two o'clock.

THE PRESIDENT: We have a big afternoon's work to perform and in order to perform it we must get at it sharply at two o'clock. So try and be here on time if you can.

DR. COTTON: Wouldn't it be perfectly proper to accept this report and discharge your committee?

THE PRESIDENT: I don't think so. The chair will entertain a motion to adjourn.

DR. HOSKINS: I move that we adjourn to meet at two o'clock.

This was seconded and on being put to a vote prevailed and the adjournment was ordered.

—◆—
Thursday, August 24, 1916, 8:30 P. M.
Hotel Statler Ball Room.

(The meeting was called to order with President R. A. Archibald in the chair.)

THE PRESIDENT: Will you please come to order? We have a great deal of work to do, and I will ask your assistance in expediting matters.

I will ask first, for the report of the executive committee. The chairman is not here, the secretary will make a report.

THE SECRETARY: The executive committee recommends an amount not to exceed \$100 to be appropriated by the American Veterinary Medical Association to defray expenses of the association faculties and examining boards.

The matter now to be brought up consists of a list of names, recommendations for appropriations, charges against the members of the association, and a miscellaneous lot of material, which would not make very smooth reading, and I would suggest—

DR. HOSKINS: I move that the recommendation of the executive committee, appropriating \$100 for the association of faculties and examining boards, be approved.

THE PRESIDENT: It has been moved that the recommendation of the executive committee in this respect be approved. Do I hear a second?

A VOICE: I second the motion.

THE PRESIDENT: All those in favor of this motion will signify the same by saying "Aye". Those contrary minded, "No". (The motion prevailed.)

THE SECRETARY: The executive committee recommends the payment of a bill of \$120.50 submitted by the committee on reorganization, and consists of one-half of the railroad fare, and a portion of their hotel bill, also a bill for stenographic assistance amounting to \$3.50.

DR. HOSKINS: I move that we approve the recommendation.

A VOICE: I second the motion.

THE PRESIDENT: It has been moved and seconded that the recommendation of the executive committee be adopted. Are you ready for the question? All those in favor of the motion will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

THE SECRETARY: The executive committee recommends the election of the following applicants for membership.

(A list of names was read by the secretary.)

DR. HOSKINS: I move that we accept the proposed names for membership, suspend the rules and have the secretary cast the ballot of the association.

DR. ———: I second the motion.

THE PRESIDENT: It is regularly moved that we suspend the rules and elect these applicants to regular membership, and that the secretary be instructed to cast the ballot. You have heard the motion. Are you ready for the question?

All those in favor of the motion as stated will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

Dr. Marshall, will you continue the report, please?

DR. MARSHALL: The executive committee reports the expulsion of J. Harvey Slater of Charlestown, Illinois, now of Kansas City, Missouri, the charge being unprofessional ethics. The advertisement submitted here is evidence, "Learn to Vaccinate your own hogs". I will read the advertisement.

DR. J. HARVEY SLATER: Is it necessary for the committee to read that? They have all read it, I presume, and this is taking up time.

THE PRESIDENT: Does any one of the members present desire to hear this advertisement read?

VOICES: Yes, yes, yes.

THE PRESIDENT: It is so ordered. Proceed.

DR. MARSHALL: (Reading): "Learn to vaccinate your own hogs. We manufacture hog cholera serum, and operate under government supervision; sell it direct to the farmers and teach them to vaccinate free; costs 22 cents to make your pigs permanently immune; 100 pounds cost 42 cents. Syringes supplied at wholesale price. Will vaccinate your hogs under written guarantee to be immune for one year. Have your banker write Southwestern National Bank of Commerce of Kansas City, Missouri, to ascertain if we are financially responsible. If not convenient to pay cash, we will take your note at 6 per cent. Listen to this offer. We will vaccinate twelve shoats free, if the owner will put three of them with sick hogs on various farms where cholera exists, sleep and eat and run with sick hogs, and if they die we will pay for them. Slater Serum Company, Kansas City, Kansas. U. S. Veterinary License Number 93. Write for free booklets, list of satisfied users, and copy of guarantee, branch 6, address Dr. J. Harvey Slater, Lock Box 122, Charlestown, Illinois." There is a similar ad. in the paper called the Marshall Herald, Marshall, Illinois, of Wednesday, March 29th, 1916.

DR. HOSKINS: I move that we receive the recommendation of the executive committee.

DR. ———: I second the motion.

THE PRESIDENT: It has been regularly moved that the recommendation of the executive committee in regard to this case be adopted. This motion has been seconded.

DR. R. C. MOORE: I do not believe there is a man in this house who regrets the actions of Dr. Slater more than I do. I have known the doctor for a good many years. He has been an exceptional member of our Western Association, and the Middle West Association, and up to this time I have never heard a word of complaint against him from a professional standpoint. Dr. Slater tells me that he has been misled, and did this matter without due con-

sideration; and that he has asked the association to give him a year's time, to show that he will completely withdraw from all such conduct in every way, shape and form; and if at the end of a year he is not entirely acceptable, he will make no objection to his expulsion.

I am not making any fight in this matter, but I am simply stating what Dr. Slater has told me, and because we have recognized him as being a worthy member of the profession in the past. We all make mistakes. I believe if the association sees fit to extend to him this clemency he will make good.

DR. J. HARVEY SLATER: I admit that I have erred against the code of ethics in this association. I feel keenly the humiliation. I ask for a suspension in this case, that it be for a year.

THE PRESIDENT: Gentlemen, is there any further discussion on this matter? The matter or the question to adopt the recommendation of the executive committee.

DR. S. STEWART: This association has tried a considerable number of men in the past for violation of the code of ethics. Most of the trials have not been made public, because the individuals have seen their error, acknowledged it, and stated that they would rectify the error, and abide by the code. This man, I believe, understands his error and will do that. The doctor acknowledges his error and promises to rectify it as far as possible, to rectify his violation of the code, and to immediately cease if we shall suspend judgment in his case for a year; and he hopes during all of that time, and thereafter to confine his living absolutely up to the spirit of the code, as well as the letter. I believe that it would be wise to accept his acknowledgement, and give him this chance to prove his desire to be a good member.

DR. HILTY: I did not understand whether the man promised to quit selling the serum direct to the farmer or not.

THE PRESIDENT: Do you care to answer that question, Dr. Slater?

(Dr. A. F. Nelson of Indianapolis, Indiana, spoke in favor of adopting the recommendation of the executive committee.)

DR. HUGHES: I wish to ask whether this man is willing to make an humble and abject apology to the members of the executive committee for his conduct while in attendance at the meeting.

DR. SLATER: I am willing to apologize to the executive committee. I felt that this case was being railroaded, but any errors that I have made, I am willing to admit, and apologize for any misconduct on my part.

THE PRESIDENT: Is there any further discussion?

DR. HILTY: My question has not been answered.

THE PRESIDENT: What was the question?

DR. HILTY: As to selling serum direct to the farmer.

THE PRESIDENT: I understand he has already said so, but if you would rather have him make a direct answer to the question, I will propound it to him. Will you please answer the question, Doctor?

DR. SLATER: Yes sir, I will agree to that, yes sir.

THE PRESIDENT: Does that satisfy you, Dr. Hilty?

DR. HILTY: Yes.

DR. SLATER: But in answering that question, I cannot speak for the Slater Serum Company. It is for myself I am speaking.

THE PRESIDENT: I will have to put the question. Are you ready for the question? All those in favor of the motion, that the recommendation of the executive committee be adopted signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered. What is next?

DR. MARSHALL: The next is that we recommend in view of the fact that there is a committee considering reorganization to report at this meeting, that all amendments to by-laws shall await the report of the committee.

DR. HOSKINS: I move that we approve the recommendation of the executive committee.

THE PRESIDENT: It has been regularly moved and seconded that the recommendation be adopted. Are you ready for the question? All those in favor of the question will signify it by saying "Aye".

DR. STEWART: Pardon me, Mr. President, but I didn't quite hear that recommendation.

THE PRESIDENT: Will you repeat the recommendation, Dr. Marshall?

DR. MARSHALL: In view of the fact that there is a committee considering reorganization to report at this meeting, that all amendments of by-laws shall await the report of that committee.

DR. R. C. MOORE: Do I understand that we are to have the report of the reorganization committee?

VOICES: Question, question.

THE PRESIDENT: All those in favor of the motion will signify it by saying "Aye". Those contrary minded, "No". The "Ayes" have it, and it is so ordered.

DR. MARSHALL: We have here copies of the constitution and by-laws of the proposed reorganization.

THE PRESIDENT: Is Dr. Wilson here?

DR. WILSON: Yes sir.

THE PRESIDENT: Gentlemen, Dr. Wilson has an announcement to make in regard to the clinic tomorrow.

DR. WILSON: Gentlemen, I would like to say a few words with regard to the clinic. We would like to begin our clinic at about 9:30 sharp, in the morning. There are a good many members who are planning to go away early in the afternoon, and I would like to see the clinic started as closely around 9:30 as possible, and if we get there about that time we will be through in ample time for those to take trains home. The clinic will be held at Dr. Brenton's Hospital at 121 West Alexandrine street. You take the Woodward car; walk one block east of the hotel, get on the Woodward car and get off at Alexandrine street, and walk about a block and a half west. We have a good assortment of cases, and everything is in readiness for the work. So, be sure and be on hand at 9:30 tomorrow morning at Dr. Brenton's Hospital at 121 West Alexandrine street.

THE PRESIDENT: Is the committee on veterinary nomenclature ready to report? There was a report of the committee held over from Tuesday. Is Dr. Sisson here? Is any member of that committee present? Is Dr. Newsom here?

DR. NEWSOM: That report was made out and signed by the members and mailed to the secretary. It should be among his records.

THE PRESIDENT: Do you wish it read, doctor?

DR. NEWSOM: It ought to be read. It is very short.

THE PRESIDENT: Perhaps, you being more or less familiar with it, Dr. Newsom, you might relieve the secretary of the necessity of reading it.

DR. NEWSOM: The report, which as I stated, was mailed to the secretary and signed by the members of the committee, seems to have been lost. It was very short, and simply stated the work of the committee having been practically all finished, there was very little for the committee to do during the past year. The first half of the names submitted were published, as you know, two or three years ago in the proceedings of the association of that year. The second half of the names were presented two years ago, I believe, and have so far not been published. Consequently, it seems impossible to pass upon those names, because those who are in position to criticise them have not had the opportunity of doing it. This report simply pointed out that some means ought to be devised of publishing this list, so that sometime in the future, preferably early, the association could act upon the names.

THE PRESIDENT: What is your pleasure with regard to this partial report? I suppose it is not necessary to take any action upon it.

DR. HOSKINS: I move that it be received.

(The motion was seconded.)

THE PRESIDENT: It is regularly moved and seconded that the partial report of the committee on veterinary nomenclature be received. All those in favor of the motion will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

I want to re-open under the head of the report of the executive committee, as the secretary has one or two matters to take up. If you have no objection, I will call upon the secretary.

THE SECRETARY. I have another list of names of applicants recommended for election to the association. In explanation of why this was not presented a moment ago, I would say that they were in the hands of the stenographer, and were just turned over to me.

(The list of names was read by the secretary.)

THE PRESIDENT: What is your pleasure, gentlemen?

DR. HOSKINS: I move that the recommendation be accepted, that we suspend the rules, and that the secretary be instructed to cast the ballot.

(The motion was seconded.)

THE PRESIDENT: It has been moved and seconded, that we suspend the rules, and that we proceed to elect these applicants whose names have just been read to active memberships, and that the secretary cast the ballot for

the same. Are you ready for the question? All those in favor of the motion will signify it by saying "Aye". Those contrary minded, "No". The "Ayes" have it, and it is so ordered. Is the finance committee ready to report?

DR. QUITMAN: Your committee on finance begs leave to report the following:

(Reads report of finance committee.) (See Journal).

THE PRESIDENT: What is your pleasure in regard to this splendid report?

DR. HOSKINS: I move that the report be received and referred to the Journal committee for publication.

(The motion was seconded.)

THE PRESIDENT: It has been moved and seconded that this report be received and referred to the Journal for publication. Are you ready for the question? All those in favor of the motion will signify by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

We will now listen to the report of the International Commission on Control of Bovine Tuberculosis. I understand that Dr. Rutherford is not here, but Dr. Reynolds will make the report.

DR. REYNOLDS: This is the report of the International Commission on Control of Bovine Tuberculosis. (See Journal, December 1916).

THE PRESIDENT: You have heard the report. What is your pleasure?

DR. HOSKINS: I move that the report be received and referred to the executive committee.

(The motion was seconded.)

THE PRESIDENT: The executive committee will probably not meet again.

DR. HOSKINS: Will not meet again?

THE PRESIDENT: Probably not.

DR. HOSKINS: The reason I wanted to make that motion was because they have made some suggestions.

THE PRESIDENT: However, I will put your motion.

DR. HOSKINS: Make it to the Journal committee, and then we can take it up.

THE PRESIDENT: That would be the better course.

DR. HOSKINS: Then I make an amendment to my motion to have it referred to the publication committee.

THE PRESIDENT: It has been moved and seconded that this report be received and referred to the Journal for publication. You have heard the motion. Are you ready for the question? All those in favor of the motion will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

This cleans up the part of the program which remained unfinished. We are now down to the regular program for the evening. Do you desire to take it up in its regular order, or do you desire to take up first the election of officers? The chair would like to be authorized.

DR. R. C. MOORE: There has been no movement made for disposing of the Commission on Bovine Tuberculosis. I move that the committee be continued.

THE PRESIDENT: Do I hear a second to that motion?

(The motion was seconded.)

THE PRESIDENT: It has been regularly moved and seconded that the International Commission on Bovine Tuberculosis be continued. Are you ready for the question?

DR. REYNOLDS: As it is?

THE PRESIDENT: I am not informed. Do you mean as it is at present constituted?

DR. REYNOLDS: I think perhaps, it should be explained to this association, for many of you may not quite understand how this work is done, that this proposed further work will be done entirely without cost to the association.

THE PRESIDENT: Are you ready for the question? All those in favor of the motion will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

DR. LYMAN: In view of the fact that there are several committees yet to report, and I judge that some of the reports will elicit considerable discussion; that this is liable to be a long, drawn-out meeting; that some of us, and I am one, will not find it possible to stay here until morning, I move you, sir, that the regular program be changed, and that we now proceed to the election of officers.

(This was seconded.)

THE PRESIDENT: It has been moved and seconded that the order of the program be changed, and that we now proceed to the election of officers. You have heard the motion. Are you ready for the question? All those in favor of the motion will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

The first item on our program then, gentlemen, will be the nomination and election of officers for the ensuing year. The nominations for president are in order.

DR. TORRANCE: I place in nomination a man who is very well known to all of us. He is a personal friend of a great many, and I am sure that he will carry the honor of president with great credit to the association. I beg to nominate Dr. Charles E. Cotton of Minneapolis.

THE PRESIDENT: Dr. Cotton has been nominated.

DR. WILLS: I desire to second the nomination of Dr. Cotton.

THE PRESIDENT: Are there any further nominations for president?

DR. R. C. MOORE: I move that the nominations be closed, the rules be suspended, and the secretary be instructed to cast the ballot of the association for Dr. Cotton as president.

(This was seconded by several members.)

THE PRESIDENT: It has been regularly moved and seconded that nominations for president be closed, and that the secretary be instructed to cast the ballot of the association for Dr. Cotton. Are you ready for the question. All those in favor of the motion will signify so by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

Mr. Secretary, will you please cast the ballot of the association for Dr. Cotton?

THE SECRETARY: The ballot is cast.

THE PRESIDENT: Nominations for vice-presidents are now in order. There are five to be elected.

DR. TURNER: I take great pleasure in nominating Dr. F. A. Bolser, of New Castle, Indiana. He has done a great deal for our association.

DR. —————: In seconding the nomination, I think it behooves us, for the work that Dr. Bolser has done on behalf of the association, that we take the same procedure, and I move that the nominations be closed and that we suspend the rules and nominate him by acclamation.

THE PRESIDENT: It has been customary to nominate all vice-presidents and vote on them at once. I think, unless the chair is authorized otherwise, that such will be the order.

DR. —————: I put that as a motion, and you know a motion is always in order, and I ask for a vote on that motion.

THE PRESIDENT: Do I hear a second to that motion? It is not seconded. Are there any further nominations?

DR. TURNER: I will second the motion.

THE PRESIDENT: But you made an original motion.

DR. —————: I wish to place in nomination Dr. Kinsley of Kansas City.

THE PRESIDENT: Dr. Kinsley has been placed in nomination.

DR. MARSHALL: I would like to place in nomination the name of Dr. Lester Howard of Boston, Massachusetts.

DR. EICHHORN: I would like to place in nomination the name of Dr. David E. Buckingham of Washington, D. C.

THE PRESIDENT: Are there any further nominations?

DR. WARD: I place in nomination Dr. Seymour Hadwen of Canada.

DR. HOSKINS: I would like to place in nomination the name of Dr. Heer of Wisconsin.

(This was seconded.)

DR. —————: I place in nomination the name of Dr. V. A. Moore, of New York.

DR. MOHLER: It has always been customary to nominate a member of the local arrangement committee. At this particular time, it would be impossible to nominate the chairman of this committee, on account of his having served this association in various capacities, only recently as president of this association. However, at this time I wish to place in nomination the name of Dr. George W. Dunphy, state veterinarian of Michigan.

THE PRESIDENT: Dr. Dunphy has been placed in nomination. Are there any further nominations?

DR. HOSKINS: I move that the nominations be closed.

(This was seconded by several members.)

THE PRESIDENT: It has been regularly moved and seconded that the nominations do now close. All in favor of the motion will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered. It is now necessary to appoint tellers. I will appoint Dr. Higgins, Dr. McKenna, and Dr. Reichel. I would ask the tellers to retire and proceed to get the ballots ready.

DR. R. C. MOORE: Mr. President, will you have stated on the board the names of these men, and the states from which they come?

THE PRESIDENT: I will ask the secretary to do that.
(This was done.)

DR. STEWART: Will you kindly have the names read?

DR. QUITMAN: What are the rules of voting, so far as respects the payment of dues? I think that attention should be called to that.

THE PRESIDENT: Have you any suggestions to make, Dr. Quitman? The chair would like advice on that matter.

DR. QUITMAN: What do the by-laws say? I do not know whether they are clear or not, but as a rule no one should be allowed to vote unless he has paid his dues.

DR. HOSKINS: I think if I observe the list correctly, we have one section of our country without a single candidate. That is the South. I would like to ask reconsideration of the motion to close the nominations, and ask that nominations be reopened.

DR. QUITMAN: I will second that motion.

THE PRESIDENT: It has been moved and seconded that we reconsider our action by which the nominations for vice-presidents were closed. Are you ready for the question? All those in favor of the motion will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is carried.

VOICES: No, no.

THE PRESIDENT: The "Ayes" appear to have it.

DR. —————: I will ask for a division.

THE PRESIDENT: The "Ayes" have it, and it is so ordered. Are there further nominations?

DR. HOSKINS: I would like to offer the name of Dr. E. M. Ranck, of Mississippi.

THE PRESIDENT: Dr. E. M. Ranck has been nominated.

DR. TAIT S. BUTLER: I would like to place in nomination the name of Dr. G. A. Roberts of North Carolina.

DR. E. M. RANCK: I would like to withdraw my name, and move that the nominations be closed.

THE PRESIDENT: Dr. Ranck wants his name withdrawn. Are there any further nominations. Do I hear a second to the motion that the nominations be closed?

(The motion was seconded.)

THE PRESIDENT: It has been moved and seconded that the nominations be closed. Are you ready for the question? All those in favor of the motion will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

If you will give us your attention for the moment, I will have the secretary read the names and read them slowly, so that you will understand who has been nominated. It is unfortunate that the blackboard cannot be placed in a position where everyone can see it.

THE SECRETARY: (Reading from blackboard): Dr. F. A. Bolser, Indiana; Dr. A. T. Kinsley, Missouri; Dr. L. Howard, Massachusetts; Dr. David Buckingham, District of Columbia; Dr. S. Hadwen, British Columbia, Canada; Dr. T. J. Heer, Wisconsin; Dr. V. A. Moore, New York; Dr. G. W. Dunphy, Michigan, and Dr. G. A. Roberts, of North Carolina.

THE PRESIDENT: Will you please prepare your ballots, and I assume that the usual custom of depositing your ballots is the best possible to observe.

DR. HOSKINS: May I ask that Dr. Haring read them again?

THE PRESIDENT: Dr. Haring, will you please read them again? Some of the members evidently did not get them all.

(The names were again read by the secretary.)

THE PRESIDENT: I will ask that, in depositing your ballots, the various sections will come forward as they are divided in this room, and pass in single file by the platform here. I assume that no one will vote who has not a right to vote. The question has been asked, and I will answer it, we are required to elect five vice-presidents, and the custom has been that the five men who receive the highest votes will be elected. Unless there is objection, each man will pass in front of the tellers and the secretary will use his best judgment as to whether the man who is voting is a member in good standing or not. If that is not satisfactory, now is the time to make objections. The question has been asked whether newly elected members have the right to vote. I assume they have, and it is so ordered, unless objection is made.

A VOICE: Do we vote for one or five?

THE PRESIDENT: You can vote for as many as you want to up to five, from one to five. I wish to repeat the by-laws or the constitution require that we elect five vice-presidents. There are more than five nominated. To vote correctly, you should vote for five men. You are not compelled to vote for five, you can vote for one, two, three or four or five, just as you please. When the ballots are counted, the five men receiving the highest number of votes will be declared elected as vice-presidents of this association. Are you ready to vote?

DR. R. C. MOORE: I think the members should be made to vote for five. Suppose I vote for myself, and do not vote for any other nominees, my own ticket would be four times as much as the man who voted for five names. I think that every member should be compelled to vote for five members for vice-presidents.

THE PRESIDENT: I see no way of enforcing that, Dr. Moore.

DR. ———: I move that every ballot that does not contain the full five names be dropped out.

(This was seconded.)

DR. HOSKINS: I am opposed to that. If a member wants to vote for one man only, that is his privilege. The only ballots that you can throw out are those where a man has voted for six or more.

THE PRESIDENT: I will declare the motion out of order. Are you ready to vote?

DR. KLEIN: What arrangements are there for choosing the different vice-presidents? Who will be the first vice-president?

THE PRESIDENT: The man receiving the highest vote will be the first vice-president and so on. Are you ready to vote? If so, I will declare the ballot open for voting.

VOICE: Who are entitled to vote?

THE PRESIDENT: Members.

VOICE: How are you going to tell them?

THE PRESIDENT: With the assistance of these gentlemen who are going to try to determine that.

DR. KLEIN: Members in good standing.

THE PRESIDENT: I will ask that this first section come forward and cast their ballots.

(The voting was done.)

THE PRESIDENT: If there is no objection, we will proceed with the nomination and election of other officers. The next office is the one of secretary. Nominations for secretary are in order. Gentlemen, whom do you desire to have for your secretary for the ensuing year?

DR. GILTNER: I nominate Dr. C. M. Haring for secretary.

(This was seconded by several members).

THE PRESIDENT: Are there any further nominations?

SECRETARY HARING: Mr. President, I wish that my name be withdrawn.

DR. JOHN ADAMS: The office of secretary of this association is the most important one in this association. The secretary has much more to do than any other man; and the work to be accomplished by this association depends entirely upon him, upon the ability and the pep that the secretary puts into the work. I realize that there are many men in this association perfectly qualified to make good secretaries, so far as ability is concerned, and so far as the inclination is concerned, but this work will take a great deal of time. A man who has the ability and the acquaintance of the membership, and the ideal as to what ought to be presented at these meetings must also be so peculiarly situated that he can give a large share of his time to it, for a very small remuneration. I am going to put in nomination to-night a man who, in my opinion, has all of these qualifications. He is not an old, old friend of mine, but I know him intimately, although he does not reside near me at all. That doesn't make any difference, because he is a good, loyal member of this association. I nominate Dr. Merillat of Chicago.

DR. —————: I have listened to the remarks of the nominator with a great deal of pleasure, and I can endorse them very thoroughly. I have known Dr. Merillat for some years, and I know what an energetic worker he is, and what a conscientious man he is. I think he will make a first class secretary of this association. Therefore I take great pleasure in seconding the nomination.

THE PRESIDENT: Dr Merillat has been nominated for secretary. Are there any further nominations?

A VOICE: I move that the nominations be closed.

DR. DEVINE: I agree with the remarks of the other speaker as to the importance of this office. But, we have in our membership a man who has done yeoman service to this association for a quarter of a century; a man who is centrally located; a man who has wide experience with veterinary matters; who has served as secretary before, and has proven most capable; a man who has ever been ready to work for the cause. I wish to place in nomination the name of Dr. N. S. Mayo of Chicago.

DR. HARING: I would like to second Dr. Mayo's nomination.

THE PRESIDENT: Are there any further nominations?

DR. HOSKINS: I move that the nominations be closed.

(This was seconded.)

THE PRESIDENT: It has been regularly moved and seconded that the nominations for secretary be now closed. All those in favor of the motion will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered. I will appoint as tellers Dr. Hadley, Dr. Jacob, and Dr. Hart. The tellers will please prepare the ballots. If you are ready to vote, we will proceed in the same manner as we did in voting for vice-presidents.

(The voting took place.)

THE PRESIDENT: Nominations for treasurer are now in order.

DR. MCKILLIP: I would like to place in nomination the name of a man who has proven himself a great credit to the association in past years, Dr. F. H. Schneider of Philadelphia.

(This was seconded by several members.)

DR. JOHNSON: I move that the nominations be closed.

(This was seconded.)

DR. JOHNSON: And further that the rules be suspended and the secretary cast the vote of this association for Dr. F. H. Schneider as treasurer.

THE PRESIDENT: The motion has been made and seconded that the nominations be closed, and that we suspend the by-laws, and that the secretary be instructed to cast the ballot of this association for Dr. Schneider for treasurer. Are you ready for the question? All those in favor of the motion will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it unanimously, and it is so ordered. The secretary will please cast the ballot.

The nominations for librarian are now in order.

DR. HOSKINS: I nominate Dr. J. N. Frost, our present librarian.

THE PRESIDENT: Dr. Frost has been nominated.

(The nomination was seconded.)

THE PRESIDENT: Are there any further nominations?

DR. HOSKINS: I move that the nominations be closed.

THE PRESIDENT: What is your pleasure, gentlemen?

DR. JOHNSON: I wish to move that the nominations be closed, the by-laws suspended, and that the secretary cast the vote of the association for Dr. Frost.

DR. HOSKINS: I will second the motion.

THE PRESIDENT: You have heard the motion, that the nominations be closed, that we suspend the by-laws and that the secretary be instructed to cast the ballot of the association. All those in favor of the motion will signify it by saying "Aye". Contraryminded, "No". The "Ayes" have it, and it is so ordered.

Gentlemen, the secretary has something to bring before you.

THE SECRETARY: Dr. J. B. Schmidt of Pittsburgh, Pennsylvania, filed an application with the secretary last spring, but I did not find the application among those which I brought with me to this city. His name has now been passed by two of the prominent members of the A.V.M.A., and I would appreciate it if you would consider the matter at this time. The name is Dr. J. B. Schmidt, Pittsburgh, Pennsylvania, Ohio State University, Veterinary Department, 1906, vouchers, C. J. Marshall, Henry Turner. Dr. Schmidt is from Pittsburgh.

DR. HOSKINS: I move that the recommendation be approved.

(This was seconded.)

DR. MILLARD: I would like to ask Dr. Haring if he has the name of Dr. Van Husan of Howell, Wyoming?

THE SECRETARY: I have no recollection of that name. I might say that on account of the large number of applications that have come in, I have tried to list them carefully, but many of them coming in late have been either held up on account of defects in the method in which the application has been made out, or possibly, as in this case, have been overlooked. I do not recollect the name of Dr. Van Husan.

THE PRESIDENT: It has been moved and seconded that the recommendation be approved, and the gentleman whose name has been read be elected to active membership. You have heard the motion. Are you ready for the question? All those in favor of the motion will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

While we are waiting for the tellers, I am informed that there are one or two gentlemen here who wish to speak a few words in connection with the next place of meeting. I wish to say that if there are any who wish to speak on the subject, I will, unless it is objected to, give them a very few minutes.

DR. KING: Mr. President and gentlemen, I have asked for five minutes to speak to you on this subject, but I think I can finish in about two. As a representative and member of the Chamber of Commerce of Mobile, I am directed to extend to you an invitation to hold your next meeting at Mobile. The Battle House has offered its assembly room, with a seating capacity of about 800 to 1000. We have other things down there, the oyster business, and a great

many other branches of industry which Dr. Correll can tell you about better than I can.

DR. CORRELL: Mr. President and gentlemen, I assure you I appreciate the great compliment that you have paid me by allowing me to extend an invitation to you, which, however mild it may be, comes from the heart of the entire south. In looking into the faces of this organization, I want to say, not in the way of flattery, but as coming from a man who is old enough to be sincere, that I am surprised that the nation which you so ably represent has not long ago recognized your worth, in the community in which you live and practice. I look upon your organization as of more value to the health of this country than any other organization on the face of the globe; and I do not believe that it will be long until every one of you receives the recognition which you absolutely deserve.

I wish to say a word to you about Mobile. It is a beautiful city, at the jumping off place into the Gulf of Mexico. The finest oysters in the world. The most beautiful women in the world. The most beautiful flowers in the world; the most hospitable people in the world, and a country that needs assistance very much, because it will be very soon the feeding ground in that country for the grazing stock of the country.

In inviting you to Mobile, we can do double duty for you, we can take you to California at the same time, and at the same place. We have everything in Mobile that they have in California. We can take you through orange groves; we can take you through pecan groves. We can take you through the live oak groves. In fact, we can take you through this, the only city on the American continent that has been under five flags, and is today the pride of the entire south, and the only seaport in this great state of Alabama,—and it is dry.

Gentlemen, if you will come with us to Mobile, we will give you a touch of southern hospitality. Our homes and our hearts will be open to you. We will drive you through the most beautiful orange groves in the world, over the most beautiful roads you have ever seen. We will take you in bathing where the water is always 72 degrees, and where it is very salty. We will give you the best fish there is in the world, the best oysters, and best of all, we will give you the right hand of friendship, which I assure you is sincere, and everybody south of Mason & Dixon's line, the railroads and the official organizations, and cities, all join in this invitation to you gentlemen, and your good wives to come to Mobile in 1917. I have a little book up here, not an advertisement, but just a statement of facts about Mobile which I will leave with the president, and if you gentlemen want any, you can help yourselves.

THE PRESIDENT: Any others?

DR. A. T. KINSLEY: Mr. President, and Members of the Association, I come as one of a committee from the next largest veterinary organization in America, to invite you to meet in Kansas City in 1917.

We have not, perhaps, all of the scenery and the oysters to show you, and to treat you to in Kansas City. A great many of you were in Kansas City in 1907. We can show you the advancement of that city in 1917, or ten years' progress. Will you come back in 1917?

We will show you the Missouri River, the muddiest water I believe of any river in the country. We will promise to take care of you properly, house you, and look after your comforts in every way. Will you decide to come to Kansas City in 1917?

The little slips which each of you found on your chairs when you came into the hall this evening will give you an insight of where the meetings have been held the last few years. We call your attention to the fact that you have not been near Kansas City; and we further call your attention to the fact that the veterinary population of that section of the country has not had ample opportunity to attend the meetings of this association in the last ten years.

DR. GLOVER: As another member of the committee from the Missouri Valley Veterinary Medical Association, I wish to sanction and endorse the invitation of Dr. Kinsley in respect to Kansas City. Kansas City is centrally located. We can have the largest and best meeting that we have ever had. Kansas City is wet. If it is in order, and to the end that the executive committee may know the wish of the majority, I am going to move you that it is the sense of this meeting that the next meeting of the American Veterinary Medical Association be held in Kansas City.

(This was seconded by several members.)

DR. HOSKINS: Mr. President, we have journeyed out here to Detroit with the intention of presenting the claims of Philadelphia. We have been persuaded by the men in the Missouri Valley that their claims are paramount to ours for the time being. So, I will not present an invitation from Philadelphia, as we had intended for 1917, but will join with those who will vote for Kansas City, but give notice now that Philadelphia will be in the field for 1918.

DR. R. C. MOORE: Mr. President, I do not live in Kansas City. I live in a neighboring city, and am a resident of the Missouri Valley. As a resident of St. Joseph, Missouri, I wish to also extend to this association a hearty welcome to come to Kansas City, and to assure you that the Missouri Valley will turn out to give you a good time.

THE PRESIDENT: Gentlemen, it has been moved and seconded that it be the sense of this meeting, and that the executive committee be so informed, that we select Kansas City as our meeting place in 1917. Are there any remarks on this motion? Are you ready for the question?

DR. QUITMAN: Couldn't we defer that for the postal card vote, the same as we did before? While I personally have no objection to Kansas City—and the fact of the matter is that at the present time I favor it—it has not been long since a meeting was held in Kansas City. The fact that the Missouri Valley Medical Association holds their meetings there, and that perhaps many members prefer going to strange places, places they have not visited repeatedly, that fact, I say, may keep away as many members as might attend from the Missouri Valley. While I do not believe that a vote taken tonight will be binding, I do not believe it would be good practice. I think the thing should be deferred, and the invitation from the cities carefully weighed by the executive committee as in the past, and a postal card vote taken of the entire mem-

bership of this association, which is not here tonight. I do not believe it would be good practice to take that vote tonight.

THE PRESIDENT: As a matter of fact, and for the benefit of those who are not familiar with our set of by-laws which affect this matter, the vote that you are about to take, whichever way it may go, has no effect upon the selection of the meeting place. That is entirely within the province of the executive committee, and the individual member has nothing to say about it. I am simply allowing this motion to go before you so that we can expedite matters and get on with our business. Are you ready for the question, gentlemen?

DR. BAKER: Before this motion is put, I would like to say a word in favor of Mobile. I think we should meet there, and it would be an act of courtesy to the south, if we accepted their invitation. We accepted an invitation once to meet in New Orleans, the meeting you will remember for 1914. New Orleans was cheated out of the meeting. As a recognition of their invitation and the courtesy which has been extended to us, I do not think it is fair to put the motion that Dr. Glover requested. It is not a fair way to get at it. Suppose you do put the motion. What will be the result? Are we giving Mobile any show?

I move you, sir, as an amendment to Dr. Glover's motion, that a postal card vote be taken the same as we did for San Francisco.

DR. SCHMIDT: I second the amendment.

THE PRESIDENT: An amendment has been offered. I am inclined to think that the chair will rule this entire matter out of order. I think it is the general sentiment here that this procedure is entirely irregular, and I think I am supported in that idea, by the majority of the members here present. I shall declare this entire procedure out of order. I might say that these matters which have been brought to our attention will be referred to the executive committee.

I will call upon the committee on legislation to make a report at this time. Is Dr. Buckingham present?

DR. BUCKINGHAM: Your committee on legislation has the following report: (See Journal, December 1916.)

THE PRESIDENT: Gentlemen, what will be done with this report?

DR. HOSKINS: I move that we accept this report of the committee on legislation, that it be received and referred to the Journal.

(The motion was seconded.)

THE PRESIDENT: All those in favor of the motion will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered. Are the tellers ready to report?

DR. KLEIN: I would like to make a motion Mr. President. The committee on legislation and Dr. Hoskins have rendered invaluable assistance in this work, and I move that they be extended a rising vote of thanks by this association for the services they have rendered.

DR. HUGHES: I second the motion.

THE PRESIDENT: It has been moved and seconded that the committee on legislation and Dr. Hoskins be tendered a standing vote of thanks by this

association for their work along legislative lines. Are you ready for the question? All those in favor of the motion will signify it by rising.

(The assembly rose.)

DR. MARSHALL: If it is in order, I would like to move that Congressman Hay be made an honorary member of this association for the yeoman work that he has rendered to our profession.

DR. QUITMAN: I second the motion.

THE PRESIDENT: It has been moved and seconded that we elect Congressman Hay to honorary membership in this association.

DR. MARSHALL: I think it will be necessary to suspend the rules to have that done. I move that the rules be suspended. That can be done by unanimous consent.

THE PRESIDENT: That we suspend the rules in order to permit this. Are you ready for the question?

DR. MOHLER: I would like to know how many honorary members this convention has elected this year.

THE PRESIDENT: None. All those in favor of the motion will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

Are the tellers who canvassed the vote on vice-presidents ready?

DR. HADLEY: I can report on the election for secretary.

THE PRESIDENT: The tellers who were appointed to canvass the vote on the secretary are now ready to report. I hear no objection to receiving the report at this time, so, Dr. Hadley will you give us the report?

DR. HADLEY: There were cast 253 votes. 141 votes were for Dr. Merillat and 110 for Dr. N. S. Mayo, and 2 for Dr. Haring.

DR. MAYO: I move that the rules be suspended and that Dr. L. A. Merillat be elected as secretary of this association, and the secretary be instructed to cast the ballot.

(The motion was seconded.)

THE PRESIDENT: It has been moved and seconded that we suspend the rules, and the secretary be instructed to cast the ballot of this association for Dr. L. A. Merillat as secretary for the ensuing year.

SECRETARY HARING: It has been cast.

THE PRESIDENT: I am informed by the secretary that this ballot has been cast. Therefore, I declare Dr. L. A. Merillat duly elected as secretary of this organization.

THE PRESIDENT: We will now listen to the report of the committee on resolutions, Dr. Adams. Is Dr. Adams ready to report?

DR. JOHN ADAMS: The committee on resolutions is unable to report tonight for the reason that several very important resolutions were introduced here this evening; resolutions that cannot be temperately considered tonight. Unfortunately, only two members of this committee are present, and it has been necessary for me, in consultation with some of the older and wiser heads, to appoint three members to fill vacancies. That has been done, and we have talked the

matter over, and tomorrow morning we expect to decide upon these resolutions. I move that the report be presented under the head of unfinished business in this room tomorrow morning.

THE PRESIDENT: There is some doubt as to whether we will meet here tomorrow.

DR. ADAMS: There are some of these resolutions that have to be considered very carefully; otherwise, toes are going to be trod upon. We have tried to get a representative, temperate committee, and we do not propose to rush through undigested resolutions before you tonight. They came in so late that they cannot be handled, cannot be considered tonight.

THE PRESIDENT: What is your pleasure, gentlemen?

SECRETARY HARING: We will probably be in session for an hour, or perhaps two or three hours this evening considering the reorganization matters. Could not the committee on resolutions retire to the parlor and get busy and report tonight?

DR. ADAMS: If we have an hour, that will be sufficient.

THE PRESIDENT: The proposition is this, tomorrow we have the clinic; the clinic starts at 9:30. If that is the case, you will not have a corporal's guard here in the morning. It is not for the chair to decide. I would like to hear from the members of the association on that question. I think it would be a very good plan at this time to settle the question of whether we will meet here in the morning, or conclude our labors tonight.

DR. E. L. QUITMAN: I move, if such a motion is in order, that the body sit in session tonight until all business is finished; because, as the chairman has already stated, if a meeting is called in the morning, the chances are that there will be few present. I understand that the local committee has provided a large and interesting clinic that will require the entire day; and if anyone has ever had any experience in getting clinics together, they know it is very disappointing to have to send half of the animals home without having been operated on or viewed by the veterinarians. As an act of courtesy to the local committee on arrangements, and the committee on clinic, we should get down there at the appointed time, and give them our support. At the same time, I want to back up Dr. Haring in the hope that the committee on resolutions will bring in their report tonight. If a motion to that effect is in order, I move that this body stay in session until all business is completed.

SECRETARY HARING: I second the motion.

THE PRESIDENT: It has been moved and seconded that we complete the work of this session this evening. Are there any remarks? Are you ready for the question? All those in favor of the motion will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered. Dr. Adams, will you retire, and try and bring in a report later in the evening?

DR. QUITMAN: Will it be in order for me to read a proposed amendment to the by-laws at this time?

THE PRESIDENT: I see no objection.

DR. QUITMAN: In conformity with our by-laws I wish to read a proposed change. As we all know, it has to be laid over. I file this amendment with

the American Veterinary Medical Association. We herewith present a proposed change in the Constitution and By-laws.

“Resolved, that Section 2 of Article X be amended to read that the yearly dues of the association shall be \$3.00, payable in advance. Should new by-laws be adopted, this proposed change shall apply to the Section and Article in the new by-laws pertaining to dues.”

In support of that, I will say that the committee on finance, of which I had the honor to be chairman, I think is more conversant with the financial condition of the association than members who have not had the opportunity to go into the finances of this association. That committee, without any dissenting voice, is of the firm opinion that \$3.00 a year, with the great membership that we have, is not only ample to support the Journal, to support this organization, but to give us a surplus. It is my observation and experience in other organizations, since we are not a financial institution, if we get too much money on hand, we will be having a surplus with our membership in another year of about \$5000 a year, unless you work hard to find ways and means to spend it. Just as soon as you get too much money, it leads to schemes and dissension. I believe \$3.00 a year is enough.

Furthermore, I believe in quality, but in numbers there is strength. I honestly believe that \$5.00 a year will keep out many a good member from this association—I do not mean the present members—but I think it will prevent new material, and while a dollar or two doesn't look so large to some of us, it may to the younger veterinarians, and \$3.00 a year will not look so large to them. Surely, in numbers there is strength. I think that had a great deal to do with the passage of the Army Bill. I think if our membership had been over 2,000, or nearly 3,000 five or ten years ago, we would have passed the Army Bill, with the efficient help of the committees, of course. I just say that in explanation and in support of this proposed amendment.

THE PRESIDENT: If there is no objection this will take the usual course, and it is so ordered.

DR. QUITMAN: I might say that the resolution is signed by the entire committee on finance.

THE PRESIDENT: The tellers on the vote of vice-president have not returned as yet. If there is no objection, we will take up the report of the committee on reorganization. I will call upon Dr. Cary, the chairman of that committee. Are there any members in the room who desire copies of this report, so they may follow it carefully while the report is presented? Please give Dr. Cary your earnest attention.

DR. CARY: Before reading the report, I wish to make a few remarks about it. This committee had no idea of presenting to you a perfect instrument, or one that would satisfy everybody in this association. The object of the committee was to furnish you an instrument that was workable, and, as we deemed it, an improvement on the old one.

I wish to say that this is not a one-man report. It is not altogether the ideas of the members of the committee, because we have taken the work of other committees as a foundation. It is probable that some of you who will casually look at it will not understand the harmony and completeness of it in the main.

We do not say that there are not possible criticisms, or real criticisms that may occur, or that could not be given to this instrument; as you all know, legislation, or a great deal of legislation for any organization is done largely through committees. This new instrument presents the foundation, at least, of something that is an improvement on the old.

We did not fail to take into consideration the old constitution and by-laws, and take out of that such as we deemed would be valuable in the new. In reading this, I wish to stop occasionally to comment. I hope you will be patient with me, and will not hastily criticise certain parts until you see what the whole contains and means.

I shall read to you Article I and Section 1 of the constitution.

(Dr. Cary read from Article I, down to and including Section 1 of Article III.)

Here is a change that affects the old members; those who have been members 25 years in good standing, and you will notice the change directly.

(Dr. Cary read all of Section 2, Article III.)

Before this, any man who had been a member for 25 years did not pay dues. As each member gets the Journal, there is no reason why one who has been 25 years a member is not better able to pay his dues for the Journal than he was when he first entered the association.

(Dr. Cary read Section 3 of Article III; and Section 1 of Article IV.)

You will notice a wide change; and that was for this reason: simply to give the association without a three-quarters or two-thirds vote to have it any time between those dates. As has occurred in past history, the place of meeting has nearly always been selected by vote of the association. We have made provision, however, that in case this association in session does not select a place, that the executive board can do so.

There is another reason. I want to mention that this association is becoming more and more United States wide, or continental wide. That being the case, while a good many of you think you could not hold it in the south in the summer, you could if we did not have any hotter weather than we have had in the last few days in Detroit—that it would be necessary to give us a wider limit, that the meeting then could be held during the holidays, say in New Orleans or Atlanta or Mobile or any other southern town, without requiring, as we had to do in New York City, a two-thirds or three-quarter vote in order to change this and enable us to go to the south. I hold that this is a good provision on that account. It gives the association the liberty to go anywhere in the United States at almost any season of the year, to suit the climate of that region. This being continental wide, we ought to grant that.

(Reads Section 1 of Article IV from, "not later than the 31st of December of each year, unless otherwise ordered", etc. Reads Section 1 of Article V.)

You will notice there is some change here.

(Reads Section 2 of Article V.)

There is a mistake in the print. You will notice in the print that it is "much". It should be "such".

(Reads Section 3 and first paragraph of Section 4 of Article V.)

(Reading): "He shall receive such salary and allowance as may be

recommended by the executive board and approved by the association." The rest of that paragraph as printed is excluded. Those words were put in there by the printer, but were not intended to be put in, "also help and office expenses". That whole phrase is cut out, so just cut that out in your copy. The report of the committee did not have that, and I possibly failed to cut it out in the manuscript I gave to the printer today.

(Reads the last paragraph of Section 4, Article V, and all of Section 5 of Article V.)

You will notice that here we have made the treasurer report a little differently than in the preceding constitution. In the old constitution, in that all his vouchers must be present at the annual meeting, so that the auditing committee or the finance committee can see every one of those vouchers and check them up. It is not just the account, but the presence of his books and his vouchers, so that you may check him as you could check a bank.

(Reads Section 6, and Section 7 down to and including, "ballots not signed and ballots not returned within sixty days after date of issue, shall not be counted".)

Here is one point about which some have raised a question; it was a question, to some extent, in the committee as to how these ballots should be counted. All of it comes back to one question. Instead of making this the president, secretary and others, in the counting of these you would have to have those two men together, and that would be expensive. It all comes back to the honesty of the man. If you are going to check an honest man, and you don't depend and trust the man you elect, then you ought to have some check on this. For my part, it looks to me that we expect to elect honest men. He must retain those ballots for two years. If he does a lot of crooked work, we certainly can check up on him. He might announce a result, and afterwards we might find it wrong. These things are possible in all elections, and all of it comes back, after all, to the honesty of the man. If we want to trust our man, all right. If we don't, we will have to have some check of that sort.

Dr. Cary read from "Accurate records shall be kept by the secretary", etc., to and including, "— shall never be withheld from publication".)

The records of votes cannot be withheld.

(Reads from "The executive board shall have full discretion to withhold from the Journal in whole or in part"—to and including the last paragraph of Section 8, Article V.)

(Dr. Robert Ellis of New York at this juncture assumed the chair.)

DR. CARY: You will notice that the division is geographical. One thing might be added to explain, that it would be almost impossible to divide this country into geographical boundaries that would give what you would call equal representation by the membership. We therefore, elect one member at large, so as to give the central and most concentrated areas the opportunity of having two, because they will generally be elected, the one member at large will generally be elected by the members in the concentrated areas.

(Reads from and including Section 9 of Article V to and including Section 2 of article II of the by-laws.)

This is the same as we adopted in New York, as I understand it.

(Reads Section 3 of Article II of the by-laws.)

This is practically what was in the old constitution or by-laws.

(Reads Section 4 and first sentence of Section 5 of Article II of the by-laws.)

This is taken directly from the old by-laws.

(Reads the balance of Section 5, Article II, Article III, Article IV and Article V of the by-laws.)

(Reads Articles VI, VII, VIII, IX of the by-laws.)

You will notice that is a distinct change.

(Reads Article X of the by-laws.)

DR. MOHLER: That is only intended for one member? "The members at large shall be elected by ballot at the regular annual meeting." That is only intended for one member.

DR. CARY: Yes, one member at large.

DR. MOHLER: It is plural here.

DR. CARY: That is a mistake and it should be erased. That should be "member" instead of "members". That is a typographical error.

(Dr. Cary read Articles XI, XII of the by-laws down to and including Section 7 of Article XII.)

There were some objections brought out. I want to discuss them with you here so that you will understand it. It is said that some state veterinarians and state men in experimental stations or the B.A.I. men could not give papers if this was enacted. The fact is that this does not prevent any man using the facts that belong to the B.A.I. or the experiment stations, or any one else, but he must put it in a little different dress if he wants to use it in the station, or with the government, but that is work that does not prevent them at all, as we interpret it.

(Dr. Cary read Articles XIII, XIV, XV and XVI.)

I want you to follow Article XVII particularly, as we have made some radical changes in committees.

(Dr. Cary read the first paragraph of Section 1, Article XVII of the by-laws.)

You will notice that we have left out the committee on diseases, for the reason that it has been argued by nearly everybody that the committee on diseases simply gave papers that should come before a section, or before the association. That is what they are as a rule, and they ought to be in the regular program, and not as a committee report. That is why we put it that way.

(Dr. Cary read the balance of Article XVII, Article XVIII, Article XIX and the first two sections of Article XX.)

The next provisions are made largely for the putting of this into operation.

(Dr. Cary read Section 3 of Article XX of the by-laws.)

You will notice that we have not provided for a librarian. The library work is to be taken care of in the new organization by the secretary. We have not provided for a librarian.

(Dr. Cary read the balance of the by-laws.)

As soon as he assumes this duty, if this is adopted, he is to take steps to have the board elected, one for one year, one for two, and so forth in regular order.

I just want to admonish you about one thing. It is the most difficult thing in the world for as large an organization as we have, to get something that will satisfy everybody. I might refer to a thing that occurred in the south not long ago when some fellow down in Thomasville, Georgia, where so many of the northern millionaires go to spend the winter, was criticised rather severely, and he made this remark: "that he never saw an editor who pleased everybody; that his face was not under glass; and he was not standing up." This is a working organic constitution and by-laws for us. There are some errors in it probably, and we must work them out; but you will never get an adoption of one, if you come up here and try to get every little detail corrected at one time, and see-saw backward and forward, over what we might call a mooted point. I do not say this is perfect. The members of the committee who were with me do not claim that, but I believe that we have a better thing than we ever had, and a workable thing, and if there are errors in it, we can work them out, and we have a way to work them out. If we take it up step by step tonight, to adopt it in its entirety, we will get nowhere.

I am not pleading with you to adopt this unless you want to, but I am simply saying this, that this has been gone over by the executive committee, it has been gone over by a great many others on other committees, of course, not exactly as we have had it, but we have tried to cut out all errors as far as possible, and to put in no favors for anybody, and to have an organic working constitution that we can grow with. A constitution is not made in a day, the constitution of any country is a growth, and a growth must occur in an organization like this.

I want to suggest that we adopt this as a whole for the reason that if you start quibbling over this, you know as well as I do where we will land. I therefore, move the adoption of this as read, and leave it with you.

DR. HIGGINS: I second the motion.

THE PRESIDENT: If there is no objection before we entertain that motion, we will have a report from the tellers appointed to canvass the vote on vice-presidents, as they are in the room and ready to report. I think we should hear them before we proceed with this matter.

DR. HIGGINS: Mr. President and gentlemen, a total of 261 votes was cast, and you have elected as first vice-president, Dr. George Dunphy; second vice-president, Dr. Bolser; third vice-president, Dr. Hadwen; fourth vice-president, Dr. Moore; fifth vice-president, Dr. Howard.

THE PRESIDENT: In view of the report of the tellers, I declare Drs. Dunphy, Bolser, Hadwen, Moore and Howard elected vice-presidents of this association for the ensuing year.

It has been regularly moved and seconded that the report of the committee on reorganization be adopted. Are you ready for the question?

DR. QUITMAN: I move an amendment to the report of the reorganization committee.

DR. GRANGE: In regard to this constitution and by-laws which have just been read, if it is adopted as it is now I do not see how Canadian colleges can live up to it; unless some provision is made whereby Canadian colleges can meet conditions acceptable to this association, we shall be in a very awkward position.

Let me explain the situation. In the first place, the examination according to the Bureau of Animal Industry requires that candidates shall pass an examination in United States History. You must be aware that different countries teach the history of their own country, and in the schools of Canada, or in some of them at all events, United States History is not taught. It is hardly fair to ask our applicants to pass an examination on a subject that is not commonly taught in the schools.

The Bureau of Animal Industry requires that the veterinarians shall be so and so. They must be selected from different colleges. We have not the different colleges to select from, and, as a consequence, we are at a very great disadvantage. I, myself, selected a gentleman who is regarded in his line as one of the most prominent men, not only in America, but in the world, a physiologist who was in Michael Foster's class, a most distinguished man; a man who had been for nine years lecturer on physiology in the Royal College of Veterinary Surgeons, who is a Fellow of the Royal College, who was an examiner for the Royal College of Physicians & Surgeons in Great Britain, and I am told that is the highest honor that a physiologist can get in that country. That man was selected by the Ontario Veterinary College, in partnership I think I may say, with the University of Toronto. According to the terms of the Bureau of Animal Industry, we could not get any credit for employing that man. He was employed by the college before I knew that there were any of these regulations to be acted upon. I do not think it is fair to expect us to live up to all of these regulations which are put forth by the Bureau of Animal Industry, simply because we are in another country.

These recommendations are splendid for the United States, splendid; but they do not suit us in all particulars. The particulars are not very difficult to overcome, at least, in my opinion, if we have an opportunity to present the case in a better way. I am a little tired, and I would like a little time to consider and present them in another way. I would like some chance to be able to live up to the wishes of this association.

DR. HIGGINS: I think this whole matter can be very easily settled and without much or any change; if the word "equivalent" is placed in the right position, when the whole report is printed, and, as I understand, the requirements of the Bureau are printed. I admit that Dr. Grange's contention is correct, that it would be unwise to ask any man going through a Canadian school to pass an examination upon United States History, although I may venture to say, and without contradiction, that any Canadian who goes to our schools and has the requirements which he should have to go through the veterinary schools in Canada, is better versed in United States History than the average man in the United States is versed in Canadian History. I think that is borne out by the teaching of history, or the difference in teaching history in Canada and in the United States.

I would, therefore, suggest that this change be made to conform to the defect which Dr. Grange has pointed out, and I believe that can be safely left in the hands of the committee. It is one of those small oversights that appears now and again in the redrafting of by-laws and constitutions, and is really a minor detail, although in Dr. Grange's eyes, and in my eyes as well, it is a defect that must be provided for.

THE PRESIDENT: Is there any further discussion?

DR. CAMPBELL: I realize that there are shortcomings, of the nature mentioned, in Dr. Cary's plan. I think I also see some others, of perhaps a different class, which are not mentioned. To my mind, the plan shows evidence of haste in preparation. I notice that a number of important recommendations contained in the President's annual address, and in the Secretary's annual report, and in the annual report of the finance committee, are not embodied and are not taken care of in this plan. For instance, there is no provision for associate members, a thing most strongly urged in the President's annual address. There is no provision for giving a man assuming the duties and the responsibilities of the position of president, some time in which to familiarize himself with just what he wants to do. The President, in his annual address, after an experience of a year in that position, says that he realizes fully that a president should be elected a year in advance, that he may look over his work and get to it better. The secretary advises us that there should be a permanent headquarters established for the association, a permanent office kept open during business hours. The chairman of the finance committee tells us that we have \$15,316.61 of assets now, and he surmises that that amount will be increased at least \$5000 a year. That will make over \$20,000 next year, because we cannot change these dues right away. It seems to me that with that amount of funds, it would surely be wise for this association to be incorporated, to put things in a business way, and to accomplish some real things that can only be accomplished by a business organization. A corporation cannot be carried out except by having a permanent headquarters and a permanent office, etc.

These are just oversights, I am sure, due to haste. I wish to present to the association an amendment. I wish to amend the motion of Dr. Cary that this constitution be adopted; I wish that the following be adopted in its stead, and I propose here to read a plan for reorganization that has been presented, in its essentials, to the executive committee of this association by two committees on reorganization, though it never got past it. Some of those members served three years on that committee, and I am certain that it represents the ideas and discussions of at least fifty or more members of the association. This is printed and available, and if you will have it distributed to all the members present, I will speak five minutes on the subject.

THE PRESIDENT: A motion to adopt is before the house. You have a right to amend it.

DR. CAMPBELL: I say that it is printed and available, and if you care to distribute it among the members, I will speak for five minutes to that subject.

THE PRESIDENT: I think that would be very much better; it will save a lot of time. If there is no objection, Dr. Campbell can submit his proposed amendment in the form of this printed booklet. If there is any objection to that, we can have him read it.

DR. HIGGINS: Has the committee had that plan of reorganization in mind?

DR. CARY: Yes sir.

DR. MAYO: Is there a motion before the house?

THE PRESIDENT: There is a motion before the house. The motion is to adopt the draft as read by Dr. Cary.

DR. QUITMAN: If this is adopted as it is here, it becomes the——

THE PRESIDENT: It becomes the constitution and by-laws of this association, as I understand it.

DR. QUITMAN: I have an amendment——

THE PRESIDENT: Dr. Campbell has the floor. Is there any objection to Dr. Campbell proceeding in the manner he suggested, that he distribute these printed pamphlets, and have the privilege of the floor for five minutes to explain what his amendment constitutes? If there is no objection, Dr. Campbell will proceed with that amendment.

(The booklets were distributed.)

THE PRESIDENT: It has been suggested that the association read this, and then we can proceed with it and save time. Dr. Campbell's amendment is that the printed matter which he has placed in your hands be offered as an amendment to the proposed constitution and by-laws as offered by the committee on reorganization.

DR. CARY: I call for a point of order. This could not be an amendment to what we have; it has to be offered as a substitution.

THE PRESIDENT: What is that?

DR. CARY: I arise to a point of order in the fact that this could not be an amendment to what we have, because it is simply a substitution.

THE PRESIDENT: I think Dr. Cary's point of order is well taken.

DR. CAMPBELL: May I say a word on that; may I state my views?

THE PRESIDENT: Yes, I think it is proper that you should.

DR. CAMPBELL: I think he misunderstands it.

THE PRESIDENT: If you offer that as a substitute, I will recognize you.

DR. CAMPBELL: That is right. I will offer that as a substitute, if that makes any difference.

THE PRESIDENT: Dr. Campbell then offers this draft as a substitute for the one offered by the committee on reorganization.

DR. KLEIN: I rise to a point of order. I doubt very much if it is according to parliamentary rules for a new set, or a proposed set of constitution and by-laws to be offered as a substitute for a committee's report. We have before us the consideration of the report of this committee. I think that we are required to consider the report of that committee and dispose of it.

THE PRESIDENT: I will have to rule on that point of order. I will say, gentlemen, that I hope you will assist me in this matter. I may have to call upon you gentlemen from time to time to instruct me as to what I should do. I am inclined to think that Dr. Klein's point of order is well taken. I think that, if there are any objections, any specific objections to the draft of the proposed constitution and by-laws that is offered by the reorganization committee, they should be offered in the form of amendments. I question very much whether it is proper that we should take up the matter embodied in this printed

pamphlet which Dr. Campbell has distributed, that that is a proper way of getting at the thing. I will rule that Dr. Klein's point of order is well taken.

DR. CAMPBELL: May I make a statement on that?

THE PRESIDENT: Certainly.

DR. CAMPBELL: I understand Dr. Klein's point, of course. I looked the matter up before undertaking this, and I was merely doing this to save time. If the association prefers it, I can offer these as forty or fifty amendments to specific things in the other as they come up, but look at the time it will take. It will not give the association the opportunity of grasping it as a whole. What is the object before it tonight? Does someone fear that this is totally bad, after having been gone over for three years by fifty men, that there may not be one little germ or something good in there? If there is some good in there, don't you want to get it in? Do you want to do the best you can, or do you want to do something else tonight? That is the question. I will offer the fifty or more amendments, if that is what you want.

DR. CARY: We asked for suggestions in the Journal from all the members, and I think that gentleman could have come before the committee and presented these or any other statements that he wanted to make. I think that would have been the proper place. I am not criticising him for wanting to get his ideas in here, but I think this is the wrong time to put in this as a substitute. I do not wish to criticise at all, but I think that we are considering the report that is before us.

DR. CAMPBELL: As a personal request, I would like to reply to that statement.

THE PRESIDENT: Dr. Campbell.

DR. KLEIN: I would like to offer an amendment to Dr. Cary's motion.

THE PRESIDENT: Dr. Campbell has the floor.

DR. CAMPBELL: The statement that Dr. Cary makes is true, that I or others should have taken this before him—if we had wanted it buried. This report, in substance, representing a great deal of work by some five or eight members of this association, and consultation work of fifty others, has been buried twice in the executive committee. This report of his had to go to the executive committee. I am not here to explain why the executive committee would not permit the association to pass on this. I will only say that the association instructed once that this be published in pamphlet form and sent to the members. I will only say that that was published and furnished to the secretary, but too late to get to all of the members. There was an opportunity, however, for it to be brought before all members at the meeting several days before it was presented. It was not done. I will say that at the time that the motion was made to recommit this, and the reason that I believe, that that motion carried at San Francisco, was because the secretary of the association, in making the report, stated that we were getting an official Journal now, and we would have an opportunity, and, as we understood him, we would publish this and other plans in the Journal from month to month and get a discussion on them. I will say further, that I wrote to the editor of the Journal and the present secretary of the association offering to discuss this matter in the

Journal, but I got no invitation to come ahead with my discussion*. After an experience of that kind, I think you will not censure me for not going to the committee in session here.

DR. HOSKINS: I simply wish to ask for a question of information; I wish to ask Dr. Cary, as chairman, whether this proposed change, this plan which was offered in California, was considered by the committee in drafting the proposed present changes or the revision of the constitution and by-laws?

DR. CARY: It was.

DR. KLEIN: I would like to offer an amendment to Dr. Cary's motion to this effect; that Article II, Section 4, the fifth line of the by-laws, that the phrase, "beginning with the session of 1917-1918", be changed to read, "beginning with the session 1916-1917."

DR. CARY: Is that in the by-laws or the constitution?

DR. KLEIN: The by-laws, Article II, Section 4 of the by-laws, the fifth line of that section.

DR. QUITMAN: There is no second to that amendment.

(This was seconded.)

THE PRESIDENT: The amendment has been moved and seconded. I would like to have the doctor repeat what the amendment is as I do not think we have all heard it.

DR. QUITMAN: I move an amendment to the amendment. I wish to move that all these proposed by-laws and constitution be taken up and considered and voted upon *ad seriatim*, that is, section by section, and article by article.

DR. CAMPBELL: I second that motion.

THE PRESIDENT: Gentlemen, you have heard the amendment to the amendment stated by Dr. Quitman. Is there any discussion?

DR. STEWART: That seems like a very long, tedious proposition. However, there is a very considerable at stake. There are a number of sections that are so defective. I am sure that if a lawyer would interpret it, we would get quite an adverse opinion, as some important business lines are slighted. It would take considerable time to look over it. I do not believe we ought to adopt it at all except in that manner. For that reason it seems to me that this motion, the whole motion, should not prevail, or that we should put it over until we have a chance to study it. I have not undertaken to canvass it carefully, as it has been read, but I have found a number of places it seems to me that ought to be modified materially. To do that will take some careful consideration. A lot of propositions now appearing, if adopted, you will want to change afterwards; but you cannot make a change for two years. That is a long time to wait, if you are going to give a trial to a proposition of this kind; let's make it so that we can either change it very much sooner, or else take the time and get in all our objections as we go along.

DR. KLEIN: There is nothing to prevent, at least I do not think there is,

*The editor is unable to find such a request in his files.

an amendment being offered to these by-laws after they are adopted, and that amendment being offered in writing and read here tonight can be taken up at the next annual meeting.

THE PRESIDENT: The question is on the amendment to the amendment, that is, that we take up this instrument, take all the various sections *ad seriatim*. Are you ready to vote on the amendment? All those in favor of the amendment to the amendment will signify by saying "Aye". (Many vote "Aye"). Those contrary minded, "No". (Many vote "No"). The amendment is lost.

DR. QUITMAN: Poll the vote, Mr. President.

THE PRESIDENT: The amendment is lost.

DR. CARY: May I say a word on the amendment as it now stands?

THE PRESIDENT: Yes.

DR. CARY: I do not wish to project myself unduly before the association, but I think that Dr. Klein's amendment could be left out very well, not because I object to it in any way, but for the reason that we did not aim in this constitution and by-laws to interfere with any of the catalogs of the colleges that were gotten out for this succeeding year. There isn't anything, so far as I can interpret it that interferes, that the old constitution did not interfere with before. That is the reason we passed that with the years as we have suggested. I therefore, suggest to Dr. Klein that he withdraw the amendment for that reason; that these colleges have already gotten out their catalogs, and that was considered by the committee. We do not, therefore, wish to make any changes beginning in 1916-1917, on that account.

DR. KLEIN: I would like to explain to the association that I have offered this amendment because I am informed that the only college which would be affected by this amendment of mine has not as yet sent out its catalog. It is waiting for the action of this association; and if my amendment is adopted, they have a four year course already drawn up, and they will put out a catalog describing the four year course. If this amendment is not adopted, they will retain the three year course.

THE PRESIDENT: Is there any further discussion on Dr. Klein's motion? Are you ready to vote? You all understand Dr. Klein's amendment? All in favor of the amendment will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered. The question is on the original motion as amended. Are you ready for the question?

DR. S. STEWART: There are several things that I think should be altered. I will call attention first, to Article III in which it describes the membership, two kinds, active and honorary. In relation to that, a provision under the by-laws which relates to sections, Article XII, Section A, B and C., Section C of which provides for veterinary colleges and examining boards. According to this, I do not understand that any man who is not a member would be likely to ever attend any of these meetings of examining boards. It has been my understanding that it was the purpose of the reorganization for the last four or five years to make provision for the associate membership of men who were members of examining boards, but not of this association, so that they would

really come in and take an active part in carrying out the purposes and the work of such committees. It would seem that no such provision is made for any such associate membership. It appears to me to be a very wise provision to make. I would suggest that there be associate members added to this first list, and that the associate members should be composed of members of examining boards, of college faculties, ex-officio; if they are members of the faculty boards, they are ex-officio members of the associate membership, and they can come in then and work to accomplish the purposes of a section of the association, the association of faculties and examining boards.

THE PRESIDENT: Is there any further discussion?

DR. HOSKINS: As I understand it now, in reply to Dr. Stewart, the association of faculties and examining boards now practically becomes a section of this organization. We have never denied the discussion of matters on the floor to any one interested in our work. We have not allowed them to vote, of course, but it seems to me that the association making it now a section, that it covers all that is absolutely essential for the work of the association of faculties and examining boards.

DR. COTTON: I heartily agree with Dr. Hoskins. I think the members of the examining boards, if they want to become members, should prepare themselves to become active members, not associate members.

DR. STEWART: May I speak again on that same question? I have given my time for the last six or seven years, or a considerable part of it, trying to interest state examining boards with the work that this association hopes to carry out by just such a section. There are state examining members in our association, quite a number of them, who are not members of this association. Because of certain things they did not want to become members of this association, but they would take an active part, if they could be associate members while they are members of boards, and we could get their co-operation under such circumstances, but we cannot now expect that. In the state of Texts, they have seven members on their board; and there is possibly one man who is ineligible to membership; he cannot become a member, has not practiced five years, and we lay down the rules of obstruction against his coming in, and say, "Come in, I think you are a good fellow". But he can't be a member, he is a member of the board. There are many of those men, and I feel we are wrong if we do not make some provision for getting their co-operation to the end of doing the work that the state examining boards can best do when they understand our purposes.

THE PRESIDENT: Is there any further discussion?

DR. R. C. MOORE: I think I noticed another serious defect in this proposed change. I notice that there are five members who constitute the executive board. It provides that four of these constitute a quorum. No business can be transacted unless four of the five are present. They have charge practically, of all the business of the association. Suppose two of those members absent themselves from our meeting. How are we going to transact business? There is no provision for the president filling temporary vacancies. There is for permanent vacancy, but no provision for a temporary one.

DR. BUTLER: Dr. Moore is in error in stating that the membership is five. It is six. He is right in stating that the quorum is four. But he also overlooked the fact that the president is given the right to appoint and to fill vacancies on the committee, on the board.

DR. R. C. MOORE: Temporary vacancies? He is to fill permanent vacancies, but is he really authorized to do that where there is a temporary vacancy?

DR. BUTLER: As it is stated here, it says, "Vacancies". It does not say "Permanent vacancies".

DR. MOORE: Would there be a vacancy on the board, Dr. Butler, if a man was still a member and had not left the state, or anything of that kind?

DR. BUTLER: I think there is some question about that. Your ground may be correct, but I maintain that when a board having power is made up of six members, that four should be required to be present before they be allowed to transact any business. I do not believe that a board of six members having the power of this board should be permitted to transact business unless they did have all four members present, because if we allow three of them to proceed, that is only half of them. This is the smallest number, four, which can be made, and still have a majority of that committee of six.

THE PRESIDENT: Is there any further discussion?

DR. MOORE: It seems to me that that would still leave the question open, as to whether the president would have a right to fill this vacancy, and if he has not, then we would still be left in the same dilemma, provided two or more than two of those members were not present. I think most of you agree with me that there are times when there are more than that absent from our executive boards, and the president has had to fill those vacancies. Would it not be wise to allow the president or the association in session to temporarily fill that vacancy so that business could be transacted?

DR. REYNOLDS: I think it is clearly the spirit of Section 9, that the president should have power to fill such vacancies, but I can see that it is not very clearly worded to that effect. "The president shall fill any vacancies in the executive board from the district in which such vacancy occurs, and said appointee shall hold office until a special election for that district may be held." The application or inference there, would point towards a permanent vacancy, but it is clearly the spirit of that, that it is to fill any vacancy, and by just a little change in the wording, that point can be very easily corrected, as it should be, temporary or permanent; the insertion of one or two words will do that easily. Dr. Cary is chairman of that committee, and has permission to do that, and will take care of it, I am sure.

THE PRESIDENT: Is there any further discussion of the question before the meeting?

DR. S. STEWART: I would like to comment on this one point, and then get back to the other. There is a provision for six members of this board of trustees, and they are to elect a chairman. What are you going to do if there is a tie?

DR. CARY: There could not be any tie. How could there be a tie?

DR. STEWART: They elect their chairman. Three for, and three against, and there is a tie. That is a small matter, as far as I am concerned.

This matter of the state boards is a very large one. We had in the delegation here in session nearly twenty state boards represented. The boards which we most needed to get in touch with were not here. We ought to have them in this association, and have their good influence spread over their territory, or we will come far short of our obligation if we do not make provision, when we can so easily. I believe we should authorize a modification of this, to an honorary member, or an associate member, and provide a section which shall describe the privileges of that associate member, that he shall be an associate member by virtue of being a member of a board, but not with power to vote, but to have an active part in that section, and then we will get his influence.

DR. HIGGINS: As far as this particular objection is concerned about veterinary colleges and examining boards, I agree with Dr. Cotton that we want all these men as members if they are eligible, and that provision is now made, with any section; and that provision has been carried out in the past few years; in any section, a man is permitted to take the floor, if he is not a member of the association. There is no doubt but that we could go along and continue to pick holes in what has been prepared. This has been prepared with a great deal of care, and a great deal of thought by a number of men. It seems to me that it is our duty at the present time to accept this, and if we find by tomorrow morning anything is wrong, that can be overcome by giving notice, or motion, handing it in, and it will be voted on next year, really before this becomes effective, as far as it affects any particular individuals, either in the association or out.

DR. R. C. MOORE: I do not believe that Dr. Higgins' argument is very good on that point. A majority vote now will adopt this constitution and by-laws. A year from now it will take a two-thirds or three-quarters vote to change the by-laws and constitution.

DR. HIGGINS: I think that is a very wise precaution.

THE PRESIDENT: As I understand it, Dr. Moore, it takes a two-thirds vote of the members present to adopt this instrument.

DR. REYNOLDS: I have to hurry away to a train, but I have heard a great deal, and I would like to say for Dr. Campbell, I think there is not a single proposition, not a sentence in that little pamphlet which he has just distributed here which was not before the committee, and carefully considered.

THE PRESIDENT: Is there any further discussion?

DR. GRANGE: I would like to ask when this constitution goes into effect? If it take immediate effect, it puts me in a very awkward position, because I had my calendar or catalogue issued, and we are still a three year college this year. I had no idea that this requirement of a four year course would go into effect or be required this year. I was informed yesterday —

DR. CARY: This does not apply until it is adopted next year.

THE PRESIDENT: That does not affect you, doctor.

DR. CARY: Until next year.

DR. BUTLER: I just want to say to Dr. Grange that that is provided for in this original motion, it would not become effective, but as I understand Dr. Klein's motion, he is affected. We have passed an amendment to this which will interfere with your catalogue that has already been issued. But, the report of the committee took care of that, recognizing that that situation already existed.

DR. GRANGE: Well, what is the condition now?

DR. BUTLER: It does interfere with your catalogue already published, because the association amended the report here in Dr. Klein's motion.

DR. GRANGE: Isn't there some way of getting out of that difficulty? I move a reconsideration of Dr. Klein's motion, or vote, on this 1916-1917 matter.

DR. QUITMAN: I will second that.

THE PRESIDENT: It has been moved and seconded that we reconsider the action whereby the amendment offered by Dr. Klein was passed. Are you ready for the question?

DR. KLEIN: I hope this motion will not prevail, because as I stated when I offered my amendment, every veterinary college in the United States but one has increased its course to four years, and the other one is waiting the action of this association..

DR. MAYO: Are you correct in that statement?

DR. KLEIN: Absolutely correct.

DR. MAYO: I think that I can name three that have not gone to a four year course.

DR. MOHLER: I think Dr. Klein is mistaken in saying that there is only one in this country. There are three of them. All the rest have signified their intention of going into the four year course.

DR. KLEIN: Are those three in this association?

DR. MOHLER: Yes.

DR. KLEIN: I am corrected to this extent that there is one college which has been giving a three year course and which has not yet announced the four year course, and that college is awaiting the action of this association. If we approve the four year course beginning in 1916, they will go under a four year course. If we do not, this college will retain a three year course. I did not know that there were two other colleges in this country on the approved list of this association that had not gone to the four year course, because I was informed that all colleges but this one, informed by a man connected with this college, that all colleges but his had gone to the four year course.

THE PRESIDENT: Is there any further discussion on this?

DR. FISH: The committee, I know, wanted to be as fair as possible toward the colleges, and they considered very carefully the points involved in regard to this matter. It does seem to me that it would work a hardship in the case of Dr. Grange, where the announcement has already been made, and where it is too late now to make any provision. In order that justice should be done, I should be in favor of the reconsideration of that motion, and having it, as it read originally, take effect in 1917-1918.

THE PRESIDENT: Anything further?

DR. MAYO: At the New York meeting, this association adopted a regulation requiring students to be graduates of four year courses, that is, for admission to this association beginning with the year 1916-1917. I thought it was a sort of a compromise then, and the colleges with three exceptions in the United States have gone to the four year course, and it seems an injustice to those institutions who have come up and met the requirements of this association as to the requirements for membership, to put this off another year, on account of three. It is a mistake. I fully concur with Dr. Klein's stand in this matter.

THE PRESIDENT: The question is upon the motion to reconsider. Are you ready for the question? All those in favor of the motion will signify it by saying "Aye". Contrary minded, "No". The "Noes" appear to have it; the "Noes" have it, and it is so ordered.

DR. STEWART: I wish to talk to the original motion again. In the by-laws, Article II, Section 5, I find a condition there which is going to lead us into considerable trouble, I believe; going to involve quite a considerable number of schools. That section, if amended by striking out the words "Studies taken in other preparatory schools",—two places in that section, and substitute the words "Education in previous schools, accepted". I make the suggestion of the proposition—I think I had better read it all. This is Section 5:

"The matriculation requirements of an approved veterinary college, beginning with the collegiate year 1914-1915"—that is going back two years—"shall be one year of high school work or equivalent studies taken in other preparatory schools".

That is not the way the old one read. It read, if I remember right, "Or equivalent training". Now —

DR. QUITMAN: It read, "Or its equivalent", Dr. Stewart.

DR. STEWART: The question of what shall be considered as one year of high school work is a very indefinite thing in our section of the country. Many a fellow does high school work that he does not get any credit for. This does not say anything about credit. It is indefinite. I propose that we substitute the word "Education" for the words "Studies taken in other preparatory schools", to pave the way for an agreement, or to pave the way to support this proposition.

DR. MAYO: I hope that this motion will not prevail. As a member of your committee, we visited the colleges this last year, and have looked over the questions that have been put in as a substitute, as an equivalent. It is appalling. I think this ought to read that they should have the equivalent of the amount of high school for two years—or for one year of high school, or four units. We must put something in there to do away with the equivalent, or they will put in blacksmithing or carpentry, or almost anything. There is where the difference of opinion comes, as to what is an equivalent. You must have some sort of a standard, even if it is an arbitrary standard.

I hope this change will not be made. I think it will be a setback, and I think in this day and age where we have schools everywhere, that an individual ought to have one year's high school, or four units.

DR. STEWART: In our state, hundreds of high schools teach blacksmithing, teach carpentry and a number of other vocations, and give students units on that sort of teaching in the high schools. They do in our schools in Kansas City. Furthermore, in Oakland last year, this association adopted a proposition, accepting the Bureau standard for admission, which advanced the old standard from the second grade to the first grade civil service examination. I have read the report over and over again, and they still make that interpretation, though there are others who think they did differently. I have submitted this question of a first grade civil service examination to several people, and they give me the opinion that it is more than the equivalent of one year of high school, or four units. If the civil service first grade examination is not an equivalent, we still have at our disposal another means. This association may appoint a committee to provide a set of questions which this association will consider equal to four high school units; and the man who has not been to a high school, but has advanced his education in other ways, has a chance for admission into a college; not confining it to a high school preparation, because high schools are high schools. If you will go into a study of what is going on in the educational world of this country, you will find that educators are complaining seriously of the work being done in high schools, and that they are not the equivalent one of the other by a long way. Some of them represent little or nothing, and some of them represent a very considerable training. There is not anything standard or definite under the unit system. That is not alone true of the academic high schools. If you will go into the further fields, you will find that the presidents of colleges are complaining seriously, because a degree from one college does not represent the same as a degree from another college.

I do not believe that we shall do wisely to exclude a man from entering a veterinary college who has an education equal to that of one year in high school, if there is any way of demonstrating it. It should be up to this association to make a provision for that fellow, not to keep him out because he is not a graduate from a high school. The language of this section says, "One year's high school work." You could not have had one year's high school work and not get at least one credit. I think that is very weak, and I think that that substitution should be made, and give the other fellow a show.

DR. HOSKINS: May I ask Dr. Stewart, when it goes on to say, "or equivalent studies taken in other preparatory schools", doesn't that cover it very thoroughly?

DR. STEWART: No sir.

DR. HOSKINS: I think so.

DR. KLEIN: I believe there is some justice in Dr. Stewart's presentation. If this clause, or this section is adopted as it stands, it may not be possible in all cases for a college to give entrance examinations, because it reads that the student must have "one year of high school work, or equivalent studies taken in other preparatory schools." Under certain conditions a student, or a candidate for admission must have an opportunity to take the entrance examinations; but in nearly all colleges and universities where entrance examinations are given, they are given only on condition that the candidate for exam-

ination will present a certificate from a tutor that he has prepared himself for the subjects on which he is going to take the examination. I will say to Dr. Stewart, that if he will add that clause to his amendment, that I think will put the matter in very good form. I do not think that any young man should be permitted to come in and take entrance examinations; he should be required to present evidence that he has prepared for those examinations.

THE PRESIDENT: Is there anything further gentlemen. The hour is getting late.

DR. MAYO: I do not want to be misunderstood in this matter. The point I wish to make is to avoid such wide interpretations of "equivalents". In the committee report which I had the honor of presenting, we recommended that this association provide a set of questions that should be satisfactory to the association, and which I believe will meet many of Dr. Stewart's objections in this matter. Just as soon as you put in an equivalent, unless it is carried out by this association, it leaves the individual who holds that examination to say what the equivalent is; and in some cases their judgment on that point is exceedingly weak, in my opinion.

DR. MURPHEY: I want to offer a comment or two on some of the statements that have been made. One of them is in regard to the objection to the clause providing for the association section of faculty and examining boards. I want to explain the difference between the psychology of one man and the majority of the vote of that association which was taken to ask for membership in this association. One man who opposed it, who had the psychology in himself against it, maintained that for several years the idea was to have associate membership, and not membership. There is a difference between the wishes of the members as expressed by vote in asking to become members of this association some three years ago, and the opinion that one man has of what they did. The objections that Dr. Stewart raises, were raised before, but in spite of that, the association of faculties and examining boards asked for membership without any qualification, and the minutes do not show that it was so presented to the A.V.M.A. when it came on the floor.

The term "high school" has been used a number of times very indefinitely. High schools are graded, first, second, third and fourth grades, and if a man says "high school", he ought to say whether he has taken the first, second, third or fourth grade. Of course, it is certain that certain high schools can be criticised; so can any school be criticised. The difference between the carpentry that is done in high schools, and that which is done outside, and the blacksmithing that is done in high schools and that outside is this, the fundamental, psychological principle is that the student is being taught principles and not the art. I think it is the principle that ought to be counted, so that the point that Dr. Klein raises that it must be definite means something. The veterinary student is going to do mental work, and he ought to have some mental training before. You men know something about horses, and horses on the track. You do not think that you are going to put a horse on the track to enter the race unless he has had some preparation, putting him into a condition to run, so that he will have the wind. That is the principle that applies to education just as well. Instead of fooling around with equivalents, let us make some progress.

DR. QUITMAN: A point of information. I would like to ask some member of this committee on revision or Dr. Mayo to make this point clear to me. It says, "Shall be one year of high school work, or equivalent studies taken in other preparatory schools." Suppose you have a student come to a school, have him prove that he attended one year in high school work, and suppose that he fails in his year's work, either in a minor percentage, or in every study. It does not say anything about his having to have a certificate for that year's work, or having to show that he graduated from the year's work, the first year's work, and being entitled to take up the second year's work. I may be dense on that point. It may be by one year's work that he has really graduated from the first year to the second year, but it doesn't say so. You should make this point perfectly plain. I would like to know just what construction you are going to put on that.

DR. CARY: There isn't any doubt about what a high school year means to a high school man. We did not put that very definite, because we wanted to leave some liberal construction, on account of the fact that if we put in there four high school units, which constitute a year, some one would say that we wanted to be too exact. It seems to me this is liberal enough. A year means four high school units. There isn't any question about that among high school men at all. If you want to put the high school units in there, we can substitute that. It was my idea that we would be a little more liberal with you. It looks to me as if this is liberal enough.

THE PRESIDENT: Is there anything further?

DR. CAMPBELL: It seems to me that it is advisable to be very definite in that matter. As stated, that may be a little too inflexible, and it might also be as Dr. Cary suggested what it was. I amend that to read, "Four high school units or an equivalent education, as outlined by the committee on intelligence and education, and approved by the association." It seems to me it would be going a little too far to put the outline in the constitution, and do it right here; but for the committee on education, let them outline just exactly what this equivalent and these four units are, and present that to the association.

DR. HIGGINS: It would seem to me that the more the attempt is made to make any alteration in this constitution and these by-laws, the worse off we get, and I think that will be the case on every objection that is brought up. We cannot here in a meeting properly consider any particular change in any part of this revised constitution and by-laws unless we will take the time to determine what that change means to some other portion. We have not considered it as a whole.

As far as this particular question of units is concerned, although I have not said anything on it before, a high school in the States and a high school in Canada are two different things. What we call a high school in Canada is altogether different from what you call a high school here. I overlooked that fact, because you have the word in there "Equivalent". If we are going to say that one year's high school work means that a man goes in the front door, stays there a year and goes out the back door without passing any examinations, I do not think we need to look at that man. If any school has men of

that character at the present time, they are not men we want to recognize. I believe, as Dr. Cary does, that any man who has done any teaching knows what one year's high school work means. I think we are just wasting time in trying to pick flaws in small matters. It seems to me that one year's high school work, as I understand it here in the United States, is little enough to ask of any man going into a professional course. Is there at the present time any other profession called a learned profession that has requirements lower than this, and it is highly questionable if we permit this last amendment to go, whether we can call ourselves learned in that particular term. Therefore, Mr. President, I call for the question.

THE PRESIDENT: The question is called for. The question is on the adoption of the revised constitution and by-laws as amended by Dr. Klein's amendment. All those in favor of adopting the constitution and by-laws as amended will signify it by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered.

DR. CAMPBELL: I wish to offer here a plan of reorganization and revision as an amendment to and revision of the constitution which has just been adopted, to be considered at our next meeting.

THE PRESIDENT: It will take the usual course.

THE SECRETARY: This plan that was offered is the printed constitution and by-laws which have been distributed. I trust it will be permissible to read it by title rather than to read the whole document.

THE PRESIDENT: If there is no objection, such will be the order. Is Dr. Adams ready to report?

DR. CRAIG: There is a gentleman to whom the association, I think, owes a vote of thanks. A man who has always stood for the profession both as individuals and as a body; a man to whom you can always go and always get consideration; a man who was very helpful in the passage of the bill, and that man is Senator Taggart. I would propose the name of Senator Taggart as an honorary member, but I do not believe in that. I think it is due Senator Taggart that this association tender him a vote of thanks. I make a motion to that effect.

DR. BUCKINGHAM: I second the motion.

DR. HOSKINS: I would like to second that motion most heartily. No man I know of who worked in the interest of the passage of the Act creating a veterinary corps in the army, gave more helpful service than Senator Taggart of Indiana.

THE PRESIDENT: It has been moved and seconded that the association tender a vote of thanks to Senator Taggart for his interest in our legislative cause. All those in favor of the motion will signify the same by saying "Aye". Contrary minded, "No". The "Ayes" have it, and it is so ordered. Dr. Adams, are you ready to report?

DR. ADAMS: The resolution committee has the following report: (See Journal, November 1916.)

(Each resolution was voted upon and passed, as read.)

The following discussion was offered in connection with the resolution on county agents:

DR. MOHLER: Before the question is put on this motion, Mr. President, I would like to say a few words in explanation, with the view of showing that the Department of Agriculture has already arranged to adopt the suggestions contained in the resolution. There has been considerable difficulty in outlining the proper and legitimate field of the county agent. Unquestionably the county agent in certain states has done a great deal more than he should in treating diseases of live stock and more than was ever intended by any legislation or by the Department of Agriculture. It has been only recently that the States Relations Service of the Department and the Bureau of Animal Industry have gotten together on common ground for the purpose of outlining the limitations of the county agent along this line. Heretofore, the work of this official has been a question of evolution. He has performed his duties as an individual and has not been limited by any definite regulations or restrictions. Only a few weeks ago this subject was taken up and adjusted promisingly by the States Relations Service and the Bureau of Animal Industry so that at the present time there is an agreement or memorandum of understanding signed by the head officials of these two bureaus as well as by the Secretary of Agriculture by which county agents in the future will be prevented from doing certain work that they have done in the past,—work in tuberculin and mallein testing and other activities which the Government calls regulatory, but which is really veterinary police work. This is not advocated by the Department and it is not the desire of the Department to have county agents perform this character of work, except where they have been authorized to do so by the State regulatory authorities. If the State Veterinarian wishes this work done in this manner, then there is a clause in the memorandum of understanding, which will permit of such action. So it seems to me that this question is now very largely in the hands of the State Veterinarians or live stock sanitary boards. I know in one state that certain county agents have done tuberculin testing where the State Veterinarian has specific regulations controlling this matter and he does not wish to delegate his authority to county agents. I know that in another state the State Veterinarian wishes the county agents to perform the serum simultaneous vaccination for hog cholera. Under the latter condition, of course, the Department will not interfere. But the agreements which I speak of specifically states that in hog cholera work the Department of Agriculture, the States Relations Service and the Bureau of Animal Industry do not wish county agents to demonstrate anything but the serum treatment on account of the danger involved through the promiscuous use of the virus and in no case is the serum-virus treatment to be applied except as authorized by the State Veterinarian. While the serum alone treatment may be demonstrated as a part of the agent's educational work, it is not intended that he should apply even hog cholera serum in a wholesale manner, but only for the purposes of demonstration and education.

DR. ADAMS: A number of other resolutions were introduced. Two of them in the judgment of the committee were held over. One other unfortunately was overlooked by the chairman until the members had separated and I

found that it would require so much reconstruction that it is impossible, to-night, to get it in shape to present it.

THE PRESIDENT: Is there any other unfinished business?

DR. HOSKINS: May I ask if there is any report from the committee on Drugs?

THE PRESIDENT: Or advertising?

DR. HOSKINS: No; we have a committee on the advertising of veterinary remedies.

THE PRESIDENT: Dr. Jacob, did you have any report?

DR. JACOB: I believe that Dr. Adams had it in the form of a resolution.

THE PRESIDENT: It went in, in the form of a resolution?

DR. JACOB: That is the one that he held up.

DR. HOSKINS: It seems to me that the time has arrived when this association, for the protection of its now 2500 members, through this committee might take up the question of the standardization of drugs, and likewise might take up the consideration of the advertisements by biological product houses, and of the statements that they send forth. We have, for instance, one large house in our country advertising a perfectly clear serum, and claiming for it the high efficiency and potency of other serum. We have another very large house that indicates in their advertisements that a clear serum cannot be prepared and retain sufficiency and potency. It seems to me that our committee on the advertising of remedies ought to take up this work and bring back some recommendations by which those houses that are doing excellent work may be encouraged, and that we may have some guide in the selection of these remedies or these products, and only support those that are doing the highest class of work. I do not offer this as a resolution.

DR. JACOB: I would like to ask Dr. Adams whether that was one of the resolutions that he held over?

DR. ADAMS: Yes. I have it. I hold in my hand a recommendation made by the special committee on veterinary advertisements. Unfortunately, several members of our committee escaped before this was put before them, so that if I read it tonight, it will not have the full recommendation of our committee. It may be well just at this time to thresh the matter out. I am perfectly willing to read the recommendation made by the committee. I started to reconstruct it. I thought, as a member of our committee that it was a little too drastic in the penalties inflicted, but of course, I am only one. I will read it, just as it was recommended by the committee.

“The special committee on advertisements of veterinary remedies recommended that the following resolution be adopted by this association:

“Resolved, That misleading claims for biological products will not be tolerated by this association; and furthermore, be it

“Resolved, that any member of this association who as a member of a firm or corporation which allows false or misleading claims to be made, shall be expelled.

“Resolved, that as a standard, the federal regulations governing biological products be adopted.”

That is the substance, with a little reconstruction.

DR. JACOB: Have you the original here, Dr. Adams?

DR. ADAMS: Here it is. You read it.

DR. JACOB: The original, as it was handed to Dr. Adams is as follows:

It has been scratched up a little, and I may not be able to get it just exactly the way that we had it.

“The special committee on advertisements of veterinary remedies, recommends that the following resolution be adopted by this association:

“Resolved, That misleading claims for biological products should not be tolerated by this association, and any official of any firm or corporation who is a member of this association and allows such claims to be made, the same shall be sufficient reason for rejection or expulsion from this association; and this association should accept the federal regulations governing biological products as a standard of application.”

DR. ADAMS: I tried to give the substance of all you read, and put it in a form that would not be misleading.

THE PRESIDENT: Do you desire to make a recommendation, Dr. Adams, in regard to this?

DR. QUITMAN: In the way it was read by Dr. Adams, I do not think it expressed the same intention as it expressed by the original read by Dr. Jacob. Its recommendation as to the regulations governing biological products, is good, but most of those manufacturers are licensed establishments, and come under this regulation. It takes care, mainly, of those who permit the sale of biological products without license.

DR. ADAMS: I did not get that meaning from the letter. I stand corrected if that meaning is there.

THE PRESIDENT: Do you desire to take any action on this?

(It was moved that the resolution as read by Dr. Jacob be adopted, which motion was seconded.)

THE PRESIDENT: It has been regularly moved and seconded that the resolution as read by Dr. Jacob be adopted. Are you ready for the question? All those in favor will signify it by saying “Aye”. Contrary minded, “No”. The “Ayes” have it, and it is so ordered.

Is there any other unfinished business?

DR. STEWART: I wish to offer a resolution to amend the by-laws, I haven't it worded very clearly, but I will read it to you, and then I will get it signed.

“Resolved, that the by-laws be amended by adding after the words ‘high school work’, the words, ‘or pass an examination equal to the first grade civil service examination’, as found in Section 5, Article II of the by-laws.”

THE PRESIDENT: It will take the usual course. Is there any further new business to come before this association? If not, we will proceed to the installation of officers. I will appoint Drs. Marshall and Hughes to escort the newly elected president to the platform.

(This was done amid applause.)

THE PRESIDENT: Dr. Cotton, it gives me great pleasure to present to you the emblem of your authority. May you use it with judgment and discretion, and may your administration be an entire success.

DR. COTTON: I have not sufficient command of the English language or vocabulary sufficient to express my appreciation of this honor which you have conferred upon me tonight. I realize the duties that are involved in this position, and in the face of the new constitution and by-laws, I hesitate. I am simply a common, everyday practitioner. I have no affiliation with schools, or executive positions. I will undertake to fill this position, but, gentlemen, I certainly shall need the support of every member of this association. This is going to be one of the hardest years under this new regime, under the new constitution and by-laws, and it is with hesitancy that I undertake to perform the duties of this office. I will surely need the support of all my loyal friends. I thank you again, for this great honor.

Is Dr. Dunphy in the audience? (No response. Dr. Bolser? (No response). Dr. Howard? (No response). Is Dr. Hadwen present?

DR. S. HADWEN: Mr. President, and gentlemen: I am very pleased and proud of the honor that you have conferred upon me, and I am especially pleased to take it back to Canada. I only hope that I will be able to live up to the reputation of the standard set by my predecessors in office.

DR. COTTON: Dr. Moore was suddenly called home yesterday morning, and I am sure that he is not present. Dr. Merillat. I will appoint Drs. Mayo and Stewart to escort Dr. Merillat to the platform.

DR. MERILLAT: Mr. President and Gentlemen: I beg to thank you all very sincerely for the honor of being elected to this high office and promise that the duties will be done as well as I am capable of doing them. Since Dr. Mayo divided the honors so evenly in this election I am in a more secure position than my worthy superior, Dr. Cotton, who was unanimously elected. A great deal must be expected of a president that is elected without opposition.

I hope very sincerely indeed to be able to help the president and the other administrative officers to untangle some of the knotty problems that will arise from the laws you have just adopted in the form of an entirely new constitution. Let us hope we shall be able to unravel them to the full satisfaction of every member of the association.

DR. COTTON: I wish to congratulate the members for giving me such an able assistant, for I assure you I shall need his assistance. Is Dr. Schneider in the room? I do not think Dr. Schneider needs any introduction to you gentlemen.

DR. SCHNEIDER: Mr. President, and Fellow Members: Words cannot express my appreciation on being elected as treasurer of an association of this kind, but I can assure you that I will fulfill my duties of the office to which you have elected me, to the best of my ability. I thank you.

DR. COTTON: Is Dr. Frost in the room? (No response). Is there any further business to be offered? Is there any unfinished business or any new business? If not, a motion to adjourn is in order.

DR. MAYO: I move that we adjourn.

(This was seconded, and on being put by Dr. Cotton, prevailed.)

(Adjournment sine die.)

CONSTITUTION AND BY-LAWS OF THE A. V. M. A.

CONSTITUTION

ARTICLE I.

Section 1. This organization shall be known as the AMERICAN VETERINARY MEDICAL ASSOCIATION.

ARTICLE II.

OBJECTS

Section 1: The objects of this association are:

- (a) To protect and promote the professional interests of the veterinarian.
- (b) To elevate the standard of veterinary education.
- (c) To procure the enactment and the enforcement of uniform laws and regulations relative to veterinary practice and the control of animal disease.
- (d) To direct public opinion regarding problems of animal hygiene.
- (e) To promote good fellowship in the profession.

ARTICLE III.

MEMBERS

Section 1. Membership in this association shall be of two kinds—Active and Honorary.

ACTIVE MEMBERS

Section 2. Active members must be graduates of veterinary colleges approved by the association and recommended by the Executive Board and elected to membership in accordance with the By-laws.

A member who has been in good and regular standing for twenty-five years, shall receive the title of Fellow of the American Veterinary Medical Association. A certificate of such fellowship shall be issued by the secretary.

HONORARY MEMBERS

Section 3. Honorary membership may be conferred upon any person resident in any part of the world, who has rendered valuable service to Veterinary Science. A person presented for Honorary Membership must be recommended by the Committee on In-

telligence and Education, and elected by three-fourths majority vote of the active members present at a regular meeting. They shall have all the privileges of active members, except that they shall not pay dues, hold office nor vote, nor have any right or title to or interest in any real or personal property of the association. Not more than three Honorary Members shall be elected in one year.

ARTICLE IV.

MEETINGS

Section 1. Meetings of the association shall be regular and special. The regular meeting shall be held annually. It shall be convened not earlier than July 15th, nor later than the 31st of December of each year, unless otherwise ordered by a two-thirds vote of the members of the association, and notice of the selection shall be given to each member by the secretary at least sixty days before the date of the meeting, or at such time as may be designated by a special election held in accordance with the By-laws.

The time, place and duration of the regular meeting shall be fixed by the Executive Board unless otherwise ordered by the association at a regular meeting. Special meetings may be called by the President upon request in writing of not less than 200 active members. The time, place and purpose of special meetings shall be designated in the call.

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. They shall be elected at the regular annual meeting, and hold office, except the Executive Board, 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 office of the President, Vice-President, Secretary or Treasurer unless he has been a member in good standing for the five years preceding his election.

PRESIDENT

Section 2. The President shall preside at all meetings of the association. At the regular annual meeting he shall be expected to deliver a short address. The President shall appoint members of committees and all officers whose appointments are not otherwise

provided for; he shall perform such other duties as ordinarily devolve upon a president. He shall not be eligible for re-election.

VICE-PRESIDENTS

Section 3. In case of death or resignation of the President, or in case of his inability to perform the duties of his office from any cause, the same shall devolve upon the Vice-President in seniority for the remainder of the unexpired term, or until the disability be removed.

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. 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), to be approved by the Executive Board. He shall present a written report at the regular annual meeting.

TREASURER

Section 5. The Treasurer shall account to the association for all moneys received. He shall give bond to the association in the sum of ten thousand dollars (\$10,000), approved by the Executive Board. At the expiration of his term of office he shall account for and turn over to his successor in office all moneys, vouchers and account books belonging to the association.

The Treasurer shall pay out moneys only on vouchers countersigned by the President and Secretary, excepting minor expenses of the Secretary, and such revolving fund allowance as may be placed at the disposal of the Editor and Manager of the "Journal" by the Budget Committee.

The treasurer shall at the regular annual meeting present a written detailed statement with vouchers covering all receipts and expenditures.

PROPERTIES

Section 6. All officers shall, at the expiration of their terms of office, turn over all property of the association to their successors.

EXECUTIVE BOARD

Section 7. The Executive Board shall consist of six members, one from each Executive Board district and one member at large and it shall elect annually its own chairman.

Each member of the Executive Board shall hold office for five years, except the district members first elected under this Constitution. Those first elected from the First, Second, Third, Fourth and Fifth Districts shall hold office respectively for One, Two, Three, Four and Five Years from the date of the election.

The Executive Board shall constitute the Administrative Body of the association, and shall make all necessary regulations for carrying into effect the provisions of this Constitution and the By-Laws.

Unless otherwise provided for, the Executive Board shall select the time, duration and place for holding the annual meetings, and shall make necessary arrangements therefor.

The Executive Board shall pass upon the eligibility of all candidates for membership and report their recommendations to the association. Four members of the Executive Board shall constitute a quorum for the transaction of business.

The Executive Board shall act upon and report promptly on all recommendations of the President of the association and resolutions or other matters duly referred to them by the association, or sections thereof.

On the written request of at least one hundred members of the association, the Executive Board shall submit any question to the whole membership for decision by mail ballot. All ballots returned to the Secretary shall be signed by the active members voting and said ballots shall be retained by the secretary for at least two years after they have been counted. All mail ballots on specific questions, nominations and elections shall be of the same date and issue. Ballots not signed, and ballots not returned within sixty days after date of issue, shall not be counted.

Accurate records shall be kept by the Secretary of the association of all meetings of the Executive Board.

A summary of such records shall be published in the proceedings and distributed to the members, except when the Executive Board deems it for the best interests of the association to temporarily withhold from such publication and distribution such records or any part thereof.

Itemized accounts of all disbursements, with the purpose thereof and records of votes shall never be withheld from publication.

The Executive Board shall have full discretion to withhold from the "Journal" in whole or in part any paper or part of proceedings that may be referred to the Board by the association or by the editor.

It shall be the duty of the Executive Board to consider and recommend yearly to the association concerning the selection of an Editor and Business Manager of the "Journal" of the American Veterinary Medical Association. The Editor and Business Manager of the said "Journal" shall receive such salary and allowances as may be recommended by the Executive Board and approved by the association.

The Executive Board shall have the "Journal" accounts audited by a qualified accountant annually or oftener if deemed necessary, and submit annually to the association a financial statement including inventory.

The Executive Board shall be vested with power to hear all complaints filed before it in writing relative to the improper conduct of any member, and shall if thought advisable, summon the member so charged to appear before it at the next annual meeting of the association, to answer the charges and make defense. If the Board find the defendant guilty as charged, said Executive Board shall report at once to the association a summary of the charges and evidence submitted on both sides, together with such recommendations as may be deemed wise; but no public report of such charges or evidence shall be made by the Board or any member thereof until after trial by the Executive Board.

EXECUTIVE BOARD DISTRICTS

Section 8. There shall be five Executive Board Districts as follows:

District No. 1 shall consist of Canada.

District No. 2 shall consist of Wisconsin, Illinois, Michigan, Indiana, Ohio, Pennsylvania, New York, the New England States, New Jersey and Delaware.

District No. 3 shall consist of Kentucky, West Virginia, Virginia, Maryland, District of Columbia, Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Florida, Cuba, South America.

District No. 4 shall consist of Alaska, Washington, Montana, North and South Dakota, Minnesota, Iowa, Nebraska, Wyoming, Idaho, Oregon, Philippines, and Hawaii.

District No. 5 shall consist of California, Nevada, Utah, Colorado, Kansas, Missouri, Arkansas, Oklahoma, Louisiana, Texas, New Mexico, Arizona, Mexico, and Central America.

VACANCIES AND REMOVALS

Section 9. The President shall fill any vacancies in the Executive Board from the district in which such vacancy occurs, and said appointee shall hold office until a special election of the district may be held.

If a member of the Executive Board removes from his district, such removal shall automatically cause a vacancy.

Vacancies in the office of Secretary or Treasurer shall be filled by appointment for the unexpired term by the President.

The Executive Board may for dishonesty or incompetence, remove the Secretary or Treasurer from office upon approval of the President.

EXECUTIVE BOARD MEETINGS

Section 10. The Executive Board shall hold its regular session at the time and place of the annual meeting of the association. Special meetings may be called by the Secretary upon written request of 5 members of the Executive Board.

ARTICLE VI.

Any amendments to this Constitution shall be proposed in writing at an annual meeting, but shall not be acted upon until the next following annual meeting, nor shall it be adopted finally except by the votes of at least two-thirds of the members present and voting.

BY-LAWS.

ARTICLE 1.

ORDER OF BUSINESS

Section 1. The following shall be the order of business, except as otherwise provided:

1. Call to order by the President.
2. President's address.
3. Presentation and adoption of minutes.

4. Report of the Executive Board.
5. Admission of New Members.
6. Election of Officers.
7. Reports of Officers.
8. Reports of Committees.
9. Unfinished Business.
10. New Business.
11. Installation of Officers.

Section 2. All meetings of the association shall be governed by Roberts' Rules of Order when not in conflict with the By-Laws.

ARTICLE 2.

APPLICATION FOR MEMBERSHIP

Section 1. Application for membership in the association shall be made on blank forms approved by the Executive Board. The application blanks filled out and signed by the applicant in his own hand writing shall be mailed or delivered to the Secretary, who shall present the same to the Executive Board for final action. An application to be considered must have been endorsed by two members in good standing, one of whom shall be a resident of his own state and must be accompanied by the membership fee and one year's dues. If the applicant is a practitioner he shall have satisfied the legal requirements for practice in the state in which he resides.

Section 2. Except as provided in Sections 3, 4, and 5, of this Article, only those veterinarians may be admitted to active membership who have spent not less than three collegiate years in the study of veterinary medicine and have been duly graduated from an accredited veterinary college conforming to the requirements of regulations 1 to 19 inclusive of Bureau of Animal Industry, Circular No. 150, as printed on pages 175 to 182 of Proceedings of the forty-ninth annual meeting of the A. V. M. A., 1912.

Section 3. A graduate of a veterinary college which, at the time of his graduation, did not maintain an educational standard in conformity with the active membership requirements of this association, may upon recommendation of the Executive Board, be elected to membership, provided he has been duly graduated not less than five years prior to the date of application, and further, that the college has ceased to graduate veterinarians contrary to the standards now fixed by this association.

Section 4. Except as provided for in Section 3, only those veterinarians may be elected to active membership who have spent not less than 28 months in not less than four collegiate years in the study of veterinary medicine, beginning with the session 1916-1917, and have been duly graduated from an approved veterinary college.

Section 5. The matriculation requirements of an approved veterinary college, beginning with the collegiate year 1914-1915, shall be one year of high school work or equivalent studies taken in other preparatory schools. Beginning with the collegiate year 1918-1919, said requirements shall be two years of high school work or equivalent studies taken in other preparatory schools.

Section 6. All candidates for membership favorably reported to the association by the Executive Board, shall be balloted upon and a three-fourths vote in the applicant's favor will entitle him to active membership.

ARTICLE 3.

Section 1. Notice of the time and place of holding the regular meeting shall be announced at least three months before the date fixed for the meeting.

Section 2. Notice of the time and place of holding a special or adjourned meeting shall be mailed to each active member at least twenty days before the date fixed for the meeting. No business shall be transacted at special meetings which was not clearly and definitely stated in the call convening such meeting.

Section 3. The general sessions of the association shall be held at 2:00 P. M. each day, except the first. On the first day of the annual meeting there shall be a session at 10:00 A. M.

The sections of the association shall hold their meetings at 9:00 A. M. each day, except the first day, when they shall convene at 2:00 P. M. Night sessions may be convened by consent of the membership of any section.

ARTICLE 4.

QUORUM

Section 1. Twenty-five percent of the members of the association registered at any meeting shall constitute a quorum for the transaction of business.

ARTICLE 5.

DUES

Section 1. There shall be an initiation fee of five (\$5.00) dollars. The annual dues shall be five (\$5.00) dollars, payable in advance on the first day of January. Honorary members shall pay no dues.

ARTICLE 6.

DELINQUENCY

Section 1. Any member who for two years fails to pay his annual dues shall forfeit his membership thirty days after notification from the Secretary has been mailed to his last known address.

ARTICLE 7.

REINSTATEMENT

Section 1. A member who has forfeited his membership for non-payment of dues, may be reinstated by the Executive Board upon payment of his entire indebtedness to the association.

Section 2. A member who loses his membership for a reason other than non-payment of dues may be reinstated only by application as in the case of new members.

ARTICLE 8.

NOMINATIONS

Section 1. Nominations for office, except as otherwise provided for shall be made orally. A nominating speech shall not exceed two minutes and the nominations shall not be closed until every member present has had an opportunity to present his candidate.

ARTICLE 9.

ELECTION OF OFFICERS

Section 1. A majority of all the votes cast shall be necessary to elect. If no nominee receives a majority of the votes on the first ballot, the nominee who receives the lowest number of votes shall be dropped and a new ballot shall be taken, and so on until a nominee receives a majority.

Section 2. The officers of the association shall be elected at the afternoon session the second day of the annual meeting.

ARTICLE 10.

ELECTION OF MEMBERS OF EXECUTIVE BOARD

Section 1. Six months before the annual meeting at which a member of the Executive Board is to be elected, the Secretary of

the association shall send to each member in that district a statement that a member of the Executive Board is to be elected and ask for a nomination to be sent to the Secretary at least four months before the annual meeting. The Secretary shall make a list of the names of the highest five, who shall constitute the nominees for membership on the Executive Board in that district. Each member of the district must send his ballot for the nominee of his choice to the Secretary two months before the annual meeting. The nominee shall be voted upon by mail ballot. A plurality only shall be necessary to a choice. In case of a tie the members from the district attending the annual meeting shall decide by ballot at a meeting of the members from the district called by the President.

The member at large shall be elected by ballot at the regular annual meeting.

ARTICLE 11.

INSTALLATION

Section 1. The officers of the association shall assume their duties at the close of the annual meeting at which they are elected.

ARTICLE 12.

SECTIONS

Section 1. The association shall be divided into the following sections:

- A. Practice and Surgery.
- B. Sanitary Science and Police.
- C. Veterinary Colleges and Examining Boards.

The Executive Board may make additional sections as deemed expedient.

SECTION OFFICERS

Section 2. The officers of each section shall consist of a chairman and a secretary. They shall be elected by the members of the section. They shall serve one year and until their successors are elected and have assumed office.

CHAIRMAN OF SECTION

Section 3. The chairman shall preside at all meetings of the section and shall perform the usual duties belonging to such office. He shall co-operate with the Secretary of the section in arranging the program and shall see that proper arrangements have been made for the carrying out of the same.

SECRETARY OF SECTION

Section 4. The secretary shall keep an accurate record of the proceedings of the section. He shall, in co-operation with the Chairman, arrange the program of the section for the annual meeting. He shall send the program to the Secretary of the association at least forty days before the annual meeting for insertion in the program of the association.

LENGTH OF PAPERS

Section 5. A maximum of twenty minutes will be allowed for the presentation of a paper, and five minutes for each speaker taking part in a discussion. The author will be allowed a reply to questions and criticisms at the end of the discussion.

PAPERS READ BY TITLE

Section 6. No paper shall be published as having been read before a section unless it has actually been read, or unless the section shall vote to have it read by title.

PROPERTY IN PAPERS

Section 7. All papers and reports of any nature presented to the Association or to any section shall be the property of the association, if approved for publication. Consent from the Executive Board must first be obtained to permit the author of any paper to publish his paper prior to its publication in the official Journal.

ARTICLE 13.

EDITOR AND BUSINESS MANAGER

Section 1. The Editor and Business Manager, which positions may be held by the same individual shall perform the usual duties of such positions in connection with the official organ of the association.

The Journal of the American Veterinary Medical Association shall publish the proceedings, transactions, papers, etc., and such other matters as the editor may select.

ARTICLE 14.

INVITED GUESTS

Persons not eligible to membership in the association may be invited by any member to attend the annual meeting of the association, or the meetings of a section.

ARTICLE 15.

REGISTRATION

Section 1. No member may vote at a regular meeting until he has registered and paid his entire indebtedness to the association.

ARTICLE 16.

HONORARY MEMBERS

Section 1. Nominations for honorary membership shall be made in writing and submitted to the association not later than the second day of the annual meeting. An interval of at least twenty-four hours shall elapse between the nomination and the election.

ARTICLE 17.

STANDING COMMITTEES

Section 1. There shall be the following Standing Committees consisting of five members each except as otherwise provided:

1. Budget.
2. Intelligence and Education.
3. Legislation.
4. Necrology.
5. Resolution.
6. Audit.

The Committee on Budget shall consist of the President, Secretary, Treasurer and Chairman of the Executive Board. It shall be the duty of the committee to consider the financial resources of the association and proposed expenditures. This committee shall report its recommendations to the association for ratification before the close of the meeting.

The Committee on Intelligence and Education shall consist of five members to be appointed by the President to serve for a period of five years, except at the outset one member shall be appointed for a period of one year, one for two years, one for three years, one for four years, and one for five years. This committee shall elect annually its own chairman. It shall be the duty of the committee to report annually upon the progress and needs of veterinary education. It shall inspect veterinary colleges as it may deem necessary or as directed by the association; and shall annually recommend a list of veterinary colleges for recognition by the association.

The Committee on Legislation shall consist of five members to be appointed in the same way and for the same terms as the Committee on Intelligence and Education.

ARTICLE 18.

RESIDENT SECRETARIES

Section 1. Each state, territory, province or country may have a Resident Secretary appointed by the President.

Section 2. Each Resident Secretary shall co-operate with the Committee on Intelligence and Education and shall aid the President and Secretary in such a manner as they may direct.

ARTICLE 19.

ETHICS

Section 1. Members of this association are expected to conduct themselves at all times as professional gentlemen. Any flagrant violation of this principle shall be considered by this association as unprofessional conduct, and on written charges filed with the Executive Board, may subject the violator to suspension or expulsion as provided in Article 5, Section 7, of the Constitution.

ARTICLE 20.

AMENDMENT TO BY-LAWS

Section 1. The By-Laws of this association may be amended at any annual meeting by the same procedure as provided for amending the Constitution.

Section 2. The By-Laws may be suspended temporarily by a vote of three-fourths majority, but such suspension shall not apply to Section 1, Article 19, and Section 1, Article 20.

Section 3. Officers elected under the old Constitution and By-Laws shall constitute the first set of officers under the new organization in so far as provided for in the new Constitution and By-Laws.

Section 4. The Secretary of the association shall proceed at once to take the necessary steps for the nomination and election of the Executive Board as provided in Section 1. of Article 10. of the By-Laws.

MEETINGS OF THE ASSOCIATION.

1863. First Meeting, New York, N. Y., June 9 and 10.
1864. Semiannual (comitia minora)—New York, N. Y., Jan. 19.
Annual—New York, N. Y., September 6.
1865. Semiannual—New York, N. Y., March 7.
Annual—Boston, Mass., September 5.
1866. Semiannual—New York, N. Y., March 5 and 6.
Annual—New York, N. Y., September 4.
1867. Semiannual—Boston, Mass., March 5.
Annual—New York, N. Y., September 3.
1868. Semiannual—New York, N. Y., March 5.
Annual—Boston, Mass., September 1.
1869. Semiannual—Boston, Mass., March 16.
Annual—New York, N. Y., September 21.
1870. Semiannual—Philadelphia, Pa., March 15 (no quorum).
Annual—New York, N. Y., September 20.
1871. Semiannual—Boston, Mass., March 21.
Annual—New York, N. Y., September 19.
1872. Semiannual—Boston, Mass., March 16.
Annual—New York, September 17.
1873. Semiannual—Boston, Mass., March 17.
Annual—New York, N. Y., September 16.
1874. Semiannual—Boston, Mass., March 17.
Annual—Not held, owing to error in date of notices sent out.
1875. Semiannual—Boston, Mass., March 25.
Annual—New York, N. Y., September 21.
1876. Semiannual—Boston, Mass., March 21.
Annual—New York, N. Y., September 10.
1877. Semiannual—Boston, Mass., March 20.
Annual—New York, N. Y., September 18.
1878. Semiannual—Boston, Mass., March 19.
Annual—New York, N. Y., September 17.
1879. Semiannual—Boston, Mass., March 18.
Annual—New York, N. Y., September 16.
1880. Semiannual—Boston, Mass., March 16.
Annual—New York, N. Y., September 1.
1881. Semiannual—Boston, Mass., March 13.
Annual—New York, N. Y., September 20.
1882. Semiannual—Boston, Mass., March 21.
Annual—New York, N. Y., September 19.
1883. Semiannual—Boston, Mass., March 20.
Annual—New York, September 18.
1884. Semiannual—Boston, Mass., March 18.
Annual—Cincinnati, Ohio, September 16.
1885. Semiannual—Boston, Mass., March 17.
Annual—New York, N. Y., December 15.

1886. Semiannual—Boston, Mass. No legal meeting held (no quorum).
Annual—New York, N. Y., September 21.
1887. Semiannual—Philadelphia, Pa., March 15.
Annual—New York, N. Y., September 20.
1888. Semiannual—Baltimore, Md., March 20.
Annual—New York, N. Y., September 18.
1889. Semiannual—Boston, Mass., March 19.
Annual—Brooklyn, N. Y., September 17.
1890. Chicago, Ill., September 16 and 17.
1891. Washington, D. C., September 15 and 16.
1892. Boston, Mass., September 20, 21 and 22.
1893. Chicago, Ill., October 17, 18, 19 and 20.
1894. Philadelphia, Pa., September 18, 19 and 20.
1895. Des Moines, Iowa, September 10, 11 and 12.
1896. Buffalo, N. Y., September 1, 2 and 3.
1897. Nashville, Tenn., September 7, 8 and 9.
1898. Omaha, Neb., September 6, 7 and 8.
1899. New York, N. Y., September 5, 6 and 7.
1900. Detroit, Mich., September 4, 5 and 6.
1901. Atlantic City, N. J., September 3, 4 and 5.
1902. Minneapolis, Minn., September 2, 3 and 4.
1903. Ottawa, Canada, September 1, 2, 3 and 4.
1904. St. Louis, Mo., August 16, 17, 18 and 19.
1905. Cleveland, Ohio, August 15, 16, 17 and 18.
1906. New Haven, Conn., August 21, 22, 23 and 24.
1907. Kansas City, Mo., September 10, 11, 12 and 13.
1908. Philadelphia, Pa., September 8, 9, 10 and 11.
1909. Chicago, Ill., September 7, 8, 9 and 10.
1910. San Francisco, Cal., September 6, 7, 8 and 9.
1911. Toronto, Canada, August 21, 22, 23 and 24.
1912. Indianapolis, Ind., August 27, 28, 29 and 30.
1913. New York, N. Y., September 1, 2, 3, 4 and 5.
1914. No meeting.
1915. Oakland, Cal., August 30, 31, September 1 and 2.
1916. Detroit, Mich., August 21, 22, 23, 24 and 25.

PRESIDENTS

- 1863–1864. J. H. Stickney, Massachusetts.
- 1864–1865. A. S. Copeman, New York.
- 1865–1866. C. M. Wood, Massachusetts.
- 1866–1867. R. H. Curtis, New York.
- 1867–1869. R. Wood, Massachusetts.
- 1869–1871. E. F. Thayer, Massachusetts.
- 1871–1875. A. Large, New York.
- 1875–1877. A. Liautard, New York.

- 1877-1879. C. P. Lyman, Massachusetts.
 1879-1881. J. L. Robertson, New York.
 1881-1883. W. Bryden, Massachusetts.
 1883-1885. W. B. E. Miller, New Jersey.
 1885-1886. L. McLean, New York.
 1886-1887. A. Liautard, New York.
 1887-1889. R. S. Huidekoper, Pennsylvania.
 1889-1890. C. B. Michener, New York.
 1890-1892. R. S. Huidekoper, Pennsylvania.
 1892-1893. W. L. Williams, Indiana.
 1893-1896. W. Horace Hoskins, Pennsylvania.
 1896-1897. F. H. Osgood, Massachusetts.
 1897-1898. D. E. Salmon, District of Columbia.
 1898-1899. A. W. Clement, Maryland.
 1899-1900. Leonard Pearson, Pennsylvania.
 1900-1901. Tait Butler, Indiana.
 1901-1902. J. F. Winchester, Massachusetts.
 1902-1903. S. Stewart, Missouri.
 1903-1904. R. R. Bell, New York.
 1904-1905. M. E. Knowles, Montana.
 1905-1906. W. H. Lowe, New Jersey.
 1906-1907. James Law, New York.
 1907-1908. W. H. Dalrymple, Louisiana.
 1908-1909. J. G. Rutherford, Ontario, Can.
 1909-1910. A. D. Melvin, District of Columbia.
 1910-1911. G. H. Glover, Colorado.
 1911-1912. S. Brenton, Michigan.
 1912-1913. J. R. Mohler, District of Columbia.
 1913-1915. C. J. Marshall, Pennsylvania.
 1915-1916. R. A. Archibald, California.
 1916-1917. C. E. Cotton, Minnesota.

SECRETARIES.

1863. A. Liautard, New York.
 1864. R. Jennings, New York.
 1865-1867. C. Burden, New York.
 1867-1869. J. F. Budd, New York.
 1869-1874. J. L. Roberston, New York.
 1874-1877. J. D. Hopkins, New Jersey.
 1877-1880. A. A. Holcomb, New York.
 1880-1888. C. B. Michener, New York.
 1888-1893. W. Horace Hoskins, Pennsylvania.
 1893-1894. T. J. Turner, Missouri.
 1894-1895. Leonard Pearson, Pennsylvania.
 1895-1902. S. Stewart, Kansas and Missouri.
 1902-1906. John J. Repp, Iowa and Pennsylvania.
 1906-1910. Richard P. Lyman, Connecticut and Missouri.

- 1910-1913. C. J. Marshall, Pennsylvania.
 1913-1915. Nelson S. Mayo, Illinois.
 1915-1916. C. M. Haring, California.
 1916- L. A. Merillat, Illinois.

OFFICERS, 1916-1917.

PRESIDENT

- C. E. Cotton Minneapolis, Minn
 FIRST VICE-PRESIDENT
 G. W. Dunphy East Lansing, Mich.
 SECOND VICE-PRESIDENT
 F. A. Bolser New Castle, Ind.
 THIRD VICE-PRESIDENT
 Seymour Hadwen Agassiz, B. C.
 FOURTH VICE-PRESIDENT
 V. A. Moore Ithaca, N. Y.
 FIFTH VICE-PRESIDENT
 L. H. Howard Boston, Mass.

EXECUTIVE BOARD

(To serve until their successors are elected).

F. Torrance, 1st District; Jos. Hughes, 2d District; J. R. Mohler, 3d District; H. E. Bemis, 4th District; R. A. Archibald, 5th District; V. A. Moore, Member at large.

SUB-COMMITTEE ON JOURNAL

F. Torrance J. R. Mohler R. A. Archibald

COMMITTEE ON INTELLIGENCE AND EDUCATION

S. H. Ward, L. A. Klein, G. H. Hart, R. C. Moore, N. S. Mayo

COMMITTEE ON LEGISLATION

W. Horace Hoskins, J. P. Turner, S. J. Walkley
 M. Jacob, A. T. Kinsley

COMMITTEE ON RESOLUTIONS

John Reichel, chairman, A. Eichhorn, C. G. Lamb
 W. G. Hollingworth, C. H. Stange

AUDIT COMMITTEE

A. S. Cooley, chairman, G. B. McKillip, H. Jensen
 W. H. Robinson, E. M. Ranck

COMMITTEE ON NECROLOGY

E. A. Cahill, H. Fulstow, H. R. Ryder
 C. C. Mix, C. D. McGilvray

SECTION ON SANITARY SCIENCE AND POLICE

J. G. Wills, chairman T. E. Munce, secretary

SECTION ON GENERAL PRACTICE

T. H. Ferguson, chairman J. H. Blattenberg, secretary

BUDGET COMMITTEE

(Exofficio Membership)

C. E. Cotton, L. A. Merillat, F. H. Schneider, V. A. Moore

DIRECTORY OF MEMBERS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

HONORARY MEMBERS

- Adami, George J., Montreal Que.
Bang, Prof. Dr. B., Royal Vet. College, Copenhagen, Denmark.
Biggs, Prof. H. M., Bellevue Med. College, New York, N. Y.
Chauveau, Prof. A., Lyons, France.
Dorset, Marion, Bio-Chemic Div., B.A.I., Washington, D. C.
Evans, W. A., 906 Tribune Bldg., Chicago, Ill.
Hay, Hon. James, House of Rep., Washington, D. C.
Hoard, Hon. W. D., Fort Atkinson, Wis.
Hoare, E. Wallis, 18 Cook St., Cork, Ireland.
Hobday, Prof. Frederick, 165 Church St., Kensington, W., London,
England.
Hutyra, Prof. Francis, Royal Vet. High School, Budapest, Hungary.
LeClainche, Prof. E., Toulouse, France.
Liautard, A., 14 Avenue de l'Opera, Paris, France.
McEachran, D., 6 Union Ave., Montreal, Que.
M'Fadyean, Prof. Sir John, Great College St., Camden Town,
London, England.
Moller, Herr Prof. H., Thierärzlichen Hochschule, Berlin, Germany.
Ostertag, Prof. Robert, Imperial Board of Health, Berlin, Germany.
Perroncito, Prof. E., Royal Vet. College, Turin, Italy.
Ravenel, Mazyck P., University of Missouri, Columbia, Mo.
Raymond, J. H., Polhemus Memorial Clinic, Brooklyn, N. Y.
Schmidt, Mr. I. I., Kolding, Denmark.
Smith, Prof. Theobald, Rockefeller Institute, Princeton, N. J.
Stockman, Sir Stewart, Board of Agriculture, London, England.
Tsunno, Dr. K., Vet. Dept. Imperial Univ., Tokio, Japan.
Vallee, H., Alfort France.
Welch, W. H., Johns-Hopkins, Univ., Baltimore, Md.
Wilcox, E. V., Dept. of Agriculture, Honolulu, Hawaii.
Woodward, William C., Health Office, Washington, D. C.

ACTIVE MEMBERS

FELLOWS.

- Ackerman, E. B., 367 Flushing Avenue, Brooklyn, N. Y.
Allen, F. S., 221 Main Street, Nashua, N. H.
Ambler, H. B., Chatham, N. Y.
Baker, A. H., 2537 South State Street, Chicago, Ill.
Bath, H. W., 270 Lafayette Avenue, New Brighton, Staten Island,
N. Y.
Berns, George H., 74 Adams Street, Brooklyn, N. Y.
Bland, Thos., 74 Phoenix Avenue, Waterbury, Conn.
Brenton, S., 121 West Alexandrine Avenue., Detroit, Mich.

- Butler, Tait S., 323 Falls Building, Memphis, Tenn.
Cary, C. A., Alabama Polytechnic Institute, Auburn, Ala.
Coates, W. J., 110 West 130th Street, New York, N. Y.
Connaway, J. W., Columbia, Mo.
Crowley, C. W., 2912 Sheridan Avenue, St. Louis, Mo.
Curtice, Cooper, United States Sheep Farm, R.R. No. 2, Vienna, Va.
Emerson, Daniel, 16 Barkers Court, Lynn, Mass.
Eves, H. P., 301 West 18th Street, Wilmington, Del.
Fair, J. D., Millersburg, Ohio.
Grange, E. A., Ont. Vet. College, Toronto, Ont.
Harrison, Robert H., 309 Wilder Avenue, St. Paul, Minn.
Hickman, R. W., 2329 First Street, N. W., Washington, D. C.
Hollingworth, W. G., 54 Lafayette Street, Utica, N. Y.
Heskins, W. Horace, 3452 Ludlow Street, Philadelphia, Pa.
Howard, L. H., 187 Huntington Avenue, Boston, Mass.
Hughes, Joseph, 2537 South State Street, Chicago, Ill.
Jacobs, J. H., 549 West 49th Street, New York City.
Johnson, George A., Exchange Building, Sioux City, Ia.
Knowles, M. E., Helena, Mont.
Lowe, W. Herbert, 117 Trenton Avenue, Paterson, N. J.
Lyford, C. C., 821 Third Avenue, Minneapolis, Minn.
McInnes, Benj., 57 Queen St., Charleston, S. C.
McLain, C. Courtney, 1001 Water Street, Bridgeport, Conn.
McLellan, F. W., 165 Noble Street, Bridgeport, Conn.
McMurdo, C. D., Tenth Cavalry, U. S. A., Hauchuca, Ariz.
Mayo, N. S., 4753 Ravenswood Ave., Chicago, Ill.
Meesner, H. A., 1133 Harford Avenue, Baltimore, Md.
Melvin, A. D., Chief, Bureau of Animal Industry, Washington, D.C.
Meyers, J. C., Jr., 1111 Walnut Street, Cincinnati, Ohio.
Nelson, S. B., Pullman, Wash.
Paige, James B., Amherst, Mass.
Peters, Austin, R.F.D., Harvard, Mass.
Peterson, W. E., 16 Lyman Street, Waltham, Mass.
Pierce, B. D., 47 High Street, Springfield, Mass.
Reynolds, M. H., Experimental Farm, St. Paul, Minn.
Richards, W. H., Emporia, Kans.
Ross, E. C., 11 Orange Street, New Haven, Conn.
Ryan, John F., 2525 Indiana Avenue, Chicago, Ill.
Scheibler, J. W., 271 Court Avenue, Memphis, Tenn.
Shaw, Walter, 114 East 2nd Street, Dayton, Ohio.
Sherman, W. A., 340 Central Street, Lowell, Mass.
Sollberger, R. J., 1412 S. 8th Street, St. Louis, Mo.
Stewart, Sesco, 1336 East 15th Street, Kansas City, Mo.
Strange, A., 322 West 15th St., New York, N. Y.
Turner, J. P., 916 O Street, N. W., Washington, D. C.
Vogt, A. G., 92 Clinton Avenue, Newark, N. J.
Waller, H. N., St. Josephs, Chiswick, W. England.
Waugh, James A., 1100 Fifth Avenue, Pittsburgh, Pa.

Weber, S. E., Lancaster, Pa.
 White, T. E., 1001 West Broadway, Sedalia, Mo.
 Williams, W. L., New York State Veterinary College, Ithaca, N. Y.
 Winchester, J. F., Bay State Building, Lawrence, Mass.
 Wray, W. H., Red Gables, Speen, Princess Risborough, Bucks,
 England.

MEMBERS

(The figures indicate the year in which the dues were last paid.)

Abbott, Andrew J., 209 E. 4th St., Marshfield, Wis. 1916.
 Abercrombie, Henry E., Cambridge, Ill. 1915.
 Achen, F. W. B., 118 Market St., Kenosha, Wis. 1916.
 Acres, George Henry, Grand Forks, British Columbia. 1915.
 Adair, Hugh H., Bristol, Va. 1915.
 Adams, Franklin, 224 W. Washington St., Paris, Ill. 1915.
 Adams, John Dawson, Genesee, Ida. 1916.
 Adams, John W., 39th and Woodland Ave., Philadelphia, Pa.
 Ahlers, F. R., Lamotte, Ia. 1916.
 Ahnert, Ernest F., 646 Central Bldg., Seattle, Wash. 1915.
 Aikenhead, J. P., Easton, Md. 1915.
 Albershardt, August H., Indianapolis, Ind. 1913.
 Alcorn, Harvey Alex., Adair, Ia. 1915.
 Alexander, E. V., 3309 Park Ave., Indianapolis, Ind. 1916.
 Alford, Simon Wayne, State Farm, Lincoln, Neb. 1916.
 Alkire, Charles N., Big Sandy, Mont. 1913.
 Allen, George H., care B.A.I., South St. Joseph, Mo. 1915.
 Allen, John F., 4 Broadway, Greenwood, Ind. 1913.
 Allen, Rollin M., 412 N. First St., Marshalltown, Ia. 1916.
 Allen, Stanley W., 115 First St., Watertown, S. D. 1916.
 Almeida, Anton S., Dixon, Cal. 1915.
 Althouse, E. P., 809 Market St., Sunbury, Pa. 1916.
 Ames, C. H., 191 12th St., Milwaukee, Wis. 1915.
 Amling, Henry, 4228 Park Ave., New York N. Y. 1916.
 Anders, T. O., care Health & Sanitation, Seattle, Wash. 1915.
 Anderson, Cecil S., Simeo, Ont. 1915.
 Anderson, F. E., 130 E. Crawford St., Findlay, Ohio. 1916.
 Anderson, F. J., Grand Forks, N. D. 1914.
 Anderson, George Guild, 417 West 49th St., New York, N. Y. 1915.
 Anderson, Herbert, Dickinson, N. D. 1916.
 Anderson, Jas E., Ligonier, Ind. 1915.
 Anderson, John P., 403 South Main St., Rochester, Minn. 1915.
 Anderson, J. S., Seward, Nebr. 1916.
 Anderson, L., Cedarville, Ohio. 1916.
 Anderson, Leo J., 2228 California St., Berkeley, Cal. 1915.
 Anderson, Melancthon O., Exchange Bldg., So. St. Joseph, Mo. 1916.
 Anderson, T. E., Bedford, Ia. 1916.
 Anderson, W. A., Sleepy Eye, Minn. 1915.

- Andrade, John S., Huntsville, Ala. 1916.
Andreassen, S. K., Barnesville, Minn. 1916.
Andrews, Frederick W., Box 655, Mt. Kisco, N. Y. 1915.
Annand, J. G., 115½ W. First St., Duluth, Minn. 1915.
Arbeiter, Reinhold, Marion, S. D. 1916.
Arburna, Joseph M., Hanford, Cal. 1916.
Archibald, R. A., N. E. Cor. 24th & Broadway, Oakland, Cal. 1916.
Armour, H. M., Chelsea, Mich. 1915.
Armour, W. J., 114 So. Third St., Goshen, Ind. 1916.
Armstrong, James A., 1767 Broad St., Regina, Sask, Can. 1913.
Armstrong, J. M., 15 1st St. E. Providence, R. I. 1915.
Armstrong, Robert, 641 Field Ave., Detroit, Mich. 1916.
Armstrong, Walter N., Concord, Mich. 1915.
Arnold, John W., 777 W. 10th St., Riverside, Cal. 1916.
Asbill, Archibald Ruff, State Capitol, Sacramento, Cal. 1915.
Ashbaugh, Frederick M., War Dept., Washington, D. C. 1916.
Ashcraft, Watt, 310 Hayne St., Monroe, No. Car. 1915.
Ast, Jacob F., 1331 Folsom St., San Francisco, Cal. 1915.
Atherton, Ira K., Box 403, Fort Dodge, Ia. 1916.
Atkins, Chas. Edw. C., 209 John St., Bridgeport, Conn. 1916.
Austin, J. A., 223 Main St., Fulton, Ky. 1916.
Axby, Wm. A., Harrison, Ohio. 1915.
Ayer, Hobart C., New Decatur, Ala. 1916.
Ayers, Admiral Taw, 1966 Kaelin Ave., Louisville, Ky. 1915.
Aymond, Sidney Clay, Bunkie, La. 1916.
Babb, Geo. F., 310 Federal Bldg., Oklahoma, Okla. 1916.
Babbitt, Frank J., 146 Oxford St., Lynn, Mass. 1916.
Babeock, Charles H., New Rockford, N. D. 1916.
Babson, Elmer W., 341 Washington St., Gloucester, Mass. 1916.
Bach, Glenn R., Medicine Lake, Mont. 1916.
Bachus, Newell D., 845 2nd St., Elyria, Ohio. 1916.
Bachus, L. S., Columbia, Mo. 1916.
Bacon, Richard M. (Mail returned). 1913.
Baddeley, Joseph C., Touchet, Wash. 1915.
Bailey, Hugh W., Orion, Ill. 1916.
Bailey, Leon L., Lowell, Ind. 1915.
Baird, Paul R., Waterville, Me. 1916.
Baker, Bennie J., Mitchell, Neb. 1916.
Baker, Eustace, Moscow, Idaho. 1916.
Baker, Frank H., Gardnerville, Nev. 1916.
Baker, Guy G., 514 Main St., Spencer, Ia. 1916.
Baker, Horace Morgan. (Mail returned). 1913.
Baker, M. C., 6 Union Ave., Montreal, Que. 1916.
Baker, Robert Ernest, Morristown, Tenn. 1915.
Baker, S. S., 2220 Jackson Blvd., Chicago, Ill. 1916.
Baldwin, Arthur, Creston, Ia. 1916.
Baldwin, Boyd, 405 So. 3rd St., Rockford, Ill. 1916.
Bales, Harold W., Box 144, York, Ala. 1916.

- Balke, Ernest J., Adam, Nebr. 1916.
Ball, Chas. H., St. Thomas, Ont. 1916.
Ballard, Fred S., Sibley, Ia. 1916.
Balleau, Ralph W., 53 Whiting St., Springfield, Mass. 1916.
Balthaser, Harry Becker, 762 N. Brooklyn St., Philadelphia, Pa. 1916.
Bamberger, George E., 39 California Ave., Reno, Nev. 1916.
Baneroff, Ernest, R. F. D. No. 3, Barre, Vt. 1915.
Banister, Raymond, R. F. D., Letts, Ind. 1916.
Bannister, H., 11 E. Luck St., Roanoke, Va. 1916.
Barber, James L., Pierre, S. D. 1915.
Barber, Lebbens Blair, Experiment Station, Island of Guam. 1915.
Bard, J. Eldoras, City Hall, Warren, Ohio. 1915.
Barker, Frederick Arnold, 274 S. Main St., Bowling Green, Ohio. 1915.
Barker, Mark, Box 463, Saskatoon, Sask. 1916.
Barnes, Clarence L., 828 LaPorte St., Fort Collins, Colo. 1915.
Barnes, Frank E., 107 Jackson St., Waxahachie, Tex. 1916.
Barnes, James F., 1715 Broadway, Toledo, Ohio. 1916.
Barnes, Miller F., 11th and Buffalo Sts., Franklin, Pa. 1916.
Barnes, Robert, 237 4th Ave., Ottawa, Ont. 1916.
Barnett, Enoch, Agricultural College, Miss. 1914.
Barnett, Frank E., 527 S. State St., Painesville, Ohio. 1915.
Barnett, William A., Clemson College, S. C. 1916.
Barnhart, Emmett P., 3292 West 98th St., Cleveland, Ohio. 1915.
Barr, Frank H., 112 S. Broadway, Albuquerque, N. M. 1916.
Barr, Oreste Edward, 12 Cottage St., Barre, Vt. 1915.
Barrett, Chas. W., 976 N. Chester Ave., Pasadena, Cal. 1915.
Bartholomies, George Ernest, Sheldon, Mo. 1913.
Basinger, H. P., Mitchell, S. D. 1914.
Bateman, John A. F., Webster & Dana Sts., Berkeley, Cal. 1913.
Bates, Elbert M. (Mail returned). 1913.
Bates, Harry E., P. O. Box 682, South Norwalk, Conn. 1916.
Bauman, Samuel H., Birmingham, Ia. 1913.
Baxter, Jos. M., 850 Connecticut St., Gary, Ind. 1916.
Bayler, Theodore M., Perry, Iowa. 1915.
Beach, Burr A., Univ. of Wisconsin, Madison, Wis. 1913.
Beach, J. R., University Farm., Davis, Cal. 1916.
Bear, Fred Louis, Effingham, Ill. 1915.
Bear, Harry H., 26 W. Main St., Mt. Joy, Pa. 1915.
Beattie, Joseph Gilmore, Box 39, N. Portland, Ore. 1915.
Beavers, Glenn R., Arlington, Ia. 1916.
Beavers, Joseph A., Canton, Miss. 1915.
Beck, Walter H., Wray, Colo. 1915.
Becker, Chas. J., Room 1108, Jefferson Co. Savings Bank Bldg., Birmingham Ala. 1916.
Becksham, Louis Edgar, 2221 Seventh St., Tuscaloosa, Ala. 1916.
Beckwith, Joseph W., Shullsburg, Wis. 1916.

- Beebe, Ward L., Beebe Laboratories, St. Paul, Minn. 1916.
 Beechy, Levi P., 48 Federal Bldg., Columbus, Ohio. 1915.
 Beere, Chas. H., Brown Place, Waterbury, Conn. 1916.
 Behler, Clayton R., Box 338, Sacramento, Cal. 1916.
 Behner, Christian Frederick, 414 Main St., Marshall, Ill. 1915.
 Behnke, A. E., Federal Bldg., Milwaukee, Wis. 1916.
 Behrens, Edward Elias, 2121 N. 7th St., Philadelphia, Pa. 1916.
 Behrens, Grover J., 610 South 3rd St., Evansville, Ind. 1915.
 Beletski, Theo., Wasco, Oregon. 1916.
 Bell, John Benson, Pasadena, Cal. 1916.
 Bell, Ralph Mack, 1102 Hilton Ave., Utica, N. Y. 1916.
 Bell, Wm. M., 609 Broadway, Nashville, Tenn. 1916.
 Bell, Wm. R., 423 Dufferin Ave., London, Ont. 1916.
 Belloff, L. J., 65 Peace St., New Brunswick, N. J. 1916.
 Bemis, H. E., Iowa State College, Ames, Ia. 1916.
 Bender, Harry Ellsworth, Lititz, Pa. 1915.
 Benjamin, Frank H., Federalsburg, Md. 1913.
 Bennett, S. E., Woodworth, Wis. 1915.
 Benson, Eugene R., No. 710 Ogden Ave., Superior, Wis. 1915.
 Benson, Lester A., Rolette, N. D. 1916.
 Berg, Adolf, Doylestown, Pa. 1913.
 Berg, Elmer W., No. 106 Spruce Place, Minneapolis, Minn. 1916.
 Berg, John A., Lock Box 34, Pender, Neb. 1916.
 Berg, Wm. N., B. A. I., Washington, D. C. 1916.
 Bergh, Henning E., Suisun, Cal. 1915.
 Bergman, H. D., 711 Hodge Ave., Ames, Ia. 1916.
 Bernath, Robert I., Wauseon, Ohio. 1916.
 Bertram, E. L., National Stock Yards, Ill. 1915.
 Bescoby, Bernard A., Emerson, Man. 1915.
 Best, W. R. L., Bureau of Agri., Manila, P. I. 1915.
 Bethel, Bailey O., College Sta., Tex. 1916.
 Betts, Roy S., Lost Nation, Ia. 1916.
 Biggs, Anson W., Bentley, Kans. 1915.
 Birch, Raymond Russell, R. F. D. No. 3, Ithaca, N. Y. 1916.
 Bird, Robert H., Greeley, Colo. 1916.
 Birmingham, Charles F., Ovid, Mich. 1916.
 Bittick, Samuel G., 810 Main St., Fort Worth, Tex. 1916.
 Black, Judson, Richmond, Mich. 1915.
 Blackstock, M. R., Spartansburg, S. C. 1916.
 Blackwell, John E., care Hull and Dillon, Pittsburgh, Pa. 1915.
 Blackwood, Allister Chester, No. 1309 11th St. W., Calgary, Alta.
 1916.
 Blair, Bruce, 350 Lafayette St., New York, N. Y. 1915.
 Blair, Wm. Reid, New York Zoo Park, New York, N. Y. 1916.
 Blakeley, Chester L., 306 Main Ave., Gardiner, Me. 1915.
 Blanche, George W., Belle Plain, Ia. 1915.
 Blatchford, Frank M., Brighton, Mich. 1915.
 Blattenberg, J. H., 128 South Union St., Lima, Ohio. 1915.

- Bleecker, Arthur B., Lake Mills, Wis. 1916.
 Boerner, Frederick, Jr., 5632 Pine St., Philadelphia, Pa. 1915.
 Bohaboy, Anton W., Prague, Neb. 1916.
 Bolander, Fred Jourette, Brownwood, Tex. 1915.
 Bolger, David L., 35 Ash St., Cambridge, Mass. 1916.
 Bollinger, A. F., 2218 Albermarle Road, Brooklyn, N. Y. 1915.
 Bolser, Felty A., 1200 Race St., New Castle, Ind. 1916.
 Bond, James Ralston, Cheyenne, Wyo. 1915.
 Bone, David R., 900 Bloor St., Toronto, Ont. 1916.
 Bonnikson, Henry P., 2226 Parker St., Berkeley, Cal. 1916.
 Boor, Orville L., 110 N. Walnut St., Muncie, Ind. 1916.
 Borden, C. R., 7 Adams St., Taunton, Mass. 1915.
 Bose, Robert G., 414 Grand Ave., Troy, N. Y. 1916.
 Blossenberger, W. P., Williams, Ia. 1916.
 Bosshart, John K., 11 Main St., Camden, N. Y. 1916.
 Bestrom, A., Lincoln, Nebr. 1916.
 Botkin, Gilbert E., Mooreland, Ind. 1916.
 Bott, Anthony E., 215 Winstanley Ave., East St. Louis, Ill. 1916.
 Boucher, W. A., 28 Valley St., Pasadena, Cal. 1916.
 Boucsein, Gustav L., Spring Valley, Minn. 1916.
 Bourne, Richard F., 1336 East 15th St., Kansas City, Mo. 1916.
 Boyes, Elliot D., Boissevain, Man. 1916.
 Bowker, Geo. W., Van Horn, Ia. 1916.
 Bowne, Frank, Paris Crossing, Ind. 1916.
 Boyce, Walter, 20 P. O. Bldg., Kansas City, Kans. 1916.
 Boyd, Benj. W., Shirley, Mont. 1916.
 Boyd, Chas. W., 825 North Ave., Pittsburg, Pa. 1915.
 Boyd, Henry, Essex, Ont. 1916.
 Boyd, H. W., Nyack, N. Y. 1915.
 Boyd, James, 505 S. 2nd St., San Jose, Cal. 1916.
 Boyd, Ralph H., AviFla, Ind. 1916.
 Boyd, Robert, 8th U. S. Field Artillery, Ft. Bliss, Texas. 1916.
 Boynton, William H., Bureau of Agriculture, Manila, P. I. 1915.
 Brach, M. W., Hales Corners, Wis. 1916.
 Bradley, Chas. A., Marion, Ia. 1916.
 Braginton, Fred, 1934 N. New Jersey St., Indianapolis, Ind. 1915.
 Brainard, E., Memphis, Mo. 1916.
 Braisted, William, 150 Prospect Ave., Brooklyn, N. Y. 1913.
 Brandenberg, T. O., Lakota, N. D. 1916.
 Branson, Roscoe Arthur, R. R. 1, Wichita, Kans. 1915.
 Brashier, Earl S., 2533 State St., Chicago, Ill. 1915.
 Bratten, J. W., Lebanon, Ohio. 1916.
 Brawner, H. K., Livingston, Mont. 1916.
 Bray, F. O., Arcadia, Ind. 1916.
 Bray, Thomas A., Box 354, El Paso, Tex. 1915.
 Brazenall, Thomas, Bury, Que. 1916.
 Brazie, F. E., Harlan, Ia. 1915.
 Breed, C. S., 645 West 160th St., New York, N. Y. 1915.

- Breed, Frank, 1320 Main St., Kansas City, Mo. 1916.
Brenton, Willis L., 224 W. Alexandrine Ave., Detroit, Mich. 1916.
Brett, Geo. W., 1636 30th St., N. W., Washington, D. C. 1915.
Bretz, S. E., Nevada, Ohio. 1914.
Bremer, Sam'l E., Live Stock Sanitary Bld., Harrisburg, Pa. 1916.
Brill, Jos. A., Dow City, Ia. 1916.
Brimhall, S. D., Mayo Clinic Bldg., Rochester, Minn. 1916.
Brod, Wm., 22 E. Ross St., Lancaster, Pa. 1916.
Broderick, Wm. H., 2475 Massachusetts Ave., Cambridge, Mass. 1916.
Bromaghin, Walter, Belle Plaine, Minn. 1916.
Bronson, Ely M., 2946 N. Capitol Ave., Indianapolis, Ind. 1913.
Brookbank, Roscoe E., Seville Apts., Washington, D. C. 1915.
Brooks, C. S., Hollister, Cal. 1916.
Brooks, S. S., Hamilton Ave. & 16th St., Brooklyn, N. Y. 1915.
Brossard, G. J., 2 Fiefield Row, Ashland, Wis. 1916.
Brosnan, Edward E., 39th and Woodland Ave., Philadelphia, Pa. 1916.
Brotheridge, H. J., 3 16th St., Brooklyn, N. Y. 1913.
Broude, Harry F., 516 E. State St., Harrisburg, Pa. 1913.
Brower, Geo. W., Q. M. Dept., Manila, P. I. 1916.
Brown, Arthur, Sarnia, Ont. 1916.
Brown, F. F., 1336 E. 15th St., Kansas City, Mo. 1915.
Brown, Frank H., Fortville, Ind. 1915.
Brown, Herbert Austin, Box 428, Victoria, B. C. 1915.
Brown, Lyman D., S. Broadway, Hamilton, Mo. 1916.
Brown, Peter B., Meriden, Conn. 1916.
Brown, Sylvester, 122 S. Union St., Traverse City, Mich. 1915.
Brown, Walter A., 220 South Champion Ave., Columbus, Ohio. 1916.
Brown, W. W., Liberty, Ida. 1916.
Brownlee, Wm. F., Kirkwood, Ill. 1916.
Browning, George W., Box 399, La Grange, Ga. 1915.
Browning, P. H., 66 N. San Pedro St., San Jose, Cal. 1916.
Bruce, Edward A., Experimental Farm, Agassiz, B. C. 1916.
Bruns, George H., 4 Live Stock Record Bldg., Chicago, Ill. 1916.
Bryans, Joseph W. E., Lansford, N. D. 1915.
Bryant, Albert E., Menomonie, Wis. 1916.
Bryant, John B., Trinidad, Col. 1916.
Buchanan, Henry, Thamesville, Ont. 1916.
Buchtel, John T., Lockhart, Texas. 1915.
Buck, John M., B. A. I., Washington, D. C. 1915.
Buck, Samuel H., Marquette, Mich. 1916.
Buckingham, David E., 2115 14th St. N. W., Washington, D. C. 1916.
Buckley, John M., 600 Carlton Ave., Brooklyn, N. Y. 1915.
Buckley, John S., College Park, Md. 1915.
Buckley, Samuel S., College Park, Md. 1915.
Buencamino, Victor, 2229 Azcarraga, Manila, P. I. 1915.

- Buller, John J., 944 4th St., Santa Monica, Cal. 1915.
Bullivant, James, Spokane, Wash. 1914.
Bullock, John L., Creedmoor, N. C. 1915.
Bundy, Edward A., 2346 Hudson Ave., Ogden, Utah. 1916.
Burdett, Cyril H., 5th and Commercial Sts., Centralia, Kan. 1916.
Burkland, Herman W., 475 N. Boulevard Ave., Atlanta, Ga. 1915.
Burley, Arthur James, Highland House, East Central Ave., Albuquerque, N. M. 1916.
Burnett, Samuel H., 410 University Ave., Ithaca, N. Y. 1916.
Burnham, F. E., 728 Ogden Ave., Superior, Wis. 1916.
Burns, Albert H., Hepler, Kans. 1916.
Burr, Alexander, Old Court House, Boston, Mass. 1914.
Burrows, Samuel, 2317 East 89th St., Cleveland, Ohio. 1915.
Burson, W. M., Athens, Ga. 1916.
Burt, James Henry, 800 Poyntz Ave., Manhattan, Kans. 1915.
Bushnell, Fred F., Box 362, Harvard, Ill. 1916.
Bushong, J. P., 603 Roumania Bldg., Baton Rouge, La. 1916.
Busman, Herman, P. O. Bldg. S. S. Station, Omaha, Nebr. 1916.
Butin, George E., 1612 W. 16th St., Kansas City, Mo. 1915.
Butler, George W., 315 Federal Bldg., Indianapolis, Ind. 1916.
Butterfield, Orlin F., Libertyville, Ill. 1915.
Butters, S. J., Box 335, Renville, Minn. 1916.
Butz, Frank R., 3116 Spring Grove Ave., Cincinnati, Ohio. 1915.
Buzzard, David K., Nappanee, Ind. 1916.
Byerrum, Roswell O., 400 E. 2nd St., Muscatine, Ia. 1916.
Byers, M. V., Broken Bow, Nebr. 1915.
Byrd, Atville, 2406 E. 9th St., Kansas City, Mo. 1915.
Cady, Bert J., Univ. of California, Berkeley, Cal. 1915.
Cady, Henry, 23 Washington St., Gloversville, N. Y. 1915.
Cady, P. L., Fremont, Nebr. 1915.
Cahill, Edward A., 561 Westford St., Lowell, Mass. 1915.
Cahill, F. M., 9th and Mary Sts., St. Joseph, Mo. 1916.
Caldwell, J. H., 16 4th St. S. E., Medicine Hat, Alta. 1915.
Caldwell, Robert A., 6th and Grayson Sts., Berkeley, Cal. 1916.
Caldwell, Wm. A., Edgewood, Cal. 1915.
Calkins, R. C., Fairbury, Ill. 1915.
Calldemeier, Edwin, 2121 W. Broadway, Louisville, Ky. 1916.
Callicote, J. K., 2 East 4th St., Oklahoma City, Okla. 1914.
Cambon, Ferdinand J., 303 Perrin Bldg., New Orleans, La. 1916.
Cameron, Alne Edward, Lethbridge, Alta. 1915.
Cameron, H. M., Springville, Ia. 1916.
Campbell, Delwin M., 9 So. Clinton St., Chicago, Ill. 1916.
Campbell, John N., Truman, Minn. 1916.
Cant, Wm. John, Erie, Ill. 1915.
Cardona, Hipolito, Fort Valley, Ga. 1916.
Carley, A. A. H., 177 Brant Ave., Brantford, Ontario. 1916.
Carlos, Tixto A., 2112 Azcanaga St., Manila, P. I. 1916.
Carmack, Ralph W., Dana, Ind. 1915.

- Carney, Stephen J., 745 Northrup St., Sta. E., Portland, Ore.
Carnrite, James Schuyler, Fort Plain, N. Y. 1916.
Carpenter, Howard, Detroit, Mich. 1916.
Carpenter, Ira V., North Liberty, Ind. 1916.
Carr, Wm. R., 816 San Pedro St., Los Angeles, Cal. 1916.
Carroll, Arthur N., 301 W. 3rd St., Pueblo, Colo. 1916.
Carroll, Thos. B., 106 N. 2nd St., Wilmington, N. C. 1916.
Carson, Geo. W., Lake Mills, Ia. 1916.
Carson, James R., Cicero, Ind. 1914.
Carstenson, L. P., Columbus, Nebr. 1915.
Carter, Alva B., Elkhorn, Wis. 1915.
Carter, E. B., Austin, Minn. 1916.
Carter, Geo. H., 219 Tuscola St., Saginaw, Mich. 1915.
Carter, Joseph E., 70 4th St., N., Fargo, N. D. 1914.
Carter, Rolla E., 619 Ohio Ave., Long Beach, Calif. 1915.
Carter, R. W., Rancocas Stock Farm, Jobstown, N. J. 1916.
Carver, Hubert C., Higginsville, Mo. 1916.
Case, C. H., 50 E. Buehtel Ave., Akron, Ohio. 1915.
Case, Leonard N., Honolulu, T. H. 1913.
Casey, Charles M., 307 Fabius St., Syracuse, N. Y. 1915.
Cash, Geo. B., 464 Bathurst St., Toronto, Ont. 1916.
Casper, George T., 419 W. Fruit Ave., Albuquerque, N. Mex. 1916.
Castor, Thos., 4914 Frankfort Ave., Philadelphia, Pa. 1916.
Caughman, Fred P., Columbia, So. Car. 1916.
Cavelle, Edwin B., Northville, Mich. 1915.
Cawley, A. O., Lewisburg, Pa. 1916.
Cecil, Joseph D., Box 284, Waterloo, Ia. 1916.
Chamberlain, Frank W., Box 1022, East Lansing, Mich. 1916.
Chamberlin, Leroy Mylton, 2503 Hamlin St., N. E., Washington, D. C. 1915.
Channing, Charles E., Q. M. Dept., Washington, D. C. 1916.
Chapin, Chester E., Fremont, Ind. 1916.
Chapman, George W., Webster, S. D. 1915.
Chase, Charles S., Bay Shore, Long Island, N. Y. 1916.
Cheney, Alonzo Henry, Polson, Mont. 1916.
Cheney, Bailey E., Health Dept., Corpus Christi, Tex. 1915.
Cheney, George Leroy, 265 Park Ave., New Haven, Conn. 1915.
Cherry, Allen E., Manila, P. I. 1916.
Chesley, G. E., 215 Huntington St., Rochester, N. H. 1915.
Chesterman, R. L., 606 E. Clay St., Richmond, Va. 1916.
Chisholm, Joseph P., Lisbon, N. D. 1915.
Chrisman, Wm. G., Blacksburg, Va. 1916.
Christian, Robert V., 1018 Houston St., Manhattan, Kans. 1916.
Christiansen, Oren A., 4319 Calumet Ave., Chicago, Ill. 1915.
Christie, Norman Douglas, Box 616, Regina, Sask. 1916.
Christie, Victor, Cardston, Alberta. 1916.
Christopher, Ralph E., Mason City, Ia. 1916.
Church, Harry R., Wilkesbarre, Pa. 1916.

- Churchill, Thos. W., Care of J. T. Milliken & Co., St. Louis, Mo. 1916.
- Clancy, J. B., Amberston Farm, Edgemont St'n., East St. Louis, Ill. 1916.
- Clapp, Walter H., Dresden, Ont. 1916.
- Clark, Chas. H., % E. Clark, McCords, Mich. 1916.
- Clark, Clarence W., Rice Lake, Wis. 1915.
- Clark, Curtis Alfred, College Corner, Ohio. 1915.
- Clark, David Bert, Purdue Univ., Lafayette, Ind. 1915.
- Clark, Henry D., 69 High St., Fitchburg, Mass. 1916.
- Clark, Roy Ralph, Theo. N. Vail School of Agriculture, Lyndon Center, Vt. 1916.
- Clark, W. G., Box 196, Marinette, Wis. 1916.
- Clark, Burnett L., Monticello, Wis. 1916.
- Clawson, C. A., 2445 Talbott Ave., Indianapolis, Ind. 1916.
- Clayton, Chas. E., 297 West 55th St., New York, N. Y. 1916.
- Clegg, Robert, Woodbridge, Ont. 1916.
- Clemons, W. E., Granville, Ohio. 1916.
- Clere, Ralph W., East Syracuse, N. Y. 1916.
- Cleveland, Edgar Charles, Jr., Cattaraugus, N. Y. 1915.
- Cleveland, Walter J., Havelock, Ia. 1915.
- Cliffe, G. W., 119 West Johnson St., Upper Sandusky, Ohio. 1916.
- Cline, Clifford M., Box 298, Maryville, Mo. 1916.
- Cline, J. D., Clarion, Ia. 1916.
- Close, F. W., Lewiston, Ida. 1915.
- Closson, Gardner W., 131 Philadelphia St., Anaheim, Cal. 1915.
- Cochran, D. W., 19 Vestry St., New York, N. Y. 1916.
- Cochran, Willard N., Trenton, Tenn. 1916.
- Cochrane, Robert E., 450 Greenbush St., Milwaukee, Wis. 1916.
- Coffeen, Robert J., 225 North 2nd St., Stillwater, Minn. 1915.
- Cole, Guy T., 2235 W. 14th St., Oklahoma City, Okla. 1916.
- Collett, Howard Barker, care of Burns & Co., Calgary, Alta. 1915.
- Collins, Frank, 320 N. 6th St., Monroe, La. 1916.
- Collins, Fred W., Madison, Nebr. 1916.
- Collins, George J., West Point, Nebr. 1916.
- Collins, Leonard, Stanton, Nebr. 1915.
- Collins, Robert E., 256 Monroe St., Memphis, Tenn. 1915.
- Colton, Chas. L., 99 Ann St., Hartford, Conn.
- Commins, Frederick E., 119 Cortland Ave., San Francisco, Cal. 1916.
- Comstock, David B., 175 Jay St., Albany, N. Y. 1915.
- Cone, Michael, Pittsfield, Mass. 1916.
- Connell, Clare V., N. 2nd St., Decatur, Ind. 1915.
- Conrad, Burton W., Sabetha, Kans. 1914.
- Constable, G. W., Fort Bliss, Tex. 1916.
- Cook, B. L., Lake City, Minn. 1916.
- Cook, F. G., 220 S. Main St., Paris, Texas. 1916.
- Cook, J. W., Brownsville, Ore. 1915.

- Cook, L. P., 3116 Spring Grove Ave., Cincinnati, Ohio. 1915.
Cook, Robert H., 1127 Keele St., Toronto, Ont. 1915.
Cooley, A. S., State Veterinarian, Columbus, Ohio. 1916.
Cooper, Edward, R. F. D. No. 3, Sunman, Ind. 1915.
Cooper, J. M., 711 Plum St., Cincinnati, Ohio. 1915.
Cophithorn, Harry K., Chelsea, Mass. 1916.
Coppess, S. A., Waterville, Wash. 1916.
Corbin, Cecil J., Pawling, N. Y. 1915.
Corcoran, Michael, Box 142, Augusta, Kans. 1915.
Corn, Samuel, 5518 Market St., Philadelphia, Pa. 1913.
Cornman, Ernest L., Marietta, Pa. 1916.
Corwin, George E., Canaan, Conn. 1916.
Corwin, Willis T., Pine Island, Minn. 1915.
Cosford, Samuel E., Box 322, Beatrice, Nebr. 1916.
Cotton, Chas. E., 615 4th Ave., Minneapolis, Minn. 1916.
Cotton, Wm. E., 3242, 38th St., N. W., Washington, D. C.
Cottrill, H. B., Sand Fork, W. Va. 1915.
Coughlin, John G., Edina, Mo. 1916.
Courtright, John M., Lathrop, Mo.
Couture, J. A., 49 Garden St., Quebec, Que. 1916.
Couture, Jas. N. L., 65 Walker St., Montreal, Que. 1916.
Cowgill, Daniel L., Rio, Wis. 1915.
Cox, Abraham G., Carlisle, Ind. 1915.
Cox, Harry B., 1516 Snyder Ave., Philadelphia, Pa. 1916.
Cox, Walter P., 7 N. Carey St., Baltimore, Md. 1915.
Cox, Walter R., Clio, Mich. 1916.
Cox, Wm., Mayville, Mich. 1916.
Coxe, S. A., 140 9th St., Brandon, Man. 1915.
Cozier, Carl, 320 Prospect St., Bellingham, Wash. 1916.
Crabb, Lewis C., Fort Worth, Tex. 1916.
Craig, D. E., Edmore, N. D. 1916.
Craig, Robert A., 621 Owen St., Lafayette, Ind. 1915.
Craig, Thomas F., Hampden, N. D. 1915.
Craig, W. B., 216 North Meridian St., Indianapolis, Ind. 1916.
Cranwell, John James, 642 West Pike St., Clarksburg, W. Va. 1916.
Crawford, Harry C., 38 Lexington Ave., New York, N. Y. 1916.
Crawford, James E., Far Rockaway, Long Island, N. Y. 1916.
Crawford, J. H., Harvard, Ill. 1916.
Creamer, J. M., 5th and Taylor St., Portland, Ore. 1915.
Creech, G. Tinsley, 4363 9th St., N. W., Washington, D. C. 1916.
Crewe, W. F., Bismarek, N. D. 1915.
Crisler, Lewis H., Covington, Ky. 1916.
Crisler, Otto S., Agr. Exp. Station, Lexington, Ky. 1916.
Crocker, Walter James, 39th and Woodland Ave., Philadelphia, Pa. 1915.
Crump, Leroy S., Ft. Atkinson, Wis. 1916.
Culver, Frederick W., Longmont, Colo. 1915.
Cummins, Wm. M., Eagle Pass, Tex. 1916.

- Cunningham, A. E., 3826 Carnegie St., S., E. Cleveland, O. 1915.
Cunningham, Elmer E., 106 Indiana Ave., Valparaiso, Ind. 1915.
Curl, Chas. M., R. R. No. 1., Highland Park, Mich. 1916.
Curran, Matthew John, 67 Willis St., New Bedford, Mass. 1916.
Curry, J. M., 995 Main St., Hartford, Conn. 1916.
Curtis, Wilbur A., Iloilo Iloilo, P. I. 1915.
Cusack, Frank L., Carrington, N. D. 1915.
Custis, Howard H., La Jara, Colo. 1916.
Dallas, John T., Provo, Utah. 1916.
Dalrymple, W. H., Baton Rouge, La. 1916.
Damman, Arthur J., 749 12th Ave. E., Vancouver, B. C. 1916.
Danforth, Arthur L., 103 Orchard St., Watertown, N. Y. 1916.
Danielson, Leopold A., Madera, Calif. 1916.
Darby, R. N. G., Barrington, Ill. 1916.
Dardis, Thos. L., 505 So. Sutter St., Stockton, Calif. 1916.
Darrah, George D., 648 Hall St., Manchester, N. H. 1915.
Darrow, John Henry, Jr., 78 N. Hamilton St., Poughkeepsie, N. Y. 1915.
Dauber, Chas. C., 107 N. Clay St., Sturgis, Mich. 1916.
Daubigny, F. T., 12 Rue St. Denis, Montreal, Que. 1914.
Daugherty, T. E. Danville, Ind. 1913.
Dauth, Albert, Coteau Du Lac, Que. 1916.
Davenport, Miles L., Fergus Falls, Minn. 1916.
Davidson, F. N., Buhl, Ida. 1916.
Davidson, George H., Rugby, N. Dak. 1916.
Davidson, Wm. A., Exchange Bldg., S. St. Joseph, Mo. 1916.
Davis, Benj. F., Box 509, Douglas, Wyo. 1915.
Davis, Harry Emerson, Arlington, S. Dak. 1915.
Davis, William L., B. A. I., So. Omaha, Nebr. 1914.
Davison, Elwin T., Athenia, N. J. 1916.
Davitt, M. H., 525 N. Main St., Palmer, Mass. 1915.
Day, Frank J., 50 Rhode Island Ave., N. W., Washington, D. C. 1915.
Day, L. Enos, 4193 S. Halsted St., Chicago, Ill. 1916.
Deadman, Chas. A., 311 E. Main St., Madison, Wis. 1915.
Decker, E. J., 16 William St., Far Rockaway, Long Island, N. Y. 1915.
Deiling, N. J., Dallas Center, Ia. 1916.
Dell, Jesse App'n, 16 and Pacific Aves., Los Angeles, Calif. 1916.
Dellert, R. B., 568 Banning St., Winnipeg, Man. (Mail returned). 1915.
DeMilly, J. W., Tallahassee, Fla. 1916.
Deming, Chas. W., 2040 Knoxville Ave., Peoria, Ill. 1916.
Deming, S. A., Ida Grove, Ia. 1915.
DeMotte, Lee, Petersburg, Ind. 1915.
Denison, Wm. K., Bemidji, Minn. 1915.
DeRonde, John D., 72 E. 82nd St., New York, N. Y. 1915.
DeSerpa, John A., Box 614, Oxnard, Cal. 1916.

- DeTray, E. M., 840 Scott St., Napoleon, O. 1916.
Deubler, Ernest C., Wayne, Pa. 1915.
Deubler, Ezra S., Narberth, Pa. 1916.
Devereaux, John L., 20 Brook St., Waterbury, Conn. 1915.
DeVine, John F., Goshen, N. Y. 1916.
Dick, George A., Kane, Pa. 1915.
Dickey, Geo. W., 319 N. Weber St., Colo. Springs, Colo. 1916.
Dickson, John, 444 Federal Bldg., Denver, Colo. 1915.
Dillahunt, Peter A., R. F. D. No. 7, Springfield, Ohio. 1916.
Dillon, L. Ray, 107 N. Grand Ave., Pueblo, Colo. 1915.
Dimock, Wm. Wallace, Iowa State College, Ames, Ia. 1915.
Dingley, Ernest C., 5335 DeLancey St., Philadelphia, Pa. 1915.
Dinse, Alfred J., Box 161, Jackson, Ga. 1916.
Dinwoodie, John T. E., Brookings, S. D. 1916.
Ditewig, George B., B. A. I., Washington, D. C. 1915.
Ditto, John K., Pleasureville, Ky. 1915.
Divine, John P., Ballston, Va. 1914.
Dixon, C. Price, Old Fire House, Charlottesville, Va. 1915.
Dixon, H. L., Box 616, Regina, Sask. 1916.
Dobbins, Quiney C., Bedford, Ind. 1915.
Dobson, Charles C., Muncie, Ind. 1916.
Dock, Norton, 515 Ludlow Ave., Cincinnati, O. 1916.
Dodge, Wm. H., Leominster, Mass. 1915.
Dolan, Francis F., Willow City, N. Dak. 1916.
Donald, James S., 213 South Catherine St., Bay City, Mich. 1916.
Donaldson, Robert R., Argyle, Minn. 1916.
Donnelly, George J., 833 Telegraph Ave., Oakland, Cal. 1915.
Donohue, Robert John, 506 Alaska Bldg., Seattle, Wash. 1916.
Doran, John Thomas, 200 Market St., Beatrice, Nebr. 1915.
Dorian, Frank P., 35 Franklin St., Yonkers, N. Y. 1916.
Dorweiler, Philip O., West Bend, Ia. 1916.
Douglass, Frank J., 1235 St. Andrew St., New Orleans, La. 1915.
Downs, Aaron E., Mt. Sterling, Ohio. 1916.
Doyle, Lawrence S., Moncton, N. B. 1916.
Doyle, Simon A., 1764 Mission St. San Francisco, Cal. 1913.
Drake, Edw. J., Toledo, Wash. 1914.
Drake, M. W., 1308 Morris St., Philadelphia, Pa. 1916.
Drake, Wm. C., care of Y. M. C. A., St. Joseph, Mo. 1916.
Draper, James Powell, Lowell, Mich. 1915.
Dreher, Wm. Henry, Box 143, Oregon, Wis. 1916.
Dreppard, Samuel G., Flora, Ill. 1916.
Drexler, Joseph L., Thibodaux, La. 1915.
Drown, Frederick A., Kellogg, Ia. 1916.
Drury, James, 218 Michigan St., Ypsilanti, Mich. 1916.
Ducey, John, Newberry, Mich. 1916.
Ducey, M. D., L. Box 148, Merrill, Mich. 1916.
DuFrene, Alfred J., Glendive, Mont. 1916.
Dufresne, A. A., Longueuil, Que. 1915.

- DuJardin, Guillaume, 270 Craig St., E., Montreal, Que. 1915.
Duncan, Francis, Ithaca, Mich. 1916.
Dunleavy, M. J., 1324 Acoma St., Denver, Colo. 1915.
Dunn, Ralph C., College Station, Tex. 1916.
Dunphy, Chas. B., Mason, Mich. 1916.
Dunphy, G. W., East Lansing, Mich. 1915.
Dustan, Henry W., 25 De Hart St., Morristown, N. J. 1916.
Dykstra, Ralph R., 714 Houston St., Manhattan, Kans. 1916.
Dyson, Orion E., State Veterinarian, Springfield, Ill. 1916.
Eagan, Paul Herman, 422 4th Ave., N., Nashville, Tenn. 1915.
Eagle, Alex. F., 725 San Jose Ave., San Francisco, Cal. 1915.
Eagle, John G., 3924 Morrell Ave., Kansas City, Mo. 1915.
Eagle, Richard F., 449 Englewood, Chicago, Ill. 1916.
Eagle, Wm. W., 308 Central Ave., Kansas City, Kans. 1915.
Eastman, O. R., Gadsden, Ala. 1915.
Ebbitt, Richard, Grand Island, Nebr. 1915.
Eckert, Henry F., Markesan, Wis. 1916.
Edelin, Allen Alfred, 1602 Lagonda St., Fort Worth, Tex. 1915.
Edgington, Bruce H., Reynoldsburg, Ohio. 1916.
Edmiston, Geo. A. H., 431 Sixth St., Rapid City, S. Dak. 1916.
Edmonds, Elmer V., 603 Lincoln Ave., Mt. Vernon, Wash. 1916.
Edmunds, Arthur L., Franklin, N. H. 1916.
Edwards, Frank, Bureau of Agriculture, Manila, P. I. 1915.
Edwards, W. R., Box 216, Vicksburg, Miss. 1915.
Egan, John Milton, 1155 Golden Gate Ave., San Francisco, Calif. 1916.
Egan, Peter J., 1155 Golden Gate Ave., San Francisco, Calif. 1916.
Egan, William F., 1155 Golden Gate Ave., San Francisco, Calif. 1916.
Eichelberger, A. Martin, Box 884, Shreveport, La. 1916.
Eichhorn, Adolph, Lederle Antitoxin Laboratories, Pearl River, N. Y. 1916.
Eiseman, Frank T., 222 E. Main St., Louisville, Ky. 1913.
Eisenhower, Elmer C., Gypsum, Kas. 1915.
Eisenhower, James M., Schell City, Mo. 1915.
Eisenlohr, Herman M., Larimore, N. Dak. 1916.
Elery, Wilton, Audubon, Ia. 1915.
Eliason, Oscar H., State Veterinarian, Madison, Wis. 1916.
Elkin, Albert F., R. F. D. No. 1, Smicksburg, Pa. 1915.
Elkin, Joseph Homer, Smicksburg, Pa. 1915.
Ellenberger, W. P., 1359 Parkwood Place, Washington, D. C. 1916.
Elliott, Adam F., Milton, N. Dak. 1915.
Elliott, Chas. M., Seward, Nebr. 1915.
Elliott, Clarence L., 5434 S. 3rd St., So. St. Joseph, Mo. 1915.
Elliott, Edward W., Park River, N. Dak. 1916.
Elliott, Harold B., P. O. Box 167, Hilo, Hawaii. 1916.

- Ellis, Percy L., Box 272, Merrill, Ia. 1916.
Ellis, Robert W., 509 W. 152nd St., New York, N. Y. 1916.
Elmes, Jos. H., Eagle Bend, Minn. 1916.
Elsey, Mark A., Marion, O. 1915.
Elwell, Fred N., National Stock Yards, St. Claire Co., Ill. 1915.
Elzinga, Martin E., 319 Latgrave Ave., Grand Rapids, Mich. 1916.
Engle, Frank Phillip, Fort Worth, Tex. 1915.
Erickson, Chas. W., Marine Mills, Minn. 1916.
Ernst, John, Jr., 125 E. 4th South St., Salt Lake City, Utah. 1915.
Essex, John J., Chevy Chase, Md. 1916.
Estey, Cyrew B., Box 287, St. Cloud, Minn. 1916.
Etienne, Albert A., 67 Drummond St., Montreal, Que. 1916.
Evans, C. E., 719 Wisconsin St., Racine, Wis. 1915.
Evenson, Harry, Sacred Heart, Minn. 1916.
Everett, A. T., 24th and North Sts., So. Omaha, Nebr. 1915.
Ewalt, W. Austin, 22 Grand Ave., Mt. Clemens, Mich. 1915.
Exline, James C., 311 Live Stock Exch. Bldg., Denver, Colo. 1915.
Fabian, Arthur H., 421 Walworth St., Lake Geneva, Wis. 1916.
Faivre, Clovis F., Latrobe, Pa. 1916.
Fake, Charles Thompson, Granville, N. Y. 1915.
Falconer, Thomas, Box 303, Alexandria, Minn. 1915.
Fallon, Edw. J., 3372 A 16th St., San Francisco, Cal. 1916.
Farley, A. J., 47 Palm Pl., Pomona, Cal. 1916.
Farley, Edwin P., 1800 Meyers St., Paducah, Ky. 1916.
Farmer, Albion C., Berlin, N. H. 1915.
Farmer, Thomas, Grand Blanc, Mich. 1916.
Farrington, A. M., 1436 Chapin St., Washington, D. C. 1916.
Faulhaber, Louis G., 2840 W. North Ave., Chicago, Ill. 1916.
Faust, Otto, 209 Union Ave., Poughkeepsie, N. Y. 1916.
Faville, G. C., North Emporia, Va. 1913.
Feeley, Robert O., Clemson College, South Carolina. 1916.
Feist, Arnold Andrew, 156 Aurora Ave., St. Paul, Minn. 1915.
Ferguson, Chas. W., Auburn, Ala. 1916.
Ferguson, Thomas H., 421 Broad St., Lake Geneva, Wis. 1916.
Ferguson, W. P., 316 Second St., Grenada, Miss. 1916.
Ferneyhough, James G. (Mail returned). 1914.
Ferneyhough, R. E., Lee St., Warrenton, Va. 1915.
Fernsler, Frank U., 32 South 7th St., Lebanon, Pa. 1916.
Ferrand, William S., Gilmore City, Ia. 1916.
Ferro, R. B., Gordon Hotel, Lafayette, La. (Mail returned).
1915.
Feron, Eugene, 3718 Spring Garden St., Philadelphia, Pa. 1916.
Fetherolf, Geo. R., Reading, Pa. 1914.
Finkle, Ray C., Seymour, Wis. 1915.
Finley, Lester C., Lapel, Ind. 1916.
Fischer, Carl F., Garden City, Mo. 1916.
Fischer, Paul, Reynoldsburg, Ohio. 1915.
Fish, Pierre A., N. Y. State Vet. Col., Ithaca, N. Y. 1916.

- Fisher, Adam, 9 West 4th St., Charlotte, N. C. 1915
Fisher, Carl W., 420 A St., San Mateo, Cal. 1916.
Fisher, D., Grandin, N. Dak. 1915.
Fisk, Alexander G., 815 Willow St., Trinidad, Colo. 1916.
Fitch, Clifford Penny, 107 Brandon Place, Ithaca, N. Y. 1916.
Fitch, Earl W., care of Merrill & Soule Co., Arcade, N. Y. 1916.
Fitch, Edward Henry, McHenry, N. D. 1916.
Fitzpatrick, Dennis B., 3225 Woodland Ave., Philadelphia, Pa. 1916.
Flack, Edward R., Enterprise, Ore. 1916.
Flaherty, James J., 127 Meadow St., New Haven, Conn. 1916.
Flanary, W. F., St. Charles, Minn. 1916.
Fleming, Jas., 23 Federal Bldg., Kansas City, Kan. 1916.
Fleming, W. R., 25 Live Stock Exchange, Buffalo, N. Y. 1913.
Floeken, Charles F., Experiment Station, St. Anthony Park, Minn. 1916.
Flowe, Berry B., Raleigh, N. C. 1916.
Flowe, Homer P., Raleigh, N. C. 1916.
Flower, E. Pegram, Box 24, Baton Rouge, La. 1916.
Flowers, Royal G., 3rd and Main Sts., Ft. Worth, Tex. 1916.
Fogle, Charles W., Leipsic, Ohio. 1915.
Folse, Charles D., 1336 E. 15th St., Kansas City, Mo. 1916.
Folsom, Edward Graham, Room 503, Watson Bldg., Fairmount, W. Va. 1916.
Foltz, Wm. C., care City Health Dept., Lincoln, Neb. 1916.
Foos, Arthur C., 126 N. Laurel St., Hazelton, Pa. 1916.
Forbes, S. D., 301 Cameron St., Alexandria, Va. 1915.
Ford, Albert T., Wingham, Ont. 1916.
Forge, Louis A., 561 Washington St., Burlington, Wis. 1916.
Formad, Robert J., B. A. I., Washington, D. C. 1915.
Foshinder, Harry R., 6403 Hollywood Bldg., Los Angeles, Cal. 1916.
Foster, Allen A., 3813 Ross Ave., Dallas Tex. 1915.
Foster, J. D., 126 N. State St., Newtown, Pa. 1916.
Foster, Joab P., Selby, S. D. 1915.
Foster, Lloyd E., Greenfield, Ia. 1916.
Foster, Robert J., 9th U. S. Cavalry, Manila, P. I. 1915.
Foster, Samuel B., 927 Union Ave., Portland, Ore. 1915.
Foster, Thomas J., Monticello, Ill. 1915.
Foust Harry L., Agricultural College, N. D. 1916.
Fowler, W. J. R., 52 Pacific Ave., Toronto, Ont. 1916.
Fox, David F., Room 423 First Nat'l Bank Bldg., Oakland, Cal. 1916.
Fox, Leroy B., Bartlesville, Okla. 1916.
Francis, M., College Station, Tex. 1916.
Francoise, Wm. I., 605 East Ave., Kalamazoo, Mich. 1914.
Frank, John Williamson, Box 291, Nelson, B. C. 1916.
Franzman, Peter A., 5966 Lowe Ave., Chicago, Ill. 1916.

- Fraser, J. Heywood, New Glasgow, N. S. 1916.
Fraser, Thomas, 316 N. Henry St., Richmond, Va. 1915.
Fraser, Walter, 13th U. S. Cavalry, Columbus, N. M. 1915.
Fraser, Chas., 5052 Cottage Grove Ave., Chicago, Ill. 1915.
Frederick, Charles B., 412 N. Walnut St., Canton, Ohio. 1916.
Frederick, Harry, Box 584, Suffern, N. Y. 1915.
Frederick, Hiram J., College Hill, Logan, Utah. 1915.
Freed, B. M., 12 South Dock St., Sharon, Pa. 1916.
Freeman, Carl E., Carrizozo, New Mex. 1916.
Freeman, F. E., Buhl, Ida. 1915.
French, Alex. W., Cheyenne, Wyo. 1915.
French, C. F., Rockland, Me. 1916.
French, Wm. Harold, Redfield, S. D. 1913.
Frese, George L., 309 11th St., Toledo, Ohio. 1915.
Frey, Charles T., Box 106, River Point, R. I. 1915.
Frey, Jesse J., 3400 Indiana Ave., Chicago, Ill. 1916.
Fridirici, Ulysses, 204 Pine St., Tamaqua, Pa. 1915.
Friedheim, Louis, Box 103, Rock Hill, S. C. 1916.
Frost, Charles E., Stryker, Ohio. 1916.
Frost, Geo. P., 4527 Ravenswood Ave., Chicago, Ill. 1916.
Frost, James N., 919 East State St., Ithaca, N. Y. 1915.
Frost, Roy C., 1513 U St., N. W., Washington, D. C. 1915.
Frothingham, Langdon, 335 Bay State Road, Boston, Mass. 1916.
Fry, Hugh L., 125 E. Rush St., Kendallville, Ind. 1916.
Fuller, Claude E., Beach, N. D. 1915.
Fuller, George S., 170 Common St., Lawrence, Mass. 1915.
Fuller, George S., 1715 N. 12th St., Philadelphia, Pa. 1916.
Fuller, John Russell, 101 W. Commercial St., Weiser, Ida. 1916.
Fullington, Harry C., 6047 Greenwood Ave., Seattle, Wash. 1913.
Fulstow, Harry, Norwalk, Ohio. 1916.
Funkhouser, George M., 410 Main St., Lafayette, Ind. 1915.
Gain, J. H., State Farm, Lincoln, Nebr. 1916.
Gaines, Chas. H., Chilhowee, Mo. 1915.
Galbraith, Alister R., Garfield, Wash. 1916.
Gall, Wm., Mattawan, N. J. 1916.
Gallagher, Bernard A., B. A. I., Washington, D. C. 1916.
Gallivan, Michael V., Box 567, Lethbridge, Alberta. 1916.
Galloway, Peter F., 318 N. Henry St., Richmond, Va. 1915.
Gamble, Henry S., 1329 Gallatin N. W., Washington, D. C. 1915.
Gamrath, Carl L., 52 E. Washington St., Fairfield, Ia. 1915.
Gannett, Ray Willard, 74 Adams St., Brooklyn, N. Y. 1916.
Gardner, Chas. M., 331 Clackmass St., Portland, Ore. 1916.
Gardner, Chennie A., Morris, N. Y. 1916.
Gardner, J. P., Kingston, Ohio. 1916.
Garside, Peter, Bourbon, Ind. 1916.
Garvey, Jas. J., Alexandria, Va. 1916.
Gates, Wm. L., Clarksdale, Miss. 1915.
Gay, Carl W., University Farm, St. Paul, Minn. 1915.

- Gearhart, D. C., 215 S. St. Clair St., Pittsburgh, Pa. 1916.
Gearhart, Frank C., Bureau of Agriculture, Box 1362, Manila, P. I. 1915.
Geiger, Milton J., Crosswell, Mich. 1916.
Gemmil, A. D., 220 E. Livingston St., Celina, Ohio. 1916.
Genereux, D., 438 Amhurst St., Montreal, Que. 1916.
George, Harrison H., 235 Federal Bldg., Cleveland, Ohio. 1916.
George, Herbert H. S., P. O. Box 521, Kamloops, B. C. 1912.
George, John H., 60 Tiverton Ave., Toronto, Ont. 1916.
Gerber, D. W., 1207 N. Broadway, Oklahoma City, Okla. 1916.
Gerlach, G. H., Morenci, Mich. 1913.
Gibson, A., 1617 2nd St., North Birmingham, Ala. 1915.
Gibson, G. D., Adrian, Mich. 1915.
Gibson, Howard Renwick, Algona, Ia. 1915.
Gibson, James Irvine, State House, Des Moines, Ia. 1915.
Giffce, Joe W., 1816 Missouri Ave., South Side Station, Omaha, Nebr. 1916.
Gilchrist, Wm. T., 410 Church St., Norfolk, Va. 1915.
Giles, Walter M., Franklin, Tenn. 1915.
Gill, H. D., 337 E. 57th St., New York, N. Y. 1916.
Gillespie, John F., 446 Hudson Ave., Brooklyn, N. Y. 1916.
Gillie, Peter T., 22 E. First St., Mansfield, Ohio. 1915.
Gilliland, S. H., Widener Bldg., Philadelphia, Pa. 1916.
Giltner, L. T., B. A. I., Washington, D. C. 1916.
Giltner, Ward, East Lansing, Mich. 1916.
Gilyard, Arthur T., 74 Phoenix Ave., Waterbury, Conn. 1916.
Gimper, W. S., 1616 Boas St., Harrisburg, Pa. 1916.
Gleason, Matthew E., Folwerton, Tex. 1916.
Glendenning, C. G., 115 W. Washington St., Clinton Ill. 1916.
Glennon, Henry J., 148 Second St., Newark, N. J. 1915.
Glennon, James T., 27 Clay St., Newark, N. J. 1915.
Glover, Albert D., Newark, Mo. 1916.
Glover, George H., State Agri. College, Fort Collins, Colo. 1916.
Glynn, Lawrence L., 444 Federal Bldg., Denver, Colo. 1916.
Gohn, Horace M., St. Johns, Mich. 1915.
Goldberg, Samuel A., N. Y. State Vet. College, Ithaca, N. Y. 1916.
Golding, Cyril, Tulare St., P. O. Box 582, Dinuba, Cal. 1915.
Goodwin, Jas. Arthur, Lock Box 584, New Iberia, La. 1916.
Goodwin, Percy W., Wrights, Cal. 1916.
Gordon, George, Hanford, Cal. 1916.
Gordon, George, Gibson City, Ill. 1915.
Gordon, William D., 268 West Santa Clara St., San Jose, Cal. 1915
Gore, Truman E., 111 W. Pike St., Clarksburg, W. Va. 1915.
Gorsuch, Dickinson, Glencoe, Md. 1915.
Goss, Leonard W., Argicultural College, Manhattan, Kans. 1916.
Gould, J. H., 2nd F. A., Manila, P. I. 1915.
Gould, J. N., Worthington, Minn. 1916.

- Gow, Ronald M., State Veterinarian, Old State House, Little Rock, Ark. 1915.
- Grady, William J., Lankin, N. D. 1914.
- Graf, John, 2nd Ave. W., Cresco, Ia. 1915.
- Graff, Carl L. P., Bisbee, N. D. 1916.
- Graham, G. G., 1320 Main St., Kansas City, Mo. 1916.
- Graham, James, 115 Queen St., Germantown, Philadelphia, Pa. 1915.
- Graham, John J., West Queen Lane, Germantown, Philadelphia, Pa. 1914.
- Graham Leroy B., 369 S. 18th St., Cedar Rapids, Ia. 1915.
- Graham, Oswald Hood, Clinton, N. C. 1915.
- Graham, Ralph, Sedalia, Mo. 1916.
- Graham, Robert, Experiment Station, Lexington, Ky. 1916.
- Grapp, Gustav H., Port Deposit, Md. 1916.
- Grau, Jeppe Andrew, Box 124, S. Auburn, Nebr. 1916.
- Graves, Henry T., E. 201 15th St., Olympia, Wash. 1915.
- Gray, Fred Sumner, Box 561, Miles City, Mont. 1916.
- Graybill, Guy M., Milford Square, Pa. 1915.
- Graybill, Harry W., 1021 Paisy Ave., Long Beach, Cal. 1915.
- Greeder, Herman, Janesville, Wis. 1916.
- Green, Benj. F., Cumby, Tex. 1916.
- Green, L. Kenneth, 37 Knight St., Auburn, Maine. 1915.
- Greenwood, E. S., Laurens, Ia. 1916.
- Greenwood, Ross A., Phelps St., Painesville, Ohio. 1916.
- Greer, John, Saranac Lake, N. Y. 1916.
- Greeson, J. O., Kokomo, Ind. 1916.
- Gregory, Wm. G., Riverside Pharmacy, Fort Worth, Tex. 1916.
- Griffin, Will C., South Side Station, Omaha, Nebr. 1916.
- Griffith, J. W., Cedar Rapids, Ia. 1916.
- Griffith, Roscoe C., Jamestown, Ohio. 1916.
- Groff, Benjamin Warren, 20 North St., Massilon, Ohio. 1916.
- Grogan, Joseph P., 909 Ashland Ave., Baltimore, Md. 1916.
- Gross, Jno. L., Bureau of Agriculture, Manila, P. I. 1915.
- Gross, R. C., Elizabethtown, Pa. 1915.
- Grossman, James D., 117 Ash Ave., Ames, Iowa. 1916.
- Grove, Jno. S., 310 Federal Bldg., Oklahoma, Okla. 1915.
- Grover, Arthur L., 65 9th Ave., New York, N. Y. 1914.
- Groves, John W., 40 York St., Hamilton, Ont. 1915.
- Grubb, Chauncey, M., Box 202, Rockville, Md. 1915.
- Gruber, John N., Lexington, Nebr. 1916.
- Gruber, John T., 316 N. Main St., Marion, Ohio. 1916.
- Gruenwald, Geo. J., 1429 West 56th St., Cleveland, Ohio. 1916.
- Grutzman, Walter R., 8th Cavalry, Ft. Bliss, Tex. 1916.
- Guard, Willard F., Iowa State College, Ames, Ia. 1916.
- Guldager, Fred Howard, 304 Ridge St., Sacramento, Cal. 1913.
- Gunn, Nelson T., 528 W. Granite St., Butte, Montana. 1916.
- Gunster, Francis, Corvallis, Ore. 1916.

- Guyselman, P. C., 1st Ave., Monte Vista, Colo. 1916.
Gysel, Robert, 9333 Escanabe Ave., Chicago, Ill. 1916.
Hadley, Frederick B., Univ. of Wis., Madison, Wis. 1916.
Hadwen, Seymour, Agassiz, B. C. 1915.
Haffer,, John W., 49 Pearl St., Paterson, N. J. 1915.
Hagin, W. A., N. Y. State Vet. College, Ithaca, N. Y. 1916.
Haines, Albertson, W., Bristol, Pa. 1915.
Hall, Arthur G., Earlville, N. Y. 1916.
Hall, Clifford L., 126 North Park St., Wheeling, W. Va. 1916.
Hall, Maurice C., care Parke, Davis & Co., Detroit, Mich. 1916.
Hall, Orlan, Health of Animals Branch, Ottawa, Ont. 1915.
Halliday, Robert J., 21 West 32nd St., Bayonne, N. J. 1915.
Hallman, Elan T., 383 Sunset Lane, East Lansing, Mich. 1915.
Halloran, John L., Broad St., Stapleton, Staten Island, N. Y. 1916.
Hallquist, Ralph A., Box 182, Oslo, Minn. 1915.
Halstead, William E., 19 Judson St., Binghamton, N. Y. 1915.
Halton, John H., 123 G. St., Salt Lake City, Utah. 1915.
Halverson, Harold M., Box 354, Yankton, S. D. 1916.
Hamblet, C. A., 495 Varnum Ave., Lowell, Mass. 1916.
Hamilton, George W., 604 N. 10th St., E. St. Louis, Ill. 1915.
Hamilton, Herbert B., 79 Hillman St., New Bedford, Mass. 1915.
Hamilton, Howard M., Paris, Ky. 1916.
Hamilton, M., 364 Main St., Delhi, N. Y. 1916.
Hamilton, Robert, 639 Broughton St., Victoria, B. C. 1916.
Hammond, Harry J., Box 338, Sacramento, Cal. 1915.
Hammond, Wm. L., 444 Federal Bldg., Denver, Colo. 1916.
Handley, John Isaac, Box 8, West Raleigh, N. C. 1915.
Handley, Jno. M., Woodworth, Wis. 1916.
Haney, W. F., 1518 Ninth St., Modesto, Cal. 1916.
Hansen, Hans P., 216 E. Mill St., Austin, Minn. 1915.
Hansen, James W., 511 N. Lafayette St., Greenville, Mich. 1916.
Hanshaw, E., 125 Carlton Ave., Brooklyn, N. Y. 1916.
Hanson, H. D., Darien, Conn. 1915.
Hanson, Peter, 310 City Hall, Portland, Ore. 1916.
Hanvey, George A., Remount No. 2, Fort Sam Houston, Tex. 1916.
Hardenberg, James Ball, 39th & Woodland Ave., Philadelphia, Pa. 1916.
Hardman, Russell T., Kyger, W. Va. 1916.
Hargrave, J. C., Dominion Vet. Inst., Medicine Hat, Alta. 1916.
Haring, C. M., Div. of Vet. Science., Univ. of Cal., Berkeley, Cal. 1916.
Harkins, Malcome J., Care H. K. Mulford Co., Glenolden, Pa. 1915.
Harries, Thos. B., Saloniki Expeditionary Force, via England. 1915.
Harrington, E. T., 873 Broadway, S. Boston, Mass. 1916.
Harris, A. W., 78 Fourth Ave., Ottawa, Ont. 1915.
Harris, E. D., Casselton, N. D. 1916.
Harrison, W. F., 329 Broad St., Bloomfield, N. J. 1915.

- Harry, Charles Edward, Anita, Ia. 1915.
Harsh, Francis A., 326 Murray Ave., Minerva, Ohio. 1914.
Hart, Charles Henry, Hankinson, N. D. 1915.
Hart, George H., Health Office, City Hall, Los Angeles, Cal. 1916.
Hart, John P., Winchester, Ind. 1913.
Hart, Wm. J., Wetmore, Kans. 1915.
Harthill, Alexander, 707 Green St., Louisville, Ky. 1914.
Hartman, Wm. J., State College of Agriculture, Bozeman, Mont. 1916.
Haskins, Albert B., 321 East 3rd St., Davenport, Ia. 1916.
Hasselbalch, A. E., Edward, Nebr. 1914.
Hassloch, August, 400 West 50th St., New York, N. Y. 1916.
Havreberg, Arne H., Olivia, Minn. 1916.
Hawke, Walter L., Vet. Research Laboratory, Lethbridge, Alta.
Hawke, William Richard, Medicine Hat, Alta. 1912.
Hawkins, Joseph, 184 Stanton Ave., Detroit, Mich. 1913.
Haworth, Charles C., Donnellson, Ill. 1915.
Haxby, J. W., 6th St. & 3rd Ave., Clarinda, Ia. 1915.
Hay, Leopold, 5th & 1st Ave., Faribault, Minn. 1915.
Hayden, Charles Ernest, 108 Irving Place, Ithaca, N. Y. 1915.
Hayes, Fred M., Univ. Farm., Davis, Cal. 1916.
Hayes, Jesse, Alexandria, Va. 1915.
Hayes, John J., 7 E. 42nd St., New York, N. Y. 1916.
Haynes, M. C., Springfield, Tenn. 1916.
Haynes, Wilford A., Jackson, Mich. 1916.
Hays, Clark H., P. O. Bldg., Kalamazoo, Mich. 1916.
Hazel, George A., Pleasantville, N. Y. 1913.
Hazlewood, Robert V., Bessemer, Ala. 1916.
Hazlet, Samuel K., Oelwein, Ia. 1915.
Heacock, Clyde C., Carlsbad, N. M. 1913.
Head, Cage, Wilton, Ala. 1916.
Head, Charles, Regina, Sask. 1913.
Healey, Thos. W., 461 North 2nd St., San Jose, Cal. 1916.
Heath, Warren E., Columbus, Mont. 1916.
Hecker, Frank, 1108 Jefferson Co. Savings Bank Bldg., Birmingham, Ala. 1915.
Hedley, Clark, Marion, S. C. 1915.
Hedrick, Horace A., 2606 Gilford Ave., Baltimore, Md. 1915.
Heer, Rufus S., 115 4th St., Platteville, Wis. 1916.
Heiney, Edgar, Hattiesburg, Miss. 1915.
Heller, Edward, Chilton, Wis. 1916.
Helmer, Jacob, 327 Madison Ave., Scranton, Pa. 1915.
Hemphill, John F., 428 Dexter St., Clay Center, Kans. 1916.
Henderson, E. P., Houlton, Me. 1916.
Henderson, Levi C., Box 666, Twin Falls, Ida. 1915.
Hendren, Oliver T., 6645 Ridge Ave., Philadelphia, Pa. 1916.
Hendren, S. G., 17 E. Market St., Lewistown, Pa. 1916.
Hendrick, M. Parks, 470 Walnut St., Meadville, Pa. 1916.

- Henneberger, W. B., Box 43, Oakland, Ore. 1916.
Hennessy, William J., 126 Front St., Worcester, Mass. 1915.
Henrich, Leo O., Vacaville, Cal. 1916.
Herbott, Julius W., 1326 N. Marshall St., Philadelphia, Pa. 1916.
Herndon, Franklin C., Rocky Mount, N. C. 1916.
Hernsheim, J. T., 6222 Lakewood Ave., Chicago, Ill. 1916.
Herr, T. J., 381 E. 83rd St., New York, N. Y. 1915.
Herring, Lawrence James, Wilson, N. C. 1916.
Herrold, Wm. C., South Side Station, Omaha, Nebr. 1916.
Herron, Moore Bryant, 1282 Pike St., Cannonsburg, Pa. 1915.
Hershey, Chas. E., Tiffin, Ohio. 1916.
Hershey, Samuel E., Lock Box 283, Charleston, W. Va. 1916.
Hess, Orlando B., Bio Chem. Div., Dept. of Agriculture, Washington, D. C. 1915.
Hickman, D. Elwyn, 333 W. Union St., West Chester, Pa. 1915.
Hickman, Thomas S., 1818 Cherry St., Kansas City, Mo. 1915.
Hicks, Floyd H., Allegan, Mich. 1916.
Hicks, Hazen H., 105 Custom House Bldg., San Francisco, Cal. 1916.
Hicks, Tunis, 642 Irving St., Washington, D. C. 1916.
Hiday, John L., Fortville, Ind. 1916.
Higbee, M. R., Albert Lea, Minn. 1916.
Higgins, Charles H., Experimental Farm, 196 Cartier St., Ottawa, Ont. 1916.
Hill, George H., Atkinson, Ill. 1916.
Hill, James, Tarlac, Tarlac Province, P. I. 1915.
Hill, Joseph G., Skaneateles, N. Y. 1913.
Hill, Robert C., West Alexandria, Ohio. 1915.
Hilliard, William A., 630 McMillan Ave., Winnipeg, Man. 1916.
Hilton, George, 126 Lewis St., Ottawa, Ont. 1916.
Hilton, Wm., 615 Spence St., Winnipeg, Man. 1915.
Hilty, Reuben, 619 Walnut St., Toledo, Ohio. 1916.
Himmelberger, Leo R., Fort Dodge Serum Co., Fort Dodge, Iowa. 1916.
Hinebauch, T. D., Tower City, N. D. 1915.
Hinkley, C. J., Carthage, S. D. 1915.
Hinkley, Emmet R., 738 Market St., Sandusky, Ohio. 1916.
Hoehn, Alvy M., Ottoville, Ohio. 1912.
Hoekzema, Otto Frederick, McBain, Mich. 1916.
Hogarty, John J., 1724 Webster St., Oakland, Cal. 1916.
Hogg, Edwin, 29 Butler Ave., Wilkes Barre, Pa. 1916.
Holden, E. H., 23 Sanford St., Springfield, Mass. 1916.
Hollander, Ferdinand, 4616 Corondelet St., New Orleans, La. 1915.
Hollingsworth, Frederick H., 39 4th St., Council Bluffs, Ia. 1915.
Hollingsworth, J. B., 105 Cambridge St., Ottawa, Ont. 1916.
Hollister, A. V., Clinton, Wis. 1916.
Hollister, Wm. L., Avon, Ill. 1916.
Holmes, W. B., 225 E. Washington St., Springfield, Ill. 1916.

- Holt, A. H., Charleston, W. Va. 1916.
Holt, Campbell L., Box 465, Norfolk, Va. 1915.
Hood, Archibald J., 910 Clauranald Ave., Montreal, Que. 1915.
Hoopes, Herbert, Bel Air, Md. 1915.
Hoover, Lee C., 11 So. 9th St., Richmond, Ind. 1916.
Hope, Frederick S., 134 N. Paxton St., Philadelphia, Pa. 1915.
Hopper, John B., 74 Maple Ave., Ridgewood, N. J. 1915.
Hopper, John G., Chesapeake City, Md. 1914.
Hornbaker, Jos. N., Front Royal, Va. 1916.
Horne, S. J., Stratton, Miss. 1916.
Horner, Glenn W., Westminster, Md. 1916.
Horner, Lewis D., Cor. Main St. & Bowen Ave., Woodstown, N. J. 1916.
Horstman, Edward, Newton, Miss. 1915.
Hoskins, Cheston M., 3452 Ludlow St., Philadelphia, Pa. 1915.
Hoskins, H. Preston, 30 Tireman Ave., Detroit, Mich. 1916.
Houchin, A. S., Newark, Del. 1915.
Houck, U. G., B. A. I., Washington, D. C. 1916.
Hover, E. V., Convoy, Ohio. 1916.
Howard, C. H., 271 Sheldon St., Houghton, Mich. 1915.
Howard, Clarence T., 11 N. Main St., Sullivan, Ind. 1916.
Howard, W. K., Houston Pk. Co., Houston, Tex. 1916.
Howe, Ivan G., Angelica, N. Y. 1916.
Howe, Walter E., 444 Federal Bldg., Denver, Colo. 1916.
Howell, Edgar C., Bishop, Cal. 1916.
Howett, Mark W., Brookville, Ohio. 1916.
Howle, Thos. Blake, Oxford, Ala. 1916.
Hoylman, John L., Franklin, Nebr. 1915.
Hoyman, Harry J., Livestock Exchange Bldg., So. St. Joseph, Mo. 1916.
Hubbell, Arthur D., 318 E. 2nd St., Los Angeles, Cal. 1916.
Hudson, Bentley F., Moweaqua, Ill. 1915.
Hudson, Percy Wilbur, Americus, Ga. 1915.
Hueben, Frank W., 1131 Riverview Ave., Kansas City, Kans. 1915.
Huebschmann, John, 625 S. 3rd St., Baltimore, Md. 1916.
Huelson, J., 348 W. 118 St., New York City, N. Y. 1916.
Huff, Logan B., Box 227, Aurora, Ill. 1915.
Huff, Wilson, 401 West Liberty St., Rome, N. Y. 1916.
Huffman, Lindney R., R. R. No. 7, Paris, Ky. 1916.
Huffman, Pleasant J., 104-5 Livestock Exchange Bldg., Fort Worth, Tex. 1913.
Hufnal, William Thomas, City Food Inspector, Port Arthur, Tex. 1913.
Hugins, Frank Almon, P. O. Bldg., South Side Sta., Omaha, Nebr. 1915.
Hull, Martin, 20 Federal Bldg., Kansas City, Kans. 1915.
Humphrey, Earl H., Santa Maria, Cal. 1914.
Humphreys, J. C., Chula, Mo. 1915.

- Hunt, Frank, 214 Washington St., Jamestown, N. Y. 1916.
Hunt, J. C. 84 N. Union St., London, Ohio. 1915.
Hurd, Ray B., 11th St. and 2nd Ave., Payette, Ida. 1916.
Hurst, Dan W., Box 218, Tecumseh, Neb. 1916.
Hurst, Wilbur H., Sioux Falls, S. D. 1916.
Hurt, Leslie M., 665 N. Fair Oaks Ave., Pasadena, Cal. 1916.
Husband, Aubrey G., 4th St., Belmont, Man. 1915.
Hutchinson, John, 7045 Emerald Ave., Chicago, Ill. 1915.
Huthman, G. H., 415 E. 7th St., Portland, Ore. 1915.
Hutton, John P., 350 Nold Ave., Wooster, Ohio. 1915.
Huyett, Walter G., East Market St., Wernersville, Pa. 1916.
Hyde, Thomas F., Brookville, Ind. 1916.
Hyland, Eugene H., Schuyler, Neb. 1915.
Hylton, Floyd D., Box 612, Longmont, Colo. 1916.
Ide, Almond H., 28 E. Elm St., Lowville, N. Y. 1916.
Imes, Marion, Room 22, Federal Bldg., Kansas City, Kans. 1916.
Ingram, F. A., Com. of Agriculture, Hartford, Conn. 1916.
Ingram, William L., Florence, Ala. 1916.
Irvine, D. A., 1127 Keele St., Toronto, Ont. 1916.
Irwin, Ivan B., Stonewall, Man. 1912.
Irwin, Samuel, 24 W. Jackson St., Battle Creek, Mich. 1916.
Irwin, W. G., 336 W. Main St., Carlisle, Ky. 1916.
Isbell, George P., East 9th St., Hopkinsville, Ky. 1914.
Ivens, Wm. H., 5328 Haverford Ave., Philadelphia, Pa. 1916.
Iverson, John P., Box 287, Sacramento, Cal. 1915.
Jackson, C. C., East Villard St., Dickinson, N. D. 1916.
Jackson, Frank B., Camden, Ohio. 1915.
Jackson, W. P., 429 Salem St., Chico, Cal. 1916.
Jacob, M., 312 W. Church Ave., Knoxville, Tenn. 1915.
Jacobs, Thomas B., Newberry, S. C. 1916.
Jaffray, Davis S., Jr., 209 N. Des Plaines St., Chicago, Ill. 1916.
Jago, Thomas E., Athens, Ga. 1916.
Jakeman, Harry W., University of Nevada, Reno, Nev. 1916.
Jakeman, Wm., Glace Bay, N. S. 1916.
Jakeman, W. W., Halifax, N. S. 1916.
James, Thomas D., 1123 Washburn St., Scranton, Pa. 1915.
James, Wm. H., 557 LaSalle Rd., Verdun, Que. 1915.
Jameson, John W., 817 Pleasant St., Paris, Ky. 1915.
Jarman, G. A., Chestertown, Md. 1915.
Jefferies, Jos. R., Columbus, N. M. 1916.
Jefferson, Joseph H., Chicago Jet., Ohio. 1915.
Jeffrey, Fred M., 1890 N. 12th St., Toledo, Ohio. 1915.
Jelen, Frank, Box 734, Cedar Rapids, Ia. 1915.
Jenkins, Elbert A., 2027 Morgan St., Shelbyville, Ill. 1915.
Jenks, Ralph C., 78 Croton Ave., Ossining, N. Y. 1915.
Jennings, C. G., Morris, Minn. 1916.
Jensen, H., 1320 Main St., Kansas City, Mo. 1916.
Jervis, Horace B. F., 1205 Lady St., Columbia, S. C. 1916.

- Jervis, James G., 3694 Victoria Drive, Vancouver, B. C. 1916.
- Jessen, Julius A., Shelby, Ia. 1916.
- Jewell, Charles H., 4th Cavalry, Schofield Barracks, Honolulu, Hawaii. 1916.
- Johannes, Conrad J., 22 Garfield Ave. S., Hamilton, Ont. 1916.
- John, Carl E., Buckhannon, W. Va. 1916.
- Johns, Clarence A., 120 W. Washington St., Medina, Ohio. 1916.
- Johnson, Aaron V., 103 E. Oat St., New Albany, Ind. 1915.
- Johnson, Homer, Bussey, Ia. 1916.
- Johnson, Howard C., Brighton, Ia. 1916.
- Johnson, Joseph, Union Stock Yards, Lancaster, Pa. 1915.
- Johnson, Levi E., 429 Pecks Ave., San Antonio, Tex. 1916.
- Johnson, Oscar Joseph, Box 661, Miles City, Mont. 1916.
- Johnson, Philip E., Dayton, Ia. 1916.
- Johnson, Ralph H., Woodhull, Ill. 1916.
- Johnston, J. Fred, St. John, N. B. 1916.
- Johnston, Nerls A., 21 Loren St., Wetaskiwin, Alta. 1916.
- Joly, A., 60 Silver St., Waterville, Maine. 1915.
- Jones, Albert C., 108 W. Washington St., High Point, N. C. 1915.
- Jones, Chas. A., North Yakima, Wash. 1916.
- Jones, Frederic S., Rockefeller Institute, 66th and Ave. A., New York, N. Y.
- Jones, George Andrew, Box 102, Sedro Wooley, Wash. 1915.
- Jones, George B., Sidell, Ill. 1915.
- Jones, James M., Lewisburg, Tenn. 1916.
- Jones, Philip K., 5604 Harvard St., Pittsburgh, Pa. 1913.
- Jones, W. F., 311 Second St. E., McCook, Nebr. 1916.
- Jopling, William, North Star, Mich. 1915.
- Joss, Jesse M., Room 3327 Federal Bldg., Lincoln Nebr. 1915.
- Joy, James J., 243 Collingwood Ave., Detroit, Mich. 1915.
- Joyce, C. O., R. R. Box 406, Indianapolis, Ind. 1915.
- Juckniess, Paul, 617 N. 23rd St., So. Side Sta., Omaha, Nebr. 1915.
- Juhl, Chris E., Osage, Ia. 1916.
- Julien, Ren C., Delphi, Ind. 1916.
- Jung, Otto E., 1514 West 30th St., Oklahoma City, Okla. 1915.
- Jungerman, George T., Morrill, Kans. 1915.
- Kaiser, A. J., Kingsburg, Cal. 1915.
- Kalkus, Julius, 805 Linden Ave., Pullman, Wash. 1916.
- Kammerer, R. A., 700 South Kingshighway, St. Louis, Mo. 1915.
- Kann, R. L., Mechanisburg, Pa. 1915.
- Kannal, Harvey J., Rensselaer, Ind. 1916.
- Kartrude, Eilert H., Jasper, Minn. 1915.
- Katsunuma, Tomitzo, U. S. Immigration Service, Honolulu, H. T. 1915.
- Kaupp, B. F., West Raleigh, N. C. 1916.
- Kay, Gustav A., B. A. I., South Side Sta, Omaha, Nebr. 1916.
- Kaylor, James M., Barry, Ill. 1916.
- Kean, Thomas J., 1630 W. Suydenham St., Philadelphia, Pa. 1916.

- Keane, Charles F., State Capitol, Sacramento, Calif. 1916.
Keefe, E. M., Winters, Cal. 1915.
Keehn, Wm. G., 2537 State St., Chicago, Ill. 1915.
Keeley, Peter T., 238 N. Elm St., Waterbury, Conn. 1915.
Keelor, J. R., Harleysville, Pa. 1915.
Keene, Chas. A., 25 Beacon St., Fitchburg, Mass. 1916.
Keene, Harry L., Shabbona, Ill. 1916.
Keepers, Robert W., Greencastle, Pa. 1915.
Keller, T. O., Ridgeville, Ind. 1915.
Kelly, James S., 31 Exch. Bldg., Wichita, Kans. 1916.
Kelly, Thomas, 1204 Pine St., Philadelphia, Pa. 1916.
Kelly, Wm. Henry, 233 Western Ave., Albany, N. Y. 1916.
Kelpé, Henry O., Box 464, Albuquerque, N. M. 1916.
Kelsey, Raymond A., B. A. I., Washington, D. C. 1916.
Kelser, Harry R., 1344 23rd St., Newport News, Va. 1916.
Kemp, Donald T., St. Louis, Mich. 1916.
Kempf, Silas, Roanoke, Ill. 1916.
Kendrick, A. D., Homer, La. 1916.
Keneley, Frank Thomas, Twin Falls, Ida. 1916.
Kennedy, E. D., Ogden, Utah. 1916.
Kennedy, James F., Bloomington, Wis. 1916.
Kennedy, R. T., Bucyrus, Ohio. 1916.
Kennedy, W. W., 74 E. First St., Fulton, N. Y. 1915.
Kenney, Thos. G., Bismarck, N. D. 1915.
Keresey, Dennis L., 15 Bridge St., Danbury, Conn. 1915.
Kern, Charles B., Beloit, Kans. 1915.
Kern, Harry F., 1208 Heard Nat. Bank Bldg., Jacksonville, Fla. 1915.
Kernkamp, Howard, 829 East 3rd St., St. Paul, Minn. 1916.
Kerr, Owen, Turlock, Cal. 1916.
Ketchum, F. D., S. St. Paul, Minn. 1915.
Kettlehorn, A. H., Broadway, Columbus, Wis. 1916.
Keyes, Burton, 118 Falmouth St., Sydney, C. B., N. S. 1916.
Keys, Archibald A., 117 N. 10th St., Minneapolis, Minn.
Kickbush, Frank O., B. A. I., Grand Rapids, Wis. 1916.
Kielsmeier, S. G., Plymouth, Wis. 1916.
Kiernan, John A., B. A. I., Birmingham, Ala. 1915.
Kigin, Lawrence C., Lafayette, Ind. 1915.
Kigin, Thomas F., 102 No. Green St., Tipton, Ind. 1916.
Kille, Wilmer B., 127 Grant St., Salem, N. J. 1915.
Kincaid, Albert R., Stonington, Ill. 1916.
King, D. Edward, Jr., Box 1299, Mobile, Ala. 1916.
King, John, Carlisle, Sask. 1916.
King, Paul R., Remount No. 2, Ft. Sam Houston, Texas. 1915.
King, Samuel A., 77 Albany Ave., Waycross, Ga. 1915.
King, William M., 1671 Folsom St., San Francisco, Cal. 1916.
Kingman, Harry E., State Agri. College, Fort Collins, Colo. 1916.
Kingman, H. W., 19 West Canton St., Boston, Mass. 1915.

- Kingston, Richard H., 41 Convent Ave., New York, N. Y. 1916.
Kinney, William M., 133 So. Grant St., Wooster, Wayne Co., Ohio. 1916.
Kinsey, George W., 931 Market St., Wheeling, W. Va. 1916.
Kinsley, A. T., 1336 E. 15th St., Kansas City, Mo. 1916.
Kinsley, C. C., Oakley, Kans. 1916.
Kinyon, B. F., Ladysmith, Wis. 1915.
Kippen, N. A., Independence, Ia. 1916.
Kirby, A. C., Page, N. D. 1916.
Kirby, Bassett, 85 Cooper St., Woodbury, N. J. 1915.
Kjerner, Rudolph, Chatfield, Minn. 1915.
Klein, Louis A., 39th & Woodland Ave., Philadelphia, Pa. 1916.
Kline, A. J., Fulton St., Wauseon, Ohio. 1915.
Kliphardt, Wm. A., 3537 A. Wyandotte St., Kansas City, Mo. 1915.
Klotz, Joseph W., Noblesville, Ind. 1915.
Knapp, Anton E. (Mail returned). 1913.
Knapp, Albert C., 2414 North Ave., Bridgeport, Conn. 1916.
Knapp, G. A., Millbrook, N. Y. 1916.
Knapp, V. M., 37 New St., Danbury, Conn. 1916.
Knight, Ralph F., 109 W. Henley St., Olean, N. Y. 1915.
Knowles, Albert D., 302 S. 4th St., W., Missoula, Mont. 1916.
Knowles, Virgil W., 305 Federal Bldg., Oklahoma, Okla. 1916.
Knutzen, Virgil H., Cleveland, Miss. 1916.
Koch, Julius, East Second St., Downey, Cal. 1916.
Koehler, Frank T., Marietta, Pa. 1916.
Koehler, Edward F., 6th and Church St., Easton, Pa. 1916.
Koen, John Stratton, Room 18, Federal Bldg., Des Moines, Ia. 1915.
Koon, George H., 12th Cavalry, Hachita, N. Mex. 1916.
Koonce, Lafayette F., 324 S. Blount St., Raleigh, N. C. 1915.
Korb, Walter A., Dept. of Agriculture, Iloilo Iloilo, P. I. 1915.
Kragness, T. A., 6031 Wentworth Ave., Chicago, Ill. 1915.
Kreamer, Wilbur C., 1010 Market St., Sunbury, Pa. 1916.
Kreider, W. E., Wadsworth, Ohio. 1916.
Kreuziger, Martin W. Hotel Rudolph, Bowman, N. D. 1915.
Krey, Theodore F., 451 Sheridan Ave., Detroit, Mich. 1916.
Krohn, Lester D., 1465 60th St., Brooklyn, N. Y. 1916.
Kron, Oscar Jacob, 1386 Golden Gate Ave., San Francisco, Cal. 1916.
Kubin, Edison F., McPherson, Kans. 1916.
Kuhn, J. M., Mercersburg, Pa. 1916.
Kulp, A. I., Box 349, Adel, Iowa. 1915.
Lacroix, J. Victor, 9 So. Clinton St., Chicago, Ill. 1915.
Ladson, Thomas Arthur, Hyattsville, Md. 1915.
Lamb, Charles G., 1140 Corona St., Denver, Colo. 1916.
Lamb, Percy, care Ernest Lamb, Worting Basingstable Hants. Eng. 1916.
Lambert, F. A., O. S. U., Columbus, Ohio. 1916.
Lambert, F. W., Box 29, New Windsor, Md. 1916.
Lambrechts, T., Box 71, Montevideo, Minn. 1916.

- Lames, G., Dysart, Ia. 1916.
Land, L. M., Limestone & Short Sts., Lexington, Ky. 1916.
Landon, Frank D. M., 16 Pleasant St., Great Barrington, Mass. 1915.
Langdon, Harry B., Charlestown, W. Va. 1916.
Lange, A. W., Lakemills, Wis. 1916.
Langevin, J. O., Hull, Que. 1916.
Langford, Samuel M., College St., Martinsburg, W. Va. 1916.
LaPointe, R., St. Peter, Minn. 1915.
Lapple, Edward, 132 Exch. Bldg., care Northern Serum Co., Sioux City, Ia. 1916.
Largent, Bert H., Battle Ground, Ind. 1915.
Larson, Louis N., P. O. Block, Whitehall, Wis. 1915.
Larson, Vernon S., Berlin, Wis. 1916.
Lash, Cris. D., B. A. I., So. St. Joseph, Mo. 1915.
Lasher, Geo. H., Rutland, Ohio. 1916.
Lassen, Christian W., 516 Bush St., Pendleton, Ore. 1916.
Latshaw, Joseph B., Ithaca, N. Y. 1916.
Law, James, 3 The Circle, Ithaca, N. Y. 1915.
Law, Samuel T., Colebrook, N. H. 1916.
Lawton, A. N., 2 Clinton Ave., Broadhead, Wis. 1914.
Lawton, Fletcher E., 110 Madison St., Greencastle, Ind. 1915.
Layne, Ernest, Huntington, W. Va. 1916.
Leach, E. D., 333 Clinton St., Ft. Wayne, Ind. 1916.
Leckie, Andrew A., Charlottetown, P. E. I. 1916.
LeClaire, Thos. Edw., P. O. Box 501, Calgary, Alta. 1916.
Lee, Daniel D., 549 Albany St., Boston, Mass. 1915.
Lee, J. D., Menomonie, Wis. 1916.
Lee, W. H., Brundidge, Ala. 1915.
Leech, G. Ed., 322 Main St., Winona, Minn. 1915.
Lees, Arnold F., Red Wing, Minn. 1916.
Legenhausen, Adolph H., Weldon, Ill. 1913.
Legner, Arthur J., Leland, Ill. 1916.
Leibold, A. A., 4515 North Robey St., Chicago, Ill. 1916.
Leigh, Beverly M., 411 20th Ave., Meridan, Miss. 1913.
Leininger, Daniel B., 7th Cavalry, Douglas, Ariz. 1916.
Leith, Fred J., 1401 Michigan Ave., Chicago, Ill. 1915.
Leith, T. L., Ames, Ia. 1916.
Lemley, Geo. Grant, 2166 Cumming St., Omaha, Nebr. 1915.
Lenfestey, John H., Lyons, Ohio. 1916.
Lentz, Wm. J., 39th & Woodland Ave., Philadelphia, Pa. 1916.
Leonard, Milton M., 18 South Park Square, Asheville, N. C. 1915.
Leslie, Chas. A., 10 Masonic Temple, Deadwood, S. D. 1915.
Lett, Haskell, 111 W. 3rd St., Seymour, Ind. 1916.
Letteney, James T., 42 Charles St., Rochester, N. H. 1916.
Leutholt, Henry, 250 Main St., Taylor, Pa. 1915.
Lewis, Harold M., 20 Railroad Sq., Nashua, N. H. 1916.
Lewis, Henry S., 110 Washington Ave., Chelsea, Mass. 1916.

- Lewis, James, Greenwood, Miss. 1915.
Lewis, Seymour V., Glenwood City, Wis. 1915.
Lewis, Watson F., Waseca, Minn. 1916.
Lewis, Walter K., 901 Union Nat'l Bank Bldg., Columbia, S. C. 1916.
Lichenwalter, H. W. C., 1215 15th St., Sacramento, Cal. 1916.
Lichty, Wm. W., Woodstock, Ill. 1915.
Leinhardt, H. F., 102 Lancaster Ave., Wayne, Pa. 1916.
Likely, Chas. W., Ankeny, Ia. 1916.
Linberg, John W., 228 N. 53rd St., Philadelphia, Pa. 1915.
Linch, Charles, 123 North Allen St., Albany, N. Y. 1915.
Lincoln, Willis B., Neuhoft Abattoir & Packing Co., Nashville, Tenn. 1915.
Lindburg, O. Enoch, Union Stock Yards, Sioux City, Ia. 1915.
Lindley, Paul S., Paoli, Ind. 1915.
Lipp, Carl Frederick, 4040 Prairie Ave., Chicago, Ill. 1916.
Lipp, Charles C., Brookings, S. D. 1915.
Lipp, George A., Box 818, Roswell, N. M. 1916.
Lobdell, Stephen C., 6 S. 3rd St., LaFayette, Ind. 1916.
Locke, George H., Lockford, Cal. 1915.
Lockett, Stephen, Univ. of Nev., Reno, Nev. 1916.
Lockhart, Andrew A., Box 131, Carnduff, Sask. 1916.
Lockhart, Ashe, 1336 East 15th St., Kansas City, Mo. 1916.
Logan, Edward A., 3209 Mitchell Ave., St. Joseph, Mo. 1915.
Logan, James A., Oakes, N. D. 1915.
Lollar, Ernest E., Red Cloud, Nebr. 1915.
Lombard, Charles M., 4502 Emerald Ave., Chicago, Ill. 1915.
Longley, Otis A., 24th and Broadway, Western Laboratories, Oakland, Cal. 1916.
Longnecker, Allen G., Hickman, Ky. 1916.
Lothe, Herbert, Waukesha, Wis. 1915.
Louck, Rex Clark, Clarence, Ia. 1915.
Love, Grover V., Main St., Chalmers, Ind. 1916.
Lovejoy, J. W., Federal Bldg., Augusta, Ga. 1916.
Loveland, Grove W., 49 East Main St., Torrington, Conn. 1916.
Lovell, Roy, 200 W. 5th St., York, Nebr. 1915.
Lowe, J. Payne, 171 Jefferson St., Passaic, N. J. 1915.
Lowrey, Frederick H. S., 1127 Keele St., Toronto, Ont. 1916.
Lucas, Clinton E., Olney, Ill. 1916.
Lueder, Charles A., 752 North Front St., Morgantown, W. Va. 1916.
Lukes, Harry, 441 Sumner Ave., Springfield, Mass. 1916.
Lull, Elmer L., Parma, Ida. 1916.
Lundell, A. O., 218 Livestock Exchange, Fort Worth, Tex. 1916.
Luther, W. H., Boonville, Ind. 1915.
Luzador, Roy A., Morrisonville, Ill. 1916.
Lyman, Richard P., P. O. Box 1018, East Lansing, Mich. 1916.
Lynch, John E., 124 West 22nd St., Indianapolis, Ind. 1916.
Lyon, H. C., Hutchinson, Minn. 1916.

- Lytle, Harrison W., Salem, Ore. 1916.
MacCormack, Douglas C., North Baltimore, Ohio. 1915.
MacIntosh, Robert Duncan, 296 Danforth Ave., Toronto, Ont. 1914.
MacIsaac, D. A., St. Andrews, N. S. 1916.
Mack, C. A., Gilbert Plains, Man. 1916.
Mack, James F., River Falls, Wis. 1916.
Mack, Winfred B., University of Nevada, Reno, Nev. 1916.
MacKellar, Robert S., 351 West 11th St., New York, N. Y. 1916.
MacKellar, Wm. M., 211 Federal Bldg., Atlanta, Ga. 1916.
Mackie, Clement L. (Mail returned,) 1913.
Mackie, Cyril, N. Y. State Vet. College, Ithaca, N. Y. 1916.
Mackie, F. H., 1035 Cathedral St., Baltimore, Md. 1916.
MacMaster, Donald A., Dalkeith, Ont. 1916.
MacMillan, Donald, Box 74, High River, Alta. 1916.
Madson, Wm., Appleton, Wis. 1916.
Maguire, Francis X., Hotel Warwick, Newport News, Va. 1916.
Mahaffy, Thomas J., 903 W. Forsythe St., Jacksonville, Fla. 1916.
Mahon, James, 405½ Main St., Irwin, Pa. 1915.
Mair, Alexander M., 131 S. Bloomington St., Streator, Ill. 1916.
Major, John P., City Bldg., Anderson, S. C., 1916.
Makins, E., Jr., Box 445, Abilene, Kans. 1915.
Malcolm, Peter, New Hampton, Ia. 1915.
Malone, William J., Mt. Horeb, Wis. 1916.
Maloney, Thos. E., 1095 N. Main St., Fall River, Mass. 1916.
Mangan, Daniel J., 2557 Third Ave., Bronx, New York, N. Y. 1916.
Mansfield, Charles M., 1344 Newton St., N. W., Washington, D. C. 1916.
Mantor, Herbert O., 354 Chestnut Ave., Long Beach, Cal. 1916.
Mannuel, Edward A., 232 Park Pl., Des Plaines, Ill. 1915.
Marks, Daniel G., 548 West 12th St., Chicago, Ill. 1915.
Marquardt, S. J., Barnesville, Ohio. 1915.
Marquis, Francis M., French Camp, Cal. 1916.
Marriott, Wm. H., 2 Harrington Pl., Ottawa, Ont. 1916.
Marsh, Hadleigh, 3401 16th St., N. W., Washington, D. C. 1916.
Marshall, Charles W., Main St., Brewster, N. Y. 1915.
Marshall, Clarence J., 39th & Woodland Ave., Philadelphia, Pa. 1916.
Marshall, Freeman A., Barberton, Ohio. 1916.
Marshall, Henry, 202 Federal Bldg., Richmond, Va. 1916.
Marshall, Herbert, Mechum River, Va. 1916.
Marsteller, Ross P., College Station, Tex. 1916.
Martin, Harry D., 481 Rhode Island Ave., Buffalo, N. Y. 1916.
Martin, Robert D., 1192 Broad St., Bridgeport, Conn. 1916.
Martin, Stanley T., 281 James St., Winnipeg, Man. 1916.
Martin, W. E., 281 James St., Winnipeg, Man. 1916.
Marvel, Alex. L., Owensville, Ind. 1915.
Mason, A. L., Oahu, H. I. 1915.
Mason, William D., Box 488, Elko, Nev. 1915.

- Mathews, E., 187 Grand St., Jersey City, N. J. 1916.
Mattroce, Daniel L., "J" St., Los Banos, Cal. 1916.
Mauldin, Columbus E., Jeanerette, La. 1915.
Mawer, George C., 9219 Clifton Blvd., Cleveland, Ohio. 1916.
Maxon, Fay I., 62 Oakland Terrace, Hartford, Conn. 1916.
Maxson, Wilbur B., Flemington, N. J. 1915.
Mayer, Gustave P., Elk Rapids, Mich. 1916.
Maynard, Lee H. P., 1937 Market St., Philadelphia, Pa. 1916.
Maze, Luther A., care Parke, Davis & Co., Rochester, Mich. 1915.
McAdory, Isaac S., Auburn, Ala. 1915.
McAlister, Rancie G., 1259 Fillmore St., Corvallis, Ore. 1916.
McAlpine, D., Box 696, Brockville, Ont.
McBride, Wm. J., Amherstburg, Ont. 1916.
McCaffrey, James, Lock Box 83, Red Bank, N. J. 1915.
McCall, Wm. R., Oklahoma City, Okla. 1916.
McCarthy, F. H., 317 N. 3d St., Pottsville, Pa. 1915.
McCarthy, Henry J., Arlington, Md. 1915.
McCarthy, Nathaniel, Castor, Alta. 1916.
McCarthy, Thos. A., Santa Fe, N. M. 1914.
McCartney, John, Middletown, N. Y. 1916.
McCaskill, Alexander W., Weyburn, Sask. 1915.
McCaughy, N. W., Church St. Veterinary Hospital, Presque Isle, Me. 1915.
McClellan, Milton P., 222 Hongus Crescent, Regina, Sask. 1915.
McClelland, Alfred H., Walton, N. Y. 1916.
McClelland, Frank E., 455 Ellicott Ave., Buffalo, N. Y. 1916.
McCloskey, Anthony J., Chestnut Hill, Pa. 1915.
McCord, Frank A., 215 Queens Ave., Edmonton, Alta. 1915.
McCowen, D., Edgeley, N. D. 1915.
McCoy, Ellis E., Canton, Miss. 1916.
McCoy, Franklin C., 1623 South I. St., Bedford, Ind. 1916.
McCoy, John E., Lock Box 21, Cawker City, Kans. 1916.
McCrank, J. A., 79 Saily Ave. Plattsburg, N. Y. 1915.
McCuaig, D., McAdam Jet., N. B. 1916.
McCulley, Robert W., 38 Lexington Ave., New York, N. Y. 1915.
McCullough, Edw. Alex. 219 McDowell St., Delavan, Wis. 1916.
McCurdy, Frank C., 616 N. 10th St., St. Joseph, Mo. 1915.
McCushing, Francis P., 104 High St., Keene, N. H. 1915.
McDaniel, J. C., 1319 S. A. St., Elwood, Ind. 1915.
McDaniel, John S., East Lansing, Mich. 1915.
McDonald, D. M., 3932 Pleasant Ave., Minneapolis, Minn. 1916.
McDonough, James, 47 Portland Place, Montclair, N. J. 1915.
McDonough, John F., 1707 S. 22d St., Philadelphia, Pa. 1915.
McDowell, Harris B., Box 77, Middletown, Del. 1916.
McElyea, Lewis W., Ames, Ia. 1915.
McFarland, C. M., 230 Exch. Bldg., Sioux City, Ia. 1916.
McFatridge, Howard S., 30 Argyle St., Halifax, N. S. 1915.
McGillivray, George, Box 303, Roseau, Minn. 1916.

- McGilvray, Chas. D., Dept. of Agriculture, Winnipeg, Man. 1916.
McGinnis, Ralph W., 724 Washington Ave., Ogden, Utah. 1916.
McGrath, Miss Elinor, 3217 Indiana Ave., Chicago, Ill. 1916.
McGroarty, Bernard, Boothwyn, Pa. 1913.
McGuire, W. C., Pitt & Second Sts., Cornwall, Ont. 1915.
McInnes, Benjamin K., 57 Queen St., Charleston, S. C. 1916.
McIntosh, Chas., 74 La Salle Road, Verdun, Que. 1916.
McIntyre, John S., Foam Lake, Sask. 1916.
McKay, Alexander M., 527 4th Ave., Calgary, Alta. 1915.
McKenna, John F., 616 Eye St., Fresno, Cal. 1916.
McKenzie, K. J., Northfield, Minn. 1916.
McKercher, Arthur, 115 Ionia St. E., Lansing, Mich. 1915.
McKey, John, 1926 W. 1st St., Duluth, Minn. 1915.
McKillip, Chester A., 1639 Wabash Ave., Chicago, Ill. 1916.
McKillip, George B., 1639 Wabash Ave., Chicago, Ill. 1916.
McKillip, Matthew H., 1639 Wabash Ave., Chicago, Ill. 1915.
McKillip, Walter J., 1639 Wabash Ave., Chicago, Ill. 1916.
McKim, Charles A., 2510 P. St., Lincoln, Nebr. 1915.
McKim, H. C., 665 N. Fair Oaks, Pasadena, Cal. 1916.
McKim, Orville E., 338 West 56th St., New York City. 1915.
McKinney, Wm. J., 585 Driggs St., Brooklyn, N. Y. 1915.
McKinnon, John A., Land Transportation, Manila, P. I. 1916.
McLain, John H., Inkster, N. D. 1916.
McLaughlin, Wm., Rush City, Minn. 1916.
McLean, Adam T., Truro, N. S. 1915.
McLean, Wm. C., San Mateo, Cal. 1916.
McLeay, John D., Indianapolis, Ind. 1915.
McLeod, J. H., Charles City, Ia. 1915.
McMullen, Robert H., 444 Federal Bldg., Denver, Colo. 1916.
McNair, Frederick H., 2126 Haste St., Berkeley, Cal. 1916.
McNally, Michael, 1412 Pine St., St. Louis, Mo. 1914.
McNamara, W. F., 8 Green St., Worcester, Mass. 1916.
McNaughton, D. D., 717 Kelly Ave., Devil's Lake, N. D. 1915.
McNeal, Harry T., Lancaster, Pa. 1916.
McNeal, Neal, Burkettsville, O. 1916.
McNeil, John H., 39th and Woodland Ave., Philadelphia, Pa. 1916.
McNiven, Alexander, Williston, N. D. 1916.
McPike, Clarence, Cando, N. D. 1916.
Mead, R. N., 301 Federal Bldg., care B. A. I., Indianapolis, Ind. 1916.
Meador, Daniel J., Auburn, Ala. 1916.
Meadors, W. H., National Stock Yards, E. St. Louis, Ill. 1915.
Meads, Frederick F., 477 Cherokee, Okla. 1916.
Mebane, Wm. Long, Rockwood, Maine. 1915.
Megowan, Claude L., 1021 J. St., Sacramento, Cal. 1916.
Meiners, R. F., Boonton, N. J. 1914.
Meixel, Earl J., Rapid City, S. Dak. 1916.
Mendenhall, Maurice, Detroit, Mich. 1916.

- Merillat, Louis A., 1827 South Wabash Ave., Chicago, Ill. 1916.
Merriman, Cecil M., Mt. Pulaski, Ill. 1916.
Metcalf, Glenn A., Knoxville, Tenn. 1916.
Metcalfe, A. R., Van Kleek Hill, Ont. 1916.
Metzger, Geo. E., 99 Western Ave., Minneapolis, Minn. 1916.
Meyer, George W., 528 Washington St., New York, N. Y. 1916.
Meyer, Karl F., 2d and Parnassus Ave., San Francisco, Cal. 1916.
Meyst, Frederick W., 144 Bryant St., N. W., Washington, D. C. 1915.
Michael, Leo B., East Main St., Collinsville, Ill. 1915.
Michael, Wm. R., Highland, Ill. 1916.
Miehner, Hiram M., North Wales, Pa. 1914.
Middleton, Asa C., Grundy Center, Ia. 1916.
Milks, Howard J., N. Y. State Vet. Col., Ithaca, N. Y. 1916.
Mill, Benj. F., Denison, Ia. 1916.
Millard, Hugh R., 2507 Central Ave., Cheyenne, Wyo. 1916.
Millen, Charles J., care Jacob E. Decker & Sons, Mason City, Iowa. 1916.
Miller, A. W., Box 162, South Side Station, Omaha, Nebr. 1915.
Miller, C. A., 411 S. Jackson St., Louisville, Ky. 1916.
Miller, Chester, Elliot & Co., Duluth, Minn. 1915.
Miller, Dale A., 29 Vine St., Dayton, Ohio. 1913.
Miller, Daniel S., 1017 S. 47th St., Philadelphia, Pa. 1915.
Miller, Frederick A., Fitchburg, Mass. 1916.
Miller, Harry K., 128 W. 53rd St., New York, N. Y. 1916.
Miller, John F., 24 New Scotland Ave., Albany, N. Y. 1915.
Miller, John M., 152 Louis St., Grand Rapids, Mich. 1916.
Miller, John P., 46 Reed St., Reading, Pa. 1913.
Miller, Melvin W., Box 464, Albuquerque, N. M. 1916.
Miller, Thomas C., 600 Tribune Bldg., Winnipeg, Man. 1916.
Miller, W. J., Indianola, Iowa. 1916.
Mills, C. C., 355 E. Main St., Decatur, Ill. 1916.
Mills, Lee H., 118 Pearl St., Burlington, Vt. 1913.
Miner, George H., 180 Claremont Ave., Buffalo, N. Y. 1915.
Missall, Frank C., Cor. Mill and Pine St., Santa Maria, Cal. 1916.
Mitchell, Adrian J., Sr., 1219 Peach St., Erie, Pa. 1916.
Mitchell, Aquila, 3rd Artillery, U. S. A., Fort Sam Houston, Tex. 1916.
Mitchell, George C., Kalmath Falls, Ore. 1915.
Mitchell, Harry B., R. F. D. 2, Wellsboro, Pa. 1915.
Mitchell, James F., 212 East 8th St., Anaconda, Mont. 1915.
Mitterling, Ira, 302 Montgomery St., Hollidaysburg, Pa. 1916.
Mix, C. C., 110 W. Jackson St., Battle Creek, Mich. 1916.
Mock, C. E., Ryegate, Mont. 1916.
Mock, Wm., 53 North Fourth St., Easton Pa. 1916.
Moegling, Richard E., 3017 Jefferson Ave., Cincinnati, Ohio. 1913.
Mohler, John R., Dept. of Agriculture, Washington, D. C. 1916.
Molgard, Peter C., Ruskin, Neb. 1916.

- Molt, Fred S., Big Spring, Tex. 1915.
Moody, Arthur H., 402 Armitage St., Three Rivers, Mich. 1915.
Moody, Geo. C., Mason, Mich. 1916.
Moody, Robert P., 111 Sutton St., Maysville, Ky. 1916.
Moore, A. E., 175 Waverly St., Ottawa, Ont. 1915.
Moore, Charles S., 5 Oak St., Danvers, Mass. 1916.
Moore, Hamlet, 610 N. Rampart St., New Orleans, La. 1915.
Moore, Herbert K., 4300 Ellis Ave., Apt. D. 2, Chicago, Ill. 1916.
Moore, Hubert O., Box 299, Hattiesburg, Miss. 1915.
Moore, Robert C., St. Joseph Vet. College, St. Joseph, Mo. 1916.
Moore, Robert G., Duulap, Ia. 1916.
Moore, Sheard, 608 Iberville St., Donaldsonville, La. 1916.
Moore, Veranus A., 914 E. State St., Ithaca, N. Y. 1916.
Moorehouse, Wm. B., 37 Main St., Tarrytown, N. Y. 1913.
Morehouse, Walter G., 746 Mill St., Salem, Ore. 1915.
Morey, B. Franklin, 235 S. Main St., Clinton, Ind. 1915.
Morgan, Frank W., 6th & Cherry Sts., Chattanooga, Tenn. 1916.
Morgan, Ray, Skidmore, Mo. 1916.
Morgan, Samuel S., Richmond, Mo. 1916.
Morgan, Wm. Jerome, Seaton, Ill. 1916.
Morin, C. L., 9 Messenger St., St. Albans, Vt. 1915.
Morris, Edward H., 221 Main St., Derby, Conn. 1915.
Morris, Harry, Experiment Station, Baton Rouge, La. 1915.
Morrow, Albert C., Dillon, Mont. 1915.
Morse, Jas. E., 3 Brock Crescent, Toronto, Ont. 1916.
Morse, John H., Box 377, Sumter, S. C. 1915.
Moss, Harry T., 710 W. Third St., Dayton, Ohio. 1916.
Mount, Willet C., 825 Crittenden St., Red Bluff, Cal. 1916.
Moyer, Calvin W., Quakertown, Pa. 1915.
Moyer, Frank Leonard, Carey, Ohio. 1916.
Moyer, Vincent C. 1914.
Moynihan, William, 135 Wright Ave., Toronto, Ont. 1916.
Mueller, Ferdinand A., 459 E. Washington St., Indianapolis, Ind. 1916.
Muller, Herman J., Long Green, Md. 1916.
Mulvey, Charles J., Mooers, New York. 1916.
Munce, Thomas W., care H. K. Mulford Co., Glenolden, Pa. 1915.
Munce, Edward T., State Livestock Sanitary Board, Harrisburg, Pa. 1915.
Munger, Grant B., 2226 N. Illinois St., Indianapolis Ind. 1916.
Munn, Albert A., Kearney, Nebr. 1916.
Munn, Ahizah J., Fayette, Mo. 1915.
Murch, Alfred Littlefield, 17 Boynton St., Bangor, Me. 1915.
Murison, James J., Manor St., Arcola, Sask. 1916.
Murphy, Howard Sylvester, 519 Welch Ave., Ames, Iowa. 1916.
Murphy, Bernard W., 604 N. 11th St., St. Joseph, Mo. 1915.
Murphy, Daniel E., Prairie du Sac, Wis. 1916.
Murphy, Francis P., 1813 N. 2nd St., Philadelphia, Pa. 1914.

- Murphy, Joseph Whitmore, 901 Union Bank Bldg., Columbia, S. C. 1916.
- Murray, Alexander G., Ingersoll, Ont. 1916.
- Musselman, S. F., Frankfort, Ky. 1916.
- Mydland, Gustav Herman, Everest, Kans. 1916.
- Myers, Chas. H., 100 Berlin St., Middletown, Conn. 1916.
- Myers, Harry E., 140 S. Main St., Fostoria, Ohio. 1916.
- Myers, Sidney D., 215 Walnut St., Wilmington, Ohio. 1916.
- Nance, Joseph E., Anadarko, Okla. 1915.
- Nash, Elmer Dennett, 717 Sixth Ave., Helena, Mont. 1915.
- Nattress, Joseph T., Delevan, Ill. 1915.
- Naylor, Ralph Edelen, Box 397, Cheyenne, Wyo. 1915.
- Neidig, C. C., Luck, Wis. 1916.
- Neilson, Norman, 345 Market St., Colusa, Cal. 1915.
- Nelson, Amos F., 656 E. 21st St., Indianapolis, Ind. 1916.
- Nelson, Charles A., 224 Front St., Brainard, Minn. 1915.
- Nelson, Conrad L., 810 S. 16th St., St. Joseph, Mo. 1915.
- Nelson, Nelson L., Box 295, Ames, Ia. 1916.
- Neuhaus, Charles O., Union Stock Yards, Pittsburgh, Pa. 1915.
- Newburg, Louis, 2442 Forest Ave., Kansas City, Mo. 1916.
- Newcomb, Harrie H., Salem, Mass. 1916.
- Newcomer, E. W., Mt. Joy, Pa. 1916.
- Newgent, Ottaway C., 1448 Sycamore St., Terre Haute, Ind. 1916.
- Newhard, Irwin C., 400 Center St., Ashland, Pa. 1916.
- Newman, Lloyd V., 800 Lincoln Ave., York, Nebr. 1915.
- Newsom, I. Ernest, Colo. Agricultural College, Ft. Collins, Colo. 1916.
- Newton, J. V., 619 Walnut St., Toledo, Ohio. 1916.
- Ney, William O., Michigan City, Miss. 1914.
- Nice, Frank K., 3514 N. 15th St., Philadelphia, Pa. 1915.
- Nicholas, George B., 1404 Homes St., Kansas City, Mo. 1914.
- Nichols, Abner Z., Hillsdale, Mich. 1916.
- Nichols, Percival K., 107 Harrison Ave., Port Richmond, Staten Island, N. Y. 1915.
- Niday, C. Ross, 805 2nd Ave., Gallipolis, Ohio. 1916.
- Nighbert, E. M., 1208 Heard Nat'l Bank, Jacksonville, Fla. 1915.
- Nighbert, James D., Pittsfield, Ill. 1916.
- Niles, W. B., Box 927, Ames, Ia. 1915.
- Nissley, Solomon M., 18 Spring St., Bellefonte, Pa. 1916.
- Niven, Andrew B., Crawfordsville, Ind. 1914.
- Nixon, Robert B., Demopolis, Ala. 1915.
- Noack, Otto G., 54 S. 6th St., Reading, Pa. 1915.
- Noback, Charles V., Otisville, N. Y. 1916.
- Noble, Geo. Edw., 1312 Grove St., Boise, Idaho. 1916.
- Nolechek, Wm. F., Thorp, Wis. 1916.
- Noonan, Albert J., Bernard, Ia. 1913.
- Norden, Carl J., 1518 Pasco St., Kansas City, Mo. 1916.

- Norgaard, Victor A., Territorial Veterinarian, Honolulu, Hawaii. 1915.
- Norris, Clarence L., 4 L. S. Record Bldg., U. S. Stockyards, Chicago, Ill. 1915.
- Northrup, Leonard E., 105 N. Davidson St., Indianapolis, Ind. 1916
- Norton, Edwin S., Greenville, Miss. 1916.
- Norton, J. C., Cor. Washington & 1st Ave., Phoenix, Ariz. 1916.
- Norton, Oscar M., 109 Main St., Greenville, Miss. 1916.
- Norton, Robert S., Velva, N. D. 1915.
- Nowell, Luster D., 118 12th Ave., Humboldt, Tenn. 1916.
- Noyes, Orrin W., Valentine, Nebr. 1915.
- Nulph, Pearley E., Crosby, N. D. 1916.
- Nulty, Nathaniel S., Nevada, Ia. 1916.
- Nunn, Henry, Box 337, McMinnville, Ore. 1916.
- O'Banion, Archie L., 1209 W. 54th St., Los Angeles, Cal. 1915.
- O'Bryan, Sherid, Pesotum, Ill. 1916.
- O'Connor, Joseph, West Hope, N. D. 1915.
- Odell, Edwin O., Central City, Nebr. 1916.
- O'Donnell, Michael J., 241 Grove St., Blue Island, Ill. 1915.
- Oesterhaus, J. H., 465 Livestock Exch., Kansas City, Mo. 1915.
- O'Hara, Peter W., Manotick, Ont. 1916.
- O'Hara, R. T., Maxville, Ont. 1916.
- O'Harra, William G., Galloway, Ohio. 1915.
- Ojers, Samuel P., Box 454, Crete, Nebr. 1916.
- Oliver, Walter Gordon, 905 1st St., San Diego, Cal. 1916.
- Oliver, Karl M., 646 Central Bldg., Seattle, Wash. 1916.
- Olsen, Luther E., care U. S. B. A. I., St. Paul, Minn. 1915.
- Olson, Louis, McIntosh, Minn. 1916.
- Olthouse, Martin, Grass Lake, Mich. 1915.
- O'Neil, Wm. R., L. B. 494, Newman, Cal. 1916.
- Orchard, Geo. W., Windsor, Ont. 1916.
- O'Reilly, James M., 508 E. 3rd St., Merrill, Wis. 1915.
- Orme, Thos. Whitfield, 260 5th St., San Bernardino, Cal. 1916.
- O'Rourke, John Michael, 720 Valencia St., San Francisco, Cal. 1915
- Orr, William Crosby, Dillon, Mont. 1915.
- Ortiz, Carlos, 26 Villa St., Ponce, Porto Rico. 1913.
- Osborn, Orin H., Paynesville, Minn. 1915.
- O'Toole, Stephen, Atlanta Board of Health, Atlanta, Ga. 1916.
- Outhier, C. B., Salinas, Cal. 1916.
- Pace, John C., Box 597, Calexico, Cal. 1916.
- Paine, Harold, Rosetown, Saskatchewan. 1916.
- Palmer, Clinton Budd, No. 15 N. 2nd St., Easton, Pa. 1915.
- Palmer, Donald B., Livestock Sanitary Board. St. Paul, Minn. 1916.
- Palmer, Floyd Elbert, Owatonna, Minn. 1915.
- Palmer, H. F., Brooklyn, Mich. 1916.
- Paquette, J. D., Cuba City, Wis. 1916.
- Paquin, Charles Henry, 17 Fiske St., Worcester, Mass. 1916.

- Paquin, Leon A., Box 225, Webster, Mass. 1915.
Parker, Chas. S., Fayette, Ia. 1916.
Parker, John Clarke, 28 Pearl St., St. Albans, Vt. 1915.
Parker, Leon L., 439 Main St., Catskill, N. Y. 1916.
Parkinson, George H., Box 799, Middletown, Conn. 1915.
Parrish, Roscoe Damron, 1724 Davenport St., Omaha, Nebr. 1915.
Parrish, William Waller, 2808 Central Ave., Tampa, Fla. 1915.
Parse, Franklin L., Columbia, Miss. 1916.
Patie, Lewis A., 132 Cedar St., Snohomish, Wash. 1915.
Patrick, Murray E., Keystone Hotel, Penn. Ave., Greentown, Pa. 1915.
Patterson, Elijah E., 650 Grand River Ave., Detroit, Mich. 1916.
Patterson, E. I., Box 34, Savannah, Ga. 1915.
Patterson, Henry G., 915 Gravier St., New Orleans, La. 1913.
Pattison, Homer D., Lock Box 40, Beloit, Wis. 1916.
Patton, Wm. T., Coutts, Alta. 1916.
Paul, Arthur, Box 291, Portersville, Cal. 1915.
Paxson, Wm. H., Marietta, Pa. 1916.
Paxton, Irving B., Box 562, Red Bluff, Cal. 1915.
Pearce, Charles D., 10 Carhart Ave., Binghamton, N. Y. 1916.
Pearce, Dee, Box 222, Celeste, Tex. 1916.
Pearce, Frank H., Carson, Ia. 1915.
Pearson, Charles, Amarillo, Tex. 1916.
Peck, Sanford Artisan, Oak Grove, Mo. 1915.
Pederson, Gumerius M., Hamler, Ohio. 1916.
Pedigo, George W., Glasgow, Ky. 1916.
Peirce, Harrie W., 83 Playstead Road, West Medford, Mass. 1915.
Peirce, Lawrence L., 452 Robbins Road, Arlington Heights, Mass. 1915.
Pendergast, Walter M., 316 West Willow St., Syracuse, N. Y. 1916.
Penniman, G. P., cor. Exchange & Commercial Sts., Worcester, Mass. 1915.
Perkins, Chester R., 19 Hillside Ave., Buffalo, N. Y. 1916.
Perrin, Floyd, Spencer, Nebr. 1916.
Perry, Burton A., Hastings, Mich. 1916.
Perry, Chas. H., 82 Park Ave., Worcester, Mass. 1915.
Perry, F. M., Edgell St., Framingham, Mass. 1915.
Perry, James G., Box 294, Ennis, Tex. 1915.
Peters, A. T., Box 43, Peoria, Ill. 1916.
Petersen, Theodore J., Ukiah, Calif. 1914.
Peterson, Peter T., 5618 E. 16th St., Oakland, Calif. 1916.
Pethick, W. H., Charlottetown, P. E. Isle. 1915.
Petty, Clarence C., Lake Odessa, Mich. 1915.
Pfarr, Albert Wm., 4623 Friendship St., Pittsburgh, Pa. 1916.
Pfersick, Jacob G., 3 Leonard St., Greenfield, Mass. 1915.
Phelps, Chas. D., Fifth St., Clear Lake, Ia. 1915.
Phelps, Oliver Jay, Mill St. Y. M. C. A. Bldg., Lexington, Ky. 1916.
Phillips, Chas. S., Mt. Vernon, Wash. 1916.

- Phillips, J. M., 3732 W. Pine Blvd., St. Louis, Mo. 1915.
Phillips, S. C. 1914.
Philp, F. W., Lock Box 204, Mineral Point, Wis. 1915.
Phyfe, Walter H., 9 Grove St., Middletown, N. Y. 1915.
Piatt, D. A., 1706 2nd Ave., Birmingham, Ala. 1915.
Piatt, Harry B., 3618 N. 9th St., St. Louis, Mo. 1916.
Pickens, Earl Max, 106 Cook St., Ithaca, N. Y. 1916.
Pielemeier, Henry, R. D. No. 1, Solsberry, Ind. 1915.
Pierce, Foster H., Faulkton, S. D. 1915.
Pine, Henry E., Carrizosa, New Mex. 1916.
Pinkham, Gerald S., Coutts, Alta. 1916.
Pinkross, Rolf D., Camp Denison, Ohio. 1913.
Pirie, Leslie D., 172 Garfield St., Santa Cruz, Calif. 1915.
Pistor, Adolph J., B. A. I., Washington, D. C. 1916.
Plantz, John Frank, 50 E. Buechel Ave., Akron, Ohio. 1915.
Plaskett, Wilford S., Clinton, Mass. 1916.
Platt, Robert M., Coldwater, Kas. 1915.
Playdon, C. H., Reading, Mass. 1916.
Plumer, Myron L., Branchville, N. J. 1916.
Plummer, Alex., 1215 W. 37th St., Los Angeles, Calif. 1916.
Poe, C. E., 113 E. Franklyn St., Hagerstown, Md. 1916.
Poirier, J. O., Trois Rivieres, Que. 1916.
Pollard, John Saml., 183 Harrison St., Providence, R. I. 1916.
Pomfret, Henry, 158 Athol St., Winnipeg, Man. 1914.
Pooley, John R., 820 S. 14th St., Cedar Rapids, Ia. 1915.
Pope, George W., 1349 Meridian Place, N. W., Washington, D. C. 1915.
Porter, E. C., 120 N. Mercer St., New Castle, Pa. 1916.
Porter, Fred W., 104 W. Ross Ave., Tampa, Fla. 1916.
Pote, Thomas B., 4925 Park View Pl., St. Louis, Mo. 1915.
Potter, Geo., B. A. I., Washington, D. C. 1913.
Potter, Jasper S., 326 S. Capitol St., Iowa City, Ia. 1915.
Pottle, Leslie G., Quincy, Ill. 1916.
Poucher, M. M., 132 W. 3rd St., Oswego, N. Y. 1915.
Powell, E. W., Box 61, Bryn Mawr, Pa. 1915.
Power, Clinton W., 218 Perry St., Attica, Ind. 1916.
Powers, Maurice Ray, Norwalk, Conn. 1915.
Presler, H. A., Fairbury, Ill. 1916.
Preston, Marvin James. 1914.
Price, John O. F., care Rath Packing Co., Waterloo, Ia. 1916.
Price, Leo, 1309 Carroll St., Brooklyn, N. Y. 1916.
Priest, Benj. H., 501 Flowers St., Kern Branch, Calif. 1916.
Prior, Robert, 214 S. 2nd St., North Yakima, Wash. 1916.
Pritchard, John W., Fessenden, N. Dak. 1916.
Pritchard, Wm. T., North Platte, Nebr. 1915.
Pritchett, Lamar F., Auburn, Ala. 1915.
Prouse, Harvey Lee, Allen, Nebr. 1915.
Prouse, Wm. C., 615 4th Ave., Minneapolis, Minn. 1916.

- Prowett, H. L., Fullerton, Nebr. 1916.
Prucha, Joseph V., care Dr. Howe, Denver, Colo. 1915.
Pugh, Walter Maurice, Powers Lake, N. Dak. 1915.
Pugh, Wm. T., 57 Elm St., Southbridge, Mass. 1916.
Pullam, John H., Santa Ana, Calif. 1916.
Pulver, Wm. A., Wamego, Kan. 1915.
Purcell, Jno. T., Federal Bldg., Rapid City, S. Dak. 1916.
Purdy, Marion Alexander, 621 10th St., Shelbyville, Ky. 1915.
Pyper, Samuel T., 1221 Superior Ave., Dayton, Ohio. 1916.
Quigley, Roscoe Murphy, Logan Ave. and Herold St., Tyrone, Pa. 1914.
Quin, Abner H., Creston, Ia. 1915.
Quinn, James E., Antioch, Calif. 1915.
Quinn, P. E., 632 W. Washington St., Indianapolis, Ind. 1915.
Quitman, E. L., 1514 W. VanBuren St., Chicago, Ill. 1915.
Radcliff, Burdett D., 108 Franklin Sq., New Britain, Conn. 1916.
Rafter, Edward, Hamburg, N. Y. 1916.
Ragan, James A., 510 Liberty St., Morris, Ill. 1915.
Ragland, Marcus J., Salisbury, N. C. 1916.
Ramsey, R. A., B. A. I., Washington, D. C. 1915.
Ramsey, Samuel A., Jr., 234 Third St., Terre Haute, Ind. 1913.
Ramsey, Samuel V., 234 S. Third St., Terre Haute, Ind. 1916.
Ramsey, Wm. J. C., Box 481, Watsonville, Calif. 1915.
Ranck, Edw. M., Agricultural College, Miss. 1916.
Raque, Chas. A., 219 Federal Bldg., Spokane, Wash. 1916.
Rasmussen, Hilmar, Box 13, Tyler, Minn. 1916.
Rasmussen, J. C., Wyanet, Ill. 1916.
Rathbun, R. A., East Scobey, Mont. 1916.
Read, H. W., 27 Court St., Freehold, N. J. 1916.
Readhead, Wm., Lenox, Ia. 1915.
Reagan, W. J., 606 River St., Patterson, N. J. 1916.
Reardon, John D., 109 S. Capitol Ave., Indianapolis, Ind. 1916.
Reber, Abram N., 2104 N. Fremont St., Kansas City, Kans. 1916.
Rebold, George P., Stockton, Calif. 1916.
Records, Edw. J., Univ. of Nevada, Reno, Nev. 1916.
Redhead, Wm. H., Dept. of Health, Cleveland, Ohio. 1914.
Redman, Jos. F., Covington, Ind. 1916.
Reed, J. O., 230 E. New St., Lancaster, Pa. 1916.
Reed, Raymond C., Newark, Del. 1915.
Reefer, Leon N., 1405 Chapline St., Wheeling, W. Va. 1916.
Reichel, John, care H. K. Mulford Co., Glenolden, Pa. 1916.
Reichmann, Andrew Francis, Armour, S. Dak. 1916.
Reichmann, Ferdinand A., Geddes, S. Dak. 1916.
Reid, Jos. C., Biological Laboratory, Ottawa, Ont. 1916.
Reid, William, Yorkton, Sask. 1915.
Reidy, Jno. B., 1108 Jefferson Bank Bldg., Birmingham, Ala. 1916.
Reifsnnyder, Irvin S., Collegeville, Pa. 1915.
Reihart, Oliver F., 4932 South 24th St., Omaha, Nebr. 1915.

- Rein, E. A., Lewiston, Mont. 1916.
Reno, John S., Southport, Ind. 1915.
Renter, Elmer J., 767 Delhi Ave., Cincinnati, Ohio. 1915.
Renter, Walter W., 1117 Overlook Ave., Cincinnati, Ohio. 1915.
Rentschler, Mandon D., 232 N. Front St., Punxsutawney, Pa. 1916.
Revercomb, Geo. Archie, Lewisburg, W. Va. 1915.
Rey, Charles R., Tulare, Calif. 1916.
Rey, George S., S. Court St., Visalia, Calif. 1916.
Reynolds, Francois H. K., B. A. I. Quarantine Div., Washington, D. C. 1916.
Reynolds, Howard C., Factoryville, Pa. 1915.
Rhea, R. Lee, Houston & Bowie Sts., San Antonio, Tex. 1914.
Rhoads, Warren L., Lansdown, Pa. 1914.
Rhodes, C. J., Beloit, Wis. 1915.
Rhody, Francis S., Chatham, Ont. 1916.
Rice, Chas. D., Ames, Ia. 1916.
Rice, John M., Cambridge St., South, Lindsay, Ont. 1915.
Rice, Ray D., Maple Rapids, Mich. 1915.
Ricebarger, Benjamin F., 200 W. Main St., St. Charles, Ill. 1916.
Rich, Frank A., Agricultural Experiment Station, Burlington, Vt. 1915.
Rich, Theodore S., 1477 W. Grand Blvd., Detroit, Mich. 1916.
Richards, L. J., Delaware, Ohio. 1916.
Richards, Thos. H., 1127 Keele St., Toronto, Ont. 1915.
Richards, Wm. R., care W. N. Neil, S. Omaha, Neb. 1914.
Richards, William Wilson, Box 950, Manila, P. I. 1916.
Richmond, Harry A., Molson, Wash. 1916.
Riddell, Robert, 460 Chester St., Victoria, B. C., 1915.
Ridge, Wm. H., Maple Ave., Somerton, Philadelphia, Pa. 1916.
Riedel, Philip H., 1401 Roache St., Indianapolis, Ind. 1915.
Rietz, J. H., 633 Crawford Ave., Ames, Ia. 1916.
Riley, Edw. H., Experiment Station, Bozeman, Mont. 1916.
Riordon, J. J., Beverly Farms, Mass. 1915.
Riordon, Wm. F., Gilroy, Calif. 1915.
Rishel, Albert E., 215 Custom House, New York, N. Y. 1915.
Risley, Harry B., 74 Adams St., Brooklyn, N. Y. 1916.
Ritter, Philip, 1609 E. 37th St., Kansas City, Mo. 1916.
Ritter, Roy W., Holtville, Calif. 1916.
Rivers, Reuben N., Lansdale, Pa. 1913.
Rives, Robert, National Stock Yards, Ill. 1916.
Roach, Frank, Box 489, Pendleton, Ore. 1915.
Roadhouse, Chester L., College of Agriculture, Berkeley, Calif. 1916.
Roberts, Geo. H., 2242 Park Ave., Indianapolis, Ind. 1915.
Roberts, Guy A., Agricultural Experiment Station, West Raleigh, N. C. 1916.
Roberts, J. H., 64 King St., Northampton, Mass. 1915.
Roberts, James William, Davis Creek, Calif. 1916.
Robertson, Allan, 1127 Keele St., Toronto, Ont. 1916.

- Robertson, James, 735 E. 44th St., Chicago, Ill. 1915.
Robertson, James E., Monona, Ia. 1915.
Robinson, Beal A., 310 N. 5th St., Independence, Kans. 1916.
Robinson, Edwin A., 214 Bollingsbrook St., Petersburg, Va. 1916.
Robinson, John W., Garrison, N. Dak. 1915.
Robinson, John W., 3 Lincoln St., Natick, Mass. 1916.
Robinson, Major S., Camp Hughes, Man. 1916.
Robinson, Paul L., 535 Public Ave., Beloit, Wis. 1913.
Robinson, Thomas E., 65 Main St., Westerly, R. I. 1916.
Robinson, Wm. B., 72 Maysville St., Mt. Sterling, Ky. 1916.
Robinson, W. H., 87 Leland St., Portland, Me. 1916.
Rockwell, Archie Merritt, Eleanor, Ill. 1916.
Rockwell, C. S., 5128 Chestnut St., Philadelphia, Pa. 1916.
Rodgers, J. C., 715 Jackson St., Anderson, Ind. 1916.
Rogers, Arthur B., Live Stock Exchange, Sioux City, Iowa. 1915.
Rogers, Burton R., St. Joseph Veterinary College, St. Joseph, Mo. 1915.
Rogers, Howard P., 68 Cochituate St., Saxonville, Mass. 1915.
Rohrer, C. G., 128 W. 53rd St., New York, N. Y. 1915.
Roig, Chester A., 173 Carroll St., Poughkeepsie, N. Y. 1915.
Rome, John, Germantown, Md. 1915.
Ropp, Harry B., Cor. Church and 2nd Sts., Ashland, Ohio. 1916.
Rose, Thos, P., Gresham, Nebr. 1915.
Rosenberger, Arthur C., Box 1019, Stockton, Calif. 1916.
Rosenberger, Guy W., San Diego, Calif. 1916.
Rosenberger, Maynard, 306 Federal Bldg., San Diego, Calif. 1916.
Rosentiel, Chas. H., 125 Wyandotte St., Freeport, Ill. 1916.
Roshon, Harry Brown, 1131 Greenwich St., Reading, Pa. 1916.
Ross, Crittenden, 370 Convent Ave., New York, N. Y. 1916.
Ross, Harry H., 1127 Keele St., Toronto, Ont. 1916.
Ross, H. H., 4 Resson Bldg., Brandon, Man. 1916.
Ross, James D., 796 William Ave., Winnipeg, Man. 1915.
Ross, Roy G., Estherville, Ia. 1916.
Roub, J. F., Monroe, Wis. 1916.
Rouche, R. C., 1382 W. 73rd St., Cleveland, Ohio. 1915.
Rowe, Wm. B., 143 Park St., Chatham, Ont. 1916.
Roycroft, W. C., 551 So. Wilkinson St., Mobile, Ala. 1916.
Royer, B., Franklyn St., Shawano, Wis. 1916.
Ruble, Jerry L., Remount Station, Fort Bliss, Tex. 1916.
Ruffner, Fred J., Beloit, Kans. 1916.
Rumbaugh, George A., Millersburg, Ohio. 1916.
Rundle, Thomas Theodore, 435 First St., Oxnard, Calif. 1916.
Runge, Werner, 130 Union St., Newark, N. J. 1915.
Runyon, Peter F., 24 E. Main St., Freehold, N. J. 1916.
Russell, E. Everett, 69 Perham St., Farmington, Maine. 1915.
Russell, Fay Franklin, 214 Washington St., Jamestown, N. Y. 1916.
Rustad, Alvin O., 303 Bismarek St. E., Fergus Falls, Minn. 1916.
Ruth, Thomas H., DeSmet, S. Dak. 1916.

- Rutherford, J. G., Canadian Pacific Railway Co., Calgary, Alta. 1915.
- Ryan, Edw. T., 83 Washington St., Brookline, Mass. 1915.
- Ryan, Frank C., Middletown, Md. 1915.
- Rydberg, August J., San Rafael, Calif. 1916.
- Ryder, Herman R., 5719 W. Superior St., Chicago, Ill. 1916.
- Ryder, J. E., Forest Hills Inn, Forest Hills Garden, L. I., N. Y. 1916.
- Sadler, Ernest D., Wagner, S. Dak. 1916.
- Sallade, J. W., Auburn, Pa. 1916.
- Salsbery, C. E., 4220 Chestnut St., Kansas City, Mo. 1916.
- Salsbury, Jos. E., Western, Nebr. 1916.
- Salter, W. R., Stronghurst, Ill. 1916.
- Sanders, Alfred E., 1033 Shelby St., Indianapolis, Ind. 1914.
- Sanderson, William, Sidney, Ohio. 1915.
- Sanford, E. F., 117 Sterling Pl., Brooklyn, N. Y.
- Sapp, Chas. F., Hampstead, Md. 1916.
- Sater, Clinton H., Hamilton, O. 1916.
- Savage, Arthur J., 414 E. Pikes Peak Ave., Colo. Springs, Colo. 1916.
- Savage, Willard A., Box 527, Tucumcari, N. Mex. 1916.
- Sawyer, F. N., Bakersfield, Calif. 1915.
- Sayre, B. Harry, Brookings, S. Dak. 1915.
- Schader, Curtis H., Sunnyside, Wash. 1915.
- Schaefer, Edw. H., 3215 Anderson Ave., Kansas City, Mo. 1914.
- Schaefer, G. L., Tekamah, Nebr. 1916.
- Schaefer, Valentine, Tekamah, Nebr. 1916.
- Schaffer, Geo. R., Midland, Mich. 1916.
- Schaffter, E. P., 408 P. O. Bldg., Detroit, Mich. 1916.
- Schafstall, A. C., New Washington, Ohio. 1916.
- Schalk, Arthur F., Fargo, N. Dak. 1916.
- Schauffler, Chas. A., Hunting Park Ave., Philadelphia, Pa. 1916.
- Schermerhorn, Robert J., 106 East Citrus Ave., Redlands, Calif. 1916.
- Schleich, Fred Harrison, Williamsport, Ohio. 1915.
- Schlingman, A. S., Eaton, O. 1916.
- Schloemer, Chas. C., 602 River Terrace, Hoboken, N. J. 1915.
- Schmidt, Hubert, College Station, Tex. 1915.
- Schmidt, John P., 200 W. North Ave., Pittsburgh, Pa. 1916.
- Schneider, Ernest, Kulm, N. Dak. 1916.
- Schneider, Francis, O., Box 504, Nicholasville, Ky. 1916.
- Schneider, F. H., York and Erie Ave., Philadelphia, Pa. 1916.
- Schneider, Frederick L., Box 464, Albuquerque, N. M. 1916.
- Schoenenberger, John Guy, Winterset, Ia. 1916.
- Schoening, Harry W., B. A. I., Washington, D. C. 1915.
- Schoenleber, F. S., 805 Houston St., Manhattan, Kans. 1915.
- Schreck, Oscar, 94 William St., New Haven, Conn. 1916.
- Schreiber, R. J., Monticello, N. Y. 1916.

- Schroeder, E. C., B. A. I. Experiment Station, Bethesda, Md. 1916.
Schubel, Otto W., Quincy, Mich. 1916.
Schucengost, Robert Hunter, Swea City, Ia. 1915.
Schuh, Herman L., 152 Louis St., Grand Rapids, Mich. 1916.
Schulz, Carl A., Independence, Mo. 1916.
Schultz, Chas. H., Box 84, Seattle, Wash. 1916.
Schumacher, Wilhelm, 1450 Park Ave., Durango, Colo. 1915.
Schwarze, Herman R., 500 S. Douglas Ave., Springfield, Ill. 1916.
Schwarzkopf, Olaf, 3rd U. S. Cavalry, Fort Sam Houston, Tex. 1916.
Schwein, Payson E., Elkhart, Ind. 1915.
Scott, Carl J., Knoxville, Ia. 1915.
Scott, Geo. A., 315 E. 6th St., Waterloo, Ia. 1916.
Scott, John A., Waverly, Minn. 1915.
Scott, M. W., 24 S. 6th St., Vincennes, Ind. 1915.
Scott, Wm. A., 1407 1st Ave., Columbus, Ga. 1916.
Sebright, Melvin R., Crofton, Nebr. 1916.
Seeley, James T., 1101 Westlake Ave. N., Seattle, Wash. 1916.
Seibert, Walter D., 808 Howard St., Petoskey, Mich. 1913.
Selby, Orval C., Worthington, Minn. 1916.
Selby, Stephen A., 429 W. 43rd St., New York, N. Y. 1916.
Self, Presley M., Farmersburg, Ind. 1916.
Senseman, Benj. F., 1723 N. 55th St., Philadelphia, Pa. 1915.
Sevester, John, Washington St., Hamburg, Ia. 1915.
Severcool, Lucius A., 217 Lake Ave., Elyria, Ohio. 1915.
Severin, John R., care B. A. I., Room 230, Exch. Bldg., Sioux City, Ia. 1915.
Severovic, Mirko F., 1821 W. 22nd St., Pilsen Sta., Chicago, Ill. 1915.
Sexmith, A. B., Charlotte, Mich. 1916.
Sexton, Michael J., 819 Marquette Ave., Minneapolis, Minn. 1916.
Shand, James Reid, U. S. Army, Tientsin, China. 1916.
Sharp, Charles E., Greenfield, Ind. 1916.
Sharp, Walter E., Newton, Ia. 1915.
Shartle, Walter W., 413 New Jersey St., Indianapolis, Ind. 1916.
Shaw, Charles W., 200 W. 78th St., New York, N. Y. 1916.
Shaw, Clarence E., 115 Sterling Pl., Brooklyn, N. Y. 1916.
Shaw, W. G., Knoxville, Tenn. 1916.
Shaw, Wm. Harvey, Pawnee, Ill. 1916.
Shealey, Alonzo S., Bureau of Agriculture, Manila, P. I. 1916.
Shearburn, Thos. O., Walnut, Ill. 1916.
Sheckler, Wm. E., 39th and Woodland Ave., Philadelphia, Pa. 1916.
Shelton, J. E., Box 308, Arkansas City, Kan. 1916.
Shepard, E. H., 2027 E. 105th St., Cleveland, Ohio. 1916.
Sheppard, Wm., Neck Rd., Sheepshead Bay, Long Island, N. Y. 1916.
Sheridan, George, Ashland, Nebr. 1915.
Sherwood, Arthur M., Naperville, Ill. 1915.
Shevalier, Eugene D., Escanaba, Mich. 1915.
Shigley, J. F., Kenmare, N. Dak. 1916.

- Shigley, Ralph E., Kenmare, N. Dak. 1916.
Shikles, Ernest Adair, Dearborn, Mo. 1916.
Shillinger, Jacob E., Easton, Md. 1915.
Shipley, Levi U., Sheldon, Ia. 1915.
Shipley, Trajan. Live Stock Exchange Bldg., Sioux City, Ia. 1915.
Shipman, Oliver B., Hilo, Hawaii. 1915.
Shonyo. John Howard. 711 Boyd Bldg., Winnipeg, Man. 1916.
Shore, Chalmers S., Lake City, Minn. 1915.
Shore, Howard J., Dept. of Agriculture, Washington, D. C. 1916.
Shreve, Raymond M., Vine & Church Sts., Panora, Ia. 1916.
Shuler, C. C., Eaton, Ind. 1915.
Shuler, W. P., Stillwater, Okla. 1916.
Shumway, Daniel G., B-4, Carlton Court, Buffalo, N. Y. 1915.
Shutte, Vernon D., Volcano House, Kau, Hawaii. 1916.
Siders, Roy A., Moran, Kans. 1916.
Sigler, Thos. A., 114 N. Jackson St., Greencastle, Ind. 1916.
Sigmond, Chas. J., Box 80, Pipestone, Minn. 1916.
Sihler, C. J., 7th and Everett Ave., Kansas City, Kan. 1915.
Silberg, Frank W., Spencerville, Ind. 1916.
Silfver, Oscar, 302 S. Jefferson Ave., Peoria, Ill. 1916.
Silverwood, Herbert, 331 Clackmas St., Portland, Ore. 1916.
Simmons, Wm. Herbert. 2344 W. Chestnut St., Louisville, Ky. 1916.
Simms, Bennett Thomas. Oregon Agricultural College, Corvallis, Ore. 1916.
Simpson, C. Rowland. 123 N. Broadway, Los Angeles, Calif. 1915.
Simpson, Hal. C., Box 69, Denison, Ia. 1916.
Simpson, Wm. H., 45 Dartmouth St., Malden, Mass. 1916.
Sims, Frank C., Aurora, Nebr. 1915.
Sims, Thos., Woodburn, Ore. 1916.
Sisk, David E., Seymour St., Mahomet, Ill. 1916.
Sisson, Septimus. Ohio State University, Columbus, Ohio. 1916.
Skerritt, Wm. Henry, 315 Columbia St., Utica, N. Y. 1916.
Skinner, John Frederick, Box 167, Morris, Man. 1915.
Slater, Leroy E., 1115 Prospect St., Indianapolis, Ind. 1915.
Slawson, Alexander. 248 $\frac{1}{2}$ St. Nicholas Ave., New York, N. Y. 1915.
Sleeth, Trewelyn E., 688-690 Seymour St., Vancouver, B. C. 1916.
Smead, Morgan J., Parkdale Farm, Rochester, Mich. 1916.
Smellie, James, Eureka, Ill. 1916.
Smillie, E. W., Rockefeller Institute, Princeton, N. J. 1916.
Smith, Arthur L., Mechanicsville, N. Y. 1916.
Smith, A. W., Farmer City, Ill. 1915.
Smith, Bert C., Brigiden, Ont. 1915.
Smith, Clarence E. Dept. of Public Health, Greenville, S. Car. 1915.
Smith, Eldon, 717 Watson St., Grand Rapids, Mich. 1916.
Smith, Ernest I., Baton Rouge, La. 1916.
Smith, Fletcher Eugene, 4801 Evanston Ave., Seattle, Wash. 1916.
Smith, George A., Rigby, Ida. 1916.

- Smith, George F., Vicksburg, Miss. 1914.
Smith, George W., 157 6th St., Hoboken, N. J. 1915.
Smith, Henry V., 90 Wildmere Ave., Detroit, Mich. 1915.
Smith, Herbert M., 407 Federal Bldg., Providence, R. I. 1915.
Smith, Jesse P. F., 2310 Central Ave., Kansas City, Kans. 1915.
Smith, Robert P., Wendell, Ida. 1915.
Smith, Roy C., 123 East Randolph St., Enid, Okla. 1916.
Smith, R. V., 17 Court St., Frederick, Md. 1915.
Smith, Stanley N., 112 College Ave., Columbus, Mo. 1915.
Smith, S. P., Cando, N. Dak. 1915.
Smith, T. E., 309 Barrow St., Jersey City, N. J. 1916.
Smith, Wilbur C., Fairfield, Ia. 1916.
Smith, Wright J., 260 Clinton Ave., Kingston, N. Y. 1916.
Smythe, Frank R., 1533 Groesbeck Rd., Cincinnati, Ohio. 1915.
Snyder, Rudolph, 444 Federal Bldg., Denver, Colo. 1916.
Sockman, Clifford Clyde, Deshler, Ohio. 1915.
Solt, C. H., Arlington, Ohio. 1915.
Songer, Lee C., Dept. of Agriculture, Olathe, Kans. 1915.
Sorenson, Andreas I., R. F. D. No. 6, Stockton, Calif. 1916.
Sorrel, Warren, Willard, N. Mex. 1915.
Spade, Fred A., Constantine, Mich. 1916.
Spalding, N. C., Castle Gate, Utah. 1915.
Sparks, H. C., Ottawa, Ont. 1916.
Sparling, Wm., Harrow, Ont. 1916.
Spear, Wm. H., 122 Cumberland Ave., Portland, Me. 1915.
Spencer, H. H., 429 W. Adams St., Jacksonville, Fla. 1916.
Spencer, Tracy N., 7 W. Depot St., Concord, N. C. 1916.
Sprague, John D., Seward, Nebr. 1915.
Springer, C. W., 48 Morgantown St., Uniontown, Pa. 1915.
Springer, Samuel E., B. A. L. South Side, Omaha, Nebr. 1916.
Sprink, George F., care Parke, Davis & Co., Detroit, Mich. 1916.
Staab, John J., 1422 W. 65th St., Cleveland, Ohio. 1915.
Stahl, Benton M., 4061 Ellis Ave., Chicago, Ill. 1916.
Staley, Raymond M., Camp Hill, Pa. 1915.
Stamp, Ashley G., 198 Candler Ave., Highland Park, Mich. 1915.
Stanclift, Ray J., 15th Cavalry, Fort Riley, Kan. 1916.
Stange, C. H., Iowa State College, Ames, Ia. 1916.
Staples, Wm. D., 1813 Quintard Ave., Anniston, Ala. 1916.
Starnaman, George W., 340 Rielle Ave., Verdun, Que. 1916.
States, Harry E., 93 Bagley Ave., Detroit, Mich. 1914.
Steddon, R. P., 1468 Harvard St., Washington, D. C. 1916.
Steel, Edw. R., Chester, Nebr. 1915.
Steele, Harry F., Ft. McIntosh, Laredo, Tex. 1915.
Steele, Joseph G., 217 Exchange Bldg., Ft. Worth, Tex. 1915.
Stehle, Frederick, Jr., 5145 Pine St., Philadelphia, Pa. 1915.
Steigley, Raymond W., LaPorte, Ind. 1916.
Steinbach, G. Frederick, Oak & Pacific Ave., Wildwood, N. J. 1916.

- Stephens, George, 18 Maplewood Terrace, White River Jnet., Vt. 1915.
- Stetson, Henry G., 24 Cliff St., St. Johnsbury, Vt. 1916.
- Stevens, Cecil H., Box 106, Stevensville, Mont. 1916.
- Stevens, Guy G., 20 Park St., Groton, N. Y. 1915.
- Stevens, Herbert L., 192 Limerock St., Rockland, Me. 1915.
- Stevenson, George T., Burlington, Vt. 1913.
- Stevenson, James A., Gretna, Man. 1916.
- Stewart, A. D., Ailsa Craig, Ont. 1916.
- Stewart, C. E., Chariton, Ia. 1915.
- Stewart, H. L., Chariton, Ia. 1916.
- Stewart, Saml. L., 3335 Brooklyn Ave., Kansas City, Mo. 1915.
- Stewart, Walter C., West Union, Ia. 1916.
- Stewart, Walter J., 4352 Montgomery St., Oakland, Calif. 1916.
- Stickel, William E., Etna Mills, Calif. 1915.
- Stiner, Jarvin O., Lindsay, Calif. 1915.
- Stokes, Wilfred J., Ft. Riley, Kan. 1915.
- Stone, Garry T., Sidney, N. Y. 1915.
- Stott, R. O., 205 Commercial Place, Mason City, Ia. 1916.
- Stouder, Kirk W., Ames, Ia. 1916.
- Stouffer, David F., Bellevue, Nebr. 1915.
- Stork, Wm. W., Brampton, Ont. 1916.
- Stover, John Price, Shady Grove, Pa. 1916.
- Strayer, Joseph Edw., Hartington, Nebr. 1916.
- Street, Jno. James, Box 87, Ventura, Calif. 1916.
- Stribling, Wm. E., Clarence, Ia. 1916.
- Strickler, C. M., 25 Elm Lane, Greencastle, Pa. 1916.
- Strickler, Don B., 1108 Jefferson Bank Bldg., Birmingham, Ala. 1916.
- Stroup, Wm. L., Corinth, Miss. 1915.
- Stubbs, Evan Lee, State Farm, R. D. 3, Media, Pa. 1915.
- Sugg, Redding S. 1915.
- Sullivan, E. J., 233 Union Ave., Saratoga Springs, N. Y. 1916.
- Sullivan, Walter A., Box 666, Twin Falls, Ida. 1915.
- Summerfield, Jas. J., Main and First Sts., Santa Rosa, Calif. 1916.
- Summer, C. O., Tolono, Ill. 1916.
- Sunderville, Earl, Forest Home, Ithaca, N. Y. 1916.
- Sutherland, Arthur W., Bristol, Conn. 1916.
- Sutter, Errold, Beach, N. Dak. 1913.
- Sutton, Otis L., 1701 Kinney Ave., Cincinnati, Ohio. 1916.
- Swail, Clark E., Dixville Notch, N. H. 1916.
- Swan, Wm. R., Stevens Point, Wis. 1916.
- Swenerton, L. Daniel, 500 8th Ave. E., Vancouver, B. C. 1913.
- Swenson, Sigwart R., Maddock, N. Dak. 1916.
- Swingley, C. W., Freeport, Ill. 1916.
- Switzer, Wm. B., 50 E. 7th St., Oswego, N. Y. 1916.
- Sylvester, John Fletcher, Langdon, N. Dak. 1916.
- Tade, James M., 518 N. 1st St., Vincennes, Ind. 1915.

- Talbert, Joseph F., 721 W. 8th St., Kansas City, Kans. 1915.
Talbot, Percy R., Box 703, Edmonton, Alta. 1816.
Tamblyn, David S., Box 616, Regina, Sask. 1914.
Tansey, Edw. J., Monrovia, Ind. 1916.
Tate, H. L., 230 Exchange Bldg., Sioux City, Ia. 1916.
Taylor, Chas. H., 632 Sycamore Rd., DeKalb, Ill. 1916.
Taylor, Geo. C., Redding, Calif. 1915.
Taylor, Lawrence, L., Condon, Ore. 1915.
Taylor, Walter J., Cristobel, Canal Zone. 1915
Teague, B. B., Bode, Ia. 1916.
Teckenbrock, W. G., Metropolis, Ill. 1916.
Teie, John A., Hatton, N. Dak. 1915.
Tennent, David C., 833 A. Bathurst St., Toronto, Ont. 1916.
Tennent, J. H., 275 King St., London, Ont. 1915.
Thacker, Thomas, Renfrew, Ont. 1913.
Thayer, Warren L., 598 Pleasant Ave., Worcester, Mass. 1916.
Thomas, John, Wells River, Vt. 1916.
Thomas, Raymond F., Canton, Miss. 1914.
Thompson, John A., Edwardsville, Kans. 1915.
Thompson, John B., Harvey, N. Dak. 1916.
Thompson, John S., 903 E. 5th St., Moscow, Ida. 1915.
Thompson, Mulford C., Box 145, Sharon, Conn. 1915.
Thompson, Warwick M., 1210 Main St., Red Bluff, Calif. 1916.
Thompson, William, Box 145, Laredo, Tex. 1916.
Thomson, Jacob J., Gladbrook, Ia. 1916.
Thomson, John T., Armstrong, Ia. 1916.
Thomson, Wm., Keremeos, B. C. 1916.
Thornton, Edw. L., Fort Kent, Me. 1913.
Tiffin, Chas. H., Frankfort, Ky. 1916.
Tillman, Albert C., Earlville, Ill. 1916.
Tillson, Hobart W., Oneonta, N. Y. 1916.
Timmons, Wilfred H., Box 254, Madison, Ind. 1915.
Tipton, Wm. B., Emporia, Kans. 1915.
Titterud, Oscar H., Preston, Minn. 1916.
Todd, Robert S., New Milford, Conn. 1916.
Tolmie, S. F. Box 1518, Victoria, B. C. 1916.
Tomlinson, W. J., Williamsport, Pa. 1914.
Tompkins, Leland J., Hobart, N. Y. 1915.
Tooley, James William, 38 Fourth St., Fond du Lac, Wis. 1916.
Topmiller, Alexander C., Murfreesboro, Tenn. 1916.
Torgerson, Henry E., 3419 Crore St., Oakland, Cal.
Torrance, F., Veterinary Director-General, Ottawa, Ont. 1916.
Torrrie, Arthur R., 17 Hepbourne St., Toronto, Ont. 1916.
Totten, G. E., 410 Fulton Bldg., Pittsburgh, Pa. 1916.
Tow, Edward, 1415 J St., Sacramento, Calif. 1915.
Towne, George V., Box 54, Thompson, Conn. 1916.
Towner, Albert N., Towners, N. Y. 1915.
Townsend, George, New Glasgow, N. S. 1916.

- Townsend, Norris L., 104 W. 42nd St., New York, N. Y. 1916.
Tracy, Angus W., Sherbrook, Que. 1915.
Trainer, Peter F., 42 Mercer St., Jersey City, N. J. 1913.
Traum, Jacob, University of California, Berkeley, Cal. 1915.
Treadway, Charles R., 2438 Prospect Av., Kansas City, Mo. 1915.
Trickett, Arthur, 1336 E. 15th St., Kansas City, Mo. 1915.
Trigg, William Stark, Beaufort, S. C. 1916.
Trippeer, H. A., 219 Newell St., Walla Walla, Wash. 1915.
Trone, Winson, 96 Hower Av., E. Cleveland, O. 1916.
Troutman, W. A., Port Trevorton, Pa. 1916.
Truax, Blair W., Burr Oak, Kansas. 1916.
Tumbleson, Benj. F., Genoa, Nebr. 1916.
Turlington, John A., Melfa, Va. 1915.
Turner, H. A., Rose Ave., Pleasanton, Calif. 1915.
Turner, Henry W., New Hope, Pa. 1916.
Turner, John E., 204 S. Detroit St., Kenton, Ohio. 1915.
Turney, Carl D., Germantown, O. 1916.
Tuttle, Lyford E., Grafton, N. H. 1915.
Tuxill, A. J., 5 Lincoln St., Auburn, N. Y. 1915.
Twitchell, J. M., 24 Bridge Ave., Nashville, Tenn. 1916.
Tyler, John Lou, 125 S. Main St., Pomona, Calif. 1916.
Tyner, Alpheus L., Goldsmith, Ind. 1916.
Udall, D. H., N. Y. State Vet. College, Ithaca, N. Y. 1915.
Underhill, B. M., 3 West 3rd St., Media, Pa. 1916.
Utt, James Garfield, 1000 G. St., Sacramento, Calif. 1916.
Utter, B. A., Triumph, Minn. 1916.
Utter, J. W., Sherburn, Minn. 1916.
Vail, Irving Roe, 20 George St., New Haven, Conn. 1915.
Vail, Wallace F., Havemeyer Place, Greenwich, Conn. 1915.
Van Brussel, O. H., Wayland, Mich. 1916.
Van Cleave, Walter B., Chrisman, Ill. 1916.
Van de Ere, Jacob, Sherwood, N. Dak. 1916.
Vanderwarf, Cornelius, 1343 Vincennes Ave., Chicago Heights, Ill. 1915.
Van De Woo, H. J., Jr., Orange City, Ia. 1916.
Van Hoozer, A. L., Powell, Wyo. 1916.
Van Es, L., M. D., Agricultural College, Fargo, N. D. 1916.
Vans Agnew, Robert, Ft. Leavenworth, Kan. 1916.
Van Vracken, Harvey S., Story City, Ia. 1916.
Vasa, J. J., 211-213 Federal Bldg., Atlanta, Ga. 1916.
Veit, Wm., 240 N. 52nd St., Philadelphia, Pa. 1915.
Veldhuis, Zachary, 408 P. O. Bldg., Detroit, Mich. 1915.
Venable, Jos. W., Cullman, Ala. 1916.
Vermilya, Ralph F., 2999 Shelby Ave., St. Paul, Minn. 1915.
Viers, Silas B., Dilles, Nebr. 1916.
Vigneau, Joseph H., Union Mkt. Hotel, Watertown, Mass. 1915.
Vliet, Geo. B., 202 Baldwin St., Hackettstown, N. J. 1915.
Vollmer, Carl G., Bryan, Ohio. 1915.

- Vorhees, E. R., 87 E. Main St., Somerville, N. J. 1916.
Vulliamy, H. F., Plaquemine, La. 1914.
Wadsworth, Francis R., Lindsey, Ohio. 1916.
Wageman, Grover M., 210 W. Superior St., Kokomo, Ind. 1915.
Wagner, Charles O., Elkton, Ky. 1915.
Wagoner, C. Otto, 212 S. 10th St., Richmond, Ind. 1916.
Walch, Chas. Ira., 4823 King Hill Ave., St. Joseph, Mo. 1915.
Walch, Clemence C., B.A.I. Exchange Bldg., S. St. Joseph, Mo. 1915
Walker, R. G., 238 Aberdeen St., Chicago, Ill. 1916.
Walkley, Seymour J., 185 Northwestern Ave., Milwaukee, Wis. 1916.
Wallace, Chester L., 381 Dundas St., Toronto, Ont. 1916.
Wallace, W. B., 220 W. 2nd St., Marion, Ind. 1915.
Walmsley, F. D., 924 Rutger St., Utica, N. Y. 1915.
Walsh, Ernest J., Minot, N. Dak. 1915.
Walsh, L. S. N., 4225 Delmar Blvd., St. Louis, Mo. 1915.
Walters, Frank A., Lemont, Ill. 1916.
Walters, Percy Knight, Suite 11, Argyle Court, Calgary, Alta. 1915.
Walther, Wm. A., Moorefield, Nebr. 1916.
Ward, Archibald R., B. A. I., Washington, D. C. 1915.
Ward, George R., 424 Persia Ave., San Francisco, Cal. 1915.
Ward, Harry C., Fulton, Mo. 1915.
Ward, John E., 12 E. Crescent St., Grand Rapids, Mich. 1915.
Ward, S. H., State Capitol, St. Paul, Minn. 1916.
Ward, Victor, Paso Robles, Calif. 1915.
Warn, Chas. C., Dodgeville, Wis. 1916.
Warner, Chas. G., 701 S. 4th St., Paducah, Ky. 1913.
Warnock, David, House of Commons, Ottawa, Ont. 1916.
Washburn, Henry J., 704 B. St., S. W., Washington, D. C. 1916.
Washburn, W. B., 172 E. Market St., Tiffin, Ohio. 1916.
Waters, R. E., 28 Village Rd., Brooklyn, N. Y. 1915.
Watson, Edw. A., Box 567, Lethridge, Alta. 1915.
Watson, Thos. E., 23 North Main St., Niagara Falls, Ont. 1916.
Watson, Thos. W., Kerens, Tex. 1916.
Waugh, Wm. J., 111 W. Wheeling St., Washington, Pa. 1916.
Way, Cassius, 108 Hudson St., New York, N. Y. 1916.
Way, R. D., 3911 Perkins Ave., Cleveland, Ohio. 1916.
Weaver, Cecil H., St. Lambert, Que. 1916.
Weaver, Gilbert S., Mitchell, S. Dak. 1916.
Weaver, Phillip V., Glen Cove, N. Y. 1916.
Webb, A. J., 2347 Hudson Ave., Ogden, Utah. 1915.
Webb, James Cleveland, Piedmont, Ala. 1915.
Webb, Wm. T., Quarryville, Pa. 1915.
Webb, W. W., Auburn, Ala. 1915.
Webber, Carr R., 135 Crossman Terrace, Rochester, N. Y. 1916.
Webber, Orrin B., 69 Front St., Rochester, N. Y. 1915.
Weber, Henry Stanley, 6128 Park Ave., Weehawken, N. J. 1915.
Weber, John H., Boise, Ida. 1915.
Webster, John H. L., Y. M. C. A., Reno, Nev. 1916.

- Webster, Wm. Owens, Utica, Ohio. 1916.
Weeks, Cornelius C., 369 3rd St., N. W., Washington, D. C. 1916.
Wegner, Earl Edward, Pullman, Wash. 1916.
Wehle, Frank A., 586 Sayre Ave., Lexington, Ky. 1916.
Weigel, Marion S., Cromwell, Ind. 1915.
Weinman, Joseph E., Arcadia, Nebr. 1916.
Weir, Robert, 84 Grove St., Rutland, Vt. 1916.
Weitzel, Fred, 100 Parkway West, Pittsburgh, Pa. 1915.
Welch, Guy Noble, 39 Union St., Northfield, Vt. 1916.
Welch, Wm. B., 353 W. Arrow St., Marshall, Mo. 1915.
Wells, Frank E., Westerville, Ohio. 1916.
Wells, Thomas Grover, Arthur, Ill. 1914.
Wende, Bernard P., 101 Florence Ave., Buffalo, N. Y. 1915.
Wende, Horatio S., Tonawanda, N. Y. 1914.
Wernitz, Harvey Grant, E. Liberty, P. O. Box 321, Pittsburgh, Pa. 1915.
Wershow, Max, Veterinary Clinic Bldg., Columbus, Ohio. 1915.
Wertz, Sidney S., Kenesaw, Nebr. 1916.
West, Jay P., 121 Monona Ave., Madison, Wis. 1916.
Westcott, Geo. F., 1008 Congress St., Portland, Me. 1915.
Westcott, Henry B., 1008 Congress St., Portland, Me. 1915.
Westgate, Saml. S., Box 1763, Grafton, N. Dak. 1916.
Westmoreland, Dewey E., Owensboro, Ky. 1916.
Whallon, E. A., Akron, Ind. 1916.
Wheeler, A. S., Biltmore Farms, Biltmore, N. C. 1915.
Whitcomb, Morton S., Live Stock Sanitary Board, St. Paul, Minn. 1915.
White, C. D., Nashville, Tenn. 1916.
White, D. S., 1656 Neil Ave., Columbus, Ohio. 1916.
White, Ernest A., 1233 Dryade St., New Orleans, La. 1916.
White, Geo. R., 1314 Adams St., Nashville, Tenn. 1915.
White, John L., 5327 Union St., Chicago, Ill. 1916.
White, Logan A., Sioux Rapids, Ia. 1916.
White, Stephen A. K., 114 St. Andrew St., Victoria, B. C. 1915.
White, Timothy P., B. A. I., Washington, D. C. 1916.
White, V. C., Blackfoot, Ida. 1915.
White, Wm. T., 4 Edinboro Pl., Newtonville, Mass. 1915.
Whitehouse, Arthur W., Ft. Collins, Colo. 1915.
Whiteman, Harry Johnson, 1301 Ligonier St., Latrobe, Pa. 1916.
Whitesell, Roy B., 1417 Center St., Lafayette, Ind. 1915.
Whitestine, Orville G., 47 E. Washington St., Huntington, Ind. 1916.
Whiting, Rex A., West Lafayette, Ind. 1916.
Whitney, A. Homer, Narka, Kans. 1915.
Whitney, Clifford C., College Station, Tex. 1916.
Whitney, Harrison, 20 George St., New Haven, Conn. 1915.
Whitney, J. C., 3 West St. N., Hillsdale, Mich. 1915.
Whitney, John Gregory, 26 Summer St., Montpelier, Vt. 1915.
Whyte, John D., 315 Sixth Ave. East, Calgary, Alta. 1915.

- Wickham, J. C., Galion, Ohio. 1916.
Wicks, A. G., 23 N. College St., Schenectady, N. Y. 1915.
Wight, W. E., 237 McKee Pl., Pittsburgh, Pa. 1916.
Wilder, Jos. L., Akron, N. Y. 1916.
Wileden, Louis A., Lansing, Mich. 1916.
Wiley, Morris C., B. A. I., Trinidad, Colo. 1915.
Wilkins, John E., Johnson & Jordan Sts., Greenville, Tex. 1915.
Will, Evan J., Harrisonburg, Va. 1915.
Willett, Frederick C., Henry, Ill. 1915.
Willey, Lewis E., Ames, Ia. 1916.
Williams, Geo. M., 611 College St., Boone, Ia. 1916.
Williman, Earl Leroy, Ohio City, Ohio. 1915.
Willis, Harry S., Orange, Va. 1915.
Willis, Harry W., Richmond, Ind. 1916.
Wills, J. G., 27 Matilda St., Albany, N. Y. 1916.
Wilson, Louis A., 167 Commissioner St. W., Montreal, Que. 1916.
Willyoung, Lester E., 11th Cavalry, Dodge P. O., Ft. Oglethorpe, Ga. 1915.
Wilson, A. F., Carmangay, Alta. 1916.
Wilson, Arthur M., Wheatley, Ont. 1916.
Wilson, Claud, 113 So. State St., Greenfield, Ind. 1915.
Wilson, Fred O., 314 Madison St., Greenbay, Wis. 1915.
Wilson, Howard C., 416 Yancey St., Montgomery, Ala. 1916.
Wilson, John Oscar, Box 714, Miles City, Mont. 1915.
Wilson, Robert H., care Parke, Davis & Co., Rochester, Mich. 1916.
Wilson, Roy O., Stanley, N. Dak. 1916.
Wilson, W. S., Bowman, N. Dak. 1916.
Wiltrant, Frank Adam, 16 Washington St., Wilkesbarre, Pa. 1916.
Wing, Casper L., Van Wert, Ia. 1916.
Wing, Charles C., 605 City Hall, Oakland, Calif. 1916.
Winsloe, J. A. H., Cooperstown, N. Dak. 1916.
Winslow, C., Rockland, Mass. 1915.
Winslow, Joseph H., Lamoure, N. Dak. 1915.
Winstanley, John H., 119 S. 37th St., Philadelphia, Pa. 1915.
Winter, Howard E., 132 E. Second St., Plainfield, N. J. 1916.
Winteringham, Harry Barker, 118 Western Ave., Petaluma, Calif. 1916.
Wipf, J. D. C., Belgrade, Mont. 1915.
Wirt, Frederick G., Box 4, Napoleonville, La. 1916.
Wise, Wm. F., 246 W. Liberty St., Medina, Ohio. 1916.
Wisner, Scott, Omega, Nebr. 1915.
Witmer, Hervey W., Bradentown, Fla. 1915.
Witte, Charles R., 852 East St., New Britain, Conn. 1915.
Wolcott, Leroy B., Shelton, Nebr. 1916.
Wolcott, Walter A., 713 E. Johnson St., Madison, Wis. 1916.
Wolf, Ortho C., West 7th St., Ottawa, Kans. 1915.
Wood, A. L. Hampton, Ia. 1916.
Wood, Ezra P., 415 Market St., Charlottesville, Va. 1915.

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- Wood, Frederick Wm., 6th & Grayson St., Cutter Laboratory, Berkeley, Calif. 1916.
- Wood, Wm. R., 167 Commissioner St. W., Montreal, Que. 1916.
- Woodliffe, Mark J., 637 E. 20th Ave., Denver, Colo. 1916.
- Woodside, Jas. H., Groton, N. Y.
- Woodward, B. T., Naval Academy, Annapolis, Ind.
- Woolfolk, Geo. H., Pottsville, Pa. 1916.
- Worcester, Harry, 118 W. 3rd St., Middletown, Ohio. 1915.
- Worms, Albert C., 2932 Broadway, Chicago, Ill. 1916.
- Wray, A. M., Wiggins, Colo. 1915.
- Wright, C. C., 310 City Hall, Health Bureau, Portland, Ore. 1915.
- Wright, Carlton J., Cerro Gordo, Ill. 1916.
- Wright, David Edwin, 323 Ralston St., Reno, Nev. 1916.
- Wright, Harmon K., care Mulford Co., Philadelphia, Pa. 1916.
- Wright, Leslie A., Water St., Columbus, Wis. 1915.
- Wright, Norman, 137 20th St., West Saskatoon, Sask. 1915.
- Wright, W. Dean, 1701 Ressigie St., Boise, Ida. 1916.
- Wurm, John E., Pigeon, Mich. 1915.
- Yancey, Wm. E., 864 S. Virginia St., Reno, Nev. 1915.
- Yards, Wm. W., Hotel Ayers, Denver, Colo. 1913.
- Young, Frank A., Delphos, Ohio. 1916.
- Young, Geo. D., 9945 S. Irving Ave., Chicago, Ill. 1916.
- Young, G. R., 4602 Center St., Omaha, Nebr. 1915.
- Young, Hulbert, 515 N. Charles St., Baltimore, Md. 1915.
- Young, John M., 419 6th St., Brooklyn, N. Y. 1915.
- Young, Wm. A., Prospect, N. Y. 1915.
- Youngberg, Stanton, Bureau of Agriculture, Manila, P. I. 1915.
- Yunker, Elkan H., 2344 N. 18th St., Philadelphia, Pa. 1915.
- Zeiler, John Lewis, Orosi, Tulare, Co., Calif. 1916.
- Zell, Chas. August, 4362 Kenmore Ave., Edgewater Station, Chicago, Ill. 1915.
- Zickendrath, Ernest G., 101 Middlefield Road, Palo Alto, Calif. 1916.
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—Dr. A. E. Rishel has returned from Liverpool, England, and is stationed at the Custom House in New York City. He will have charge for the port of New York of the importation of hides, etc., under the Joint Order No. 1, issued by the United States Treasury Department and the Department of Agriculture. These regulations governing the certification and disinfection of hides, fleshings, hide cuttings, parings, and glue stock, sheepskins and goat-skins and parts thereof, hair, wool, and other animal by-products, hay, straw, forage, or similar material offered for entry into the United States, will be effective beginning January 1, 1917.

MISCELLANEOUS

—DR. EICHHORN LEAVES THE DEPARTMENT OF AGRICULTURE.—
Dr. Adolph Eichhorn, for a number of years connected with the Bureau of Animal Industry, has resigned to accept a position as Director of the Veterinary Department of the Lederle Antitoxin Laboratories, with headquarters at Pearl River, N. Y. Dr. Eichhorn is so widely known among the profession and has devoted so much energy to investigation that the following brief biographical sketch should be of interest:

Adolph Eichhorn was born at Lipto Szt., Miklos, Hungary, May 27, 1875. Attended the Royal Veterinary College of Budapest, Hungary, 1892 to 1895. Graduated from the New York Veterinary College in 1900, receiving the degree of Doctor of Veterinary Surgery.

In 1900-1901 he acted as Assistant Surgeon in the American Veterinary College Hospital, of New York. Engaged in teaching as Professor of Infectious Diseases and Meat Hygiene in the Veterinary Department of the George Washington University, 1910-11.

Appointed to Meat Inspection Service, B.A.I., March 25, 1901; transferred to Pathological Division at Washington, D. C., May 1, 1906.

Appointed Chief of the Pathological Division, B.A.I., July 1, 1915.

Research Work, Papers and Translations.—In cooperation with Dr. John R. Mohler, translated Edelmann's "Meat Hygiene"; Hutyra & Marek's "Special Pathology and Therapeutics of Domestic Animals"; and Ernst's "Milk Hygiene".

Articles.—"Production of Hog Cholera Serum in Hungary";

"Complement-fixation Tests in the Diagnosis of Dourine and Glanders";

"The Need of Controlling and Standardizing the Manufacture of Veterinary Tetanus Antitoxin";

"Immune Bodies and Biological Reactions";

Articles on Glanders, and Foot-and-mouth Disease for Reference Handbook of Medical Sciences.

Contributions to the Diagnosis of Malta Fever;

"Immunization Tests in Tetanus";

"Vaccination against Hemorrhagic Septicemia";

"Ophthalmic Mallein for the Diagnosis of Glanders";

"Biological Therapeutics"; also other miscellaneous articles on similar subjects.

—Dr. Q. C. Dobbins, a prominent veterinarian of Bedford Indiana, has recovered from a severe attack of tetanus. Dr. Dobbins injured his arm on a thorn bush, tetanus developed and for nearly two weeks he was unconscious and several times it was thought that he could not recover. More than \$80.00 worth of tetanus antitoxin was used in his case.

—Dr. Adolph Casper has been transferred to Nebraska City, Nebraska, where he has been placed in charge of the meat inspection work of the Bureau of Animal Industry.

—Dr. Robert Turnbull has removed from Chicago to Fostoria, Ohio, and is in charge of meat inspection in the latter place.

—NEBRASKA SERUM LAW INVALID.—The Nebraska Supreme Court has decided that a statute enacted in that state in 1915, making it an offense to deal in anti-hog cholera serum or virus without a veterinary license from the United States Department of Agriculture, and a permit from the Live Stock Sanitary Board, is an unconstitutional interference with the right to engage in a lawful industrial pursuit; in effect, giving a monopoly to serum-manufacturing plants. And the further provision of the same act, forbidding giving or acceptance of rebates on serum or virus sold within the state, is also declared void.

Speaking of the law, the court said: "It creates a monopoly of the right to sell, and then requires those who have the monopoly to fix the price, and then it makes it unlawful for them to change the price." (Hall vs. State, 158 Northwestern Reporter, 362.)—*Druggist's Circular*.

—Dr. Frank Breed, formerly with the Lederle Laboratories, is now located with the Jensen-Salsbury Laboratories at Kansas City, Mo., in connection with their Biological Department.

—That Dr. D. Gorsuch, of Glencoe, Md., has an interest in agricultural matters is evidenced by the fact that he has won the silver cup for the best exhibition of ears of white corn. He has taken prizes at several contests.

—An interesting and important paper on "The Selection, Training and Care of the Horse for Street Cleaning Work", was presented by Dr. D. J. Mangan at the Second Annual Convention of the Society for Street Cleaning and Refuse Disposal, held at New York City. The paper is printed, in part, in the November number of *Engineering and Contracting*.

—The Rhodesia *Agricultural Journal* for October contains an interesting article on "Immunity in Its Relation to the Stock Diseases of Southern Rhodesia" by L. E. W. Bevan, M.R.C.V.S. Encouraging results are reported from the veterinary laboratory relative to

inducing immunity by plasmosis inoculation in bulls, also against horse-sickness by the use of vaccines.

—Dr. F. A. Marshall, formerly of Towanda, Pa., has located at Barberton, Ohio.

—A MOUNTAIN MEETING OF THE A. V. M. A.—We are busy men and to most of us the annual convention of the A.V.M.A means our vacation, but is it?

We travel to some distant city at a great expense, we buy a lot of non-dividend bearing stock in some fashionable hostelry, fuss for our accommodations with some impertinent clerk, tipping bellboys, porters and God knows whom, and everything else that we purchase around such places, whether "wet" or "dry", makes us feel what easy marks we are.

The convention per se is of course intensely interesting, it is good to visit with the brethren, but in the meantime, with standing collars and frock coats, this in addition to all other inconveniences, not forgetting the temperature of 100 degrees Fahrenheit in the shade, takes all vacation dreams away, and the fact of the matter is it is not a vacation.

Imagine a meeting in Estes Park, Col., away from the turmoil of the city, your food and sleeping quarters furnished at the nominal sum of \$2.50 per day; greeting in the mornings upon rising by stately pine trees and majestic mountains, a temperature around 50 degrees Fahrenheit. * * * * *

When the convention is over you have enjoyed your program more than you would in the city, you are rested in mind and body and your soul has been enriched through your visit to this, the most picturesque spot in all America, and you will not have suffered depletion of your pocketbook.

Let us be sensible and select a place like this for our future meeting place.—*The Jen-Sal Journal*.

VETERINARY MEDICAL ASSOCIATION MEETINGS

In the accompanying table the data given is reported by many Secretaries as being of great value to their Association, and it is to be regretted that some neglect to inform us of the dates and places of their meetings.

Secretaries are earnestly requested to see that their organizations are properly included in the following list:

Name of Organization	Date of Next Meeting	Place of Meeting	Name and Address of Sec'y
Alabama Vet. Med. Ass'n.		Auburn	C. A. Cary, Auburn
Alumni Ass'n College of Vet. Med. O. S. U.	1917, Jan. 10.	Columbus	W. R. Hobbs, care O. S. U., Columbus, Ohio.
Alumni Ass'n, N. Y.-A. V. C.		141 W. 54th St.	P. K. Nichols, Pt. Richmond.
Alumni Ass'n U. S. Coll. Vet. Surgeons	April 14, 1917	Wash., D. C.	C. M. Mansfield, Wash., D. C.
American V. M. Ass'n.	August, 1917	Kans. City, Mo.	L. A. Merillat, 1827 Wabash Ave., Chicago, Ill.
Arkansas Veterinary Ass'n.	Jan., 1917	Little Rock	R. M. Gow, Little Rock
B. A. I. Vet. In. A., S. Omaha	3d Mon. each mo	S. Omaha, Neb.	J. V. Giffe, So. Side, Omaha
British Columbia Vet. Ass'n			K. Chester, White Rock, B. C.
Buchanan Co. Vet. Ass'n.	Monthly	St. Joseph	F. W. Caldwell, St. Joseph, Mo.
California State V. M. Ass'n			F. M. Hayes, Davis.
Central Canada V. Ass'n.	Feb. and July	Ottawa	A. E. James, 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. 25, 1917	Denver	I. E. Newsom, Ft. Collins.
Connecticut V. M. Ass'n.	Feb. 6, 1917	Hartford	A. T. Gilyard, Waterbury.
Delaware State Vet. Society	Jan. Ap. Jul. Oct.	Wilmington	A. S. Houchin, Newark, Del.
Essex Co. (N. J.) V. M. A.	3d Mon. each mo	Newark, N. J.	J. F. Carey, E. Orange, N. J.
Genesee Valley V. M. Ass'n		Rochester	J. H. Taylor, Henrietta, N. Y.
Georgia State V. M. A.	Sept. 18, 1917.	Columbus	P. F. Bahnsen, Americus.
Hamilton Co. (Ohio) V. A.			Louis P. Cook, Cincinnati.
Hudson Valley V. M. A.		Hudson	W. H. Kelly, Albany.
Idaho Ass'n Vet. graduates	1917, Feb. 4-5.	Boise	C. V. Williams, Blackfoot
Illmo Vet. Med. Ass'n.			L. B. Michael, Collinsville, Ill.
Illinois State V. M. Ass'n.		Chicago	L. A. Merillat, Chicago.
Indiana Veterinary Ass'n.	1917, Jan. 9-10	Indianapolis	A. F. Nelson, Indianapolis.
Iowa Veterinary Ass'n.	Jan. 9-11, 1917.	Ames	H. B. Treman, Rockwell City.
Kansas State V. M. Ass'n.	Jan 3-4, 1917.	Wichita	J. H. Burt, Manhattan.
Kentucky V. M. Ass'n.	Jan. 10, 1917	Hopkinsville	D. F. Westmoreland, Owensboro
Keystone V. M. Ass'n.	2d Tu. each mo	Philadelphia	C. S. Rockwell
Lake Frie V. M. Association	Pending	Pending	Phil. H. Fulstow, Norwalk, O.
Louisiana State V. M. Ass'n.			Hamlet Moore, N. Orleans, La.
Maine Vet. Med. Ass'n.			M. E. Maddocks, Augusta
Maryland State Vet. Society		Baltimore	H. H. Counselman, Sec'y.
Massachusetts Vet. Ass'n.	1st Wed. ea. mo	Young's, Boston	E. A. Cahill, Lowell, Mass.
Michigan State V. M. Ass'n.			W. A. Ewalt, Mt. Clemens.
Minnesota State V. M. Ass'n			G. Ed. Leech, Winona.
Mississippi State V. M. Ass'n	1917 Jan. 10, 11	Clarksdale	E. S. Norton, Greenville.
Mississippi Valley V. M. Ass'n	Semi-Annually	Galesburg, Ill.	G. E. McIntyre, Alexis, Ill.
Missouri Valley V. Ass'n.	Feb. 14-16, 1917	St. Joseph, Mo.	R. F. Bourne, Kansas City, Mo.
Missouri Vet. Med. Ass'n.			Chas. D. Folse, Kansas City.
Montana State V. M. A.	Jan. 5-6, 1917	Missoula	A. D. Knowles, Missoula
Nat'l Ass'n B. A. I. Employees			S. J. Walkley, 185 N. W. Ave., Milwaukee, Wis.
Neb. Vet. Med. Assoc'n.	2d Tues. & Wed. Dec., 1916.	Lincoln	S. W. Alford, Lincoln
New York S. V. M. Soc'y.		Brooklyn	C. P. Fitch, Ithaca, N. Y.
North Carolina V. M. Ass'n.		Wrightsville Beach, N. C.	J. P. Spoon, Burlington.
North Dakota V. M. Ass'n.			W. J. Mulroony, Havana
North-Western Ohio V. M. A.			Paul E. Woods, Ottawa
Ohio State V. M. Ass'n.	1917, Jan. 11-12	Columbus	F. A. Lambert, care O. S. U., Columbus, Ohio.
Ohio Valley Vet. Med. Ass'n			G. J. Behrens, Evansville, Ind.
Oklahoma State V. M. Ass'n			R. C. Smith, Enid, Okla.
Pennsylvania State V. M. A.	Jan. 23-24, 1917	Harrisburg	T. E. Munce, Harrisburg
Philippine V. M. A.	Call of Pres't.	Manila	David C. Kretzer, Manila.

JOURNAL

OF THE

American Veterinary Medical Association

Formerly American Veterinary Review
(Original Official Organ U. S. Vet. Med. Ass'n)

PIERRE A. FISH, Editor ITHACA, N. Y.

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JANUARY, 1916.

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Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary L. A. Merillat, 1827 S. Wabash Ave., Chicago, Ill. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

AT HOME AND ABROAD

At home there is prosperity and peace. Abroad there is pugnacity and pauperism. At the beginning of the New Year it is well to inventory some of the conditions that have affected us and may influence the future. Abroad we are probably a very much disliked nation. One group condemns us loudly because we have furnished supplies which have been used to their detriment. The other group dislikes us because we have grown rich and waxed fat by charging high prices for material much needed by them. We have prospered because of the misfortunes of others. We soothe ourselves with relief funds and point with pride to the few millions we have sent to relieve the necessities of the unfortunates. Has our charity been proportionate to our prosperity? Has the bulk of our contributions come from those who have profited most by the foreign misfortune? Has this prosperous nation contributed as much for relief as some of the nations which have grown lean and wasted in the conflict?

Statistics, which are said to be approximately accurate, indicate that we have contributed \$12,000,000 out of a total of \$250,000,000 to the relief of Belgium. Furthermore the balance, \$238,000,000, has been spent largely in this country for the supplies,

from which we have received a profit of about 20 per cent. We have received in profits a sum nearly four times as great as we have contributed. Have those who received the profits contributed as much proportionately as those who have not? It is stated we have given 10 cents per capita for the relief of Belgium. New Zealand gave \$1.25 per capita and Australia still more.

Up to a couple of months ago our aggregate contributions for war relief were reported to amount to \$34,000,000 in which is included \$6,000,000 for the funds of the central empires, \$6,000,000 for Jewish funds, \$3,500,000 for the work of the American Red Cross and \$6,500,000 for various funds, in addition to the \$12,000,000 for Belgium. This seems like a large sum and we may be inclined to believe that we are dispensing relief with a liberal hand; but this sum sinks into insignificance when we consider what our other hand is doing. Since the beginning of the war, our foreign trade has totalled \$12,000,000,000. Estimating profits at an average of 20 per cent, we have profited \$2,400,000,000. Our receptive hand has received seventy times more than our liberal hand has given. "Let not your left hand know what your right hand doeth" seems misapplied in this instance. It would seem desirable that, through a formal or informal introduction, they should become acquainted with each other. Compared with some of the nations, staggering under the burdens of war and simultaneously contributing to relief, our contributions are moderate indeed and exhibit little of the sacrificial spirit which should enhance their value.

We may not escape the animosity of all the warring nations, but we may mitigate it, by showing a greater charitable American spirit in alleviating the misery of their unfortunates. A little introspection now and then is good for the soul. If we could occasionally see ourselves as others see us, it would materially assist in our education. While we have a duty toward others, we also have duties of our own. We must remember that P stands not merely for prosperity: it stands also for patriotism, preparedness and peace. Patriotism insures preparedness, and preparedness insures peace.

There is a professional as well as an humane aspect to the question. The International Veterinary Congress, held at London, promised to be one of the most successful meetings yet held. Much money and effort had been expended to guarantee its success. The thunder-clap of war aborted its proceedings and the effort to cos-

mopolitanize and promote the solidarity of the profession was fruitless. The trail of the war, even if it should soon terminate, will cast a blight on the next Congress. Professional comity has been endangered and so much bitterness has been engendered, that more than a few years will be required for the cicatrization of the war-inflicted wound. Whatever may be accomplished in the next two years, there is, in the meantime, a more immediate condition to consider. Many of our professional brothers in Europe have been completely ruined by the war. The outlook for the future is hopeless without aid, and who is better able to administer it than their brothers in America?

At the beginning of the New Year, especially, it is well to use a little introspection; to consider the needs of others as well as our own; to rise to the occasion when worthy opportunities to assist occur, and cement the bonds of professional brotherhood throughout the world.

P. A. F.

THE ANIMAL FACTOR IN AGRICULTURE

The relative importance of animals and their products to the public is well illustrated in the report of the Secretary of Agriculture, just issued. It is stated that meats and dairy products constitute 37 per cent of the average diet, fish 2 per cent, cereals 31 per cent, Irish and sweet potatoes 13 per cent and other vegetables 8 per cent. More than one-third of the products of agriculture concern those things with which the veterinarian has to do.

The question as to whether the domestic food supply of this country is keeping pace with its growth in population is answered affirmatively. Statistics for the past 16 years show that the population of the Nation has increased, in round numbers, 26,000,000, or 33 per cent. Notwithstanding the rapid increase in population, the production per capita of the commodities indicated above, with the exception of meats and dairy products, has remained approximately the same or has increased. With the agencies now available for improving agriculture there is ground for optimism as to the ability of the Nation, not only to supply itself with food, but increasingly to meet the needs of the world.

There is need for an increase in the meat production and this involves two factors; checking and eliminating diseases and para-

sites—the work of the veterinarian, and increasing and improving stock raising by extending the industry where conditions are favorable and by pointing the way to better breeding and feeding.

The eradication of the southern cattle tick is proceeding more rapidly than ever before and is opening up for beef and dairy production, a large territory. Within the past three years the quarantine has been removed from 106,810 square miles, making a total of 294,014 since the work was begun in 1906. More than 40 per cent of the original tick infested territory has been cleared, and therefore the direct losses, originally estimated at \$40,000,000 annually, are being greatly reduced.

Sheep and cattle scabies are being eliminated rapidly from the western states.

Hog cholera, the cause of heavy losses, has been less prevalent during the year than for many years. This is due to the wise application of the protective serum. In 14 selected counties where demonstration work has been going on, there was an increase of 474,734 in the number of hogs raised and a decrease of 121,628 in the number lost, or a total gain of 596,362 hogs.

Contagious abortion has reached such proportions as to seriously threaten the cattle raising industry. It strikes at the source by curtailing the production of calves. The department has been giving its attention to this disease and vigorous efforts are being made to advise stock breeders as to its nature and means of prevention and eradication.

Tuberculosis is regarded as the most common, destructive, and widely disseminated of the infectious diseases of domesticated animals, especially of cattle and swine. Its transmission to man may be prevented in a reasonable measure by the pasteurization of milk and the inspection of meat. The loss from tuberculosis is estimated at \$25,000,000 annually. Three undertakings to eradicate this disease seem practicable to the department at this time: 1st Eradication from pure-bred herds of cattle. Compulsion is not necessary. Assistance may be rendered by advice and supervision as to proper disposal and management. Tuberculin reactors may be retained under proper quarantine conditions and their offspring raised free from tuberculosis. 2nd Eradication from hogs. It is believed this would be relatively easy of accomplishment. Hogs do not convey the disease to one another to any extent. They contract it from cattle, chiefly in two ways—by being fed on non-pas-

teurized products from creameries and by following cattle of somewhat mature age in the feed lot and feeding upon the undigested grain. An educational campaign should be effective in removing these two sources of infection. State laws requiring the pasteurization of skimmed milk and other products before they leave the creameries would be desirable. 3d. Eradication from restricted areas. The plan would be to select certain communities in which, after a thorough educational campaign has been made, the stock owners are willing to cooperate in eradicating the disease entirely from that territory. This would require the slaughter of infected animals and would necessitate reasonable indemnity for the animals slaughtered. This would undoubtedly require large expenditures. The joining of areas freed of tuberculosis in the manner proposed should gradually result in the elimination of the disease from groups of counties and from entire states.

Such an undertaking would be very similar to the plan of exterminating cattle ticks in the South. It is believed that such a plan should succeed against tuberculosis. It is a large task. Its feasibility will have to be thoroughly established first. The department has recommended in the estimates for the next fiscal year that an appropriation of \$75,000 be made for the inauguration of the work.

The annual losses of live stock in the United States from the depredations of predatory animals has been estimated at \$12,000,000. A single wolf has been known to kill more than \$3,000 worth of stock in one year. A campaign has been inaugurated to eliminate the wild animals and thus diminish the losses.

Attention is called to the sheep industry, which has declined in some sections of the United States. Recommendations are made urging its extension for the dual purpose of increasing the wool supply—much of which is imported, and the food supply, in which some advance has been made.

Recommendation has also been made that the department be given authority to inspect establishments producing foods or drugs intended for shipment in interstate or foreign commerce. No specific authority exists at the present time. There are many forms of adulteration which are exceedingly difficult to detect without inspection of the place of manufacture. The importance of sanitation in the preparation of drugs and food products is obvious.

The production of potash from kelp is a possibility which may develop into a matter of economic importance in this country. We have been entirely dependent upon the German mines. The prohibition, by Germany, of the exportation of potash salts has resulted in abnormally high prices for this material. With the utilization of by-products formed in the production of potash from kelp, it is hoped that the potash industry may prove profitable and permanent and render this country independent of foreign sources in normal times.

The report shows that the department is animated by a sincere desire to conserve and augment the products of the soil and the supplies of this nation. On the animal side it is shown that progress has been made in the eradication of disease, and that some increase has been attained in the animal population. With educational and cooperative methods still further progress is to be expected.

P. A.F.

EUROPEAN CHRONICLES

Bois Jerome, November 1916

ETIOLOGY OF INFECTIOUS ANEMIA:—More than a year ago, I analyzed in the A.V.R. from Leclainche's Journal, a communication taken from a German paper which related to the etiology of this disease and was from two German writers M. M. X. R. and R. Seyderhelm. The paper presented a new aspect of the question and undoubtedly attracted the attention of many investigators.

Director Vallee and Professor Carre, who are so intimately connected with the pathology and the history of infectious anemia, have made in the *Annales de l'Institut Pasteur* the answer which the new etiological discovery deserved and was expected from them.

Let us summarize the article of the savants of Alfort, which *de novo*, establishes their former conclusions, demonstrates the errors of the German discoverers, and besides adds new suggestions to the conclusions of all their investigations.

First of all, they refer to the principal results obtained by them when, some 12 years ago, they undertook the work of the history of infectious anemia, results which they presented under five conclusions: 1st, the pernicious anemia of horses is an infectious disease, transmissible by inoculation and due to an ultra-microscopic filterable virus; 2nd, the blood and urine of the sick are

virulent; 3rd, the virus is destroyed by heat at 60° ; 4th, infection takes place notably through the digestive tract, by the means of the urine; 5th, apparently recovered horses, remain, in reality, infected and carry the contagion about them.

These essential ideas were evidently the object of many investigations. At various epochs, confirmation came from various parts of the world, presented by authorities known to all and which Vallee and Carre take pleasure in acknowledging, namely; Ostertag of Germany, Marek in Hungary, Francis and Marsteller of Texas, Mack of Nevada, Mohler of Washington, Van Es of North Dakota, Told and Wolbach, etc. To which is added the Japanese commission, whose labors, it has been my great pleasure to consider in the A.V.R. also.

Following the strong confirmation of their work, the French authors speak of the conclusions presented by M. M. Seyderhelm. It must be remembered that with these gentlemen, pernicious anemia is not due to an ultra-microscopic virus, but to a poison, which they name *Oestrine*, which is contained in the oestri of horses, the *Gastrophilus equi* and principally the *G. hemorrhoidalis*.

The experiments of Carre and Vallee, on this aspect have always proved negative, and in Japan the Commission has also published the failure of the experiments made to elucidate the question.

It is true that verminous anemias are observed in horses, some of gastrophilus origin, others of strongyloids, but the unity of pernicious anemia and its verminous etiology only cannot be admitted. Among the facts, which substantiate the opinion of Vallee and Carree and so many others, is the one advanced by the German authors, viz: that the poison from the oestri resists heat in the autoclave for one hour and a half and three hours, is not altered by alcohol, acetone, ether, chloroform and trichloride of iodine, and yet notwithstanding all these, remains with its toxic and anemic power.

Without discussing these statements or even admitting them as correct, the French authors remark that they have proved as well as others that the virus of infectious anemia loses all its infective or pathogenic quality with simple heating at 60°C . and that the virus is equally sensitive to all the antiseptics.

After this evident proof of the duality of the disease and a few critical remarks on the pathogenic properties recognized in oestrine, on the theory of its action when in the organism and also on the transmissibility of the disease by insects, it is stated that whatever

experiments they have made in that direction and failed in transmitting the infection with insects, parasites and even with the products from the crushing of *Gastrophili* taken from animals that died from infectious anemia: on this account the necessity for new experiments arises before arriving at a definite conclusion on this point of the etiology of the disease.

In closing their article, Vallee and Carree summarize the best established facts relating to the etiology and the diagnosis of the infection, so particularly insidious, as follows: 1st. The disease is transmissible through the digestive tract. Blood and urine of the sick are virulent. Whenever the watering of animals is allowed with water soiled with animal excreta, this is a permanent source of contagion, the virus of anemia resisting for months dessication and putrefaction.

2nd. During the chronic evolution, anemia presents crises which are characterized by violent accesses of fever, of icterus, of hemoglobinuria: the blood is little coagulable: the erythrocytes agglutinate and the serum is highly colored and dichroic. Between the crises, the disease can be detected by the examination of the always albuminous urine, by the cardiac test, and accessorially by the examination of the ocular mucous membrane which appears fatty, pale and infiltrated. At the post mortem can be found splenomegaly, large cardiac liver, endocarditis and a strong hematopoietic reaction of the marrow of the long bones.

3rd. Subjects, apparently cured, remain infected for months and years. Whatever success may be obtained by various forms of treatment, real recovery, characterized only by the non-virulence of the blood, is problematic.

4th. Separation, watching of the sick, disinfection of the excreta, protection of the drinking places are imperatively indicated. Killing of the diseased and destruction of the cadavers are essential prophylactic measures.

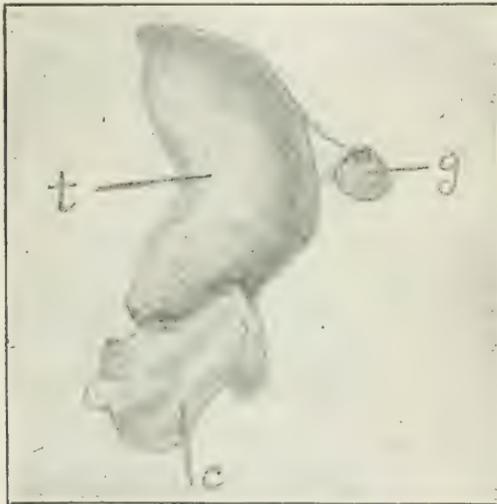
5th. To this day all attempts at vaccination or serotherapy have been negative.

THYROID TUMORS:—Veterinary literature can be said to be rather limited on the subject of these tumors and yet they are identical with those found in man, being at times benignant and at others malignant. Professor Petit has mentioned some in animals, which have not been noticed in man.

This is the introduction that the learned Professor gives in an article relating to the case of a Thyroidian "Aberrant" Cancer in the horse, which will be but the beginning of a series, where tumors of the thyroid body will be considered.

To make his subject clearer, Petit first proposes a classification of these tumors, somewhat different from that generally admitted.

He divides them into two classes, (a) the Epithelial and (b) the Conjunctive and Mixed Tumors.



Typical Thyroid Epithelioma (Horse)

(Normal size)

t—Intact thyroid gland.

c—Accessory cancerous thyroid.

g—Small lymph gland hypertrophied.

(Cancerous adenopathy first step of the generalization.)

Copied from the *Recueil*.

(a). The epithelial are Benignant or Malignant. The first or goiters (adenomas, which can be transformed exceptionally into cancers), the malignant or cancers (thyroidian epitheliomas.)

There are two kinds of goiters: 1st. those that take their origin in the thyroid body, the Goiters Proper. 2nd. those that

begin in the accessory thyroids (which must not be confounded with the parathyroid glands) Aberrant or Accessory Goiters.

The malignant or cancers are of four kinds: 1. those which originate in the thyroid body, with two varieties, the Typical and Atypical Cancers: 2. those which start in the accessory thyroids, the Aberrant Thyroid Cancers: 3. those derived from the parathyroid glands, Parathyroid Cancers: 4. those resulting from an inclusion or propagation, Malpighian Cancers, Branchiogen Cancers.

(b) The conjunctive and mixed tumors are divided into: Benignant, imperfectly studied, exceptionally Malignant, sarcomas of the various kinds: Mixed, embryomas, osteo-epitheliomas.

After the presentation of this new classification follows the description of the case of this aberrant thyroid cancer, which was developed at the expense of an accessory thyroid and discovered in a horse.

It is the first observation of its kind in comparative pathology and, though only a post mortem discovery, it is very interesting.

The illustration will give a good idea of the definition given by the author.

When the aberrant thyroid cancer develops at the expense of a supplementary or accessory thyroid, it is said to be Aberrant. It leaves the thyroid body intact and on that account it is easy to see and recognize at post mortem. It may be taken for an adenoma or aberrant goiter, except when it is generalized or accompanied as in this case with positive circumthyroid adenopathy.

There was nothing clinically to reveal the presence of the tumor except at the first stage of its evolution: though it showed progress toward generalization, as indicated on the plate by the little lymph gland already invaded by the cancer. The aberrant or accessory thyroid which has become cancerous is at the inferior extremity of the normal gland.

Aberrant thyroid cancer may be typical or atypical. It is typical when its structure resembles the structure of the gland from which it rises. It is atypical when it does not.

The subject of this article was a typical cancer.

Professor Petit will, in other articles, continue the series of his studies on this neglected subject of comparative pathology.

LUMBAR MYELITIS AND TREATMENT: This is commonly called, among French practitioners, dog's illness (Mal de Chien.) on ac-

count of its prevailing manifestations, which make the animal affected assume frequently the sitting position as the result of the threatening paralysis, or its inability to rise, when laying down, as often observed in azoturia.

Frequently there are complications of distemper; it often occasions serious losses among horse breeders, especially when it breaks out among thoroughbreds.

Perfect recoveries are seldom obtained or at least the literature is meager of such records. This is probably due to the very uncertain and frequent failures of the various treatments which have been advocated against paraplegias.

In the Panisset Review, there is an article on a preparation which seems to have given encouraging results to its discoverer, Mr. Veloppe.

This preparation is made of cacodylate of strychnina 0.1 gram, glycerophosphate of soda 10 grams, distilled water 10 grams. This is not a solution, but a mixture, which to be satisfactorily used, requires that the cacodylate be in the finest powder, as otherwise the canula of the syringe might become obstructed if the powder was too coarse or might pass through and give rise to trouble in the veins, acting as a foreign body which could not be absorbed.

The injections are made intramuscularly. An abscess may follow but is of no serious consequence.

On account of the peculiarities which often accompany the administration of strychnia, the writer recommends to begin with a dose of one centigram, say an injection of 2 c.c. of the mixture, whatever be the size and weight of the animal. According to cases, this daily dose will be increased one or two cubic centimeters ($\frac{1}{2}$ or 1 centig of the strychnin).

In this way the tenth day may be reached with a dose of 10 centigrams and even more, but it will be better to divide in two doses.

The treatment should then be stopped and started again after a rest of 10 days.

Following the description, the records of five cases are given, which present a perfect recovery in three of them, and an improvement in the others to such extent that the animals showed only a slight twitching of the loins when in action.

Perhaps this treatment deserves a trial on a larger scale?

SERUM OSMOSIS:—The treatment of wounds has been the object of much interest in recent times, and while some treatments have given most satisfactory results, others, if not failures, have not at least realized any action superior to that of ordinary therapeutic agents.

The polyvalent serum of Leclainche and Vallee seems to have been the most satisfactory in its many applications, in human as well as in veterinary surgery. For the latter, publications of the results obtained are of repeated occurrence and their records are continuously found in our professional journals.

Nevertheless, the question has presented itself to some, viz: if the normal serum from the blood could not give to wounds a greater vitality than the one from an artificial serum, without, however, giving the exact results indicated by the polyvalent. It would seem as if the natural blood serum, without having the properties of the polyvalent, might by the vitality it would communicate to the tissues, give a rapid cicatrization and could be utilized in the treatment of severe or complicated wounds."

In these words, Dr. P. Chatelain presented the subject in his article in the *Recueil de Médecine Vétérinaire*, relating to the Treatment of Wounds by Blood Serum Obtained by Osmosis.

The principle in obtaining this serum is one of physics, viz: Osmosis, which will permit the serum to be obtained without difficulty.

Indeed, taking into consideration, the power of exchange which can take place between osmotic substances, "the surface of a wound is covered with a saturated solution of chloride of sodium, a phenomenon of osmosis will take place from the blood serum towards the saline solution, which would result in vivifying the tissues of the wound by the serum, which would bathe it and by the great vitality it will bring in the tissues moistened with the saline solution."

The name of serum osmosis has been selected for this mode of treatment because if the solution indicated is one of chloride of sodium, the results would be the same with any other saline solution. That of ordinary salt has been selected because it is the type for osmotic solutions. It is not irritating, is easily used, insignificant in cost and its osmotic equilibrium for blood serum is not very high.

The chloride of sodium can be used as a powder or in solution. The former is indicated for fistulous wounds, when the application of a dressing soaked in the solution is difficult, or when the entrance of the fistula is small or opening upward.

The solution is obtained by mixing a good quantity of salt in a bottle with sterilized water and shaking it well. A solution is thus obtained which will answer all purposes.

For the solution to act well, the wound must be well soaked with it. Dressings soaked in it can be laid and slightly pressed upon the wound. Flat surfaces can be covered with it. Fistulous wounds are injected with it and their openings closed with moist dressings.

The results obtained by this treatment are said to be unexpected. There is rapidity in the formation of the cicatrix, with an improved appearance of the wound and a reduction in the suppuration, which is sometimes entirely arrested after the first dressing.

With such advantages it is evident that a resort to serum-osmosis can be essentially beneficial and that it deserves thorough application.

SUMMARY FROM RECENT PUBLICATIONS RECEIVED AND BIBLIOGRAPHIC ITEMS.

Titles marked "X" will be summarized. Those marked "O" will appear as abstracts.

VETERINARY RECORD—Sept. 7th. A treatment for horse sickness by W. F. Poulton, M.R.C.V.S.—(O) Undiagnosed abscess by P. G. Bond, M.R.C.V.S.

Sept. 23d.—The coloring of foods by W. J. Young, F.R.C.V.S. (O) Punctured wound of the lungs by Rob. Henderson, M.R.C.V.S.

Sept. 30th.—(O) Chloride of adrenalin after parturition by H. Thompson, M.R.C.V.S.

October 7th.—Infectious paraplegia by M.R.C.V.S.—Undiagnosed by W. W.

VETERINARY NEWS—Sept. 9th.—Mechanism of saline dressings by Kenneth Daylor, M.D.—On the use of petroleum for cleansing wounds by H. Embree, M.R.C.V.S.

Sept. 23d.—Nervous diseases in the horse by E. W. Hoare, F.R.C.V.S.

October 7th.—(O) Empyema of the nasal sinuses by E. Langford, M.R.C.V.S.—Women as veterinary surgeons by Ada Helen.

VETERINARY JOURNAL.—Sept.—Local anesthesia by Prof. Woodridge.—(O) Paracentesis abdominis by P. G. Bond.—(O) Coital or vesical exanthema by Hancock.—Case of primary infectious osteomyelitis.—Peculiar case of skin disease in W. Rhodesia by J. M. Armfield.

IL NUOVO ERCOLANI.—Aug. and Sept.—Leishmaniosis in dogs and prophylaxy of infantile Kalar-Azar by Doct. Guido Finzi.—Asphyxiating gases by Doct. E. Bellotti.—(O) Umbilical abscess discharging through the vulva by Doct. C. Fabretti.

CLINICA VETERINARIA.—Aug.—Experimental researches on the antibodies of spores by Doct. Giovanni Chimaran.—Contributions for the differential diagnosis between exudates and transudates by Doct. Ugo Mello.

Sept.—Anatomo-histologic and embryologic communication on a case of hermaphroditism by Doct. Pietro Venturi.—Digipurin in veterinary medicine by Doct. A. Medri.

IL NUOVO ERCOLANI.—Spleen abnormal and accessory by Prof. Ghisleni. Upon the technic of ovariectomy in the slut by Doct. Gosbodino.—(O) Congenital atrichia in a calf by C. Ferrero.

BULLETIN DE LA SOCIETE CENTRALE—(X) Benignant tumor of the mammae in dogs and cats by G. Petit and Germain.—(X) Phenicated and guaiacolated intravenous injections in distemper, anasarca and pneumonia by Poret.—(X) Oxalemia in domestic animals by Doct. Rodgers.

RECUEIL DE MEDECINE VETERINAIRE.—(O) Caseous pneumonia in a pig by Dr. Chausse.—(O) Strangulated inguinal hernia in a mare by Pezet.—Trypanosomiasis of camels in Maroc by Bouin.—(X) Anomalies of the heart in a dog by G. Moussu.

ANNALES DE L'INSTITUT PASTEUR.—Sept.—Intracellular digestion in protozoans by Dr. S. Metalmikov.—Experimental antiexanthematous serum and its application in man by C. Nicolle and L. Blairot.

ANNOUNCEMENTS of the New York State Veterinary College for the session of 1916-1917 and also that of the Chicago Veterinary College have been received. The latter has added to the program usually presented by veterinary faculties of colleges, generally, a great collection of recorded cases which are of great interest, the records being taken principally, however, from cases that have occurred at the clinics of the school.

A. LIAUTARD.

—THE INSPECTOR, official organ of the National Association of Bureau of Animal Industry Employees. Number 1 of Volume I of this interesting publication, edited by H. B. Raffensperger, has reached our desk. "The object and purpose of the magazine will be to promote the interests of the association by giving some degree of publicity to the work that is being done by the employees of this Bureau; also to disseminate information on matters to the different employees of the different stations and thereby bring them into closer working relationship." The first number gives every promise of attaining its object.

AN ARMY VETERINARY CORPS*

C. J. MARSHALL, Philadelphia, Pa.

The writer recently made a trip to the war zone of the English and French Armies for the purpose of making observations on the usefulness and care of horses in war. This trip was made possible through the generosity of a friend of the University of Pennsylvania. At the same time he was appointed a delegate by the Presidents of the American Veterinary Medical Association and the American Humane Society to make observations for them along the same lines. All furnished valuable assistance in arranging for the passport and letter commendatory from the Secretary of State, the Honorable Robert Lausing, and our diplomatic representatives abroad for the necessary authority to get into the lines of the two armies. Permission was promptly obtained from the war office in England to visit their remount stations and veterinary hospitals in England and France. Similar permission was obtained from the French War Department to visit some of their remount stations, veterinary hospitals and cavalry schools. At the same time an opportunity was given for investigating the work of the Royal Society for the Prevention of Cruelty to Animals and the Blue Cross which is a branch of the Dumb Friends League in London. Every courtesy was afforded by these armies and societies to make the trip useful and profitable. The writer feels under a great debt of gratitude to each of them for the kindness and assistance so generously and promptly given. The experience was wonderful and the surprises many. It is hoped that due allowance will be made for any extravagant opinions that may be expressed in reviewing the observations made.

Our association is especially interested in the care and treatment of horses used for military purposes and the organization of the Army Veterinary Service at the present time, on account of the recognition that has recently and justly been given to veterinarians in our army. We have felt for many years that better results could be obtained if our profession were properly recognized and the necessary authority given to our Army Veterinary Service. We should be truly grateful for the recognition recently received,

*Presented at the meeting of the A.V.M.A., Aug. 23, 1916. Detroit, Mich.

but never satisfied until our Army Veterinary Service is properly organized and equipped to the fullest extent.

In reference to the necessity for horses in war, there can be no question. It is true that much of the work formerly done by them is now handled by machine drawn vehicles. Each has its place. Handling the supplies for an army is an immense undertaking and without horses an army would be helplessly handicapped. The kinds or classes of horses needed in war are: riders, light and heavy draft, and pack. The riding horses are used by the light horse troops, mounted infantry, pack, and cavalry. Those used by the first three average in height from 14.2 to 15.1½ hands, and the cavalry horses are 15.1½ hands and over.

Light draft horses fit for field artillery and transport wagons, are 15 hands and over. The heavy draft horses are the same height but do their work at a walk. The Shires, Clydesdales, Belgians and Percherons make the ideal heavy drafters the same as in civil life. Much of the heavy hauling is done in fields, woods, mountains, etc., where it is impossible to operate machine drawn vehicles. The American mule has proved itself most useful in the various kinds of work.

The remount service of an army looks after such duties as purchasing remounts, issuing them to the various units of the army, disposing of those that are unfit for service in the army, maintenance of an equal standard in units, studies the horse supplies of the world for peace and war requirements and the mobilization in horses. This service is well organized and its duties carefully outlined. In the English army, the remount service is controlled by the Quarter Master General through the Remount Directorate which is a branch of his department.

The Army Veterinary Corps is under the control of a Director General at the war office. He is a veterinarian and has the rank of Major-General. The general function of the corps is to secure the efficiency of the animals of the forces in the field by preventing the introduction and spread of transmissible diseases, reducing wastage among animals by means of prompt application of first aid, relieving the field army of the care of sick and inefficient animals, the presence of which hampers mobility, treatment in hospitals of animals removed from the field army and by replenishing veterinary equipment. The chain of organization for this purpose is as follows: veterinary officers with field units, mobile veteri-

nary sections, veterinary hospitals, veterinary convalescent depots and depots of veterinary stores. The whole being controlled by the Director of Veterinary Service who is assisted by Deputy Directors, and assistant Directors. Sick, wounded or otherwise unfit animals are turned over to the veterinary corps which has entire charge of their care and treatment. When cured, they are turned over to the nearest remount section. If the case is found to be incurable, it is destroyed or sold as considered best by the proper veterinary officer. The results from handling disabled animals in this way have been surprisingly good. Of the first 100,000 that passed through the English veterinary hospitals, 70% were returned to the army, in most cases, better horses than when first purchased. Better results are now possible for the reason that the hospitals are established, better equipped, and the men are better trained to carry out instructions.

By a corps is meant a department of an army having its own organization and head. This is true of the army veterinary corps. Men enlist for the veterinary corps the same as in other branches of the army. There are something over 18,000 men serving in the English army veterinary corps. They are under military discipline, wear an army uniform, and conduct themselves as good soldiers should. An effort is made to get men who are not qualified physically for fighting. Where so many men are required, it is not possible to get all that have had experience in handling or caring for horses. Some are from factories, mines, etc., and army life is the first opportunity they have ever had to care for or handle horses. A large proportion of the men connected with the veterinary corps were thoroughly trained horsemen before the war began and every effort has been made since to teach them the details of good horsemanship.

In the hospital service a grand total of 382 men of all ranks are allowed to look after each 1,000 horses. The commanding officer is a Major. With him is associated two Captains, two Lieutenants, a Quarter Master and one Warrant Officer. All the officers except the Quarter Master, are veterinarians. In addition to the above officers, there are four Staff-Sergeants whose duties are general, and ten Sergeants. One Sergeant is assigned to office duty, one to the pharmacy, one to the operations, four on general duty, one detrainning and entraining, one on forage, and one in the quarter-master stores.

There are 24 Corporals including six Lance-Corporals. They are assigned as follows: one to forage, one to operations, one to officers' mess, one detrainning and entraining, and twenty to general duties.

There are 54 Privates (Dressers) which include 15 Lance Corporals. One of these is assigned to office work, one to the pharmacy, eight to operations, and forty-four to the various wards.

There are 261 Privates (Grooms). These are assigned as follows: 200 for grooming (one for each five horses), twenty detrainning and entraining, and conducting parties, twelve drawing, preparing and issuing forage, ten cooks (one for officers' mess, one for sergeants' mess, and eight for men's mess), nine batmen or servants, three on police duty, two storemen, one orderly and four in the sanitary squad.

One Farrier Staff-Sergeant has general supervision of shoeing. He has two farrier Sergeants, four shoeing smith corporals and eleven shoeing smiths. There is one shoeing smith for each hundred horses and one extra smith to look after foot operations.

There is one Saddle Corporal, whose duties are to repair head collars, rugs, tents, shoes, etc. He has three saddler assistants.

Each hospital is allowed thirteen horses, one for each officer, one for the non-commissioned officer doing detrainning service, and one for the farrier.

The field hospitals are located on the lines of communication convenient to shipping stations. They are fully equipped to handle about 1,250 horses. The field hospitals are supplied by the mobile hospitals which are located nearer the activities of the army. There is one mobile hospital allowed for each division of the army and cavalry brigade. When the troops are stationary the mobile sections may be utilized for the treatment of a limited number of cases. The buildings are mostly temporary and can be readily moved. They are allowed one veterinary officer, two corporals and seventeen privates and are assisted in certain ways by the farriers with the army. Most of the cases sent to mobile sections are evacuated as soon as possible to the base hospitals. Only the minor cases or those that can be cured in a few days are held for treatment. The mobile sections are equipped with food and supplies for rendering first aid and attending to emergency cases. These sections are supplied direct from the field of activities.

A veterinary officer is attached to each regiment of cavalry, brigade of artillery, brigade of infantry, divisional ammunition column and divisional train. He is mounted and armed. He is attached to the brigades or units and is under the command of the brigade or unit commander for discipline. He conforms to all regulations regarding billeting, dress, etc., in force in the brigade. He is under the orders of the Assistant Director of Veterinary Service in regard to all veterinary matters. All units are instructed to report urgent calls for the veterinary officer to the brigade headquarters. The veterinary officer is assisted by a sergeant army veterinary corps. There is one with each infantry brigade battery, and ammunition column. He is a non-commissioned officer, but not a veterinarian. He is required to visit each unit of a brigade daily, supervise the dressing and treatment of all sick, and attend the veterinary officer on his round. Sick and injured animals are reported to the sergeant as soon as possible and he in turn reports to the veterinary officer any serious or urgent cases of sickness, or injury, and all cases of transmissible disease. It is not so much the duty of the veterinary officer to treat sick and injured horses as to retain the animals of his unit in an efficient and serviceable state. In order to do this he must give it his constant personal supervision. He is at all times on the lookout for the first symptoms of a transmissible disease, the loss of condition, faults in the stable management that may cause preventable injuries, faulty shoeing, etc. His time is so much occupied with work of this kind, that there is but little time left to do operations, dress wounds, or give very much attention to individual cases. He, therefore, sends, as soon as possible, all animals except minor cases to his divisional mobile section. Animals that are seriously injured or considered incurable are destroyed at once.

Aside from the veterinary officers assigned to field hospitals, mobile sections and field units, two are allowed for each remount section, a certain number are on transport duty and others with remount officers assigned to purchasing animals. There are something over a thousand veterinary officers connected with the English Army Veterinary Corps. Some of these men have spent from twenty to thirty years of their professional life with the army. Others are from the ranks of private practitioners. Many of the best English speaking veterinarians in the world are with this service. All are satisfied with the organization of the corps and the

manner in which the work is conducted. All are thoroughly educated and a credit to the profession.

The organization of their magnificent service has required years of hard work, study, and experience. It had its beginning in the South African war. With constant hard work the plan of organization was completed and put into operation just in time for the present conflict. No country has done more than Great Britain for horse breeding in general. This has been proved by the many valuable, useful breeds, families and individuals that have been produced in that country. The British are as good horsemen as the world has ever known. It is but natural that they should evolve a plan for caring for horses in war that would be effectual. War is a system of extermination and the horse is not excepted. The conservation of horses in war is an economic proposition. England is thoroughly organized and fully equipped to do everything possible to conserve the animals in war and reduce their amount of necessary suffering to the minimum.

From a veterinarian's point of view, the French Army Veterinary Service is not so well organized. The veterinarians are equally as well educated and trained in military affairs as the English veterinarians. Both are required to have a four year's preliminary or high school education at least, and a four years' professional course in one of their own recognized veterinary schools before they are qualified to take the examination for admission to the army. Successful candidates are then required to serve one to two years in a military school. They are veterinarians with a cavalryman's training. Promotions are made by merit only. By the time a veterinarian has gained a position of authority in either army, he has been thoroughly trained and tried. The French Veterinary Service was not properly organized and outlined before hostilities began. There has been no time for deliberation on these subjects since. The French veterinarians are not complaining, but are doing their best under the conditions as they exist and getting good results. After the present conflict is over, it will probably be possible to outline a plan of organization that may be even more perfect than the one in use by England at present.

The principal aim of the service in both armies is to prevent disease and injuries in every possible way. The list of diseases and injuries are but little different than those found in civil life. Of the large number of horses seen in the various hospitals, a com-

paratively small percentage were afflicted with wounds. There were many cases of quitters, poll-evils and fistulae. The results obtained in treating this disagreeable class of cases were unusually good, much better than ordinarily obtained in civil life. But little medicine is used in treating either surgical or medical cases. Much more is accomplished by cleanliness, good care and sanitation than was possible in former times where more dependence was placed upon the use of medicine.

Both armies are giving special care to the subject of controlling glanders. In previous wars, it has never been possible to do so much in this line. The great improvement is due, of course, to the modern methods of diagnosis. In both armies the intrapalpebral test is most generally used. The subcutaneous test is used to a certain extent. The ocular test is in bad repute and has been used but little. The serum tests are not used for the reason that satisfactory results are obtained by the use of mallein and they are not equipped to make blood tests on a large scale. Practically all the horses in both armies have been tested for glanders. This is true of all horses from over seas. Many have been tested several times. All clinical cases and all that react to the test are promptly destroyed. Of the horses that pass through the hospitals, all are tested once or twice and the records show less than one case of glanders to the thousand tested. War has always been a prolific means of spreading glanders and the trouble would continue for many years after peace had been declared. It is believed that the present war will be an exception in this respect. If so, it is not possible to estimate the saving to agriculture and horse husbandry in general from this dreaded disease.

Both armies are fully equipped to give the necessary care and attention to diseased and injured animals. In neither army has it been necessary to call for assistance from outside sources. Considerable assistance has been accepted by each. There is always a certain amount of anxiety on the part of persons interested in humane measures lest there should be unnecessary suffering. It is possible for such people to do many things that add to the comfort of animals and the pleasure of those having them in charge. Provision is made by the English army for handling this question. They have a provision which states that all voluntary offers of veterinary assistance must be approved by the Army Council, and if accepted, will be controlled by the Director of Veterinary Serv-

ices of the forces in the field. This provision was adopted for the reason that the work would be properly supervised and the charity could be most profitably spent. At the beginning of hostilities the Royal Society for the Prevention of Cruelty to Animals volunteered veterinary assistance. The offer was accepted by the Army Council. This society is one of the oldest organizations in the world that has to do with the prevention of animal suffering. E. C. Fairholme of London is the Secretary. He enlisted in the veterinary corps and has been promoted to the rank of Captain. He is located at Brigadier General Moore's headquarters. Brigadier General Moore is Director of Veterinary Service for the English Army in France. Captain Fairholme is in a position to know how diseased and injured horses are handled and what is most needed. Through his society at home, he has been able to obtain funds that have assisted wonderfully in caring for animals. In many cases hospitals have been built and equipped for the veterinary corps. The society has provided horse ambulances, rugs, blankets, etc. The charity is all distributed under the supervision of the Director of Veterinary Services. The society and veterinary corps are in perfect harmony. One hears nothing but the highest praise for all the efforts of the humane society. This is the only society which is authorized to solicit or collect money or supplies for the veterinary corps and the only one recognized by the Army Council or that has assisted the corps.

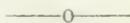
The French army has accepted assistance from two humane societies. One is the Blue Cross which is a branch of the Dumb Friends League in England. The other was the Purple Cross which was organized in France. While the French army has accepted assistance from these societies, it has recognized neither. The Purple Cross met with financial reverses and has abandoned its work.

The Blue Cross was organized at the time of the Balkan War. It has furnished considerable assistance to the French and Italian armies. Its services were most appreciated in the beginning of the war. At that time the French were badly prepared and the Blue Cross promptly established a few base hospitals and were able to care for a good many horses before the regular army service was prepared to do so. It has continued to assist in this way up to the present time. The work is not under military regulations. As compared with the work of the English Veterinary Corps, there is

no comparison. Those engaged in the Blue Cross service are doing faithful, conscientious work, yet it is believed that more could be accomplished now if the money were turned over to the Army Veterinary Service as it is in the English Army.

Much has been accomplished by the veterinary service in the present war. The greatest progress has been made in the manner of organization. Veterinarians in the United States should keep in touch with this progress and assist in every way to bring about the most valuable veterinary service for our own army. This can not be done in times of trouble, but should be carefully and thoroughly studied and organized as soon as possible. The United States Army has acted wisely in sending Dr. Hill to France to make observations on their veterinary service. He should be kept there, if possible, until the war is over.

We have been awarded the much deserved rank. Let us keep up our interest until our Army Veterinary Service is properly and thoroughly organized. A properly organized veterinary service will not only increase the efficiency of the United States army, but it will also encourage our schools to maintain a high standard of requirements. A large proportion of our schools already require the four years' high school preliminary education and four years' professional training in veterinary medicine.



DISCUSSION

DR. TURNER: Dr. Marshall's paper has overcome me in such a way that I hardly know how to express myself, because of the wonderful organization which has been given to the British Army. One fact stands out alone in my mind, when you think of an army having 1200 or more veterinarians, and where a thousand horses are given the attention of 350 or 360 men. Think of it. It is rather to be observed that in our army at an average post where we have 900 or 1000 horses, that we have one veterinarian, and two stable orderlies to do the work. Secondly, the paper which has just been shipped to us from the quartermaster's department—did you notice that this poor fellow down in Panama could not send us this paper himself, but had to transmit it by order of Captain Hawkins? That must have amused Dr. Marshall very much, transmitted by permission of Captain Hawkins, whoever he is. It is illustrative of the condition that exists in our army today. It will not exist six months from now. It illustrates the fact that our present veterinarians occupy the position of civilians, and are absolutely under the control of laymen who are fighting men.

Dr. Marshall's paper draws out another point, that in an organization which stands on its own bottom, where it is responsible for its actions, where there is a veterinary head, and I suppose a veterinary tail that goes with a veterinary head, where the veterinarians are held absolutely responsible for their horses, for their medicine, for their remounts, for their stables, and there are no interfering laymen; that the loss from glanders has been about one in a thousand. When we think of our little war of 1898, with the few horses we had assembled, and think of the amount of glanders which existed, it shows the value of a properly organized veterinary corps. The condition existed in those days when veterinarians in civil life had to go to their United States District Attorneys to protect themselves against the exploitation of army officers in selling glandered horses in their respective neighborhoods. It is pretty tough when you have to go to the courts to protect yourselves against your own army. It surely shows the patriotism.

Dr. Marshall is to be congratulated on the opportunities given him. I doubt if any army veterinarian could have had such opportunities. He seems to have been happy first in his selections and in the people he went to. Then again, the man himself counts for a great deal. Most of us could not get around like Dr. Marshall did.

We will be criticised in our country, those of us who have been interested in the organization of a veterinary service; and I see a lot of us here today, in fact I suppose two-thirds of those assembled have aided in the organization of our veterinary service. They will wonder why we do not have something of this kind. We are now starting an organization just about where England was 75 years ago; but, don't be faint-hearted. We will get along some day. You all remember Dr. Huidekoper; there is probably no man in this country who ever gave so much thought to the subject of army veterinary matters as did he. He said a war would bring us an army veterinary corps. Well, it wasn't a real war that we had. If we would get a great war, we will get a veterinary corps, but it won't be until after the war. England did not get her veterinary corps until she had been thoroughly disciplined by the Boer war. She saw the advantages after the Boer war. As Dr. Marshall said, it is too late, when war starts, to organize a corps, but we will get ours after we get thoroughly trounced. We will get it some time, but we have to have a start. Do not be disappointed by this little organization that we have at present, because I can see in it a growth.

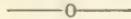
The Signal Corps of our army, which is an independent corps, started about twenty-five or thirty years ago, started with a few first and second lieutenants, and now they are independent. When we asked Congress to commission us this year, we had that everlasting old argument put against us, that we were trying to inject another bureau into the military service. I don't know what is

the matter with this bureau. It seemed to be a sort of a big fellow too, but every time you try to get a bureau in Congress, everybody jumps on you. So we had to say to them, we won't have another bureau, we will just have an inside wheel of another bureau. It was put up to Dr. Hoskins and myself and some others to say where we will have this; and we thoroughly agreed that, if the Lord would ever forgive us, we would never go to the Quartermaster for it. We have been so tired of taking orders from laymen; and here this letter comes in today; so we agreed that the best place to put the veterinarian, if he must be placed under some officer, was under a trained medical officer. So we agreed to be put in the medical corps. That is the best corps in our army, the best educated, the best organized corps we have in our service. With that in view we thought if we got in their band-wagon, we would probably be organized along the proper lines. I have no doubt at all that after this little excitement is over on the border, and when the Surgeon General of the army and his able assistants have time to thoroughly think this matter over and have time to go into matters which Dr. Hill will bring back from Europe, and which Dr. Marshall's paper will evolve, we will see a great change in our service. I cannot help but think that they will not be satisfied to have an inferior corps of inferior men that are not earning their money in their corps.

It can be seen today in the dental corps. The dental corps in the medical department of the army started just like we are starting, but nothing like the rank; they started as first lieutenants. By the way, General ——— had to go in and serve a year without any shoulder straps, as a civilian, at the post until they found out whether he was a gentleman or not. I glory in the fact that our profession has been taken in as gentlemen. There is nothing at all about taking them in without shoulder straps for a year; but the man is put on the basis of all other officers, except that of the graduates of West Point, inasmuch as we must put on a six months' probationary service. That is proper and right. A great many of you men are well qualified to be practitioners in civil life, but you would be absolute failures in military life. Some men cannot stand discipline; we have too much of that American spirit, you know. That won't do in military life; a man who cannot stand discipline, who cannot obey orders, cannot give orders; so that naturally a great many of the young men who go into the service will not be successful, because they will not be able to stand the gaff. When we think that the veterinarians have been made majors in our service, that is, up to and including that rank, we are to be congratulated when our sister profession, the dentists only started in as first lieutenants. I simply voice today our sentiments, and try to defend ourselves against any criticism that we did not become an independent corps. It wasn't possible. It may be possible in the future. We are on about the same basis today as the Russian army.

The Russian army veterinary service is included in their medical service, as a great sanitary corps of the army.

I believe having our big brother, the medical corps, to sort of brother us and father us at the same time, that we will succeed in the end in getting a thoroughly organized veterinary service. I certainly congratulate our brothers from Canada on the fact that they have the most efficient service, after hearing Dr. Marshall's paper, that could possibly exist, and the results are showing themselves.



SHIPPING FEVER FROM THE ARMY STANDPOINT*

W. G. TURNER, Corozal, Canal Zone, Panama.

You, no doubt, have heard as one of the many Army grinds, that,—“The sun will set tonight at 6:27, by order of the Secretary of War”, and while there is no desire on my part to offer any excuses for presenting this paper to your learned convention, still with Battle Creek being a suburb of Detroit, you might expect a “reason”. It is similar to the setting of the sun, as above quoted.

Of course there is shipping fever among horses and mules, just as sure as there is a Santa Claus for the kids. Both have been officially recognized throughout the entire land, for both are universal. In the former, however, as far as the writer knows, there has been no specific organism isolated; while in the latter the old microscopic Pater Familias Osteoblast, has long been isolated, attenuated, stained, etc., etc., and a specific remedy has been recommended, which the writer hopes to try soon (increased pay).

The first mention I find of shipping fever in army horses is that of Rusius, who says: “Great losses occurred among the war horses of Rome in the year 1301”.

That shipping fever includes every disease of the respiratory tract—strangles to purpura hemorrhagica—is a statement upon which I fear no argument. That it is, and always has been the bane of the horse and mule buyers existence, will not be denied. It undoubtedly has been the direct means of causing more dealers to discontinue the business than all other causes combined; and an additional goodly number to count their profits in “dead ones” and accept a meagre living for their efforts.

*Presented at the meeting of the A.V.M.A., Section on Practice. Detroit, Mich., Aug. 23, 1916.

That the buyer does not suffer equally with the seller is only because there are more of him, he does have to stand his proportional loss. In normal times (some of you may recall them) our army is the largest individual buyer of horses and mules in the country, requiring in the past, something like three to four thousand remounts of all classes per year, hence our proportion of the risk of loss, of the grand total, is the largest; we have been superseded on this point, however, during the past two years.

By virtue of the army being the largest consumer, the army veterinarian, has no doubt, more "shipping fever" in the form of influenza, epizootic cellulitis, pink eye, catarrhal fever, typhoid pneumonia, pleuro pneumonia, strangles, etc., etc., to contend with than the average practitioner.

In making this statement and assuming that you gentlemen will concede the point, it should naturally follow that some of us should step forward with at least a few helpful suggestions, but even after more than twenty years' service, a large portion of which was spent on the shipping end, with little more than a year on the receiving end (Chickamauga Park). I am afraid that, personally, I have little, if anything, to offer as a practical remedy that is new.

In saying remedy, preventive remedy of course is what is meant. The only allusion I would beg leave to make, to the treatment of shipping fever (all of them) is to urge a maximum of sanitation, hygiene and nursing, with a minimum of medication:—serum therapy may be.

I have long held the opinion that the real exciting cause of shipping fever is the actual shipping, the railroad ride; of course, there are other contributing influences, many of them. Let us say for instance that a car load or more of horses, usually young ones, are assembled at a country point. They are loaded in the evening—you know all "stock trains" come to all points in the evening; that means the horses must be loaded between five and seven o'clock for the fast freight which is due at 7:21, but "unavoidably detained" until about midnight. In the meantime the twenty to twenty-five horses loaded in what is called a common stock car (of the open work variety) arranged snugly that they may ride better and with less liability to injury, gradually become nervous, restive, and irritable from the close confinement, the strange surroundings and the excitement of passing trains (going the other way) and by the time the freight train does arrive and the crew

switches the stock into the train (gently of course), the horses are in a profuse and frequently a dripping sweat. In this condition they are hustled along across the country at a thirty to fifty mile per hour rate, into and through the variable currents of wind, a probable rain, sleet or snow, thrown in for good measure, with the inevitable result that they are immediately chilled to the proverbial marrow. This is shock number one, and succeeding shocks are limited only by the distance traversed. Stops at division terminals are, it seems, necessarily long ones, the car or cars are frequently stopped, with a long warehouse or other such building on the one side and a row of freight cars on the other, when the Turkish bath process again becomes active and when ready for the "drying room" they are, instead, whirled out through the country and once more exposed to the cooling influences of the omnipresent breezes. This process continues throughout the journey with the result that thus enervated and more or less exhausted from the over-taxing of the heart to accommodate the extreme sudden changes, the animals seem to become a veritable incubator for the multitudes of bacteria, which we know are constantly on the lookout for just such susceptible prey as these animals have become, and upon or soon after arrival at their destination from ten to ninety per cent of the number develop some phase of shipping fever, which may prove to be strangles, pleuro-pneumonia, or any one or more of the formidable list of respiratory diseases.

Then we have the horse or mule procured at the big commercial horse centers; these animals, probably purchased by the country buyer, are shipped to one of the numerous smaller markets, are then purchased by the fellow from the larger centers and re-shipped to his commission man. The next purchaser gets his horse or mule with at least two shipments to his credit (or discredit) plus the further possibility, yes probability, of having come in contact with animals in which "shipping fever" had already developed.

Through the insistence of the Quartermaster General and in one or more instances with the co-operation of the state veterinarian, strenuous methods were adopted in a thorough cleaning up of the entire plant of at least two of the big markets. The dealers entered into the scheme enthusiastically, and after seeing the good results attained, have since set aside one day per week for cleaning and sanitation.

I believe, as a general proposition, that the sanitary conditions obtaining in sales stables and markets—large and small—throughout the country are much better than they are usually given credit for. The one outstanding, crying deficiency in practically every horse or mule stable or barn that I have seen, is the ventilation. Allowing that a well horse requires about one hundred and twenty cubic feet of fresh air per hour and a sick one at least one-third more, if one were asked to estimate the quantity of fresh air available in these places per animal, with an average run of stock, stabled, I think, they would have to divide the allowance by four; and then be plenty high in their estimates.

We all know the contaminating influence of such a condition and in my opinion, it is a big factor in the propagation and intensification of "shipping fever".

The army always insists upon having its stock cars in a state of good repair, free from nails or other projections which might injure an animal. The cars must be scrupulously clean, disinfected and bedded with sand. These are precautions that would return good interest, for the effort, to every shipper, but it is too often entirely neglected.

It is with genuine regret that after having vaccinated thousands of horses and mules, using several of the best known equine serums and anti-toxins, I am unable to submit any data as to the results, on this most important subject, for the reason that I was on the shipping end and returns from the various points are spasmodic, incomplete and frequently unofficial.

During my connection with the remount service we requested and were granted authority to vaccinate nine horses in each car of eighteen (at that time we were using the stalled car) and allow the other nine to go untreated; but owing to the difficulty of providing for the professional and official observation of these animals for the period of not less than thirty days after arrival at their respective posts, the plan was abandoned. Had it been possible to carry out this scheme on three or four hundred animals, it would have furnished the most practical and in fact the only tangible data of its kind that I know of, on the real value of preventive serum-therapy, but alas, etc. Occasionally we would hear from a shipment that had gone a long distance under adverse weather conditions, and landed in fine shape, we would immediately wax enthusiastic over the particular serum we were using at that time,

Again I recall on one occasion we sent a fine load of horses to a Post, treated with the same serum, and while they were on the road, some four or five days, the conditions were normal, yet the verdict came back of "contagious" pleuro-pneumonia in three horses upon arrival, developed en route, and some five or six more in the following few days, several of which died. Then we wondered whether we had vaccinated or inoculated.

I am firmly of the opinion that like the sanitation of the stock car, particularly for the initial shipment of the fresh country horse, if the maximum of prophylaxis is to be attained, his vaccination should also begin with leaving the farm and not to be deferred until he has been subjected to the discomforts of shipping, exposed to infections, and surcharged with disease before receiving the prophylactic treatment. Of course subsequent injections of serum should be administered when indicated.

We have on several occasions had young horses (three and four years old, gathered from a neighborhood and *led*, not shipped, to a clean, sanitary farm stable furnished by the contractor, we would select our load of colts, ship them and the contractor would proceed to assemble another bunch for inspection at a later date. So long as he was able to procure his horses within a *leading* radius there were no signs of disease, but just as soon as he got far enough away from his rendezvous to necessitate his shipping by rail, just so soon did the inevitable shipping fever (in some form) make its appearance.

There is another great element of probable infection, and that is the feeding yard or pen, provided and mismanaged by the railroads. The legislators, no doubt, enacted wisely and humanely when they wrote into the statutes the law requiring the unloading of stock in transit, at least once in every 24 to 36 hours for recreation, rest, etc., but they should have gone a step further; and this without embarrassment to our great common carriers (not the kind you are thinking of) and insisted upon a clean, sanitary, uninfected and covered pen or yard in which to unload stock, and not the quagmire of filth and contamination too often found. These conditions can and should be overcome.

In this connection a thought suggests itself:—Would the horse-express-car with its extra capacity (from 28 to 30 horses) its greater likelihood of always being clean, its scheme for ventilation, without exposure to wind and weather, the elimination of laying on sheltered

side-tracks, as well as the avoidance of the feeding yard, and the cutting down of the time in transit by two-thirds, deliver these young fresh recruits to their destination free from shipping fever? There is a strong probability that it would, and I believe it is worth a trial.

Many eastern shippers use this system exclusively in shipping horses from markets, having had all of the exposures mentioned and still they do it because it pays them, no doubt.

The proper kind and quantity of feed to be fed en route is a much mooted question, but I want to hazard my opinion, nevertheless. I believe as a rule they are over-fed rather than the contrary, that grain of all kinds should be eliminated entirely from the ration, except in specific instances, and whenever possible, alfalfa hay (leafy and well cured) should constitute the main sustenance; it is a laxative and diuretic, hence is a febrifuge; and in a wide observation of its feeding I have never seen any of the ill effects so erroneously ascribed to it. The foregoing has reference to remounts only; of course *fresh clean* water should be given *ad libitum*.

In peace times, the buying of horses and mules for our army is done largely from March to November; and wisely too, for the months of December, January and February are the least desirable in which to make shipments, especially of long distances, owing to the weather conditions; besides by staying out of the big markets,—where after all we must go for large numbers within specified periods—we avoid the competition of the southern buyers whose season this is, and his “sugar” mule and “turpentine” mule is our best wheeler, his “cotton” mule is our best leader, his “miner” is our best pack mule and the best of his horses known commercially as the “top southerner” is the class that furnishes a large number of our cavalry and riding horses.

It is not surprising that our old troop horse—he of a year or more service—rarely, if ever becomes a victim of shipping fever. In the first place he is largely immune, having had his ordeal as a recruit, secondly he is more or less of a traveller, does not get excited about it and knows how to travel. Latterly and paramount, he comes from perfectly appointed stables, so far as sanitation, fresh air and highly efficient stable management are concerned; in fact is a seasoned and conditioned horse. He is usually transported in numbers great enough to warrant one or more trains, he is accompanied by the troops, who are commanded by efficient

officers, none of whom will permit of his abuse by being walled in on some side-track, with all fresh air excluded, nor will unnecessary delays be countenanced.

In conclusion may I hope that somewhere in this conglomerated thesis, essay, paper or what-not, that my earnest effort, though ever so feeble, may carry some message, suggestion, word, or thought, original or otherwise, that will in some way inure to the benefit of the Army Remount Service, to our chosen profession and to man's best friend, the horse (and mule).

TEACHING PHARMACOLOGY*

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In the present day and age when so much pro and con is said concerning medicinal agents, when drugs are either ridiculed as worthless or worshipped as miraculous, it is high time that the underlying causes be ascertained and the remedy applied.

Pharmacology is as definite a science as any other branch of our professional studies, and it is a topic that should engage our most careful study and attention, in view of the fact that the practitioner is daily brought face to face with conditions where medicinal agents are called for, and it is our observation that he who denounces medicinal agents most is the one who has not paid the proper attention and study to the subject, but is ever ready to note down formulas and receipts of the most ridiculous kind and being unable to analyze these combinations, as well as not knowing the action of the individual drug, the whole matter becomes a faith cure. I feel that no man should give medicine without knowing and understanding its action.

The existing erroneous ideas with reference to drugs must have a cause and you are entitled to inquire the reason for this. As a whole, we are agreed on the main facts pertaining to pathology, bacteriology, physiology, but when it comes to medicine and therapeutics, then the existing ideas are vague, erroneous and antagonistic.

After carefully looking into this matter for a number of years,

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I have arrived at the conclusion that incompetent and indifferent teaching methods are the primary causes. How many instructors have we who have paid any special attention to pharmacology? Is it not a fact that in many cases, an instructor is selected, not with special reference to his fitness, but because his services can be obtained at a very low rate? And, for the reason above stated, the recent graduate is usually selected and fortified with no more preparation or special training to teach the subject of medicine than was handed the new "Prof." by his teacher. He starts in to impose upon the unsuspecting student.

The student, before entering college, must, by some sort of an examination, give evidence of his fitness to take up the work, but what is there to protect the student against the unfit teacher?

Much of the teaching of medicine lacks detail, the student is informed there is a drug named "thus and so", the preparations and the dose are alluded to in a general way, followed by a tirade of personal experiences of wonderful cures, the blackboard is covered with fanciful prescriptions, and all the student has retained is the drug, the cure and a selection of specific prescriptions, but left absolutely without any foundation that enables him to reason for himself.

I feel that any information that cannot be reasoned out is, in many instances, absolutely worthless, although it is conceded that many drugs in common use are prescribed purely on clinical evidence.

Another reason that, in a measure, excuses the condition just alluded to, is lack of time. It is absurd to think that only fifty hours during the school term should be given to this subject, a subject that in spite of criticism and superstition, must be mastered to practice successfully.

Laboratory work has, in many cases, been entirely ignored and I believe it is generally conceded that one obtains a more thorough knowledge by actual demonstration than by the lecture method alone. If this is not true, why laboratory anatomy, bacteriology and pathology? We consider laboratory work in *materia medica*, pharmacy, pharmacodynamics, incompatibility, not only essential but absolutely necessary, in that it gives the student a degree of familiarity with medicinal agents that cannot be obtained otherwise, and should also prove intensely interesting.

To understand a drug means a great deal. It means first of all to know its source: is it a plant or is it a chemical combination? In the former case, the plant should be thoroughly described; in the latter case, the physical and chemical properties should be thoroughly studied. Again, if a plant part is used, it should be made clear to the student that the plant contains certain active constituents and that the United States Pharmacopoeia demands a definite percentage of strength present.

The official preparations and dosage, the action throughout, the question of absorption and elimination, the toxic action and antidotes, question of incompatibilities, chemical, physiologic and pharmaceutic, the indications for use and training in prescription writing; all these points must be considered.

In the study of drugs, I feel that the student should have free access to the drugs under consideration, or better still, be in possession of the same. In case of plants, I have not gone beyond the general appearance as I consider plant histology superfluous, however, in the study of the inorganic drugs, such as the various salts, a more thorough method was insisted upon.

The student is supplied with blanks and the following outline is followed: Observe appearance as to color, form, etc.; note its odor and taste, observe its behavior in the presence of air, as to whether it remains unchanged, hygroscopic, deliquescent or efflorescent.

The question of solubility is ascertained and the reaction is noted by means of litmus paper.

It is my experience that by insisting upon the student working out these problems for himself, it gives that intense degree of familiarity that simply lecture work will not give, and enables the student to identify the drug. If, however, the student is not positive as to the character of the drug, a simple chemical test should be given.

The question has arisen in the minds of the students, why all this? I will get familiar with this as I go out in practice and handle these drugs, and I will know all about them. If that instructor will only tell me what that drug is good for and how much to give of it, that is all the information I desire. Our reasons for insisting upon this work being carried out are not alone because of the scientific value but because of the actual practical necessity of it.

Supposing a label should accidentally be removed from a con-

tainer, it would mean that unless we had some way of getting at the contents, it would be lost. It is true that in many instances, a drug can be recognized by its appearance, but many cannot; it is true that the crystalline forms of magnesium sulphate and zinc sulphate are quite similar in appearance, but when a student, a few years ago, took a dose of zinc sulphate instead of magnesium sulphate he knew the difference, hence the appearance is not enough to know, but if the student had stopped to taste of it he would have known the difference. The odor very often enables us to identify the substance. The question of odor should also be considered in dispensing as no mal-odorous drug should be dispensed in powder form if you want the animal to eat it.

Permanency of the drug is of practical importance to remember as it would be rather embarrassing to the practitioner if he should forget himself and prescribe a deliquescent substance in powder form.

We cannot prescribe intelligently unless we know something about the solubility of the substance and the reaction has many important sides and should be known. If we are not familiar with the reaction and we prescribe alkaline salts with alkaloidal salts, dangerous precipitation may occur; again the reaction of the salts is of practical importance as this has everything to do with the physiologic action.

As an example, potassium nitrate, potassium bicarbonate and potassium acetate are all classified as diuretics and yet there is a great deal of difference in the action, due to the difference in reaction, thus your nitrate is neutral, the bicarbonate, alkaline and the potassium acetate, neutral. The bicarbonate neutralizes gastric acidity, is absorbed as a carbonate, increasing blood alkalinity as well as increasing the alkalinity of the urine. The potassium nitrate, on the other hand, is a neutral salt and is broken up into ammonia and urea. It does not increase blood alkalinity nor does it influence the composition of the urine, but rather increases diuresis through irritation and possibly through dilation of the renal artery.

Potassium acetate being neutral, does not affect the stomach but is converted into carbonate in the bowel and after this its action is identical with the bicarbonate. Much more could be said about the importance of reaction.

As a pre-requisite to the study of organic drugs, the student should be familiar with the fundamentals of botany, at least enough to read and understand the botanical terms used, so that by means of a text book on botany, they might be able to identify a plant. The necessity of this should be especially evident when we consider the annual losses from live stock eating poisonous plants.

We should be thoroughly familiar with the active constituents of that plant, whether an alkaloid, glucoside, resin, gum resin, oleoresin, oil, fixed or volatile, or a mixture of several of these. They should not consider it sufficient to merely know the active ingredient but to be thoroughly familiar with the physical and chemical characteristics of each of these.

Just a practical point or two in this connection; do not buy any acetic extracts, the active principle of which is a glucoside, as glucosides are broken up by acids and made inert; equally ridiculous is an acetic extract of *cannabis indica*, inasmuch as the active principle of this plant is a resin and resins are not soluble in acetic acid.

Lobelia, the active principle of which is lobeline, also contains an inert resin. Some time ago we were consulted by a practitioner as to the cause of sticky lumps occurring in a syrup after adding fluidextract of *lobelia*; simply a precipitation of the resin.

I have endeavored by just a few practical suggestions to show the necessity of knowing intimately the plant constituents.

The official preparations should be thoroughly familiarized, with special reference to their character, strength, manner of preparation, etc.; this latter work should be demonstrated in the pharmacy laboratory or better yet, each student should be required to make one or more of the official preparations in common use. In the pharmacy laboratory the student should also be thoroughly familiarized with the various pharmaceutical processes such as distillation, sublimation, filtration, precipitation, maceration, percolation, etc. Work of this kind gives the student a better insight and understanding of medicinal agents.

I do not mean to infer that this should constitute the entire pharmacy course.

Dosage, perhaps is the most difficult problem we have to solve in view of the great difference of opinion. German writers advocate enormous doses compared with ours, but by adhering to the average dose advocated by American writers, taking into consider-

ation the age, breed, sex and general condition of the patient, you will not go far astray. Again, it should be borne in mind that in acute conditions, maximum doses are required to a certain point, whereas in subacute and chronic conditions, the smaller dose should be selected.

Pharmacodynamics is the study of the physiologic action of medicinal agents and a topic that has been a great stumbling block in teaching medicine.

The methods pursued in the past have been inadequate and superficial. The student has, in most cases, only been told that a drug does "thus and so" and this meager information followed by flowery tales of miraculous cures, and as a result of such information, there is absolutely no foundation laid in the mind of the student that enables him to think for himself.

The action of every medicinal agent discussed should be considered in the following order: first, its action if applied to the skin, then being administered by the mouth, its action in the digestive tract and any changes it might undergo there.

The question of absorption and elimination is of special importance as the time taken to absorb and eliminate a drug is the only guide the prescriber has to govern him in directing how often the medicine should be repeated.

Our drug is now absorbed and circulating in the blood, it unites with certain nerve centers, in the brain or spinal cord, and thus by either stimulating or depressing, the drug action is obtained, thus strychnine especially stimulates the motor portion of the cord and as a result thereof stimulates the heart's action, increases blood pressure, stimulates respiration and practically all functional activity of the various organs and tissue.

The question has often been raised, how does this selective action on the part of the drugs take place? The action is purely a chemical one and may be simply stated to be one of chemical attraction.

We have stated what the drug is doing but this is not sufficient, it must be clearly brought out in every instance possible how this action is brought about.

After the drug has circulated a certain length of time in the blood stream and its energy spent, the body throws it off. Some drugs are completely oxidized in the body but most of them are eliminated unchanged or in some other form. The channel through

which the drug is eliminated as well as the form in which it is eliminated are of the utmost importance.

As many of our medicinal agents exert their most valuable influence during elimination, this particular phase of our study must be borne in mind. Thus hexamethylenamine, being broken up in the kidney into formaldehyde and ammonia, exerts its action only during elimination, as a disinfectant to the urinary canal.

Galactagogues, such as anise, fennel, juniper, etc., are eliminated in part through the mammary gland, thus stimulating the glandular activity and increasing the milk flow.

Camphor, creosote, etc., being eliminated through the lungs, bring about a most valuable disinfectant, antispasmodic, expectorant action during elimination.

We have now followed the drug from the time it enters the body until it is eliminated; we have stated just how each action is brought about. We have, however, several medicinal agents in common use, the physiologic action of which has not been worked out and has simply gained recognition purely from clinical observations. These drugs are, however, in the minority.

This work on physiologic action should also be demonstrated in the clinic on dissecting subjects as well as in the physiologic laboratory and no opportunity along this line should be overlooked.

Toxicology is not alone of importance insofar as recognition of symptoms of the toxic action of medicinal agents are concerned but it should also include a thorough study of poisonous plants, such as equisetum, cocklebur, larkspur, digitalis, etc.

Again, the toxic action of drugs in common use can be advantageously demonstrated on dissecting subjects, and while the proper antidotes should suggest themselves to the student, thoroughly conversant with the action of the poison, yet a thorough understanding of the fundamentals should be presented.

We should know the value of the chemical antidotes as well as the physiologic antidote and a good point to always bear in mind is that in many cases where depression is evident, the application of hot blankets is as useful as medicine.

The indications for use undoubtedly furnish the most interesting chapter of pharmacology for the student, but the usual methods pursued are open to criticism, in that the personal views of the instructor are forced upon the student. A better method that calls upon the student to think for himself and make use of

the facts presented, is to bring out the individual ideas in a quiz by the following method: In view of the facts presented with reference to the action of this drug, calling upon the students, the instructor requests that one or more indications for its use be given, also demanding that the reason for this statement be given. This method evokes much interest and stimulates the student to think for himself.

I think it is exceedingly helpful that occasional suggestions be made by the instructor, but at all times, let the student think for himself.

Prescription writing should be limited strictly to proper form and combination and all pet prescriptions and formulas entirely omitted.

Incompatibility, chemical, physiologic and pharmaceutical, should be considered in the class and also demonstrated in the laboratory.

Give the student an opportunity by giving him a good fundamental knowledge of pharmacy, materia medica, then with the proper presentation of pharmacodynamics and the other subjects alluded to, at all times making this subject interesting, plain and reasonable, giving practical demonstrations wherever possible, and he will soon observe that there is nothing superstitious or mystifying about medicinal agents and much of the present indifference, ridicule and criticism will soon pass away.

DR. QUITMAN: Unfortunately, I came in late, but I want to compliment Dr. Jensen on his careful preparation and his well thought out plan. Judging from what I heard, what he proposes is an ideal plan. Just as soon as private veterinary schools can furnish all the facilities, I certainly would advocate taking up every one of the plans. All teachers, I think, that are honest and sincere in their teaching endeavors, realize that we should have more time and more laboratory work in the teaching of pharmacology.

CHAIRMAN MERILLAT: One thing that occurred to me in connection with this paper, is how a man could learn all that in an ordinary lifetime. I want to compliment Dr. Jensen very much on his paper.

THE MEDICINAL TREATMENT OF PARASITIC DISEASES—AN UNDEVELOPED FIELD OF VETERINARY MEDICINE

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With the exception of those parasitic diseases which are of interest from the standpoint of quarantine regulations (Texas fever and scabies) or of meat inspection (hydatid, "beef measles", "hog measles", etc.), the diseases of stock due to parasites receive entirely too little attention from the veterinarian.

One reason for this is that such animals as sheep and swine, which animals most commonly suffer from parasitic infestation, are species with which the veterinarian has little to do, aside from dipping sheep for scabies and injecting hogs with serum against hog cholera. That veterinarians treat sheep and hogs so little is due to a combination of circumstances. From the farmer's standpoint, the value of the individual sheep or swine commonly does not warrant the expense of paying a veterinarian. From the veterinarian's standpoint, the compensation to be expected from treating the individual sheep or swine does not warrant an interest in this field. For years veterinary practice in the United States concerned itself primarily with horses and secondarily with dogs. Today cattle practice is coming into its own, but aside from hog cholera work, sheep practice and swine practice are little known quantities in the United States.

The field of sheep and swine practice is one that deserves attention. The diseases that attack these animals are commonly epizootic or enzootic, and the aggregate value of the stock involved is usually considerable, even though the value of the individual animal be comparatively small. At the present time the value of even the individual sheep or swine is no small matter.

Sheep, swine and dogs are commonly infested with worms, Sheep, especially, are affected but little by bacterial diseases and suffer principally from parasitic infestation. Quite often the animals suffer from massive infestations with the usual damage due to irritation of the digestive mucosa from the movement and pressure of the worms, from occlusion of the lumen of the digestive tract, from enterospasm, from abstraction of nourishment, from

absorption of toxic products, and from hemorrhage and traumatic injury occasioned by some species of worms. The damage is most pronounced in young animals. In these animals the digestive tract is more sensitive, the mucosa more tender, the reflexes perhaps more acute. Infestations that give rise to little or no apparent injury in old animals often appear to occasion considerable injury to young animals and in some cases are the cause of death. One of the most important features in the case is the fact that young animals that are heavily parasitized commonly suffer a serious setback and frequently are permanently stunted in growth. They become unthrifty adults—"runts".

Clinically, parasitic infestation does not present a sharply defined, well characterized picture, but in a general way, one may suspect parasitism when dealing with an afebrile disease, with unthriftiness grading into emaciation and commonly accompanied by anemia and edema. Gastric and intestinal parasitism is often accompanied by more or less diarrhea or constipation. These features should be considered in relation to other facts; that parasitic worms are most prevalent in warm climates and moist localities or in wet years; that they are, therefore, more apt to be of importance in the South and along the coast than in the Rocky Mountain states or in such dry climates as parts of Arizona; and that continued use of closely cropped pastures will favor massive infestation. As a rule there is opportunity for post-mortem examination to confirm the suspicion of parasitism as the cause of trouble, for the veterinarian is not apt to be called in until the death of at least one animal makes it seem desirable to have advice. Of course, it is possible to confirm a suspicion of parasitism by microscopical examination, but at the present time there are comparatively few practicing veterinarians sufficiently experienced to make a satisfactory diagnosis in this way, especially when it involves the question of passing on whether the fecal findings indicate a common and light or moderate infestation or a massive and dangerous infestation, a rather difficult point to settle. To be sure, the presence of parasites would warrant treatment from many standpoints, but it would not necessarily settle the question as to whether they were responsible for the condition the veterinarian was called in to treat.

Most of the work on parasitic diseases of live stock in this country has been done in the federal bureaus. From the very

nature of things they have, heretofore, laid most of their emphasis on prophylaxis, something that could not well be over-emphasized. They have, however, noted the necessity and desirability of medicinal treatment, and it is well known that there are times when such prophylactic measures as pasture rotation are, for one reason or another, not feasible. An illustration of this fact that came to the writer's attention lately was in the case of two flocks of goats used as brush cleaners on Virginia farms. It was necessary that the goats feed down the brush to the point where it would die, a feature which made it undesirable to rotate pastures and give the brush which had only been lightly pastured a chance to recuperate. In cases like this the repeated use of proper medicinal treatment might reasonably be expected to gain all that pasture rotation would gain in the way of keeping infestation down to a negligible minimum.

There is an excellent opportunity at the present time for the veterinarian to educate the owners of sheep and swine in regard to the desirability of employing veterinarians to treat their stock for parasitic diseases. Live stock values are especially high at the present time; and there is less than the usual amount of philosophical resignation in contemplating dead stock. Live stock papers and farm journals are emphasizing more and more the importance of worm parasites and related pests and the need of combating them. If the veterinarian does not take occasion to interest himself in this field at the present time, he will sooner or later find himself lamenting the prevalence among farmers and stockmen of the practice of treating their own flocks and herds for parasites. There is a growing interest in this matter which marks the veterinarian's opportunity to take advantage of the situation or give rise to a regrettable situation by neglecting it. If the farmer could treat his stock as well as the veterinarian could, it would only be the veterinarian's loss if the farmer became confirmed in this practice. But this would not be the case. The veterinarian is in a position to know the latest, safest and best treatments, whereas the farmer, who cannot be so well informed, is apt to waste time and money and lose stock by the inexpert administration of ineffective or dangerous treatments.

There are doubtless many veterinarians who feel that the task of dosing a flock of sheep or a herd of swine could not possibly be accomplished in sufficient time to make it remunerative. More ex-

perience will dispel this idea. With three or four assistants, such as can usually be found on a sheep ranch, flocks of five hundred to perhaps a thousand sheep could be drenched in a day, by the use of suitable equipment, at a cost which would make it profitable to the veterinarian and the sheep owner. This means that the sheep must be drenched at a rate of more than one animal a minute, and in the writer's experience it is not especially difficult to work at that rate. With proper facilities for handling and restraint, swine can also be handled at a rather rapid rate.

The stomach worm has ruined the sheep industry in some sections. The practicing veterinarian owes it to himself and to the sheep business to cultivate an interest in the stomach worm problem instead of neglecting it. And what is true of the stomach worm is true, in a general way, of other parasitic diseases which cannot be discussed within the limits of this paper. Such prophylactic measures as pasture rotation must be carried out by the farmer and stockman, preferably under the advice of a trained veterinarian, but no adequate scheme of eradication or control can neglect medicinal treatment, and this is and should remain the veterinarian's field. But the saving of stock is the object which gives point to the veterinarian's work, and if he refuses to take an interest in sheep and swine and to educate his community in regard to the possibilities of treatment and the need for treatment of parasitic diseases by the skilled veterinarian, then the stock journals will develop in the farmer and stockman the idea that they must treat their own stock for these troubles.

—Drs. E. M. Aldrich of New Bloomfield, Pa., F. A. Baldwin of Kansas City, Mo. and H. H. Tucker of Covington, Ky. have been appointed veterinary inspectors in connection with the Bureau of Animal Industry and are located at Omaha.

—A loss of nine horses has recently been reported near Stella, Nebraska. It was believed that the deaths were due to some form of poisoning—possibly forage poisoning. An exact diagnosis could not be determined.

—It is reported that black leg was recently found in a herd of cattle near Sullivan, Indiana.

BOTULISM

A Cause of Limber-neck in Chickens.

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During the investigation of several outbreaks of botulism which have recently occurred in human beings, it was noted that varying numbers of chickens became paralyzed and died after eating remnants of the food which had caused the poisoning. In Hillsboro, Oregon, fifty chickens were affected after eating home-canned corn which had caused the death of a woman who tasted it; in Hornbrook, California, between fifty and a hundred chickens became paralyzed and died at the same time as the woman who cared for them died of "bulbar paralysis"; in San Jose, California, eight chickens showed the same symptoms and died after eating home-canned string beans which had caused the death of a woman who tasted them, and in Fallbrook, California, seven chickens died after eating home-canned apricots which also caused the death of five people.

In all the human cases the symptoms and the course of the intoxication were identical with those of botulism, and in one the histologic examination of the tissues which were obtained at autopsy showed the typical thrombosis and hemorrhages which have been shown to be characteristic of the condition. (1 & 2). The symptoms of the chickens were not accurately recorded although in one instance it was stated that the chickens developed "limber-neck", in another that they developed a cough and aphonia and became paralyzed in the necks before death, in a third that "they had the same symptoms as the women who died" and in the fourth that they became paralyzed and died about two days after eating the spoiled food.

The carcasses of some of the chickens were obtained from San Jose and from Hillsboro, and from the gizzard of one which had eaten canned corn, and from the crops or gizzards of three which had eaten canned beans, anaerobic bacilli were recovered which have all the morphological and cultural characteristics of the *Bacillus botulinus*. Cultures of both strains in suitable media produce a virulent toxin with which it is possible to reproduce the typical symptoms and pathologic findings in guinea pigs, rab-

bits and cats by subcutaneous injection, and in chickens by feeding.

The symptoms of the injected animals are identical with those which have been described by van Ermengem (3) and others, and those of the chickens are quite characteristic. The birds become dull and inactive, refuse to eat, remain quiet in one place with the feathers ruffled and gradually develop weakness of the legs, wings and neck so that they are unable to stand, droop the wings and allow the beak or the side of the head to rest upon the floor of the cage. In the experimental cases death occurred within twenty-four hours after the feeding. Histological examination of the tissues of the chickens which died in the San Jose outbreak as well as in those which died after experimental feeding showed the peculiar thrombosis which is characteristic in mammals.

The significance of these observations is of some importance in that they show that botulism must be considered as a possible cause of limber-neck in chickens. It has been recorded in the European literature that ducks and pigeons are also susceptible to botulism but in a fairly complete review of the literature I have been unable to find reference to susceptibility of other domestic fowls, although it is highly probable that they are susceptible. The fact that it has been shown that the toxin of the *Bacillus botulinus* may be formed in certain vegetables and fruits without the addition of animal protein (1) may explain the occurrence of this peculiar disease of the domestic fowl under conditions in which access to spoiled meats can be excluded.

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CLINICAL AND CASE REPORTS

“Knowledge is born in laboratories and in the experience of the thoughtful. It develops form in the journals and ‘when dead it is decently buried in books’.”

ECTOPIC PREGNANCY WITH MUMMIFICATION OF THE FOETUS IN A RABBIT.

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One encounters at times, most interesting anomalies and locations of foeti. The unnatural locations vary in different animals from the cornu of the uterus (although this is normal in some ani-



a, Enlarged lymph glands; b, normal lymph glands; c, mummified foetus;
d, normal ovary; e, uterus.

mals) to the peritoneal cavity or it sometimes occurs that the foetus lies in close relationship with the ovary. Where the foetus develops outside of the uterus, either in the peritoneal cavity or in close relationship with the ovary, we speak of such a condition as

ectopic or extrauterine pregnancy. All such occurrences are rare. The great motility of spermatozoa makes it possible for them to travel long distances in a comparatively short time and thus before their life becomes extinct they sometimes, during their wander-



a, *Cysticercus pisiformis*; b, right kidney; c, left kidney; d, mummified foetus; e, stomach; f, bladder.

ings, reach the fimbriated ends of the Fallopian tubes, ovary or even the peritoneal cavity. If by chance an unfertilized ovum lies in the way of such a migratory spermatozoan, fecundation may occur which would result in ectopic pregnancy.

While conducting a post-mortem examination on an experimental rabbit an interesting case of ectopic pregnancy was found. The rabbit had died during the course of immunization against *Bacillus typhosus*, having received two injections of a killed suspension of the typhoid bacillus, dying eight days after the second injection. As is seen in the accompanying photograph the foetus is in the extreme end of the right cornu, closely adherent to the ovary. The foetus appeared to have been in the third week of development when it died. It was shrunken and mummified and closely enveloped by a membrane. The regional lymph glands in the neighborhood of the foetus were eight to ten times as large as those on the opposite side.

Another feature of interest in this rabbit was an unusually large cyst containing *Cysticercus pisiformis*. This was located in the right sublumbar region, embedded in the muscles of that region. It lay immediately behind the right kidney which was slightly pushed forward and extended from the last rib to the second lumbar vertebra. After the cyst was dissected out it was found to weigh, with its contents of 20 c.c. of cloudy fluid and parasites, 33.30 grams. It was four inches long and one and three-quarters inches wide at the widest portion and had the general shape of a plumb-bob, the widest end lying close to the last rib. This large cyst contained six smaller ones, the size of each being as follows: $3\frac{1}{2}$ by $1\frac{3}{8}$ inches; $1\frac{3}{8}$ by 1 inch; two being one-fourth inch in diameter and two more one-eighth inch in diameter. The first of these cysts contained 174 young parasites; the second, 62 and the rest each one parasite. Three young parasites were also found free in the fluid in the cyst formed by the membrane which enveloped the other six cysts; and three were found free in the peritoneal cavity.

INTUSSUSCEPTION OF THE INTESTINES OF THE SHEEP

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The present report is of interest on account of the apparent rareness of this condition in sheep.

A flock of Shropshire lambs, about six months old, were on Bermuda grass pasture and received a small amount of grain daily as a supplementary feed. A number of the lambs had died of in-

festation by the *Haemonchus contortus*, showing the typical lesions of edema of the chest or other parts of the body and a serous exudate poured out into the pericardial and pleural sacs. At times a quantity of serous-like fluid was also found in the peritoneal cavity. Myriads of the worms were also found in the fourth stomach or abomasum.



In the accompanying photograph may be seen a case of intussusception found in one of the cases at autopsy. No definite symptoms indicating such a trouble were recorded. No. 1 is a portion of the intestine which began to invaginate at No. 5. No. 2 is a portion of the intestine beyond the invaginated portion and 3 the open bowel. No. 4 is the invaginated and strangulated portion freed from the lumen. There is noted more or less strangulation and necrosis of the extreme end of the invaginated portion.

BLACKLEG*

W. J. HARTMAN, Montana State College,
Bozeman, Mont.

“The use of blackleg vaccine as a preventive measure has resulted, according to a recent publication of the department of agriculture on this subject, in reducing the loss from blackleg to less than one-half of one per cent. Where this disease is allowed to prevail the losses to cattle from it frequently exceed those from all other causes combined, and in certain badly infected regions have amounted to more than ten per cent of the animal calf crop.”

Blackleg causes at least one-third of our cattle losses in Montana. In some districts and in some years over two-thirds of the cattle deaths can be attributed to this cause; so that taking six per cent* the average annual loss and 1,023,000† cattle in Montana of an average value of \$50.00, two per cent of which would represent a loss of over \$1,000,000.

This is altogether too great a loss to allow when vaccination would prevent it.

Many cattle raisers in Montana use reliable blackleg vaccine regularly and prevent nearly all losses in their herds from this cause. However, on account of unreliable commercial vaccines on the market, some of the stockmen have ceased using any vaccine at all. Where a reliable vaccine is used, such as is furnished free by the U. S. Department of Agriculture, through the state veterinarian, at Helena, and used according to directions, practically no losses occur.

A number of complaints have been received the past year of the poor quality of commercial vaccines. The following is a report of a few cases taken from different parts of the state, illustrating the experiences of some men. In all of these cases I have been careful to ascertain that the vaccination has been done properly and that the loss has not been from carelessness in the use of the pills. We found the majority of the men put all the pills in vaseline before putting them into the plunger, so that very few errors occurred.

*Read at the Montana Veterinary Medical Association, Helena, Mont., Sept. 27, 1916.

*From Live Stock Loss Statistics in the Bitter Root.

†From the U. S. D. A. Year Book, 1915.

*DETAILS OF CATTLE LOSS

Cause of Death	Cattle		Young Stuff	
	No.		No.	
Bloat	15	23.8 %	7	2.63%
Accident	9	14.28%	6	2.25%
Poison	8	12.70%	9	3.38%
Calving	6	9.52%		
Exposure	6	9.52%		
Pneumonia	5	7.93%		
Udder trouble	3	4.80%		
Blackleg			87	32.70%
Lung Worms			45	17.00%
Scours			36	13.53%
Born Dead			24	9.02%
Indigestion			9	3.38%
Miscellaneous	6	9.52%	17	6.39%
Unknown causes	5	7.93%	26	9.72%

*From Live Stock Loss Statistics in the Bitter Root.

C. E. Stuart of Fishtail lost five calves out of seventeen last March—four to eight months old; five yearlings out of eighteen; two 2-year olds out of twenty-four.

John Eik, Fishtail, lost five out of thirty-four from blackleg in March; three after vaccinating with commercial pills. He vaccinated the first of January.

Mr. Cash near Hamilton, who ran cattle in Ross's hole, vaccinated three times with commercial pills, yet he lost one to three from blackleg every month. After using government vaccine, he had no more losses.

Mr. Chatterton, who manages a herd of Herefords of three thousand head near Belt, lost three valuable young bulls one month to six weeks after vaccinating with a commercial vaccine last fall. He used government vaccine and had no further loss.

H. C. Drange, Shepherd, lost thirteen head from blackleg last March. He vaccinated thirty-five head December 25th with commercial pills and was very careful. After losing eleven, he vaccinated all those left with another commercial preparation about April 1st and lost two more about two weeks afterwards.

J. Groen of Huntley, lost eight from blackleg out of nineteen head. He vaccinated with pills and had no more loss.

Dr. Welch, veterinarian of the Experiment Station, and Dr. Butler, State Veterinarian, have a number of reports of similar failures of commercial vaccine. They also report cases in which the vaccine was so strong as to cause blackleg. With these reports at hand and also with the good results we have experienced from the use of government vaccine, we are advising county agriculturists to use government blackleg vaccine exclusively and to recommend it to the farmers in their counties.

In most cases the farmers do this work themselves or where they have many head of animals, they frequently call in a veterinarian to do the work as he can do it much more quickly and accurately. Until last summer we have had comparatively few reports of these failures and therefore we have not recommended the government vaccine exclusively until recently. Considering the great importance of this disease to the cattle business of Montana, I think it wise that all veterinarians have a clear understanding of the methods of prevention and also of some of the failures with vaccines as now used.

We find that ranchers use all kinds of nostrums as vaccines or as tortures, drawing on their imagination as to the value of these ancient devices and while a veterinarian may not be called to do this work in many cases, yet by recommending a safe and reliable prevention, he can be a big help in overcoming some of these false notions of copper wire and garlic vaccinations and this will aid him to win the confidence of the people he serves.

Vaccinate all cattle three months to two years of age, April 1st and October 1st.

Get Free Government vaccine from State Veterinarian, Helena.

Some commercial vaccines have proven worthless; some dangerous.

—A house warming was given at the St. Joseph Veterinary College, St. Joseph, Mo. the latter part of November to celebrate the completion of their new auditorium.

—Dr. Louis Klein of the University of Pennsylvania recently gave a paper on "The Diseases of Dairy Cows" at the monthly meeting of the Western Pennsylvania Veterinary Club.

ABSTRACTS FROM RECENT LITERATURE

CLINICAL AND THERAPEUTIC NOTES. Prof. Doct. A. Delmer. *Bulletin de la Soc. Centrale*.—In his long communication the author records his experience while at the front, relating to the action of the polyvalent serum of LeClainche and Vallee, also the action of petroleum as a modifying agent in wounds of a bad nature and on the treatment of herpes with application and friction of common petroleum.

With the polyvalent serum, where excellent results have always been recorded, he mentions a number of cases, relating to wounds in general: in an old fistula 45 centimeters in length, or deep fistula due to the migration of a piece of obus, a fistula of the withers, suppurative phlebitis following phlebotomy, an ulcerated tumor of the anterior face of the right stifle joint, a deep abscess of the superior part of the neck, a deep wound due to a complete section of the skin, of the perforatus and perforans tendons complicated with opening of the sesamoid sheath, an abscess of the mammae, a deep peritendinous abscess of the left fore cannon, a purulent collection of the sinuses following fracture of the frontal bone.

In relation to the action of petroleum as a modifying agent upon wounds, Doctor Delmer, while considering some of the advantages obtained by the use of petroleum, states that the granulating and the definitive process of cicatrization of the tissues, takes place more slowly than with the polyvalent serum.

In relation to the use of petroleum in the treatment of herpes, he considers it as an excellent therapeutic agent.

LIAUTARD.

TO PREVENT THE SPREAD OF ANTHRAX AMONG SWINE. *Zeitschrift für Fleisch und Milchhygiene*, Vol. 25, p. 351, 1915.—The Medical Commission in Bremen has issued the following warning: The increased number of cases of anthrax in swine, that have been observed in recent years, is due to the feeding of fish meal that had been fed with imported bone meal. The bone meal was not sterilized. Anthrax spores frequently contaminate such meal. Its introduction into traffic, except under declaration, is forbidden.

BERG.

UMBILICAL ABSCESS DISCHARGING BY THE VULVA. Doct. C. Fabretti. *Il Nuovo Ercolani*.—The writer was called to attend a three months old calf, which presented all the symptoms of ordinary omphalitis with a tendency to suppuration. The animal was in very poor condition, had no appetite and did not ruminate. The abdomen was retracted and the temperature elevated. Notwithstanding the treatment instituted, the calf died a few days after showing all the symptoms of peritonitis. At the post-mortem there was found, besides the ordinary lesions of peritonitis, two large cylinders, whitish, hard, dry, one in front of the other which seemed to extend from the umbilicus to the urinary bladder. Not realizing their nature and thinking that they were perhaps post-mortem findings, the author, carrying them in mind, was, a short time after, called again to advise for another heifer which had a swelling at the umbilicus. The application of an ointment was made for a few days with the expectation that fluctuation would soon be detected and the abscess could be opened. Instead of that, the swelling gradually diminished and disappeared. This change took place with the appearance through the vulva of a purulent discharge, which subsided gradually and the heifer got entirely well. The urachus in the first case had been obliterated, that of the heifer remained open and through it the abscess emptied itself.

LIAUTARD.

PARACENTESIS ABDOMINIS. P. G. Bond, M.R.C.V.S. *Veterinary Journal*.—The writer has had cases which made him conclude that this operation was not resorted to as often as it should be. After speaking of two of these cases he gives a concise résumé of five cases where he performed the operation with the satisfactory results that are frequently obtained when it is applied at the proper time and when needed.

“The region selected to operate on is fixed by drawing an imaginary line from the pin-bone to the flank. A hand breadth in front of this is the place to puncture. The portion of the intestine pierced is the pelvic flexure of the large colon on the off side.” The cannula is left in place and if necessary tied with a piece of tape. It is rare that later trouble ensues.

LIAUTARD.

PROLAPSE OF THE UTERUS CAUSED BY A FOREIGN BODY. Ohler. *Muenchener Tierärztliche Wochenschrift*, Vol. 66. p. 1007, 1915. After a reposition of the uterus there was powerful straining. Injuries to the uterus were not found, although on removing the placenta it was noticed that the fetal membranes were attached to the uterus more firmly than usual. After a second reposition, it was not possible to prevent straining in spite of the use of the usual means and appliances. The animal was slaughtered.

A nail which had penetrated the reticulum was found in the diaphragm. Between the reticulum and the diaphragm were found the changes due to a recently invading foreign body. This alone I regard as the cause of the straining, insofar as no significant injuries were present in the uterus. BERG.

FATE OF MAMMALIAN TUBERCULOSIS BACILLUS IN SPARROWS AND CHICKENS. Van Es and Schalk. *Journal of Infectious Diseases*, Oct. 1916.—Sparrows fed with tuberculous material of mammalian origin succumbed in a markedly emaciated condition. They were almost entirely free from any gross lesions resembling tuberculosis.

The material fed was derived from caviar which had died of tuberculosis and which had been used for the propagation *in vivo* of three strains of mammalian bacilli, two of bovine and one of human origin. Twenty-one sparrows thus fed, with one exception, died emaciated. One sparrow showed a small nodule in the liver which contained typical tubercular material. The organism was demonstrated in three sparrows thus fed. Intraperitoneal injection of small amounts of liver emulsion from six of these birds caused tuberculosis in caviar into which it was injected.

The tubercle bacilli may maintain themselves for long periods in organs of birds without losing vitality or original virulence.

Material taken from caviar, having become tuberculous as a result of injection with the liver emulsion of sparrows, was injected intravenously into chickens, in order to see if there was a survival of the tuberculous material in the body of the chicken as there had been in that of the sparrow. Some of these chickens died at different times. Some were killed. A very small number showed lesions. A slightly larger number showed the bacilli in the organs. A still larger number transmitted the disease to caviar.

There were one or more animals in which no infection could be shown. Other animals inoculated from them, however, through

a series of two to five transmissions were proven to contain tubercle bacilli either by microscopic examination or by positive results in caviae. The authors infer that this phenomenon was due to the smallness of the number of bacilli that survived in the bodies of the birds and were missed either in the microscopical examinations or the emulsions injected.

Some chickens were fed one meal of tuberculous material and kept for six months to test the feces for bacilli. Only one of this series showed the presence of virulent material in the feces.

Nearly one hundred birds which either ingested or were injected with mammalian material enter into the summary of results as regards the mortality. Sixty died and thirty-seven were killed. Those that died became greatly emaciated near the end; those killed were in a perfect state of health and nutrition.

The authors conclude that since the bodies of birds retain the organism for long periods, with their pathological characteristics fully preserved, it is possible that birds may serve as intermediary carriers and transmitters of mammalian tuberculosis.

HAYDEN.

GERMAN CROWN PRINCE PRAISES THE VETERINARIANS. *Zeitschrift für Fleisch und Milchhygiene*, Vol. 25, p. 384, 1915. The Crown Prince has issued the following command: I have been informed that the development of the veterinary hospitals which are so necessary to the maintenance of our horses has been going on very favorably throughout the entire army. This is due to the far-sighted and ceaseless activities of the veterinarians in charge. I thank them and all the other veterinary officers in the army. They have distinguished themselves in all branches of the service, especially in the difficult and comprehensive work of the prevention of disease. The Commander-in-Chief, William; Crown Prince of the German Empire and of Prussia.

BERG.

COITAL OR VESICULAR EXANTHEMA IN THE HORSE. R. C. Hancock, B.Sc., M.R.C.V.S. *Veterinary Journal*.—A mare which had been served a few days before by a local stallion, had the vaginal mucosa presenting three or four marked raised ulcers, flat-topped, and about the size of a six-pence. Their surfaces were of a bright red color and their appearance was as if they had been stuck on artificially. There was another ulcer on the hairless skin of the vulva

and one on the buttocks, where the penis could easily have come in contact during copulation. There was a yellowish discharge from the vulva.

Washing twice a day with a solution of Lysol brought the mare to health in ten days

The case was evidently mild and might have gotten well without any treatment.

LIAUTARD.

INTESTINAL AFFECTIONS DUE TO PECULIAR MECHANICAL CAUSES. Bress. *Münchener Tierärztliche Wochenschrift*, Vol. 66, p. 1008-1010, 1915.—In a year old bull calf, heavily built and in good flesh, a strong, woody clover stalk as long as a finger became lodged transversely in the ileum: the intestinal walls were held apart and partly perforated by it. Following were the findings after emergency slaughter 2½ days afterward:

At the site of injury the intestinal mucosa was necrosed and appeared black-gray in the deeper layer. There was strong injection of the vessels in the parietal peritoneum. The contents of the omasum were somewhat drier than usual. Otherwise nothing abnormal was found.

Clinically the following was determined: sudden appearance of colic symptoms. The animal strikes the abdomen with the hind foot, lies down and gets up, groans a little; there were slight convulsive twitchings of the glutei muscles. The animal refused food, sounds in the rumen were slight; sounds in the intestine were loud. There was a small amount of feces passed, of normal consistency, with traces of blood. Respiration was difficult, although no cause for this could be found in the respiratory organs. Pulse, 120; respiration, 40; temperature, 39.6. On the following day no feces were passed, only some mucus. Colic symptoms were no longer observed. The animal groaned and was off feed. Pulse 110, remained at 110 on the third day. The animal groaned no more and appeared somewhat improved; but being still off feed and in good flesh; emergency slaughter was done.

The following is a case similar to the above: A cow in the 35th week of gestation, in fine flesh, had suffered from digestive disturbances for five days. The condition became aggravated. Slight, transitory symptoms of colic appeared.

On examination I found the following: temperature of the body surface not uniform. Pulse 62, respiration 28, rectal tempera-

ture 38.9. Peristaltic movements of the rumen are few and weak; intestinal sounds audible. Occasionally a front foot was lifted, as if to paw the ground. There were slight groans, which were more plain when the animal's back was pinched. Examination of the genitalia disclosed nothing abnormal. Administration of a cathartic resulted in a passage of thin feces without improvement in the general condition. The animal was slaughtered.

Inspection disclosed a slight swelling of the spleen and hardening of the liver: 120 centimeters anterior to the anus there was a strong, gelatinous infiltration of the rectum, its mesentery and of the tissues of the pancreas. The rectal mucosa showed a depression in which there was a dry, decomposed potato, and inflammatory products.

BERG.

UNCOMMON TUBERCULOUS LESIONS. Doct. P. Chausse. *Rec. de Medecine*.—TUBERCULOSIS OF CASTRATION.—This is only the fifth observation made by the author and it is probable that many more could be discovered if the attention of inquirers was directed to it. In this case the tuberculous tumor was developed at the expense of the stump of the spermatic cord with extensive generalization. On the left cord the lesions were well marked, the inguinal lymph glands were only a little hypertrophied, the iliacs were more involved, the crurals and popliteals were not apparently tuberculous. On the right cord, the lesions were more important. There was a bilobulated mass, well illustrated in the plates accompanying the article of Doct. Chausse. The lymph glands were relatively little involved. The generalization was much developed considering the age of their existence and the age of the infected animal.

The lungs contained between 4000 and 5000 spherical tubercles, the liver about 3000 uniformly disseminated, the hepatic lymph glands were largely hypertrophied, hard, fibrous and caseo-calcareous, the spleen contained some 30 tubercles, the kidneys were apparently free.

Nothing was found in the other lymph glands nor on the median section of the vertebral bodies.

LIAUTARD.

TUBERCULOSIS OF THE VESICULA SEMINALIS, EFFERENT CANALS AND URETHRA IN A STEER.—With the exception of one communication of a Swiss Veterinarian, Hess, and that of a French confrere, Bedel, made later, the author has failed to find the record of any observations relating to said localization of tuberculous lesions.

A steer, in perfect condition, had tuberculosis of the lungs, liver and general lymph gland lesions, but none on the pleura or peritoneum. The right vesicula seminalis formed a mass twice as large as the fist, a tuberculous abscess containing about one liter of pus. Besides this abscess, the two vesiculae were tuberculous, both were large, hard and more or less caseous. The right efferent canal showed an ovoid nodosity, as big as a hazel nut, which contained thick caseous pus and under the microscope exhibited many tubercle bacilli. The left canal was apparently normal but atrophied. In opening the urethra, there was found in the prostate portion, tuberculous lesions not well developed and involving the mucosa and sub-mucosa. There were 15 or 20 gray or caseous granulations.

LIAUTARD.

TUBERCULOSIS OF THE DOG, ESPECIALLY IN ITS RELATION TO TUBERCULOSIS OF MAN. Dr. H. Markus and H. Shornagel. *Folia Microbiologica*, Feb. 1916.—Autopsies on 745 dogs performed between the years 1906 and 1915 at the Institute of Pathology of the Veterinary School of Utrecht resulted in finding 14 cases of tuberculosis, or 1.87% of the total number of dogs examined. Three of the cases were discovered accidentally while the other 11 cases were so extensive that the animals were either dead or had to be sacrificed as incurable.

The frequency of the occurrence of the disease in the various organs was as follows:

Mesenteric lymph glands	9 cases	Omentum	4 cases
Lung	7 "	Spleen	2 "
Bronchial lymph glands	7 "	Parietal peritoneum	2 "
Pleura	5 "	Mesentery	2 "
Liver	4 "	Kidneys	2 "
Mediastinal lymph glands	4 "	Pancreas	1 "

Chronic generalized tuberculosis was found in 5 cases and acute miliary generalized tuberculosis in one case.

A careful study of the organisms found in each case was made and the results obtained from ten of the cases tended to show that in 2 of them the bacilli were of the bovine type, while in the other 8 cases, they belonged to the human type.

From their observations and experiments the authors conclude that in Holland, tuberculosis in the dog is more frequent than was supposed; that manifestly in most cases in dogs the infection is of

human origin and that this being true, the tuberculous dog furnishes a source of infection for man, *par excellence*.

A dog ingesting virulent human sputa in the street may serve to introduce and spread the virus in a home where the family is free from tuberculosis. A rational system of prophylaxis against tuberculosis should include methods of sanitary control of dogs living in the home.

L. T. GILTNER.

UNDIAGNOSED ABSCESS. P. G. Bond, M.R.C.V.S. *Veterinary Record*.—A fine cow, nine years old had six calves. After the last she could raise herself only with difficulty and at times looked back at the lumbar region and side. She died three days after parturition, her calf being strong and healthy. The post-mortem revealed an abscess, which had matured and burst in the region of the left kidney. There were heart clots in the ventricles. On inquiry it was found that the cow had received a blow on the loins from a falling tree. There followed a swelling which was overlooked as it did not seem to incommode the cow in her general health. The only trouble that had been noticed was some difficulty in getting up, but this had been the case for several years.

LIAUTARD.

—Dr. J. P. Hutton has removed from East Lansing, Mich., to 350 Nold Ave., Wooster, Ohio.

—Dr. Robert Boyd has been transferred from the Quartermaster's Department, U. S. Army, El Paso, to the 8th U. S. Field Artillery, Fort Bliss, Texas.

—Dr. W. H. Paxson has removed from Marietta, Pa. to Glenolden, Pa.

—Dr. Walter Boyce has been transferred from Kansas City, Kans., where he has been engaged in Virus, Serum, Toxins and Analogous Products work for the Bureau of Animal Industry to Superior, Nebraska.

—Drs. W. T. White and William Shannon, who were with the Massachusetts troops at the border, told of their experiences and the way horses in the service were looked after, at a recent meeting of the Massachusetts Veterinary Medical Association.

ASSOCIATION MEETINGS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Prepare for the next meeting of the A. V. M. A. at Kansas City, Mo., in the week beginning August 19, 1917.

NOTE:—In order to comply with the postal regulations, it will be necessary to remove from the mailing list, those who have not yet paid their 1916 dues. Prompt payment of dues from those who are still delinquent, will insure the receipt of the February number at the usual time; prevent any break in the files and add much to the convenience of the Secretary's and Editor's offices.

REPORT OF THE COMMITTEE ON AGRICULTURAL COLLEGE EDUCATION

F. B. HADLEY, Chairman

W. L. BEEBE

A. D. KNOWLES

Your committee on agricultural college education begs leave to report that during the past year it has made an effort to get in touch with the teachers of veterinary science in the fifty or more agricultural colleges in the United States and Canada. The object was to find out what sort of instruction is being offered in veterinary science to students of college grade. With this information as a basis, we have arranged a course of study that will be recommended as a standard curriculum for all agricultural colleges.

The investigation impressed us with the fact that these teachers have peculiar and difficult problems to solve, among the most important of which may be mentioned:

(1) The need of giving instruction in veterinary science that will meet the demands of agricultural students who are preparing themselves to become practical livestock men.

(2) The necessity of limiting their instructional work to strictly veterinary topics, so as to avoid trespassing on the field of their colleagues in the animal husbandry department, many of whom maintain that certain courses which are given by the veterinarians in some colleges properly belong to them.

(3) The difficulty of meeting these demands and at the same time of satisfying those practicing veterinarians who object to having farmers taught anything about veterinary science that may in any way deprive them of a small fee, no matter of how much benefit it may be to the farmer.

In regard to the first problem, it must be apparent that unless the instructor furnishes the kind of material that is demanded and for which he is employed, he will soon be asked to resign to make way for a teacher who will offer work to suit the needs of agricultural students.

Relative to the second problem, it may be said that the veterinary work in agricultural colleges from its very nature must always be minor or secondary to that in animal husbandry. Therefore, due deference must be paid to the ideas of the men in charge of the latter courses.

In regard to the third problem, it is to be expected that the instruction in live stock sanitation and methods of controlling epizootic diseases, which young men in agricultural colleges of today receive, is far more advanced than that received by the veterinary student of even a few years ago. When the practitioner, who has not kept pace with the rapid strides of science, meets one of these graduates in agriculture he is obviously at a disadvantage. This accounts for his objections to the giving of veterinary instruction.

On the other hand, the leading practitioners of veterinary medicine support these teachers in their work. The reason why they do so is because experience has shown them that their services are more appreciated by farmers who have had the advantage of an agricultural college education and learned the fundamental veterinary truths. This is especially true if the farmer, when a student, had pointed out to him how difficult it is to establish a correct diagnosis without which one has no basis for intelligent treatment.

Almost without exception, these teachers have met the committee fully half way and have expressed a desire to conform to any reasonable recommendations that this association may make. Therefore, we should carefully consider their problems before offering suggestions for a standard course of instruction.

The tendency of natural science teachers is first to give the student training in basic subjects. This is followed by the more highly specialized courses. Consequently, in outlining courses of

study in veterinary science, the accepted method has been followed and the fundamental subjects, anatomy and physiology, are placed first in the schedule, while the more advanced courses in diseases, for an understanding of which the former are necessary, are placed last.

This introduction should be sufficient to give an idea of the objects of this report. We will now submit for consideration the curriculum of veterinary subjects that is recommended as a standard for agricultural colleges. It should be understood that none of the courses are supposed to be given in as complete a manner as in a veterinary college, so, unless the agricultural student does additional work, he should not expect full credit for courses comparable in name only, provided he decides to round out his education with a professional training.

CURRICULUM OF VETERINARY SUBJECTS RECOMMENDED AS A STANDARD FOR AGRICULTURAL COLLEGES

1. Anatomy of Farm Animals. A study of the structure of the animal body with demonstrations to show the normal appearance, position, and relations of the various organs.
2. Physiology and Hygiene of Farm Animals. A study of the functions and hygiene of the animal body, including the physiology of obstetrics.
3. Common Diseases of Farm Animals. A discussion of the causes, symptoms, methods of prevention, and first aid treatment of the common non-infectious diseases.
4. Common Diseases of Farm Animals. Continuation of Course 3, with special reference to the infectious diseases.

In regard to courses 1 and 2, which cover the study of anatomy and physiology, there is no reason why these may not be taken together, if this appears desirable to the teacher. If the students have a crowded schedule and are pressed for time, experience shows that they can more readily understand the structure and functions of the different organs if these subjects are studied in a combined course. Many teachers have found that agricultural students will not elect courses in dissection of the larger animals. To meet this objection and at the same time to give the student some idea of the normal appearance and relation of the viscera, the instructor demonstrates to the class by the use of wet and dry anatomical specimens and by dissecting pigs or other small ani-

imals before them. It is recommended that as much laboratory work be given in physiology as time and facilities permit.

In courses 3 and 4 the students should be taught the fundamentals relative to the causes, symptoms, prevention, and first aid treatment of the common diseases of farm animals. Discussions and demonstrations of the simpler surgical procedures, such as castration and wound treatment, may well be included. There is no reason why a few lectures on the more commonly used medicines should not be included, if the instructor sees fit. When clinical cases are available they should certainly be used to visualize the instruction given in the class room. If all this work is given in one semester, there is no reason why two courses should be listed in the catalog.

The final decision of the question as to whether all, part, or none of the courses shall be required or elective must be left to each agricultural college faculty, as the matter is entirely within their control. However, it is recommended that the association urge every teacher of veterinary science in agricultural colleges to have courses 1 and 2 adopted as requirements for graduation. The other courses may be made elective as students are always interested in the study of diseases and their treatment and will elect them.

The essential point of this proposition is that of forcing the student to take the subjects in logical sequence. In any event, we believe that even one course in veterinary science is desirable, not only from the standpoint of the agricultural student, but also from that of the veterinary profession in general.

Whenever the general curriculum can be so arranged, it is desirable to require agricultural students to postpone their work in veterinary science until they have taken the usual required work in botany, zoology, chemistry, bacteriology, and animal husbandry. If this is done, the students are much better able to grasp both the theory and practical application of the veterinary instruction. Experience in the class room has proved this statement true in every case.

The committee had originally intended to recommend a course in hygiene of farm animals and one in conformation and soundness, the latter to include horseshoeing. Undoubtedly the information that might be given to the student in courses in these subjects would be very useful. However, many veterinarians and nearly all animal husbandmen think that much of this work properly be-

longs to the field of animal husbandry, or should be given in some of the other courses. Therefore, we have decided to leave them out of the standard curriculum. However, the agricultural student should certainly be given an opportunity to get this information either in one department or the other, depending upon which one the man or men best suited for the work is associated.

We realize that in some colleges instruction is given in clinical work, materia medica, therapeutics, and other veterinary subjects, but feel that while it may be highly desirable to offer such courses in some institutions, it is not wise to recommend them as part of a curriculum that is designed to be a standard. A prerequisite consisting of the four courses recommended as a standard should be made for the above-mentioned courses when they are offered.

We recommend the adoption of this report with the firm conviction that, if the suggestions are followed, it will (1) unify and correlate the work in veterinary science offered by the various agricultural colleges, (2) place it on a more permanent basis, (3) entitle it to a place in the general agricultural curriculum with other sciences, and (4) lead to a better understanding between the teacher and practitioner of veterinary science.

SECRETARY'S OFFICE, A. V. M. A.

A meeting of the Executive Board was held at this office December 5th, 1916. It was convened at the request of the members to decide several very important problems which, in the unsettled state, were thwarting the progress of the administrative officers. There were present Drs. F. Torrance, Jos. Hughes, John R. Mohler, H. E. Bemis, R. A. Archibald representing the 1st, 2nd, 3rd, 4th and 5th districts respectively. Dr. V. A. Moore, member-at-large, President Charles E. Cotton, Editor of the Journal, Dr. P. A. Fish, and the Secretary.

The business transacted is too voluminous to report fully in this issue. A definite system of handling the cash resources of the association was adopted, whereby all money collected for fees, dues, subscriptions, advertisements, etc., whether they fall into the hands of the Secretary or the Editor of the Journal, shall first be deposited in the treasury whence they shall be disbursed only on properly signed and approved drafts. A "petty cash" fund not to exceed \$500.00 was allowed the Editor to facilitate his work, but this

must be replenished only from the treasury. The association's cash assets were divided into three funds, namely:—the Association Fund, the Journal Fund and the Salmon Memorial Fund, of each of which the Treasurer is the sole custodian. The Tenth National Bank of Philadelphia was accepted as the official repository. As this arrangement places a heavy burden on the Treasurer it was voted to allow him not to exceed \$500.00 for office expenses. A sum not to exceed \$500.00 was appropriated to help the Bureau of Animal Industry employees in their effort to secure additional compensation through a legislative action now pending before Congress. This action was taken to clear up a disputed point arising from an ambiguous transcript in the Detroit minutes.

It was decided that the sum of \$2.50 shall be set aside from the annual dues of each member for subscription to the Journal and that this sum shall actually be deposited in the Journal fund. Non-members shall pay \$3.00 per year as formerly for such subscription. The Secretary's salary was fixed at \$1200.00 and the Editor's at \$1500.00 per annum, and plans looking to a closer co-operation of these two officers were decided upon.

The votes cast for the nominees for the offices of District Member of the Executive Board were counted November 27th, by a committee composed of Drs. N. S. Mayo, Chairman, A. H. Baker, George B. McKillip, A. C. Worms and J. F. Ryan; and the following candidates were declared nominated:—1st District: George Hilton, Ottawa, Ont.; Fred H. S. Lowry, Toronto, Ont.; C. D. McGilvray, Winnipeg, Man.; J. G. Rutherford, Calgary, Alta.; and F. Torrance, Ottawa, Ont. 2nd District: S. Brenton, Detroit, Mich.; O. H. Eliason, Madison, Wis.; W. Horace Hoskins, Philadelphia, Pa.; L. A. Klein, Philadelphia, Pa.; and D. S. White, Columbus, Ohio. 3rd District: C. A. Cary, Auburn, Ala.; M. Jacob, Knoxville, Tenn.; A. D. Melvin, Washington, D. C.; John R. Mohler, Washington, D. C.; and G. A. Roberts, W. Raleigh, N. C. 4th District: J. S. Anderson, Seward, Nebr.; W. F. Crewe, Bismarck, N. D.; J. I. Gibson, Des Moines, Ia.; C. H. Stange, Ames, Ia.; L. Van Es, Fargo, N. D. 5th District: R. A. Archibald, Oakland, Calif.; W. H. Dalrymple, Baton Rouge, La.; George H. Glover, Ft. Collins, Colo.; C. F. Keane, San Francisco, Calif.; and A. T. Kinsley, Kansas City, Mo.

Pursuant to the provision of the new constitution to proceed at once with the election of the Executive Board a return-postal bal-

lot was immediately printed and mailed. The cards were mailed at Chicago, December 6th and 7th and are returnable on or before February 20th, 1917, on which date the same committee will count them and recommend the successful candidates.

Owing to the requirements of the postal laws, the publisher of the Journal of the American Veterinary Medical Association will be compelled to discontinue sending the Journal within a reasonable time after the expiration of the subscription. It is a violation of the postal regulations to send periodicals in the absence of a bona fide payment in advance thereof or some indication that payment is intended to be made. It will save much unnecessary work in the offices of the Secretary and Editor if the dues are paid promptly. This notice is to urge members to remit promptly in order to avoid discontinuance of the Journal.

In order to comply with the postal regulations; that the office of publication shall be fixed by the association or its executive board, Ithaca was declared the official home of the Journal.

The matter of securing rates to Kansas City, the place selected for the next annual meeting, has already been taken up with the following passenger associations: Central, Eastern Canadian, New England, Southeastern, Southwestern, Transcontinental, Trunk Line, and Western. Mr. R. S. Parish, City Passenger Agent of the Chicago, Burlington & Quincy Railroad has kindly consented to act as our personal adviser in this connection. While it may seem premature to discuss this subject now, we find that concessions in rates can only be obtained through favorable action of the associations at their annual meeting which will be held at an early date. Under the guidance of Mr. Parish we have reasons to believe some benefits will accrue to the members through this early action.

L. A. MERILLAT, Secretary.

TWENTIETH ANNUAL MEETING OF THE U. S. LIVESTOCK SANITARY ASSOCIATION

The twentieth annual meeting of the U. S. Livestock Sanitary Association was held at the Hotel LaSalle, Chicago, on December 5, 6, 7, 1916.

The meeting was called to order by President Dyson on the morning of December 5th. Hon. Edward F. Dumm of Illinois was expected to welcome the association, but was unable to keep his ap-

pointment. Dr. Rutherford had been chosen to respond to the Governor in behalf of the association. The Governor's message being received too late to make other plans, the president peremptorily summoned Dr. Rutherford to extend to the association the address of welcome that he might then be allowed the privilege of replying to it.

We read of the fellow who does something in an inimitable manner and in most cases it is only the elastic imagination or conscience of the writer that admits such an expression, but we doubt if this expression were ever applied with more merit than to Sir John G. Rutherford.

He summoned his Scotch humor to aid in his impersonation of the Governor of Illinois and, among other things he stated, was that all cities claim to have some advantages and that with all sincerity, with the possible exception of Glasgow, a city in his native country, that to him Chicago stood out as the most undesirable place on earth to live; but he would admit that possibly for those from the arid regions of either the States or the Dominion, to them Chicago had one advantage; it is a place where a man can get a drink.

He then proceeded to respond to the address of welcome by announcing that we "*smell*" Chicago with pleasure; the odor being somewhat mitigated by the knowledge that Chicago is the greatest livestock center in the world and that no man, whether he be veterinarian, feeder, or breeder, could come to Chicago and take an intelligent interest in the animal industry without deriving some benefit. In connection with animal industry he pointed out how greatly transportation facilities have increased and how additional duties and precautions have multiplied for those engaged in sanitary control work, where the slightest carelessness or dereliction might bring about disaster; that no veterinarian should miss an opportunity to impress upon the constituted authorities the necessity of safeguarding the livestock industry and the universal necessity of sanitary control measures.

The next was the report of the Secretary-Treasurer, showing the Association to be in good financial condition and the splendid increase of membership to 307.

The President's address reviewed the Association work from its conception in 1907, the first meeting being held in Virginia with a membership of 23, to the present time. He reminded us

that the livestock interest is the largest single interest of our agricultural industry and how livestock producers should see to it that capable non-partisan men are in charge of sanitary regulations. He laid emphasis on the necessity of practical and economic principles and that these two important factors should not be lost sight of in such regulations and that no regulations should be so stringent as to cause hardship where interests outweigh the risk of unreasonable ones.

He further pointed out, what is evident to any one who is capably informed, that a tuberculin test certificate issued by a veterinarian of questionable character is of no value and should not receive any consideration and that likewise a certificate issued by a capable, reliable veterinarian for a non-reacting animal coming from a diseased herd is of but little value.

He advocated the necessity of some restrictions in the shipment of hogs intra-state from premises where hog cholera exists.

He does not believe it necessary to exact a mallein certificate for horses shipped inter-state except from areas known to be infected.

He also stated that influenza is causing serious losses to our equine industry, yet nothing is being done to control this contagion by enforced sanitary attention of stock cars and public stables.

Dr. Kiernan, as chairman of the Committee on Uniform Livestock Regulations, a report of which was delayed from 1913 on account of the presence of foot-and-mouth disease, in 1914-1915, submitted the delayed report which was accepted by the society.

Following the report, Dr. Merillat read a paper on the mouth trouble that has been so prevalent at many stations during the past two or three months, where great numbers of horses have been gathered preparatory to shipment to foreign countries.

Dr. Merillat prefers the term "gangrenous glossitis" to "infectious stomatitis", basing his nomenclature on the pathology and the fact that the lesions are mostly confined to the tongue, the lips and the nasal lesions not being constant and never independent.

A pleasant and educative discussion took place between Dr. Merillat and Dr. Mohler of Washington as to the pathology, Dr. Mohler believing that the lesions are more vesicular than gangrenous and that it is quite typical of the disease long known as "infectious stomatitis", being prevalent in South Africa since 1884.

Dr. Eichhorn also discussed the subject and the important facts that all seemed to be agreed upon are that it is:—first, highly contagious. 2nd, disseminated through feed, hay, and water boxes. 3rd, etiology not known. It is not a filterable virus as it is not capable of reproducing the disease after passing through a Berkfeld filter. A Gram negative bacillus has been found which produced certain symptoms but were not typical, however. This organism appears to have a bearing on the cause. 4th, transmissible to cattle but not to sheep or hogs. 5th, the virus can be recovered in an inoculated calf and reproduce the disease in the horse.

Symptoms in the horse:—thirsty; temperature 102° to 104° , lasting two to six days; appetite, good; salivation and difficulty in masticating; white patches slightly elevated, mostly seen on ventral surface of tongue.

Symptoms in cattle:—salivation; smacking of lips similar to foot-and-mouth disease; vesicle on tongue and pad similar to foot-and-mouth disease; some difficulty in masticating; temperature around 103° .

Differs from true foot-and-mouth disease in cattle:—1st, it is not transmissible to hogs and sheep. 2nd, it is readily transmissible to horses, while foot-and-mouth disease transmission is exceptional; natural infection of the horse did not occur in a single instance in the last three outbreaks in this country. 3rd, in foot-and-mouth disease, we have mouth lesions, foot lesions and udder lesions. In this disease the lesions are confined to the mouth. 4th, foot-and-mouth disease is systemic with high temperature; this disease is rather local with a lower temperature. 5th, this disease spreads slowly whereas foot-and-mouth spreads quickly.

Dr. Kinsley also took part in this discussion speaking of the recent outbreak among cattle in the Kansas City stockyards which gave so much concern to western stockmen. He made an appeal for the government to evolve some rapid method of diagnosis, possibly a biologic test, with the hope of relieving stockowners of the suspense, worry and expense, where, perhaps, cattle had already reached a market and had to be held for the slower method of diagnosis.

Dr. Mohler stated that if the organism was found, an antigen should be simple. Dr. Eichhorn, in giving details of some experiments he conducted, stated that he had been able to transmit the disease to one horse in three days and another in five days, by seari-

fication of the dorsal surface of the tongue. First vesicles and then erosions appeared. Material taken from these lesions transmitted the disease to a calf by scarifying the dental pad.

The lesions so resemble foot-and-mouth disease in the calf that it is almost impossible to tell the difference, the ruptured vesicle leaving practically the same surface and the healing of the lesions progressing rapidly as in foot-and-mouth disease; the only variation being that a few cases showed a pseudo-gelatinous membrane.

Three calves were subjected to intravenous inoculation and five to scarification of the dental pad. Lesions appeared in 48 hours on the scarified pad; but those receiving virus intravenously gave negative results.

Inter-digital application on hogs gave negative results. Horses apparently do not take the disease readily with scarification. Application of the virus on slightly scarified surfaces caused cases to develop in the horse on the third day. Treatment consists in allowing the animals to wash their mouths in drinking troughs with a solution of permanganate. If the lesions are very severe it is well to dress them daily with a mild solution of picric or boracic acid.

After the close of this interesting subject, Dr. Dorset gave a review of the research work on hog cholera conducted by the Bureau of Animal Industry during the past year.

He first took up the application of heat on hog cholera serum and virus to determine if possible a method to destroy the virus of foot-and-mouth disease without injuring the potency of either the serum or virus. Fifty-six degrees C. did not destroy potency but did interfere with the physical appearance and thus with the marketing; so it was found advisable not to heat above 50°C. It is generally agreed that the heating of the foot-and-mouth disease virus to 50°C. for 12 hours would be sufficient, but this was not practical. Another method was then tried of separating and washing the red blood cells since the cells contain no antibodies and are of no value, but centrifuging was only about 50% satisfactory.

Dr. Henley devised another method of separating serum and cells. He found that the common white navy bean would cause agglutination without giving any irritating properties to the serum and by adding 1% sodium chloride before centrifuging, 70% of the total volume of the original defibrinated blood could be recovered. This heated for 30 minutes to 60 C. is apparently satisfactory. Time enough has not elapsed since this method has been in use to determine the keeping qualities of serum so treated.

One lot has been kept two and a half months and another one eight months and up to the present this process seems to meet all requirements.

Another experiment was to determine the infectiousness of blood and excreta of the cholera infected hog, at different periods. The information obtained from this experiment indicates that the blood and urine are infectious the first day after the animal has been inoculated with virus, the second day the feces: and the third day the discharges from the eyes and nose: all before the hog shows symptoms of the disease.

To determine the effects of natural exposure three infected hogs and two non-infected ones were put in a pen together for 48 hours. The latter were then removed to disinfected pens, then two more susceptible ones put in 48 hours more and so on up to the 10th day. All hogs developed cholera except the two put in the first two days. These were not immune to the disease as was later proved by inoculation. Another experiment was to determine how long recovered pigs are carriers. Two recovered pigs, the 23rd day were scrubbed, disinfected and put with two non-immunes for 21 days. The latter remained well. Another experiment was to determine the survival of virus in buried carcasses. Four carcasses buried in warm weather at the depth of two feet were exhumed on the 7th, 14th and 21st days and pieces fed in bran mash to susceptible hogs. None developed cholera from carcasses that had been buried 14 days or over, putrefaction apparently destroyed the virus.

The likelihood of attendants carrying virus to healthy pigs was then taken up. Healthy pigs were placed 100 yards from cholera infected ones. Men took the temperatures of the sick pigs disinfected their hands and thermometers, then went into the pens where the well pigs were, and took their temperatures without changing their clothing or giving any attention to their footwear. The test pigs remained perfectly well for thirty days; they were then moved 50 yards nearer under the same practice but continued well; they were then directly exposed to and contracted cholera. Two control pigs nearby did, however, develop cholera on the 17th day.

The question which is often asked and is an important one, is; how soon is it safe to restock a farm after an outbreak of cholera has been suppressed? An experiment to determine this was carried on in August, September and October 1916. Covered pens

of five different kinds, wood, concrete, etc., were used; very little sunlight was admitted in any of them; they ranged in size from 5 feet square to 25 feet square. In all the pens pigs were present in different stages of the disease, dying in some of them. Without cleaning or disinfecting, susceptible pigs were placed in these after sick or dead hogs had been removed, the time varying from 7 minutes to 24 hours. In no case did a pig develop cholera in a pen where the dead or sick had been removed for 24 hours.

In closing Dr. Dorset wished it to be understood that none of these experiments have been carried far enough to be considered as definite and stated that summer conditions should be taken into account in aiding putrefaction as it does, more rapidly than in cold weather. Dr. Dorset's paper was discussed by several interested in this great problem. Dr. Connaway of Missouri recited some experiments that had been carried on in his state and believes hyper-immunes should be tested for tuberculosis. Dr. Rauek of Mississippi told of interesting experiments he had conducted to determine if possible the infectivity of air alone. His results would indicate that air does not play an important part as a carrier of hog cholera virus.

Dr. Gibson of Iowa is always loaded on the hog question and as is characteristic of him, he tackled the proposition from a practical viewpoint; even considering the possibility of saving the salvage of cholera carcasses. There was a sound of amusement over this, somewhere in the room, when a twinkle appeared in the Doctor's eye and he quickly retorted that the dead hogs of his state were worth more than the live ones of some other states.

He stated that the iniquitous practice of hog raisers inviting their neighbors to help them draw their hogs hurriedly to market, when they suspected an outbreak of hog cholera, was a method of infecting several carriers which in turn infected other premises.

Dr. Gibson believes in facing conditions as they are and devising methods to suit the occasion so that the public will co-operate rather than evade, and favors the disinfection of every stock car at its point of destination and that it would be more practical to make regulations allowing exposed hogs to go to market under restrictions rather than prohibit it. He believes every shipment of live hogs should be immunized and that every breeder marketing breeding animals should be forced to immunize under proper regulations.

Hog raisers should have a loading chute at their hog lot to prevent the necessity of neighboring teams entering the hog lot. Susceptible hogs should be loaded direct from wagons in clean, disinfected cars and unloaded in clean, disinfected chutes.

Dr. Luckey of Missouri believes that hogs for shipment receiving serum alone, should be dipped and held for six hours after, before being shipped. He explained the method of handling hog cholera in his state, reaching out for aid from various associations on all sides, even enlisting the aid of school boards to do detective work, and reporting outbreaks. Competent veterinary practitioners are appointed irrespective of politics, and are paid *per diem* when employed.

Dr. Koen of the Bureau of Animal Industry then read a paper on hog cholera, reviewing the entire subject, mentioning as important factors:—1st, diagnosis. 2nd, quarantine. 3rd, serum alone. 4th, serum and virus. 5th, proper administration by qualified veterinarians.

Dr. Nelson of Indiana said that there was a law in his state allowing the salvage of hog cholera carcasses which was very objectionable, as it courts vicious practices. He told of the methods of control practised in his state which are quite similar to those in general use.

Dr. Cooley from Ohio, explained that in his state they allowed only veterinarians to use serum, and that such veterinarians are approved to administer it only after they have taken special instructions at a serum plant, and additional instructions from an experienced field veterinarian. This would seem to us like a sensible precaution.

Dr. Musselman from Kentucky said that statistics in his state in 1914 indicated that the annual loss from hog cholera had been averaging around \$200,000.00 and it is now estimated that this has been reduced one-half. The Kentucky requirements are that a serum treated hog entering the state must be so treated not more than five days before entrance and that in the case of virus and serum not less than 21 days after treatment.

Dr. Cahill of Massachusetts explained how conditions differed in reference to swine raising in the New England States as compared with the Middle and Western States, ninety per cent being swill fed and kept under bad sanitary conditions. No serum or virus is allowed to be used in the State of Massachusetts until it

has been tested by the Massachusetts Department of Animal Industry and then must be administered by the Department agent. Splendid advancement has been made in Massachusetts in the control of hog cholera.

On the morning of the second day Dr. Eichhorn presented a paper dealing mainly with immunization against abortion with live cultures. In his summary he stated that present investigations point to the possibility of success along these lines. Like all good sanitarians he believes that prevention is the important phase of this trouble and should receive the greatest attention.

The Federal Bureau of Animal Industry has undertaken a campaign to suppress abortion and hopes to secure the assistance of many agencies, such as state and local organizations, and recommends that the U. S. Live Stock Sanitary Association appoint a committee of the most capable men available, to get together such facts as are worthy of consideration at the present time, and to formulate and develop plans looking to the control of this malady.

Dr. Williams of New York followed Dr. Eichhorn with a paper mentioning the noted changes that have come about among scientists and breeders during the past few years in recognizing the disaster of abortion and its allied ailments. He believes as others of us do, that calf scours is closely associated with abortion, and that the new born calf usually gets the infection from infected milk or the udder that has been soiled with vaginal discharges. He outlined methods in caring for a herd where abortion is present, paying special attention to the care and treatment of the pregnant cow. On this subject the Doctor was on his good behavior, and we recommend a careful reading of this by those interested in the subject. He still adheres to the belief that abortion has no tendency toward immunity.

Dr. Lamb, of Colorado, gave a paper on the subject, "Abortion and the Range Cattle Industry." He does not believe that contagious abortion is present among range cattle, and that practically all abortion among range cattle is due either to accident or dietetic causes, and if the contagion did exist simpler methods of control would need to be found in order to be of practical application.

Dr. Marshall of Pennsylvania presented a paper on "Possibilities and Limitations in Control of Abortion." He told of conditions as they exist in Pennsylvania, basing his deductions prin-

cipally on some large purebred herds he has had to do with. He believes that isolation and sanitation are the best agents of control known as yet. He does not believe granular vaginitis plays much part in sterility, having seen herds so affected with practically no sterility. Neither does he believe that calves contract contagious abortion by drinking the milk of affected cows. He advocates good sanitation, proper attention to the uterus following parturition and that if the uterus is cleansed and made healthy, animals can be bred very early.

Drugs and crude operative interference such as dilating the os is useless and sometimes harmful. Thinks it is wrong to sell aborting animals as many will never abort again. In summing up he submitted the following recommendations:—1st, frequent stable disinfection. 2nd, washing hind quarters, tail, etc. with disinfectants daily. 3rd, watch non-pregnant animals: if there is any discharge, douche uterus three times weekly. 4th, discharges and membranes should be properly destroyed. 5th, attention to the bull in the way of douching and keeping clean.

The next on the program was "Practically Significant Facts about Abortion disease," by E. C. Schroeder and W. E. Cotton of the Bureau of Animal Industry. The paper was presented by Dr. Schroeder. Some of the important conclusions of these authors were that cows may be carriers that have aborted, and then cease to abort. Cows that never abort may be carriers. The udder is frequently infected. Period of udder infection varies greatly, several cases known from one to four years. Period in which uterus remains infected after abortion, about three weeks. *Abortus bacilli* do not ordinarily live in a non-pregnant uterus. *Abortus* organisms do not live in the animal body in parts other than the udder and pregnant uterus of mature animals. Not so with the fetus, as the intestinal tract of the newborn calf of infected mother is frequently infected. This seems to disappear in about three or four months. Believes there is danger of milkers' hands infecting the udder through the teats and so spreading the disease. Questions the value of uterine treatment with germicides, even thinks it may possibly be harmful. Does not believe the bull is an important factor in the spread of this disease.

(On this particular question we would like to inject a bit of experience that we did not have the courage to bring up at the meeting after such an exhaustive discussion of the subject, and our

friend Dr. Moore, with the formidable task still ahead of him under the caption of "Summary".

A client with 23 cows and a rather choice bull that had been getting some particularly fine calves, some two years ago was prevailed upon to loan or hire his bull for a few weeks to a neighbor, that he might breed some of his animals. The bull was loaned or hired and returned in about five weeks and the owner then bred more of his own animals and continued doing so during the summer and fall months. Some three or four months after the bull had been returned abortion appeared in his herd and 13 out of the 17 animals bred that year aborted. They were all home bred animals, no strange female had been added to the herd. Where was the source of contagion?)

Dr. Moore of New York, in summing up stated that we are yet in the research stage. There is really nothing definite to state. He thinks that various opinions are beneficial even though conflicting, we are making progress. For instance, we seem to be agreed on the definite cause, also the complex disasters that go with the disease. As it appears to him, he thinks that abortion can be prevented or at least lessened by applying our present knowledge in the way of attention to the uterus, ovaries, etc. He believes the two important factors at present are: How widespread is this organism and how is it disseminated? He has found organisms in the uteri of cows six weeks or longer after abortion.

The next on the programme was a paper by Dr. Wills of New York entitled "How should a tuberculin test be applied to insure accuracy in results?"

He reviewed the different tests as applied to detect tuberculosis and in the subcutaneous test recommends beginning the taking of post temperatures at the eighth hour and carrying them through to the twentieth hour.

Dr. Kinsley spoke briefly on "The Nurse Cow and Her Relation to Bovine Tuberculosis." Believes that this phase of infection does not receive sufficient attention, particularly the present custom of stockmen using nurse cows that have not been properly examined to determine whether or not they are free from tuberculosis. This ended the morning session of the second day.

The program of the afternoon session was arranged largely to discuss what might be termed "administrative questions."

The first speaker was Mr. Groman of Illinois. He advocates legally constituted Sanitary Boards of three members who are actively engaged in farming or stockraising in their own states so as to be familiar with local conditions; having headquarters at the State Capitol; expenses and reasonable compensation to be allowed. He was followed by Dr. Cotton of Minnesota, who mentioned the principles he believed should be taken into account. The sanitary Board should have full power to act promptly when a sudden outbreak of a dangerous disease appeared. All biologics used in the state should be under state control. There should be a State Laboratory with the power to make necessary investigations. The board should consist of stockmen and veterinarians. Field men should be qualified, experienced practitioners and should be on full pay. Meat and milk inspection should receive more attention.

This important subject was discussed by Drs. Dunphy, Ramsey and DeVine.

Mr. Hastings of Texas spoke on the "Desirability of Exempting Range Bred and Branded Cows and Heifers from State Regulations Governing Importation of Cattle for Breeding Purposes." He pointed out the impracticability of testing range cattle shipped to the middle or northern states when in transit, and pleaded for the assistance and co-operation of such states in making an agreement that would be equitable to the cattle shipper and at the same time protective to the state receiving the cattle.

Believes there is practically no tuberculosis among range cattle and in case tuberculosis is discovered in the shipment of cattle coming from the ranges, they could be traced to point of origin by the owner's brand.

Dr. Bahmsen of Georgia also spoke on this subject, supporting Mr. Hastings' contentions.

Dr. Ramsey explained the law required, in the case of range bred cattle, that the owner register his brand.

From the discussion that followed it seemed that a plan could be sensibly arranged.

A proper method of applying the subcutaneous tuberculin test was again brought up and settled by adopting uniform regulations that had been submitted by the committee which included the Bureau regulations in making a tuberculin test, which read from the eighth to the twentieth hours.

Dr. Ranek of Mississippi, in presenting the subject "Sugges-

tions for Regulations Governing Inter-State Movement of Live Stock," believes that it is unreasonable and unjust to exact a veterinary certificate from a poor man with a few head of animals from an isolated area where infection is not known to exist.

The next subject on the programme was "State Accredited Herds" by Dr. Eliason of Wisconsin. He explained that Wisconsin already has several such herds and the policies and methods in vogue in that state. Those who spoke in favor of the accredited herds were Mr. Bent of Illinois, Mr. Glover of Wisconsin and Drs. Ingram, Marshall and DeVine. The matter was referred to the Committee on Resolutions.

During the forenoon of the third day the representatives of the different stock papers had the floor.

Mr. Russell of the 20th Century Farmer, presented a splendid paper on "How can State Livestock Sanitary Officials Best Serve and Co-operate in Promoting the Interests of Livestock Producers?" His discourse gave evidence of an intimate knowledge of the details that enter into efficient sanitary control work. He advocates a Sanitary Board rather than a State Veterinarian as he believes that different interests should have representation. The board should consist of five members; two veterinarians and three laymen. The latter should represent different kinds of stock. The executive veterinarian to be selected with greatest care as the most important of all members. He should be selected for ability alone, politics not to be considered. Salary should be adequate to secure a good man. Should not be engaged for any definite period but retained as long as he gives faithful, capable service. Believes quarantine lines in any serious outbreak of disease should be placed by the Bureau of Animal Industry as it so often happens the state line is not satisfactory.

Mr. Gregory of the Prairie Farmer, emphasized the necessity of more co-operation of all taking an active part in the livestock industry.

Mr. Snyder of the Farmer's Review, commented on the wisdom of recognizing the agricultural press as an important factor and the only way sanitarians can get the true version of their work before the public.

The closing topic for the morning session was "Livestock Sanitation, Past, Present and Future," by Dr. John G. Rutherford, of Canada. The Doctor dispensed a little fun, some science and a good

bit of common sense. He said in part that sanitation might be traced from the days of Moses but there was no beginning of real veterinary sanitation until the 18th century. Knowledge then was contradictory making very little progress until the last half of the 19th century. The principal agents used in the early times as disinfectants and deodorants were asafetida, anise, and the far famed Billy goat. Following this, corrosive sublimate was introduced and still later carbolic acid and its derivatives.

He said that even as late as the time he graduated, in 1879, spontaneous origin of infectious diseases was still taught. Hunting of England published a monograph in 1887 on glanders and quoting from George Fleming gave a lengthy explanation of how this disease could arise spontaneously. Williams of Europe, as late as 1890, put forth what he believed a very positive argument that glanders originated spontaneously. The speaker compared the great strides since made in the introduction of tuberculin and mallein, opening the way for simpler and surer methods of diagnosis. Fleming's Veterinary Sanitary Science and Police was the first real text book written comprehensively on this subject. This book was published about thirty years ago. In emphasizing how slowly, sometimes, science advances, he reminded us that even at this time there are some who doubt the existence or infectiousness of rabies and, in contrast to this, the great strides that have been made in tick eradication since it has been found that southern cattle fever was due to this intermediate agent.

An important problem along this line for the future is the animal that is a disease carrier while in all appearances being quite well. Future regulations require more uniformity among authorities and to show as how ridiculous and even disastrous quarantine methods may be even with our present knowledge, he cited how England has long since exacted rigid quarantine methods on all dogs coming into the country, but neglected the foxes imported from France for hunting purposes, until a master of hounds died with rabies contracted from a fox bite.

He advocates the collaboration of the producer, consumer, Government, State and Municipal authorities. All should be consulted before an order or regulation affecting all be promulgated; pointing out how often unpleasant circumstances may arise or develop without such consultation. Even the "crank" should be consulted as he has a value if handled properly.

All great nations, such as ours, should be always ready to handle any emergency or crisis. Cautioned against today's tendency of believing that we know all that should be known concerning many maladies. He spoke at some length of the great value of the practising veterinarian in sanitary control work and he left no doubt in our minds but that in his opinion, after all, the capable, conscientious practitioner is the backbone in controlling contagious disease.

Thursday afternoon was devoted mostly to committee reports and the following resolutions were submitted and adopted:

1. WHEREAS, It is important that outbreaks of contagious and infectious diseases be promptly quarantined, therefore, be it

RESOLVED, That the Federal law and such State laws as provide to the contrary be amended to permit the State Veterinarian, a Livestock Sanitary Board, a Livestock Commissioner and the Federal Bureau of Animal Industry to quarantine any outbreak of contagious or infectious disease as soon as the fact or a well grounded suspicion is established.

2. BE IT RESOLVED, That this Association recommend to the various State Fair Associations the adoption by them of regulations requiring that all cattle exhibits shall be accompanied by a certificate issued by the authorities of the State from which exhibits originate—that such animals are from a State Accredited Tuberculosis Free Herd or a certificate from the authorities above mentioned that animals have been tuberculin tested within a period of six months and are free from tuberculosis as evidenced by the test.

3. WHEREAS, The expense of inspection of hogs and sheep shipped interstate by express is burdensome upon the breeders and tends to restrict the movement of such animals, it is recommended that State regulations be amended to permit swine and sheep, when expressed in interstate shipment to go forward when shipment is accompanied by an affidavit of the breeder that such animals are free from all contagious and infectious diseases, and that they have not been exposed to any contagious or infectious disease for a period of three months prior to shipment.

4. RESOLVED, That the United States Live Stock Sanitary Association place on record its deep conviction of the importance of cleaning and disinfecting stock cars and stock yards in the control of contagious diseases of animals, and desire to call the attention of the Secretary of the U. S. Department of Agriculture and State Live Stock Sanitary authorities to the urgent necessity for proper legislation or regulations requiring transportation companies to clean and disinfect all cars used in live stock transportation immediately after unloading, and also requiring that all public stock yards be maintained in a clean and sanitary condition.

5. WHEREAS, It is highly desirable that tuberculosis be eradicated from all farm animals, and that to accomplish this systematic and efficient effort be made, and

WHEREAS, The plans as laid down for the establishment of accredited

herds of cattle in several States that have accredited herds provide for intelligent application of the tuberculin test and for the proper handling of such herds thereafter,

THEREFORE BE IT RESOLVED, That the members of the United States Live Stock Sanitary Association in our Twentieth Annual Convention pledge themselves to render all the assistance possible to establish accredited herds in all States.

6. WHEREAS, It has been shown by investigations made by a representative of the Bureau of Animal Industry throughout the greater part of the United States, that the losses of horses from shipping fever or influenza are becoming so alarming as to be a menace to the horse and mule industry of the country, not only are animals in transit affected, but the disease is carried to other animals in sale and livery stables and even to those used for agricultural and other purposes.

WHEREAS, It is believed that the ravages of this disease can be greatly reduced by proper sanitary measures, provided the same are applied to all shipments of horses whether in *interstate* or *intrastate* transit.

THEREFORE, Be it resolved that this Association, urgently requests that the Federal and State authorities promptly adopt and enforce such measures as will tend to control the spread of shipping fever or influenza.

And be it further resolved that this Association recommend an appropriation of \$100,000, by the Federal Congress for the control of this equine plague and that copies of this resolution be forwarded to the Secretary of Agriculture and the Chairman of the Committee on Agriculture and Forestry of the Senate and the Chairman of the Committee on Agriculture of the House of Representatives, Washington, D. C.

7. WHEREAS, There is some contention between a few of the veterinarians and the county agents and

WHEREAS, This condition is deplorable and uncalled for, as they should work harmoniously together for the advancement of our live stock interests, therefore be it

RESOLVED, That we as members of the United States Live Stock Sanitary Association urge a close co-operation between the County Agent and the veterinarian, and be it further

RESOLVED, That we do all we can to eliminate contention between these two factions.

The election of officers for the coming year resulted in the following being chosen:

For President, Dr. J. G. Wills of New York. For Vice-Presidents:—Dr. Archibald, Dr. Eichhorn, Dr. Graham, Dr. Ingram, Dr. Torrance. For Secretary-Treasurer, Dr. Ward of Minnesota, and so closed one of the best, if not the best, meetings the association ever held.

J. F. DEVINE.

BRITISH COLUMBIA VETERINARY ASSOCIATION

A Practitioner's Meeting of the B. C. Veterinary Association was held in the Hotel Vancouver on Wednesday, December 6th. Dr. Howell, Vice-President, acted as Chairman in the absence of Dr. Jervis of the Social Committee who was sick in the hospital with appendicitis. Dr. Howell made an address of welcome and then called upon Dr. Strong who is connected with the Health Department of the City of Vancouver as Meat Inspector. He spoke of his duties in this connection and though only being appointed a short time, showed the improvements that had been carried out. Discussion followed and it was the opinion of the meeting that the only solution of the pure meat question was the Municipal Abattoir. The Chairman then called upon Dr. Ransom who spoke on "The Ethics of the Profession"; discussion followed. The Chairman then called upon Dr. Hadwen, who gave a very interesting paper on "Staggers in Horses" caused by bracken, and described experiments conducted by Drs. Hadwen and Bruce at the Veterinary Research Laboratory at Agassiz, B. C. Discussion followed. Dr. Sleeth then gave a paper on "Abdominal Operations on the dog as compared with the horse". This paper went very minutely into the subject and will be concluded at the next meeting to be held in January. Dr. L. D. Swenerton then related some of his duties as an Army Veterinarian in the British Army in England and France, having lately returned from the front. This brought a very successful meeting to a close, but more will be held throughout the winter, some of which the public will be invited to attend.

K. CHESTER, Sec.-Treas.

**WESTERN NEW YORK VETERINARY MEDICAL
ASSOCIATION**

The Western New York Veterinary Medical Association held its 3rd semi-annual meeting Friday, December 15th, at the rooms of the Erie Co. S.P.C.A. building, 121 W. Tupper St., Buffalo, N. Y., with 20 members present. The clinic started at 2:30 P. M., and consisted of eight cases: 5 horses and 3 dogs.

Case I was a Chestnut Gelding with ringbone on both fore feet, involving the posterior tendons of the left to such an extent as to cause considerable contractions of the tendons. Treatment: rest and blistering and taken off city pavements.

Case II, Grey Gelding with a chronic levator humeri abscess. Had never been operated upon, but had been treated with anti-phlogistic measures and reduced to nearly normal with the exception of a small bunch at the extreme anterior edge of the muscle just over the joint, the bruising of which would cause the recurrence of the enlargement at intervals. Treatment advised, was to reduce the swelling, to circumscribe the enlargement as much as possible by opening up and evacuating the pus, which evidently was encysted.

Case III, Grey Gelding aged with generalized melanosis—especially around prepuce, tail and anus. Treatment none, inoperable, horse to be destroyed, the general opinion was that it was malignant.

Case IV, Brown Gelding. Hair falling out in large spots all over body, sides of neck nearly entirely denuded. Diagnosis: Alopecia Symptomatica due to faulty digestion. Treatment: Soft laxative food and intestinal antiseptics.

Case V, Brown standard bred stallion. Lamé in both hind legs after violent exercise and only then. Diagnosis: thrombosis of iliaes. Upon rectal examination found the post aorta enlarged and hard just anterior to the branching of the iliaes. Treatment: regular exercise.

Case VI, Dog. Bladder trouble. Diagnosis, calculi. Treatment: operation revealed a tumor condition inside of bladder, presumably malignant. Will be verified by microscopical examination.

Case VII, Dog. Injury to back by automobile 3 months previous. Diagnosis: broken back with decided crepitus. During first two months the dog was unable to walk but walks now with partial control of hind parts. Treatment: questionable. Results also questionable.

Case VIII, Dog. Old perineal hernia. Treatment: keep bowels open; operation unsuccessful in old dogs.

Case IX consisted of the Heart and Lungs of a horse that died with contagious pleuro-pneumonia, a disease quite prevalent at the East Buffalo Stock Yards at the present time.

After the clinics the regular business session was held. Three new members were elected. Dinner at 6:30 at the Park Hof Hotel in which all the members participated, after which they returned to the assembly rooms for the remainder of the business and papers.

A committee was appointed to take up the matter of illegal practitioners, collect evidence and prosecute if necessary.

A resolution was also drafted and adopted in regard to the increasing prevalence of contagious pleuro-pneumonia at the East Buffalo Stock Yards and a copy forwarded to Chief A. D. Melvin, of the Bureau of Animal Industry, Washington, D. C., to see if measures could be brought about to eradicate this highly fatal disease.

The papers of the evening were given by Dr. J. L. Wilder, "Physical Examination of Dairy Cows", also a paper on "Nuclein, its uses in Veterinary Practice," by Dr. W. D. Bennett. Both papers aroused considerable discussion in which all the members participated.

The members voted the sum of \$25 to be given by the society toward the Salmon Memorial Fund. Meeting then adjourned to the 4th week in June 1917.

F. F. FEHR, Secretary.

THE OHIO STATE VETERINARY MEDICAL ASSOCIATION

The Ohio State Veterinary Medical Association will hold its thirty-fourth annual meeting in the Veterinary Clinic Building on the Campus of the Ohio State University, Columbus, Ohio, on January 11 and 12, 1917. The usual large attendance of over three hundred veterinarians is expected.

A good program is assured. Dr. D. H. Udall, Professor of Veterinary Medicine in the N. Y. State Veterinary College, Cornell University, will speak at the afternoon session, January 11 on "Some Clinical Observations on Tuberculosis of Dairy Cows" and give a demonstration relative to the same at the morning session, January 12. Another excellent and interesting paper will be "Observations and Results in the Field with Infectious Abortion", by Drs. R. I. Bernath and A. J. Kline, Wauseon, Ohio.

The sessions will be as follows: January 11, 1:00 to 6 P. M., the regular business meeting followed by papers. 6:30 P. M., The Dinner Session, The Ohio Union Commons. January 12, 9:00 A. M., Papers and Demonstrations.

Dr. O. V. Brumley, of the Ohio State University is Chairman of the Local Committee on arrangements. Dr. Reuben Hilty, Toledo, President, will preside at the meeting.

A copy of the program will be mailed to each member January 1st. Non-members desiring copies may secure same by writing to F. A. Lambert, care O.S.U., Columbus, Ohio.

THE CENTRAL NEW YORK VETERINARY MEDICAL ASSOCIATION

The seventh semi-annual meeting of the Central New York Veterinary Medical Association was held at Syracuse, N. Y., November 28th, 1916.

The morning session, opening at 9:00 o'clock, consisted of a clinic held at the infirmary of Dr. H. A. Turner, 938 South Salina Street, at which the following cases were presented:

CASE 1. Bay stallion; castrated; standing operation; surgeon—Dr. H. A. Turner.

CASE 2. Sorrel gelding; sidebones and ringbone; neurectomy, high operation; surgeons—Drs. E. E. Dooling and H. A. Turner.

CASE 3. Bay mare; ringbone; neurectomy, high operation; surgeons—Drs. Turner and Dooling.

CASE 4. Gray gelding; six years old; fistula of withers; patient chloroformed and major operation performed; surgeons—Dr. Frank Morrow, assisted by Drs. Clark and Currie.

CASE 5. Nailed foot; surgeons—Drs. Turner and J. A. Pendergast.

CASE 6. Bay mare; cystic ovaries; spayed by Dr. Danforth, assisted by Dr. Currie.

Following the clinic a lunch was served at the infirmary.

The afternoon session was called to order at 2:30 o'clock at the St. Cloud Hotel by the President, Dr. Frank Morrow. Routine business was transacted. Roll-call found the following members present: Drs. W. G. Hollingworth, H. A. Turner, F. E. York, J. M. Currie, J. A. Pendergast, L. G. Moore, E. E. Dooling, Frank Morrow, A. J. Tuxill, W. B. Switzer, W. L. Clark, R. C. Hurlbut, J. V. Townsend, J. C. Stevens, J. K. Bosshart, D. O'Laughlin, R. C. Hartman, and A. L. Danforth. There were also present Dr. O. P. Jones of Manlius, an applicant for membership, and Dr. J. H. Taylor of Henrietta and Dr. Joseph Turner of Lyons, as guests.

Dr. J. M. Currie, for the Board of Censors, reported that Dr. D. C. Papworth of Rome, N. Y., a member of the association, had made application to the secretary, for the assistance of the associa-

tion in the defense of an action for mal practice pending against him. This application was made under an amendment to the by-laws passed some years ago, providing for the accumulation of a fund for the purpose of affording such aid to members who would transfer to the association such defense, at the same time relinquishing their right to the costs of the action if successful in the defense. It being determined, after consultation with an attorney, that the case pending against Dr. Papworth came within the provision of the by-law in question and Dr. Papworth being ready to grant to the association the control of the defense and any advantages arising therefrom, the Board of Censors authorized the employment of counsel to represent the defense. Dr. Currie reported that an answer had been served in the action and that the case had been put over until March, 1917.

The application of Dr. O. P. Jones for membership was presented, favorably reported by the Board of Censors and Dr. Jones was elected to membership.

The secretary reported an action pending against N. J. Muldoon of Oswego for alleged illegal practice, the same having been brought by the People under the recent amendment to the Public Health Law, giving to the Attorney-General the right to prosecute such actions. At the date of the meeting the case had been put over to a later term of Court upon an agreement of counsel that said Muldoon would discontinue the practice of the profession until final disposition of the case should be made.

The association adopted a resolution providing for the use of cards releasing it from liability for causing the death or injury to any patient treated or operated upon at its clinics. The advisability of using such precautionary measure in the treatment of patients at their infirmaries by the members individually was also discussed.

Among the papers presented were the following: "Rupture of the Pre-pubian Tendon" by Dr. W. M. Sullivan; "Foot wounds" by Dr. A. L. Danforth. Dr. W. B. Switzer gave an interesting instance of a nailed foot and the treatment used. Very full discussion was had on all these matters.

Dr. Hollingworth made a strong appeal for support, both financial and otherwise, for the N. Y. State Veterinary Society. He also called attention to the proposition pending before the American Veterinary Medical Association to provide a fund for the re-

lief of members of the profession disabled through accident or other causes. He asked the members to express their views upon this proposition through the *Veterinary Journal*.

No further business appearing, the meeting was regularly adjourned.

W. B. SWITZER, Secretary.

SOUTHERN STATES VETERINARY MEDICAL ASSOCIATION

The following program was prepared for the meeting held at Atlanta, Ga., December 27 and 28:

Call to Order by Temporary ChairmanTait Butler, Memphis
Address of WelcomeMayor Woodward, Atlanta
Response to Address of WelcomeW. H. Dalrymple, Baton Rouge
Some New Therapeutic Suggestions.....N. S. Mayo, Chicago
Healing of Fractures in FowlsB. F. Kaupp, Raleigh
Operations for Abdominal HerniaC. A. Cary, Alabama
Open Joints in EquinesJohn W. Salter, Georgia
The Veterinary Profession of the South—Past and Future

F. W. Porter, Florida

“Contagious Abortion” Infections in Animals and Man..G. A. Roberts, Raleigh
Vesicular StomatitisM. Jacob, Nashville
Hemorrhagic Septicemia of Cattle.....F. P. Caughman, Columbia
Influenza and its ComplicationsR. L. Humphrey, Southern Railway
Clinical and Post Mortem Observations on Influenza and its Sequelae

M. J. Ragland, North Carolina

The Veterinarian and Some of His Problems.....D. O. Piatt, Birmingham
Evening dinner, with formation of Permanent Organization, adoption of
Constitution and By-Laws and Election of Officers.

Interstate Health CertificatesP. F. Bahnsen, Atlanta
Methods of State Control of Live-Stock Diseases.....E. M. Ranck, Mississippi
Acorn Poisoning of CattleT. N. Spencer, North Carolina
Hog Cholera Vaccination from the Practitioner’s View Point

E. D. King, Mobile

Legal Phases of Veterinary Practice.....D. M. Campbell, Chicago
Veterinary Medicine—Its Social and Economic Relations..S. O’Toole, Atlanta
Non-Surgical Clinics. Hospitals of Drs. Burkland and Wright.

ANNUAL CONFERENCE FOR VETERINARIANS

The program for the ninth annual Conference for Veterinarians, at Ithaca, N. Y., January 16 and 17, 1917, has been announced as follows:

Opportunities for the Average VeterinarianV. A. Moore
Some of the Common Parasites of the Domesticated Animals and their

Importance to Veterinarians. Illustrated	C. P. Fitch
Tuberculosis in Carnivorous Animals	W. Reid Blair
Suppurative Lesions in Pigs and Cattle due to <i>Bacillus Pyogenes</i>	A. R. Ward, Washington, D. C.
Salivary Digestion in the Horse	C. E. Hayden
Relation of the Veterinarian to the Farm Bureau Work	H. E. Babcock
Symposium on Poisoning Among Animals:	
Poisonous and Stock Killing Plants	Prof. J. W. Harshberger, University of Pennsylvania
The New Toxicology	Prof. E. M. Chamot
Discussion on Poisoning in Animals opened by Drs. Udall, Hollingworth, Kelly, Knapp and others	President Schurman
Address of Welcome	J. W. Adams, Pennsylvania
The Veterinarian Himself, His Reputation and Success	
Infectious Abortion	W. L. Williams
Formalin in the Treatment of Mastitis	J. N. Frost
The New Pharmacopœia	H. J. Milks
Diagnosis of Tuberculosis	D. H. Udall, R. R. Birch
Meetings of Alumni Associations.	

Clinics will be held in the Surgical, Medical and Small Animal Buildings. In the medical clinic there will be a demonstration of the use of the Sputum Cup by Drs. Udall and Koenig; the use of anti-hog cholera serum by Dr. Birch. Subjects in the other clinics to be announced later. There will also be post mortems by Drs. Fitch and Goldberg.

On the evening of Wednesday, the 17th, there will be a banquet at the Ithaca Hotel, to which all veterinarians attending the conference are invited.

—The Popular Science Monthly for January gives an illustrated account of the work done by Dr. G. W. Little, of the American Society for the Prevention of Cruelty to Animals, relative to anesthesia upon small animals. The method is similar to that in dentistry and involves the use of nitrous oxide and oxygen.

—At a meeting of the Kentucky State Veterinary Examining Board, the middle of December, licenses were issued to more than seventy-five applicants. With those previously issued more than 400 licenses have been issued to veterinarians in the State of Kentucky, a majority of whom are non-graduates. After January 1, the recently enacted law will go into effect and the examinations in the future will be more rigid.

COMMUNICATIONS

*Journal of the American Veterinary Medical Association,
Ithaca, N. Y.*

THE BENEFIT OF COOPERATION

In a recent issue of the *Journal of the American Veterinary Medical Association*, was contained the announcement that the veterinarians of Oklahoma had united and launched into existence a new and creditable association. This is indeed, a step in the right direction and a cause for congratulations from all right minded veterinarians.

For quite a period, I was assigned to Oklahoma in conducting educational work among farmers and others, and it was my good fortune to come into personal contact with many of the practicing veterinarians. It had always been a source of wonderment why such men as composed the profession in that state would allow strife and dissension to handicap the progress and benefit that might accrue to any profession, especially their own, by the union of efforts of many members bound together by one common cause. The culmination of their efforts into the organization of the present association amply justifies the opinion formed, that the standard of the veterinary profession in Oklahoma was deserving of special credit.

Another phase of this movement which is cause for favorable comment is the fact that veterinarians in the federal employ participated in the organization. It is gratifying to note that professional prejudice is dying out and that bonds of mutual interests are being cemented and apply to all veterinarians, whether they are private practitioners, municipal, state or federal agents or engaged in the care of mounts for the soldiers and officers of Uncle Sam. In the general tendencies of today for cooperation among and between classes, let it go forth that the veterinarian at the state college, in the private institution of veterinary medicine, in the eradication of contagious and infectious diseases, in the army, in the slaughter house, in municipal sanitation, or as a private practitioner, is entitled to the respect, the courtesy and the fair judgment of the profession. Each of these assignments, of course, should be the medium for the veterinarian to make the most of his opportunities, having in mind, always, the best in his chosen field, the judicious direction of efforts, the accomplishment of professional tasks, devoting his energies constantly towards the goal of a high standard of efficiency.

The time is now opportune for the veterinarians of other states and centers to emulate the action of those in Oklahoma. Complete and efficient organization is the order of the day, which means cooperation, and which in turn means applying to life in general and to the profession in particular the golden rule, "do unto others as you wish them to do to you."

T. P. WHITE.

REVIEW

THE PATHOLOGY AND DIFFERENTIAL DIAGNOSIS OF THE INFECTIOUS DISEASES OF ANIMALS

VERANUS ALVA MOORE

Professor of Comparative Pathology, Bacteriology and Meat Inspection, New York State Veterinary College at Cornell University, and Dean of the College.

Fourth edition, revised and enlarged, XVI and 593 pp., 120 illustrations.
New York, MacMillan Co., 1916. \$4.00.

It has been eight years since the publication of the third edition of Moore's Pathology of the Infectious Diseases. Since that time considerable has been added to what is known of the infectious diseases. Practitioners and sanitarians will welcome the appearance of the fourth edition, which has been revised and partly rewritten. While there are only fifteen more pages in the new edition, there is much new matter.

Some rearrangement of the material has been made but the same plan has been followed in this as in previous editions. The titles of the chapters indicate the arrangement. They are:

I. Etiology, infection and specific infectious diseases. II. Diseases caused by bacteria—genus *Streptococcus*. III. Diseases caused by bacteria—genus *Micrococcus*. IV. Diseases caused by bacteria—genus *Bacterium*. V. Diseases caused by bacteria—genus *Bacillus*. VI. Diseases caused by higher bacteria. VII. Diseases caused by Fungi. VIII. Diseases caused by protozoa—genus *Spirochaeta*. IX. Diseases caused by protozoa—genus *Ameba*. X. Diseases caused by protozoa—genus *Piroplasma*. XI. Diseases caused by protozoa—genus *Trypanosoma*. XII. Diseases caused by protozoa—genus *Microsporidia*. XIII. Infectious diseases for which the specific cause is not determined. XIV. Immunity and protective inoculation. XV. Disinfection. Two appendices are added, I. State requirements governing admission of live stock, and II. Regulations governing the meat inspection of the United States Department of Agriculture.

In general each disease is discussed as to its characterization, history, geographical distribution, etiology, symptoms, morbid anatomy, diagnosis, prevention, specific biologic treatment and control. Of these much more attention is given to etiology, morbid anatomy and diagnosis. This is just the kind of information needed by those who have to do with the prevention or control of the infectious diseases of animals. In these harvest days of the manufacturers of biologic products, when for every ill there is one

or more serums, vaccines or the like, the practitioner will be glad of the opportunity to consult, as he may in this book, a disinterested and reliable authority.

Dr. Moore has more than kept up to the high standard of excellence set in the earlier editions of this work. The publishers are to be congratulated on the manner in which they have done their part. The paper, printing and illustrations are excellent.

S. H. B.

NECROLOGY

WILLIAM JOHN COATES, M.D., D.V.S.

Dr. William J. Coates died at his home in New York City on Tuesday, December 19, 1916, at the age of 58 years, after an illness extending over a period of about two years, during which time, he had spells of convalescence which permitted him to return to his office for a time.

Born in New York City in 1858, he attended the public schools there, subsequently entering Georgetown University, and on completion of his studies at that institution, he returned to New York and entered the American Veterinary College, from which he graduated in 1877, with the degree of Doctor of Veterinary Surgery.

His amiable disposition and earnestness of purpose attracted the attention of the Dean of the veterinary school, Dr. Alexander F. Liautard, who became his life-long friend. After his graduation from the veterinary school, Dr. Liautard made him House Surgeon, and later, Assistant Surgeon on his hospital staff. Finally, as years went on, and the American Veterinary College grew until it was the leading veterinary school in this country at that time, with a large hospital crowded with patients as well as a very large free clinic of animals brought in from outside by their owners at stated periods, Dr. Liautard advanced Dr. Coates to the position of Chief Surgeon, himself assuming the important post of Clinical Director.

In the meantime, in addition to his duties as Chief Surgeon in the hospital, Dr. Coates was taking an active part in teaching in the veterinary school, and was himself attending lectures at the Bellevue Hospital Medical College, from which institution he graduated with the degree of Doctor of Medicine, in 1882.

The doctor's duties continued to increase, and after becoming Professor of Anatomy, Clinical Surgery and many other minor

subjects, he was finally placed in the responsible position of Acting Dean, in the absence of Dr. Liautard.

Those were his many complex duties when in 1899 the American Veterinary College amalgamated with the New York College of Veterinary Surgeons, and became a department of New York University, under the name of the New York-American Veterinary College. In the consolidated institution he was continued as Acting Dean and given the chair of Anatomy, Clinical Surgery and Medicine, and a few years later was made Dean. So that at the time of his death, his position in the New York State Veterinary College at New York University in New York City, (the college having been adopted by the State in 1913) was that of Dean and Professor of Anatomy, Clinical Surgery and Medicine; and next to Dr. Liautard was perhaps the best anatomist in this country. Those in the profession who knew him well, claimed the same for him as a diagnostician.

Dr. Coates had a most amiable disposition, was kind and charitable in his judgment of his fellows and was loved by his students for his justice and loyalty to them. Like all great men, he was modest. He was also extremely reserved, so that it required a very close acquaintance to really know the *man*. This it was our privilege to enjoy for thirty years, during which time we frequently sought him as consultant and adviser and benefitted by his valuable store of knowledge. Close acquaintance also brought out the poetic and social side of Dr. Coates' character that never was possible of appreciation by a casual acquaintance. These qualities as well as his nobility and greatness, were fully appreciated by his friends.

The doctor was an "Honor" member of the American Veterinary Medical Association, a member of the New York State Veterinary Society, and the Veterinary Medical Association of New York City. We believe he was a member of the New York Academy of Medicine, but as we are writing from memory, and at very short notice have not time to verify the latter belief.

Church services were held on Friday, December 22d, at which the Chancellor of New York University, the President of the University Council, members of the Veterinary Faculty, and students attended in a body. Dr. Coates is survived by a widow and two sons, William J., 22 years of age, and Hugh, 20 years of age.

R. W. E.

MISCELLANEOUS

—U. S. CIVIL SERVICE EXAMINATION. The U. S. Civil Service Commission announces an open competitive examination for veterinarians, for men only, on January 17, 1917. From the register of eligibles resulting from this examination certification will be made to fill vacancies as they occur in the position of veterinary inspector at the entrance salary of \$1,400 a year in the Bureau of Animal Industry, and in positions requiring similar qualifications.

—The circular for the one week course for graduate veterinarians to be given at the Agricultural and Mechanical College at West Raleigh, N. C., announces the following staff of instructors: Dr. R. C. Moore, Missouri; Dr. N. S. Mayo, Chicago, Ill.; Dr. T. B. Carroll, Wilmington, N. C.; Dr. P. F. Bahnsen, Georgia; Dr. J. P. Turner, Washington, D. C.; Dr. L. F. Koonce; Prof. Z. P. Metcalf; Dr. B. F. Kaupp; Dr. G. A. Roberts; Dr. Tait Butler; Dr. J. I. Handley.

—The report of the prosecuting committee of the Veterinary Medical Association of New York City states that the committee has endeavored to carry on the unpleasant task of prosecution, impartially, energetically and without fear or favor. It is hoped the work may be continued until the Veterinary Law is acknowledged by every practitioner in the State of New York. Fourteen arrests have been made. Thirty-eight contributors furnished a fund of \$735.00 of which \$559.85 have been disbursed.

—A quarantine on dogs against rabies, has been recommended in Yakima County, Washington.

—Dr. Adam Fisher, who has served the city of Charlotte, N. C., under several administrations, as city food and milk inspector, has tendered his resignation and will hereafter devote his entire time to veterinary practice.

—At the recent meeting of the Schuylkill Valley Veterinary Medical Association at Reading, Pa., there were about fifty in attendance.

—Dr. Paul R. King has been transferred from San Antonio, Texas, to Potwin, Kansas.

—Dr. H. S. Van Vranken has removed from Story City to Burt, Iowa.

—Dr. J. M. Baxter has removed from Middlebury to Gary, Ind.

JOURNAL

OF THE

American Veterinary Medical Association

Formerly American Veterinary Review

(Original Official Organ U. S. Vet. Med. Ass'n)

PIERRE A. FISH, Editor

ITHACA, N. Y.

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FEBRUARY, 1917.

No. 6.

Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary L. A. Merrillat, 1827 S. Wabash Ave., Chicago, Ill. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

THE HIGH COST OF LIVING AND THE VETERINARIAN

That the cost of living is advancing there can be no doubt. Particularly unfortunate is the fact, that the staple articles of diet, bread, eggs, potatoes, cheese, sugar and meat are increased in price. This is to be regretted because the staples are essential for health and an insufficiency means malnutrition, lowering of stamina, decreased vitality and greater susceptibility to disease. In this connection the prediction has been made that the disease known as pellagra is likely to increase during the coming year. The situation is so real that it has received the attention of the Public Health Service. Investigation has determined the cause of pellagra to be an insufficient and poorly balanced diet. Through the application of this knowledge the disease was greatly reduced during 1916. Under the new scale of prices, increased from 25% to 50%, there will be many who must of necessity limit or deprive themselves of some of the staples of diet.

This condition applies to fodder as well, and because of its increased cost it is reported that, in some localities, many have sold

their cows and as a result there may be a decreased supply of milk, which is regarded as one of the best pellagra prophylactics. Meat, eggs, beans and peas are also regarded as prophylactics. If the reduction or absence of some of these articles from the diet is conducive to pellagra, it is also quite self-evident that an insufficient diet is conducive to some of the other ills to which the flesh is heir. Hunger is an inherent instinct. Failure to gratify it spells disaster of variable degrees. Food is essential to the maintenance of life; it is also requisite for restoration to health in the sick and convalescent. True prosperity is of service to the community only when the standard of living is raised in that community and there is opportunity to exercise thrift to provide against emergencies.

Although the high cost of living involves veterinarians as well as others, there is an aspect which should demand special interest. The annual direct losses from animal diseases are estimated at \$212,000,000 as the result of the prevalence of hog cholera, Texas fever, tuberculosis, contagious abortion and some other diseases. The reduction or eradication of this loss lies chiefly in the hands of the veterinarians. The task is an enormous one but there is evidence that some progress has been made. It is a task that involves the best talent of the profession and the highest educational facilities available to even a greater extent than exists at the present time. The opportunity is an exceptionally great one. Each reduction in loss is a double gain as it represents not only the financial value but the possibility of further use for breeding and increased production.

The bob-veal bogy, with its arbitrary age limit, is not exciting the terror it formerly did. The federal government is basing its inspection of calves upon quality rather than age limit, which only semi-divine qualifications could determine. It is rational that signs of immaturity in the quality of the flesh may be as detectable as certain diseased conditions and suffice for its rejection. It is not unlikely that some of the states will take the same rational attitude as does our government and other enlightened nations. In this event much waste will be avoided, which, in a way, has its bearing on the high cost of living.

Checking the loss of animals from disease, increasing their productivity and avoidance of waste, all have their bearing on the high cost of living and are matters in which the veterinarian may take a direct part by action, counsel and advice. P. A. F.

AN IMPORTANT DECISION IN LIVESTOCK SANITARY CONTROL WORK

During the foot-and-mouth disease epizootic in 1914, one H. S. Bomberger, of Pennsylvania, formed a "Protective Association" to resist the efforts of the State Livestock Sanitary Board in eradicating the disease by the plan of killing affected and exposed animals. He conceived the plan of having a bacteriologist examine samples of milk and finding no evidence of foot-and-mouth disease in the milk, the farmers were to ship the milk from affected herds in defiance of the quarantine regulations. In pursuance of this plan he visited several quarantined herds and took away samples of milk; for this offense he was prosecuted, the indictment being drawn under the Act which states: "After the establishment of any quarantine authorized by this act, and posting of notices required by law, it shall be unlawful for any person, without a special permit in writing from the State Veterinarian or the State Livestock Sanitary Board, as the case may be, to remove from or to any premises within the limits of the quarantine any domestic animal or poultry; or to remove from any quarantined area or premises any hay, straw, grain, fodder, or *other food*, etc."

Inasmuch as milk was not specifically named, it was contended by the defendant that milk was not covered by the act, while the prosecution argued that milk should be included in the general term "other food". Both sides agreed on a statement of facts: "that the premises were lawfully quarantined and that milk had been removed".

In a brief submitted by the Commonwealth it was stated that it was not believed the defendant would contend that the criterion of establishing the likeness of milk to the other foods as specifically named would depend on the nature of the food itself so much as the purposes for which such food was used. The purpose of the act and practically the section quoted was to prevent a spread among domestic animals of transmissible diseases, and for that reason it sought to prevent the removal from infected premises of vehicles of transmission. In another section of the same act milk is recognized as such a vehicle of transmission, in that its use as food is prohibited where such milk comes from an infected source, until the same has been treated as therein specified. The act itself recognized milk as food for domestic animals and it was submitted

that in construing a particular section of the act the Court would look at the whole act, its intent and purpose, and not only gather from such act the purpose sought to be attained by it, but also in so far as the same might throw any light, be guided by such light in the interpretation of any doubtful section of the act.

In rendering the opinion the Court stated: "The question presented is whether milk embraced by the term 'other food' as used in the section referred to. * * * * * 'other food' cannot be interpreted to mean food used by animals alone because the word 'grain' is one of the articles of food mentioned, and is used as a food by man as well as by beast. Nor can it be restricted to articles of food belonging to the class to which those specifically named belong. If so, nothing would be added to the prohibited list, for grain is a collective word and necessarily includes other articles of food belonging to the same class as those specified. * * * * * The general object of the statute before us was to prevent the spread of transmissible disease among animals and poultry. If the word 'food' is given its general and common meaning it would include milk, the product of the animals which were quarantined on the premises in question. The removal of milk from the premises would just as likely spread the disease as the removal of any of the other articles of food, especially if the milk be taken from animals under quarantine for a transmissible disease. We think, therefore, to carry out the purpose of the Act, the proper interpretation of the words 'other food' requires us to hold that milk, the food which was removed from the quarantined premises, falls within the statutory prohibition. This article of food comes both within the letter and purpose of the statute. * * * * * It is true the removal was for an entirely innocent purpose but this can make no difference. The prohibition of the statute is absolute."

In pursuance of the findings of the Jury, we direct a verdict of "guilty" on the second count of the indictment to be entered against Harvey S. Bomberger, the defendant. * * * * * (Signed) George Kunkel. P. J.

The decision will be of material assistance to the Pennsylvania State Livestock Sanitary Board in handling transmissible diseases. It will also establish a precedent which may be of assistance to livestock sanitary authorities of other states.

C. J. M.

THE OUTBREAK OF VESICULAR STOMATITIS

During the early fall of 1916 reports were received from several sources to the effect that a disease involving the mouths and particularly the tongues of horses existed at the concentration remount station in the vicinity of Chicago, Ill. A careful and systematic investigation was immediately inaugurated, which indicated that at this time the disease was confined solely to equines and that the infection could be traced back to similar remount stations at Grand Island, Nebr., and Denver, Colo. At these points horses and mules had been gathered together by agents of the French and English governments for shipment abroad, and the disease found ideal conditions for its spread among the thousands of these animals closely quartered in barns and pens. As the disease was undoubtedly contagious, local quarantines were recommended and enforced. Sick animals were separated from the well, the healthy but exposed were held for eight days before being allowed shipment, infected pens were cleaned and disinfected, and the mouths of the sick animals were thoroughly washed with a weak solution of permanganate of potash.

Several weeks later, a livery barn in Chase County, Nebr., became infected as a result of the owner shipping a carload of horses to Denver for Army purposes and the return to the livery barn of several rejected horses. Three or four days later these rejected animals developed the disease, which spread to other horses and one cow in the livery barn. The disease was carried back to several ranches in that vicinity by the ranch horses which had been driven to town by their owners and fed and watered at this public livery barn.

The disease now seems to have reached its most virulent stage, and having affected many of the horses on these ranches, it spread to a number of cattle but did not involve the hogs which were running in the same pastures.

The spread of the disease to the Chase County district was brought indirectly to the attention of the bureau late in November, when a shipment of cattle from that locality to the Kansas City Stock Yards was found by the bureau inspectors to be affected with lesions in the mouth strikingly similar to those of foot-and-mouth disease. All precautionary measures were immediately taken, outgoing shipments from the yards were stopped, the cars carrying cattle were located and disinfected, and the cattle were traced to

their point of origin in western Nebraska. In the meantime, experts were sent to the latter point as well as to Kansas City, and a series of careful and comprehensive experiments was immediately inaugurated at those points and also in Washington. As a result of these tests and the reports from the field inspectors, the opinion was reached that the disease in question was not foot-and-mouth disease, but vesicular stomatitis, a contagious disease affecting the mouths of horses, but at times spreading to cattle also.

The most striking lesion of this disease is the occurrence of vesicles or blisters followed by erosions chiefly on the tongue, but also involving other portions of the mouth and occasionally the muzzle. This disease is known in Europe and South Africa and has been observed occasionally in the United States. The present outbreak, however, is the most extensive yet noted in this country. While the disease has not the great economic importance of foot-and-mouth disease, it nevertheless is contagious and causes considerable alarm owing to its close resemblance to the dreaded European disease. Furthermore, it is accompanied by numerous difficulties in making a prompt differentiation and will therefore remain a menace so long as it prevails. For these reasons it is strongly urged that local quarantines to prevent its spread be imposed by State live stock officials in whose territory the disease is found. All owners and handlers of horses, mules, and cattle, particularly liverymen, managers of stock yards, and stockmen, should be directed to separate sick from well animals, clean and disinfect contaminated premises and equipment, and have all infected animals appropriately treated.

The opinion that the malady is not foot-and-mouth disease is based on the fact that persistent observation of sick animals has failed to reveal certain typical symptoms which would be expected in an outbreak of foot-and-mouth disease. The drooling, vesicles, and erosions are similar in appearance to those produced by foot-and-mouth disease, but in none of the animals examined in the field has there been found any soreness of the feet which is a common symptom of foot-and-mouth disease. Moreover, many horses have this particular ailment, and horses have not been observed to contract foot-and-mouth disease in any of the previous outbreaks in the United States. Hundreds of hogs exposed to the disease and in association with the sick animals in pastures have shown no signs of the malady, and this is regarded as significant because in the

last out break of foot-and-mouth disease hogs were as susceptible to foot-and-mouth disease as were cattle. Exposed sheep also fail to show the disease, yet these cloven footed animals are also susceptible to foot-and-mouth infection. The disease seems to be local and not a systemic infection like foot-and-mouth disease, and unlike the latter, it is not ushered in as a rule by any apparent rise of temperature. In a number of cases of vesicular stomatitis the lesions appeared to be continuous or progressive and not explosive as in foot-and-mouth disease. In these instances secondary lesions were apparent on a number of consecutive days in the mouths of both horses and cattle and vesicles were observed on the base of tongues whose free portions were almost denuded of mucous membrane as a result of the rupture of similar vesicles six or seven days before. Furthermore, instead of increasing in virulence by passage through a series of calves as foot-and-mouth disease has always done in our previous experiments, vesicular stomatitis became greatly reduced in pathogenesis and required a constantly increasing period of incubation before manifesting lesions of the disease. Likewise, the virus of vesicular stomatitis apparently retains its vitality but a relatively short time outside its host. Although numerous filtrate experiments have been conducted, in no case has the disease been reproduced in this manner which is also unlike our experiments with foot-and-mouth disease.

Finally, the percentage of animals infected in each of the herds of cattle and the history of exposure without transmission of the disease except by immediate contact, would indicate that this ailment is not the highly contagious foot-and-mouth disease, which, once it is introduced into a herd, quickly affects practically one hundred per cent of the cattle and hogs on all the farms to which the virus may be carried by intermediate agencies.

The result of a preliminary study of vesicular stomatitis suggests the necessity of adding horses to the species of experimental animals (calves and hogs) which must be inoculated with suspected material in any future outbreak of disease bearing a resemblance to foot-and-mouth disease. Various organisms thus far isolated from the contents of unruptured vesicles have in no instance produced the typical disease in either horses or cattle, but the work is still unfinished.

In conclusion it must be apparent, even to the casual reader, that in vesicular stomatitis we have a disease more closely resemb-

ling foot-and-mouth disease than either mycotic or necrotic stomatitis and that Hutyra and Marek are correct in their opinion that a reliable differential diagnosis of this disease can be made only after inoculation experiments and careful observation lasting a number of days.

J. R. M.

EUROPEAN CHRONICLES

Bois Jerome.

MICROBIAN FLORA OF WAR WOUNDS.—In the *Presse Medicale*, I find the analysis of an article on this interesting subject by Dr. A. Cayrel.

Of all the new ideas obtained since the beginning of the war, that of the constant infection of wounds is the one most unanimously admitted. Another, no less firmly accepted, is the double telluric and fecal origin of this infection, realized by the appearance in the tissues of various foreign bodies, carrying with them dirt and fecal matter on the clothes or skin of the men fighting.

In fact, the flora of wounds is the same as that of the ground, especially of the trenches, and the same also as that of the intestines. This is saying that all kinds of germs are found, pathogenic and saprophytes, sporulated and non-sporulated, bacilli and cocci. Practically this diversity is represented in an association of aerobic and anaerobic microbes, the latter occupying the first place in the genesis of the most serious complications.

Anaerobic Microbes.—First in rank, in this category of germs is the *Bacillus perfringens*: a normal host of the intestines of man and animals: eminent proof of fecal infection, it is the common agent of gaseous gangrene: which does not mean that all wounds where it is present, will fatally terminate in gaseous gangrene, except the bacillus finds a favorable condition of anaerobiosis or a medium of culture. This microbe does not seem susceptible of creating septicemia or of passing into the circulation: all the hemocultures made to that effect have remained negative. Yet, it may promote extremely serious toxemias. It is very exceptionally found in a pure state in the war wounds, it is almost always associated with other aerobic or anaerobic germs, diplococci, proteus, staphylococci, streptococci.

Next to this germ, the most frequently met is the *Septic vibrio*, which is also able to cause gaseous gangrene. It is a host of fecal

matter and of the earth, it is an energetic proteolytic but must also have favorable conditions to stimulate the progress of gangrene or of phlegmon. Its presence does not imply a serious prognosis. It secretes an active toxin.

Sacquepee has isolated in war wounds a special germ which he has named "*Bacillus of the malignant oedema* or *B. bellouensis*."

It is a microbe strictly anaerobic, able to reproduce a peculiar clinical form, the malignant gaseous oedema.

A *Bacillus oedemeticus* has also been discovered, which, in local inoculations, has given rise to an oedema with troubles of a general condition of a toxic aspect.

The *Tetanus Bacillus* is quite common, though the use of the preventive serum has considerably reduced its action.

A microbe which has the morphological characters as the tetanic is the *Bacillus putrificans filamentosus* or *Pseudotetanus*.

It is as common as the septic vibrios and exists in gaseous phlegmons and is an agent of all putrefaction.

Another putrefying bacillus is the *Bacillus anaerobicus accazines* and again as agents of suppuration the *B. ramosus*, the *fragilis*, The *B. of jungano*, The *B. sporogenus of metschnikoff*, various *Anaerobic Streptococci* of fecal origin and finally the *Micrococcus fetidus* found by N. Flessinger.

Aerobic Microbes.—The one most commonly found is the *Streptococcus*, which is present in every stage of war wounds. Its vitality is extraordinary and its resisting power to antiseptics is remarkable.

Then comes the *Staphylococcus* which has a less proliferating power and is present also to the end of the reparative work of the tissues.

The various *Cocci*, especially diplococci, are also very abundant, such as the *Diplococcus crassus* and *flavus*, the *tetragenus*, the *Pneumococcus*.

The *Bacillus proteus* is commonly met, and sometimes in abundance so that it kills the other germs and is found in a pure state.

The *B. pyocyaneus* is constantly present. In the group of the *B. coli* this last is most easily isolated: but all the varieties of *Colibacilli* and *Paracolibacilli* may also be detected in war wounds. Even typhoid and paratyphoid bacilli may be found.

The *Pneumobacillus* of Friedlander is not rare and the *Coccobacillus verduensis* has been discovered in some wounds.

The bacteriological study of the development of wounds shows that the microbial elements vary in quantity and in quality in the different stages. The organisms are found more rarely, if the examination is made before the sixth hour. If made 24 hours after the wound is received, the germs at times cannot be counted, they are everywhere.

Indeed, it seems that the evolution of the microbial flora is, according to some, somewhat constant in the appearance of the species of microbes during the first hours, viz: 1st the bacillus of the family vibrios—perfringens, 2d the group of the coli-bacillus, 3d the cocci (staphylo, strepto, diplococcus, saprophytes).

The microbes are not present in all parts of the wound and there are bacterial areas along active centers of germination, true microbial nests in the center of which a close examination reveals generally some fibrillae of tissue or some small thread of clothing. Again a rich growth of perfringens may be found in a very small spot which escapes the action of free air or of antiseptics.

The ideas presented in the article of Dr. A. Cayrel are of importance for the surgeon and of great interest also to the bacteriologist.

MASSIVE AND CYSTIC ADENOMAS.—The mammae of carnivora, like the breasts of women, are a seat of predilection for the development of all varieties of neoplasms.

Profs. G. Petit and H. Germain have presented a communication entitled the benignant tumors of mammae in sluts and female cats, which is reproduced in the *Bulletin of the Société Centrale*, in which is related a number of observations, the reproduction of which adds much to the history of these neoplasms.

In the first part, four cases are recorded.

One of *Massive Fibro-Adenoma* of the mammae in a slut, which consisted of a mass, oval in shape, bosselated and about as large as a pigeon's egg. It was a fibrous body, located in the inguinal mammae.

Another was a *Cystic Fibro-Adenoma* of the mammae also in a slut. It was represented by a flattened tumor 15 centimeters long, 8 wide and 3 to 4 thick. It was not adherent to the skin and had a fibrous capsule, which separated it from the abdominal walls. It was irregularly lobulated, bosselated, formed of large cysts containing a colloid, yellow or brown material. It also showed grey-

yellowish patches analogous to those found in massive fibro-adenomas.

The third observation was also in the same region of an animal of the same species, viz: mammae of a slut. It was a *Cystic and Hemorrhagic Fibro-Adenoma*. A globular tumor as big as two fists, situated in the inguinal mammae, not ulcerated on its surface, covered by the skin moderately stretched, and having a thick retracted teat, as observed in old sluts that have nursed many pups. On section this tumor was found hollowed with cystic cavities, communicating with each other, although some were isolated and separated by special septa. In the non-cystic part of the tumor, it was represented by striae indicating its hemorrhagic condition.

The fourth observation, again in the mammae of a slut was one of a *Large Vegetating Cyst*. This was represented by a tumor not very large, weighing only 80 grammes and resulting in the entire cystic transformation of an inguinal mammae. The skin was intact, the teat large and cystic by dilatation of the galactophorous canals.

The second part of the communication of the writers related to *Osteo-Chondromas* and *Osteo-Chondro-Adenomas* of the mammae.

These osteo-cartilaginous tumors are frequent in sluts. They are characterized by their special consistency and the presence of cartilage found on their section.

In some cases, bony tissue is also found in more or less abundance. The cartilaginous structure is greater in recent growths, in the oldest it is the bone that predominates.

The first observation is on an *Osteo-Chondroma* with *Peripheral Fibro-Adenoma*. In that slut, the growth was as big as a mandarin, round, weighing about 50 grammes, and extracted from a ten year old animal. It had a capsule, very adherent and thick on the outside, on which was a glandular tissue transformed into fibro-adenomatous tissue with small cysts. The other mammae of the slut had nuclei of fibro-adenomas forming.

The second observation was an *Ossified Chondroma*, representing a tumor of 500 grammes in weight, removed from the mammae of an aged slut in which the parts were entirely ossified and were readily observed.

The third case referred to a *Papillar Osteo-Chondro-Adenoma* of the mammae of a slut. It was as big as the fist, weighed about 500 grammes, had the form of a flattened sphere and was hard, compact and osteo-cartilaginous.

The fourth observation relates to a *Vegetating Osteo-Chondro-Adenoma* of the mammae of a dog, developed at the expense of one of the inguinal mammae. This tumor was situated in the region of the sheath. It appeared as an osteoma, weighing 450 grammes, was as big as the first, elliptical in shape and irregularly mammillated by the presence of projecting superficial nodules which were intimately connected with the body of the tumor. It was composed of two lobes, intimately connected and as if articulated. The central part of the growth was completely ossified. On the level with its inferior extremity there were numerous cystic cavities filled with yellowish matter.

All these observations are completed by the description of the histologic characters and illustrated by very interesting woodcuts.

TETANUS AND ITS PREVENTION. Notwithstanding the many publications that have found their way in professional journals and notwithstanding the many discussions its treatment has promoted in scientific circles, the subject is still one of interest and occupies many pages of our periodicals.

First, I notice a long article in the *Presse Medicale* on the *Prevention* of tetanus by the antitoxic serum. While it was for some time considered as doubtful in most cases, it is now admitted that the systematic application of the preventive injections has reduced to a very small proportion the early cases, which most likely might be avoided by a proper use of the preventive serum and a better knowledge of conditions which promote the development of the tetanic spores.

There are indeed some essential conditions which always ought to be thought of.

For instance, one relating to the condition or the form, under which the tetanic spores soil the wounds and which are more resistant. They are not destroyed by ordinary antiseptics. They disappear only after being absorbed and digested by the leucocytes. Experimentation on animals has proved that even after several months spores can be found in leucocytes, immobilized it is true, but ready to revive and germinate at the first exposure favorable to their development.

Then again, it must be remembered that the antitetanic serum is not a *Bactericide*: it has no direct action on the spore nor on the bacillus itself. It is simply antitoxic, it neutralizes the poison secreted through the culture of the virus, and during the time of its action. It then protects the organism against intoxication and leaves to the phagocytes, which it stimulates, the work of fighting the specific bacillus, which develops in the wound, and to the surgeon the obligation and the time to suppress this dangerous center.

It must also be borne in mind, that the protection given by the serum is limited in its time. It lasts as long as the antitoxin is present and circulates in sufficient quantity. After a delay of an average of 8 to 10 days in man, if the culture of the virus continues, the secreted toxin will not find antitoxin to be neutralized and it will have full liberty to produce its ordinary effects. If on the contrary, the supply of antitoxin is renewed in proper season, the resistance will be kept up for a certain period after each new injection. Hence the indications are not to trust to only one injection as a lasting measure of prevention.

Finally, the special condition must also be taken into consideration. For some wounds there are specific conditions for the development of the germs. The nature of the traumatism, the peculiar condition of muscular or bony attrition, the presence of soiled foreign bodies, etc. If only one preventive injection, even abundant, is made, complete protection cannot be expected. Tetanus may be slow in its appearance but it will certainly appear.

The article in the *Presse Medicale* which is by Prof. Vaillard, is continued by the examination of some specific cases of the disease of a various nature and occurring under special conditions. After making a few remarks relative to the danger of anaphylactic manifestations, the writer ends by saying: "That notwithstanding a sure and positive efficacy, antitetanic serum cannot always, and without failure, prevent the disease. Such a power is not possessed by any preventive method, even one with a good reputation and relative certainty does not exist in the domain of biological phenomena as it is exposed to many contingencies that escape us." "The serum is one of the means of preservation and in the cases where the disease takes place after its use, it has nevertheless a beneficial effect as the attack is very often less serious."

SULPHATE OF MAGNESIA IN TETANUS. The advantageous use of this treatment has already been referred to in other publications.

Its use with the wounded during the present conflict has been the subject of a communication in the *Archives of Internal Medicine* by an American physician, Dr. Robertson.

Since Meltzer and Auer, in 1906, called attention to the good effects of rachidian injections of sulphate of magnesia in tetanus, the method has been used with various results. Some authors have advocated the simple subcutaneous injection or again the intravenous.

It is interesting to know the results obtained by the method in the different armies during the war.

In Germany a certain number of authors are positively opposed to it in the treatment of tetanus. Czerny, while admitting its quieting action on the pain is not convinced of its real value. Angerer has not used it. Kreuter has lost two patients by the treatment. Hochkaus, Homeier, and Goldscheider have obtained no good results. Madelung reserves his decision. Mathis believes that its good influence is limited to the first injection.

In opposition other authors praise the good effects of the sulphate of magnesia. Eunike has made intra-rachidian injections of 10 c.c. of a solution of 10% in 8 severe cases, and 4 recovered. Wieselin has used it on 12 patients; he made, in Vienna subcutaneous injections as high as 80 c.c. of a solution at 25%. He states that the association of the magnesia with chloral is superior to any of the narcotics.

Usener, with a very sick patient who recovered, has made more than 10 subcutaneous injections at intervals of 2 to 4 hours; the solution of 50% seems less painful. No accident followed. Dreyfus and Unger have treated 32 cases with 22 recoveries. Wienert has obtained good results with subcutaneous injections of 10 c.c. of a solution at 40%. Out of 40 cases treated only 16 died, and Grundman believes that in 25 of the cases treated the sulphate of magnesia has proved superior to all the narcotics in the treatment of tetanus.

In Russia L. Feinmann has had 95 cases in the hospital of Dwinsk, 74 died. He has had no good results with the injection of serum nor that of the sulphate of magnesia.

Deroninsky reports that he has had 5 recoveries out of 6 cases treated with the sulphate.

In France, Monod has treated with success 4 cases, with chloral in large doses and intra-rachidian injections of the sulphate.

Schoute has seen two recoveries out of 3 cases in soldiers treated with intra-rachidian injections.

In England, Bruce gives a most complete review of cases of tetanus treated in the English military hospitals during the first year of the war: 231 cases have been treated and gave a mortality of 57.6%, while 179 English soldiers treated in France and seldom with sulphate of magnesia, had a mortality of 78.2%.

A NEW CASE OF SODOKU. I am quite sure that this name is a surprise to many. The interest it may promote, may justify its publication. It appears in the *Presse Medicale* as an analysis of an article by Dr. D. Flazza in *Il Morgagni*.

Sodoku is an affection following a rat's bite and is most likely of parasitic origin. It has been observed and described principally in Japan, where several authors have been able to detect the presence of the specific parasite. In later years, cases have been published in America and in Europe. One case has been mentioned in Germany, three in France, five in Italy, the present is the sixth in that country.

The author describes briefly the evolution of the disease. A rat bites more or less deeply and a wound is made which cicatrizes in a few days. Then after an incubative period of one to four weeks, suddenly, while in a comfortable condition, there appears local phenomena characterized by inflammatory manifestations at the seat of the bite: redness, swelling, pain, formation of vesicles ending in ulcerations, with lymphangitis and more or less generalized adenitis, general phenomena of chills, uneasiness, general soreness, headache, nausea, anorexia, dizziness, frequent pulse and high fever but no visceral disturbances. Finally there appears a more or less wide eruption of rounded patches or striae, more or less deep in color, of various sizes, some times painful and similar to what takes place in exudative erythema. The fever occurs intermittently and may be accompanied, or not, with increased cutaneous or glandular manifestations. Little by little after several months the various phenomena subside and the patient recovers.

There are, however, some severe forms with cough, muscular and articular pains, troubles of general sensibility, more or less generalized oedemas, delirium and coma. According to *Hata*, in Japan where the disease is frequent, the mortality reaches 10%. Some authors who have observed cases in Europe, have not yet suc-

ceeded in finding the parasite described by Japanese writers. In the case recorded the patient had presented all the phenomena attributed to the disease, except the erythematous eruption. The disease was followed in its entire course, but the parasite was not discovered, notwithstanding that many investigations were made for it. Recovery took place after several months after an injection of arsenobenzol, to which, however, the author does not attribute the success.

SUMMARY FROM RECENT PUBLICATIONS RECEIVED AND BIBLIOGRAPHIC ITEMS.

Titles marked "X" will be summarized. Those marked "O" will appear as abstracts.

JOURNAL OF COMPARATIVE PATHOLOGY AND THERAPEUTICS.—Sept. 1916. (X) A Granulomatous Affection of the Horse—A case of Holoacardius Acephalus in a Bird—(X) John's Disease, The Reaction of Animals to "Johnin."

VETERINARY NEWS—October 14th. Intestinal Strangulation in the Horse—Open Stifle Joint in a Mare—A case of Intussusception.

October 21st—Inversion of the Vagina in Cows—Some Cases, Unexpected Foreign Body—A Fishing Hook, a Dog and Radiography.

VETERINARY RECORD—October 14th—(X) Specific Vulva Vaginitis—An Unsuspected Unsoundness in a Horse.

October 21—Canine Cases—Pelvic Fracture.

VETERINARY JOURNAL—October 1916. A New Form of Lymphangitis in Army Horses—On Subcutaneous Tuberculosis in Bovines—Notes on the Early History of the Veterinary Profession in the War—A case of Melano-Sarcoma in the Dog—Open Joint in the Horse.

REVUE GENERALE DE MEDECINE VETERINAIRE—(X) Transmission of Tuberculosis Porcine to Man—Reinoculation in the Calf—(X) Sand Colics.

IL NUOVO ERCOLANI—1st and 20th of October—Anaphylactic Reaction in the Horse, Secondary to Intravenous Injections of Horse Serum—New Contribution to the Study of the Lesions of the Penis in the Horse—Contributions to the Study of Coccidiosis in Birds.

BIBLIOGRAPHIC NOTES—The Fate of Mammalian Tuberculosis Bacillus in Sparrows and Chickens by Dr. L. Van Es and A. V. Schalk.

Larkspur Poisoning of Live Stock by C. Dwight Marsh and A. B. Clawson and Hadleigh Marsh.

Contagious Epithelioma in Chickens—Its Control by Vaccination by W. B. Mack and Edward Records.

A. LIAUTARD.

LOST OPPORTUNITIES*

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The honor and pleasure of addressing you, my colleagues, on this occasion were not sought by but thrust upon me. The gentleman whom I find to be chairman of this section not only requested me to do this thing but even went so far as to assign a specific text—"Lost Opportunities". He probably felt with Bishop Williams of this city (Detroit) that "a parson without a text is like a shoemaker without his last. He has nothing over which to shape and form his thought". A text has the advantage of affording a point of departure: whether it also furnishes a point of arrival and application will depend upon the speaker's individual sense and ability. Let us pray for help in these latter regards!

Veterinary medicine is not simply a science like physics or chemistry. The practice of it is in reality an *art*; but underlying the art are many basic sciences which form the foundation of biology. While it is possible to learn and apply the art of practice without a knowledge of the sciences upon which it is built, experience teaches that where this knowledge is lacking, progress is arrested and the plane of the art lowered to mere charlatanism. Too many members of our profession, I think, overemphasize what they term the "practical". I presume a patient railroad engineman could teach a baboon how to stop, start and back a locomotive. He might also instruct his pupil how to pull the whistle cord and to apply the air and sand. In fact with time and diligent training I can conceive that the baboon might become as proficient in these arts as the engineman himself. But is the doing of these things, the operating of the regulatory mechanism all there is to engine driving? Would any school of engineering want to grant this monkey the degree of mechanical engineer? Is there no more to the profession of veterinary medicine than drenching horses with "colic", pumping up the udders of "milk fever" cows, injecting "serums" under the skin of animals and castrating "ridgling" colts? Is the almighty dollar the only standard by which we measure suc-

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cess? Is there no opportunity beyond that afforded by such routine service? The answer to these questions is personal and depends upon the individual. Most of us measure our services in the terms of the coin of the realm. If you ask the average practitioner how successful he has been during the past year, for instance, the inevitable answer is he did so many dollars' worth of business.

To the "bigger man" our profession offers more than a mere monetary remuneration for routine services rendered. Armed with a better preliminary education, a broader training and a mind capable of greater comprehension he can assume the true professional rather than the trade view of the profession. Obviously he will be more interested in correlating the fundamental sciences with the facts pertaining to the cause, recognition, prevention and cure of disease. He possesses power not only of supporting but elevating the profession; and a graphic portrayal of his activities in this regard is represented by a vertical rather than a horizontal line. He is never mediocre but stands above the average and is ever rising from lower to higher heights. One of the lost opportunities is our failure sometimes to recognize the value to the profession of such an individual and to use every influence to induce more men of this type to enter it until our own ranks will contain a greater number of the kind of men we consider "exceptional" who are now being shunted into medicine and law.

Taking up the school-education side of the problem of inducing better men to become veterinarians it is now generally conceded that preliminary to entering the professional college the *minimum* requirements should be the training of the high school. To this there is some dissension, the dissenters using the old argument that by setting the entrance requirements beyond the grammar grades is to deprive the country boy or poor boy of an opportunity to enter the profession. This time-honored and threadbare argument is lustrous only from long use. It has served for decades to check the development and progress of professional education in this country. As this argument can only appeal to the thoughtless and ignorant, it is usually insincere. In any case it is a reflection upon the youth whose home happened to be in the open country or farm village or whose pocket-book happened to be empty.

In the College of Agriculture of the Ohio State University the percentage of students from the open country or village is no higher than in law or engineering. Fully 25 per cent. of the students in American Universities are poor boys. The country or poor boy resents the invidious comparison. He realizes the value of an education usually even better than his brother more fortunate in these regards. Thousands of them are yearly being turned out of the high schools and colleges of this country. Not long ago I sat among nine college professors, some of them deans of colleges. Of the nine, five were "born and raised" on the farm and of this five, four worked their own way through school. The Governor of our state and the President of our University were each farm-bred and both poor in youth. There is absolutely nothing in this plaintive plea for the "poor country boy" unless you limit the definition to those who are uneducated because they lack brains, ambition and courage. All the other professions have barred young men of this stripe. Do we want to fill the ranks of our profession with such stuff as this? Is our profession to become the asylum of the rejected from other professions? At present most of the state schools of veterinary medicine demand high school training as the minimum requirement for entrance. In medicine they have gone far beyond this. All of the accredited medical schools in America now demand at least two years of college work for entrance and the better ones four. This high standard has been brought about largely by the American Medical Association, a sister organization of ours. A river cannot rise higher than its source. The source of any profession is the man. No profession can make a man, but men do make professions. If the calibre of the man be kept low, the profession itself is kept low.

The plea of the non-endowed, poorly equipped medical school was: "It will put us out of business". It did. What was the result? A better class of better trained men entered the profession until today American medicine is no longer ridiculed by other countries but given a high place in their estimation. Generally speaking, we pay for what we get in this world, although sometimes we do not get what we pay for. I firmly believe that as we increase the calibre of the product of our veterinary schools the emoluments of practice will likewise increase. The "trained baboon" type of veterinarian is too easily satisfied. A dollar

looks too big to him. A veterinarian renders his community a certain service which has a rather fixed market value and receives in return for this service just what it is worth. It may be \$400 or \$4000 per annum depending on his education, training, business acumen and personality. All else equal, the better educated the man is on entering his college work the better prepared will he be to carry on that work. He will get more out of the course of study and in post-college life will be able to render to the community in which he locates a far more valuable service. As in the long run the service has a fixed market value, the emoluments will be greater, his influence as a citizen greater and public opinion in regard to our profession enhanced. Heretofore there has been too much laxity in the demands for efficiency and proficiency. For the good of humanity the standards of our profession should be raised and raised from the bottom up. Many the youth who has lost an opportunity in the very outset of his professional career in that he has failed to avail himself of a good preliminary education which any young man, be he ever so poor, may obtain if he has only the brains, energy and courage to do so.

Passing from the preliminary to the college course the young man too often fails to realize the importance of the basic years of the curriculum. He looks upon chemistry, histology, physics or botany as subjects to be treated as independent entities which have no bearing on the more practical years to follow. Once he has "passed" these branches he dismisses them forever from his mind, taking it for granted that they will "never be of use" to him, probably thinking they were introduced into the curriculum for the sole purpose of serving as instruments of torture. This attitude is by no means confined to the pure sciences. Even as important a subject as pathology is treated without serious purpose and with no thought of its connection with "special diseases" or what is usually called "theory and practice". How often in quizzing a class in medicine have I asked the question: "What is pharyngitis?" "Inflammation of the pharynx" is promptly returned. "What is inflammation of the pharynx?" "Why, pharyngitis". This shows the crux of the whole situation. Pathology has been treated as a lonely, isolated Robinson Crusoe, a castaway on an uninhabited island without a boat, submarine or airship, cable or wireless communication with the mainland of Application. Fully 90 per cent. of the disease processes

treated daily by the thousands of practicing physicians are inflammatory in character. Whether it be known clinically as "poll evil" or "proctitis", "quittor" or "pnenmonia" fundamentally the process is an inflammatory one.

Subjects like animal husbandry, meat and milk hygiene and forensic medicine are also taken in a Pickwickian sense by too many students. There is no more important course in a veterinary curriculum than animal husbandry. The day of the "horse doctor" has passed. The modern veterinarian should be an animal engineer with a good practical knowledge of breeds and types of animals and the feeds and feeding of animals. His services in this regard should be as much sought by the animal owner as the usual medical service. The thinking husbandman would soon learn to appreciate the importance of this service and for it should be willing to pay an adequate fee. Furthermore, a knowledge of animal husbandry is essential to a better understanding of disease prevention. Most of the causes of internal ailments in our animals pass through the mouth with the food and water. Obviously, therefore, a study of feeds and water supply is essential to the control of diseases originating therefrom.

The student is not entirely to blame for the lack of appreciation of the pure sciences, animal husbandry, etc., things he looks upon as extraneous matter. Sometimes the teacher is at fault. The late Dr. Dieckerhoff used to say that "no one who could not ride a horse well should be allowed to teach veterinary students". While this maxim is not to be taken literally, its philosophy is sound. In veterinary schools there are now two groups of teachers, teachers of the basic sciences (the "laboratory men"), and clinical teachers. Those of the former group are usually not veterinarians and few among them have had veterinary training; those teaching the clinical branches are too often mere artists, many of whom even repudiate what the student has been taught in the classroom and laboratory. While the former group may consist of good pedagogues, what they teach does not always apply, as the veterinary back-ground is lacking. On the other hand the clinical teacher is too often ill-educated, too few of them are the prototypes of a Froehner, a Schindelka or a Bayer. The effect of such contradictory pedagogy upon the mind of the student is well expressed by Lyon who says: "We know that an army of young men is every year turned loose into the clinical

subjects there to have their carefully built up habits of thought tumbled and scattered like block houses in a children's play room. After the intensive discipline of the laboratory branches, we find them dissipating their energies among a dozen subjects with no idea of relative values. We find them wearing out their eyes trying to see surgical operations from the peanut gallery, their intellects trying to assimilate half-digested theories and their ham-bones sitting out interminable lectures. Then we acknowledge with dismay that our average graduate is far from being a scientific physician and tends rapidly to degenerate into the typical "routinist".

Too few of our veterinary teachers know anything about pedagogy. I do not believe that there are in the whole United States a sufficient number of good teachers of veterinary subjects to make up the faculty of a single well-manned veterinary school! Surely, therefore, no one veterinary school is adequately manned in this regard.

A college cannot furnish an education. This one must acquire himself. Thousands of persons who never entered the halls of an institution of higher learning, are nevertheless educated. One of the most intelligent and best informed veterinarians for his time I ever knew was a man who had been a country school teacher until the demands of a rich stock-raising community in which he taught forced him to take up veterinary work. He made a systematic study of the fundamental branches from standard texts and topped off his self-constructed and self-taught curriculum by reading carefully and thoughtfully the best medical and veterinary medical school books of his day. Assisted by a naturally good intellect and unusual powers of observation, he acquired enviable technical skill or the art of knowing "how" with which he coupled to a remarkable degree the theory of knowing "why". His powers of observation and deduction or "knowing how to know", more important even than knowing "how" and "why", made him valuable to his community and himself. Had he only had the opportunity of a college professional training he would have been a leader among us.

The average young man on graduation feels his education is now complete. Books, periodicals and association with more learned members of his profession he denies himself. He takes no interest in the professional organization beyond his annual

pilgrimage to the "state meeting" where he goes more often to "see the boys" or to fresco the town a bright vermilion which he can do more safely abroad than at home. Such a man rarely makes an accurate diagnosis and his treatment of disease is largely guided by the influence of some drug-house drummer who is exploiting some new remedy which has become as fashionable to use as it is to wear a "Siss-Lizzie" or "sport" shirt on a sweltering July day. In fact most of his professional literature comes from the drug houses: he takes his post-graduate course from the drug drummer. He has allowed himself to degenerate into a mere routinist whose profession is to him a mere trade. Such an individual once in a while appears on the program at the "state meeting" perhaps. His essays carry so often the caption "What is it"? "What was it"? describing, maybe, a clinical case with obscure symptoms and no post-mortem record. Once in a while he announces something startling from a pseudo-scientific point of view—I once heard a paper on the "Origin of the Soliped Hog". The essayist traced it back to Mexico, where he stated, in all seriousness, a Merino buck sheep had had illicit relations with an unvirtuous sow, and as a result of this mesalliance the first litter of soliped pigs was created! I should have enjoyed, were I a lawyer, defending that buck against a bastardy charge before a United States Court. The soliped hog probably inherited its largely advertised immunity against hog cholera from its paternal ancestor, the sheep! At another meeting a paper was read proclaiming the value of intra-vascular bovine blood infusions to prevent glanders in horses! I believe there was some merit in this suggestion, for if the blood vessels of a horse are filled with ox blood the resulting hemolysis will absolutely protect that horse *here* against glanders or any other disease for that matter. However, knowing naught about horse-heavens, I cannot be so sure about the immunity in the *hereafter*. Each of the essayists were locally well known members of our profession. They both lacked the "know how to know" or deductive ability so necessary to the physician. They were not the prototypes of a Schmidt, who by deductive reasoning with a knowledge of what he deemed to be an established principle worked out a successful method of tuberculosis eradication long before the tubercle bacillus was discovered, and who later made himself famous by giving to the world a successful method of treating parturient paresis of cows. Schmidt was a practitioner.

One great weakness in our educational system is the lack of adequate schools where the practitioner may elect post-graduate courses. A few schools do offer training but the curriculum is generally very brief and consists largely in attenuated and fragmentary courses in mere undergraduate subjects. A school of this kind needs large clinical facilities and plenty of clinical material available for didactic use.

Too many of us seem to think that efficiency will not be rewarded unless supported and sustained by protective legislation. While undoubtedly no man should be allowed to practice his profession who has not satisfied a competent board of examiners of his competency to serve the people, we must at the same time remember that the law is for the protection of the people rather than for the veterinarian. To be sure if the law is a good one and strictly enforced, competition which the practitioner too often considers the bane of his existence, is curtailed and, theoretically at least, his clientele will be numerically increased. However, no law can make a weak, ill-educated, unskillful practitioner of any better service to the community. This must come through other channels. He alone can make himself strong and efficient by taking advantage of every opportunity to increase his knowledge, his powers of observation and his deductive reasoning. Some weaklings seem to feel that to improve the state law governing practice is equivalent to improving the efficiency of every practitioner in the state. Really they have put the cart before the horse. As the efficiency of the profession increases through better educated, better trained and more influential men entering it, the laws regulating that profession will in proportion become strengthened. This has been the history of things in medicine and law. We had no medical law in Ohio until we got a better class of physicians; no veterinary law appeared upon our statutes until the numerical strength of the better class of veterinarians increased and he became a factor of influence direct and indirect. We went longer in most instances without a regulatory statute than the other professions only because our profession was younger and therefore relatively cruder. Generally speaking, it had not yet attracted to its opportunities many men of the best type. Notable exceptions prove this statement.

There is before us a great opportunity to make our profession what it should be in this country and what it is in many older

foreign countries. To fail to realize the true situation, to keep our standards below those of other professions is to accept their "leavings". The right type of youth, the fellow with the right kind of stuff in him will pass us by to where his better educational preparation permits him to enter "higher up" as readily as he might "lower down" and do so without what he deems an educational sacrifice.

In conclusion permit me to indicate briefly a few of the opportunities which we cannot afford to lose:

1. Higher demands of those entering the profession. Its portals must be more carefully guarded. To leave the doors wide open and the whole an "open stage" upon which anyone who sees fit may enter and exit at will, will eventually lower us to a plane beneath the other learned professions and down to the level of the trades. I would not be unreasonable and demand that the gates be kept locked to all but the chosen few, for due regard for the urgent need of maintaining an adequate supply of trained men, even if not all of the highest type, must be recognized.

2. More intensified, better balanced, better taught curricula and better facilities and equipment for our colleges.

3. A standardized curriculum as to content of courses and curriculum. The length of the curricula in different veterinary schools in this country varies from twenty-one to thirty-six months, and the content of the courses varies even more.

4. More veterinary teachers; better veterinary teachers. The teaching of veterinary medicine is a profession in itself. Beyond mere routine pedagogy some may never get, but at every institution of learning a certain amount of research should be carried on. Of our veterinary teachers we should demand productivity. There is no more useless animal than a tough, old hen which never lays an egg.

5. More real, post-graduate courses and fewer make-shifts. There should be somewhere in this country a high-grade school open to the men in the field who crave more intensive professional knowledge. Such an institution would make a splendid federal investment which would a thousand fold repay the people all it cost.

6. Stronger, better organized, less political and more scientific and therefore practical veterinary medical organizations.

Whether community, state or national in membership only the spirit of real service should underlie them.

7. Better technical literature, especially in the way of up-to-date, sound, practical, well edited periodicals. Medical books are too short lived: most of them are obsolete sooner than a battleship.

8. A greater effort on the part of the veterinarian to become more of a social, political and generally influential factor in his community. I feel like cheering and my heart fairly swells with pride when I note that one of us has gained recognition of these kinds.

In our ranks is plenty of good timber out of which may be made good legislators, national, state or municipal officers. When I find a colleague Mayor of his home town I am more tempted to shine up my A.V.M.A. button and stick it in the lapel of my coat!

9. Adequate laws to protect the people (not us) against pseudo-veterinarians, fakirs, mountebanks, charlatans and quacks, those omnipresent ignoramuses tightly inflated with hot air but so often seemingly puncture proof. In this category I would include stock-food and veterinary-specific manufacturing members of my profession. They all form a blot on the escutcheon of one of man's noblest opportunities, an opportunity to relieve pain and distress, to save the country untold millions in money as was demonstrated by the last foot-and-mouth disease experience, and finally to contribute to a large degree toward the comfort and happiness of mankind—our profession.

Veterinary medicine is an inclusive topic. No one individual can hope to master it. Its aims may be formulated under many heads but chiefly it consists in knowing "the essential, fundamental facts pertaining to the cause, effects, recognition, prevention and cure of disease and to correlate these facts with the fundamental sciences". To become accomplished the veterinarian therefore must develop technical skill, powers of observation, judgment, thoroughness, persistence and precision. He should also have inculcated into him the ethical and professional ideals of honor, self-respect, altruism and social conscience without which the profession will degenerate into a business or trade.

DISCUSSION

Dr. Hoskins. I just turned to my colleague on my right, Dr. Hollingworth, and I said to him we need every little while just such a paper as this. We need to be recalled from the selfish side of our lives that too often sways us too far away from the ideal. I have been delighted with the presentation of this paper. I have been helped materially to a much higher aspect of my own personal duties to my profession and to you, my fellow colleagues, and I have been stimulated to do much better with reference to the future by this recalling us to the higher sense of duty so well presented by our colleague, Dr. White. I trust that each one of us will think many times in the years to come of what he has said to us so forcefully and so well, and how he has pointed out to us the way in which we should go in order that we may make the work of the past look like a candle compared with the arc-light in the future. So I say, that we all certainly have benefitted this morning: and if we have traveled across the continent to attend this convention, and should not hear any other paper, it would have been well worth our while to have come from the longest distance to have listened to this wonderfully fine presentation of the every day aspect of our profession.

Dr. Mayo. There is one particular phase of this excellent paper that I wish to emphasize if possible. In visiting various veterinary schools of this country, or quite a number of them, as a member of the Committee on Intelligence and Education, one of the painful impressions is the poor quality of some of the teachers in those schools. It is a crime to waste the students' time with some of those teachers. Men, too, that have had an excellent training, thoroughly trained in some of the best universities of this country, and yet they were not teachers, they were not inspiring. There was a waste of the teacher's time, and more than a waste of the time of the students in those classes.

We have certain regulations regarding faculties, that they shall not be, so many of them, graduates of the institutions in which they teach, and so on. Of course, this is necessary in a certain way, but after all, it does not make so much difference where a man comes from, if he is a teacher. That is the thing. That is something that we need to look after more than ever in our educational institutions.

Another phase that we also presented in our committee report was the need of the preliminary training. I would not shut a single man out of the profession if he has the intent and the determination to go into the profession. I do not care how poor he is or how few facilities he has had in the past; but, in this present day and age the opportunities for a preliminary education are at every man's door, and it is absolutely necessary, if we raise the standard of the profession in this country, that our veterinary

students shall come to the veterinary school with a more thorough preliminary training.

Another very important point that we touched upon was the fact that frequently students in veterinary colleges are not students. There are a good many in the college who think that because they are in a veterinary college they are students. A college cap and the college yell do not make students. There are many men who have never seen the inside of an educational institution, who are profound students and thinkers, and we must get this idea out of our students, that just as soon as they enter a veterinary college that they are students. That must be done very largely by the teaching force, and the atmosphere that is carried by the institution, and particularly the atmosphere that prevails in some that just as soon as they have their veterinary degree, they have all that the world has to offer them in a professional line. We must impress upon our veterinary students and every man who teaches in a veterinary college, should impress upon his students the fact that when they have completed their college course, they are just upon the threshold of their veterinary education, and that they must go on and study and keep up with the times, with the very best that modern science and research has to offer them.

Dr. Stewart. I see a number coming in, and I regret for them that they did not have the pleasure, the stimulus, the sense of pride which would have come to them had they heard Dr. White's paper. It was of a character that should swell the breast of every true veterinarian to think that we have such high ideals presented, that we have them to look forward to, and I trust that every man who did not hear it will take a positive resolution home with him that he will read it as soon as printed; and, not only read it, but he will undertake to digest it because it will make him a force for higher veterinary education, higher professional standards in his own community, and those with whom he comes in contact as the years go by.

There were so many phases of the paper that one could not readily discuss each of them without having it before him and making his notes thereon. One particular feature that I would like to dwell upon, was the entrance requirement for a veterinary education. There has been before this association for years the thought that a high school training of a specific amount should be the basis for entering. High school as represented by units is a very uncertain factor. I happen to know from personal experience men who have been enrolled as veterinary students, where they completed a course in a high school, who had very little capacity for comprehension of veterinary science. I happen to know that men who never went into, or ever enjoyed any high school training, showed large aptitude for understanding the fundamental principles and the advanced art of veterinary science.

So, it seems to me that when this association shall again express itself upon the conditions for admission, that while they may with all propriety, set forth the fact that a high school training of a certain degree must be a minimum training, there should also be provision for finding out even then, whether that man has capacity for understanding the tenets, understanding the information which shall be imparted to him, have capacity enough to understand veterinary medicine in its various phases.

Young men have come to veterinary colleges with a credit of one year, two years, three years, four years in high school, and yet have had little mental capacity. I believe provision should be made for ascertaining by examination of those men as to whether or not they should be allowed to enter; that there should be some equivalent arrangement as to high school conditions for admission. We place so much reliance on high school credits that we overlook just what has been stated here by the writer of the paper and by other speakers, that individuals may acquire an education without going into the high school; that education means the development of the powers of observation and the interpretation of what is seen and heard. I hope when this association shall again put its stamp of approval upon the conditions for admission, that this be taken into account.

I am very glad to hear the speaker discourse on the conditions found in the teaching staff. Men may be enrolled in the list of a faculty, and yet have very feeble teaching capacity. I am very glad to hear him speak of the importance of moral ideals. It is very well known that on some faculties there are men who do not seem to have much moral precept at all; rough and ready, coarse dollar-getting ideas only. Relations to the public, matters of citizenship, are not brought forward prominently as part of the instruction to be imparted to the students under their direction. There are many other phases of this to which I might make brief mention, but I will leave it at this, believing there are others who see points they would like to elaborate.

—Dr. John R. Mohler, Assistant Chief, Bureau of Animal Industry, in addition to the duties of that office, will also have charge of the work of the Pathological Division of the Bureau. He will become Assistant Chief and Chief Pathologist, which latter position was made vacant by the recent resignation of Dr. Adolph Eichhorn, who left the Bureau to accept a position in the Lederle Laboratories of New York.

—A new federal meat inspection station has been established at Bristol, Virginia, and Dr. J. B. Hill, formerly of Paterson, New Jersey, has been placed in charge.

SHIPPING FEVER AS MET WITH IN A LARGE CITY PRACTICE*

GEO. B. MCKILLIP, M.D.V., Chicago, Ill.

A few years ago when shipping fever, in its ascendancy, began its campaign of devastation in the stables of our large cities it was hailed by the city veterinarians as a friend—as a thing that would fill their idle hours with profitable work and increase their clientele to a satisfying degree. There had always been more or less of it to deal with and it had been a tractable and fairly well-behaved malady, in no way a particularly disturbing factor in the veterinarians' daily life. There was nothing at that time to indicate that it was going to be other than it had been in the past, a disease of moderate severity yielding satisfactorily to prophylactic and curative measures.

But after five years of hand to hand combat with this monster in its new form we are ready to admit that instead of a friend it is now and has been for these past five years a gross enemy of the veterinary profession. Viewed in the light of past experiences we are ready to state that shipping fever with its present malignant proclivities is doing more damage to the city veterinarian's prosperity than has any other one thing in recent years. Why is this? Merely because our own acknowledgement of our helplessness in the presence of this disease weakens our standing with our clients generally, and, further, the losses sustained by horse owners as the result of the prevalence of this disease have been a most potent stimulus to the motorizing of our transfer and delivery concerns.

The margin of economy that has heretofore existed in favor of the horse drawn carrier as against the motor carrier is being wiped out by the enormous losses sustained through the mortality and morbidity from shipping fever. Motor truck salesmen, making use of this factor, are capturing our best clients and converting them into patrons of the auto mechanic.

I want to impress it upon this audience that unless some efficient steps are taken to lessen the ravages of shipping fever thousands of carrier concerns in our larger cities now using horses will

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be compelled, for economic reasons, to supplant their teams with motor trucks. It is being done now as a direct result of this disease and the movement is going to gain momentum in the months to come if conditions remain as they now are. Veterinarians in the cities are going to feel the influence of this movement primarily and chiefly, but also will its influence ramify to every town and hamlet in the United States, as the horse and mule industry suffers from want of demand, and rural veterinarians sooner or later will feel its effects.

To impress upon you the seriousness of this situation, as we view it, let me give you from among our many experiences a single representative example of what shipping fever does to a client, and, incidentally to the practitioner. One of our large concerns during the last two years purchased at the Chicago market 1300 green horses. These horses were removed to isolation stables and under as good prophylactic care as is possible at present, 963 of them (approximately 74%) contracted shipping fever. Seventy-eight of these died, a general average mortality of about 8%. It is a noticeable and a significant fact that at the beginning of the period the mortality percentage was about 5% while during the past few months the disease has been claiming approximately 10% of the cases, showing that the virulency of the infection is increasing.

While the loss from mortality was high in this case, as in all others, the most bitter complaint of the client was not of the loss by death but of the economic loss due to disability, temporary and permanent, occasioned by the morbidity.

Twenty-six patients, or about 2% of those that weathered the storm failed to recover sufficiently to be put to work and after from four and six months of care and treatment were disposed of because of permanent disabilities. These patients were ones developing intractable, chronic sequelae consisting of sesamoiditis, gonitis, laryngoplegia and laryngeal stenosis, laminitis, tendinitis, intestinal catarrh, or malnutrition, all of a chronic nature and irresponsive to treatment. Eight hundred and sixty-nine, approximately 90%, recovered sufficiently to return to work, many, however, carrying with them blemishes as mementoes of their experiences. These 869 required for full convalescence an average period of about six weeks, the period of morbidity varying from 10 days in the mild cases to three months in the severe lung cases and six to eight months in some of the protracted ones with rheumatic sequelae.

Nine hundred and sixty-three patients with temporary disability, averaging six weeks, with cost of care, feed, medicines and professional advice is a monetary item to the owner of no mean proportion. To reduce it to a simple and obvious comparison it is equivalent to the care of one patient for a period of 5778 weeks, or 111 years; or the care of 111 patients for a full year. The approximate total cost of the care of a single patient per month in Chicago is about \$10.00, making for this concern an expenditure of about \$13,320 during the past two years for care of sick horses. The loss by death and permanent disability was \$16,380, making a total of \$29,700 lost out of a \$200,000 purchase of horses. Is it strange then that these clients begin to consider the proposition of motorizing their business?

A smaller teaming concern in Chicago had 250 horses. Twenty-five green ones were purchased at the Chicago Yards and of the 25 head, twenty, or 80%, contracted shipping fever in a malignant form. Ten (or 50%) died; one was permanently disabled and nine recovered more or less completely after periods of convalescence of ten days to three months.

But that is not all that happened to this client. By some means the contagion was transmitted to the stable of old horses and it was eight months before the demon could be dislodged and the stable cleared of its presence. During the eight months 70 (28%) of these 250 aged and acclimated horses contracted the fever with the usual severe characteristics; eleven of the 70 (nearly 16%) died; the balance recovering after varying periods of time.

The shipping fever contagion at present is not nearly so virulent for mules, they being, according to our observations, relatively immune. In time to come, no doubt, the virus will adapt itself to these animals and its virulency will be increased for them as it has for horses in the past. In connection with the relative immune characteristic of the mule I might relate that the first concern mentioned above purchased with its 1300 head of horses 200 head of mules. These mules were exposed to the disease as fully as were any of the horses yet only 15 of them contracted the disease, none died and all made a complete recovery and with a less average period of disability. Not one of these patients developed that most dreaded complication, broncho-pneumonia, although all were exposed to the most severe cases of it.

The above are representative cases. I could enumerate many more as I dare say could any veterinarian practicing in Chicago.

So far as the pathological peculiarities of the disease are concerned I have nothing new to offer. The general course of the typical case, as we find it, is as follows: infection of the upper respiratory mucosa with the general signs of toxemia are the first evidences of the disease. As the case continues the inflammatory process extends down the respiratory tract involving the trachea and bronchi and in a number of cases terminating in bronchopneumonia, the most fatal complication of the malady. The mucosa of the sinuses of the head and the eyes are involved early. The gastro intestinal mucosa in the majority of cases shows involvement; mucous diarrheas are common. Articular synovial membranes, tendinous bursae, tendons, ligaments, the pododerm and muscular tissue soon show the injurious effects of the toxin by the presence of inflammatory or degenerative reactions.

Certain structures suffer more frequently and earlier in the course of the disease either from a selective action of the toxin or a greater susceptibility of the part as a result of function or structure. Thus we find among the earlier common complications sesamoiditis in 6% of cases, laminitis 3%; tendinitis of the flexors of the foot 2%, gonitis 1½%, laryngoplegia ½%, bicipital bursitis ¼%, other similar structures less frequently. Degeneration of skeletal muscles to the point of paralysis is not unknown. Recent severe cases have occasionally exhibited paralysis of the crural quadriceps with destructive muscular changes not unlike that found in azoturia. The nervous system seems to be fairly immune to the action of the toxin. Functional interference is noted but evidences of either temporary or permanent structural changes are lacking. It is those toxic rheumatic complications that become chronic and incurable and account for the permanent disabilities among those cases that do not die.

In view of the above facts and others that are suggested by them is it not reasonable to suggest that it is time to urge the adoption of radical preventive measures as a substitute for our apparently hopeless campaign of cure and relief? As matters now stand the local veterinarian and his clientele are helpless in the matter. So long as the large markets of the city, the transportation carriers and the smaller local markets are incubators of contagion and so long as our new stock must come through them to be exposed

what chance has the final purchaser and his veterinarian to save themselves from disaster like that in those cases cited above?

The sales stables of Chicago, while attempts have been and are being made to clean them up, are but incubators in which the contagion is not only propagated and disseminated but in which the virulence of the infection is being constantly improved by the continued live animal transplantation. It seems that occasionally new strains of virus are introduced, probably from other concentration points, evidence of this being in the appearance of new and often more malignant pathogenic characteristics of the virus in the live animal cultures that are sold to our clients in the guise of draft horses.

Not all sales stables are equally infected. Many barns through the continued, intelligent vigilance exercised by their management have been made relatively free from the infection. Other barns as the result of ignorance and negligence are "rotten" and scarcely an animal that passes through them escapes a serious infection. Observation of the exhibition of ignorance and carelessness in matters of ordinary sanitation in these worst stables is sufficient to explain their relation to the prevalence of shipping fever in the barns of patrons.

In closing I want to emphasize first, that shipping fever is causing enormous losses to horse users generally but especially in the large city stables; that this loss has a serious, injurious effect alike upon the horse producing industry and upon the veterinary profession. Second, immediate relief for this situation is imperative; such relief must come through a prophylactic control of the horse markets, concentration camps, transportation concerns and the premises of the producer, as in the case of any infectious disease. I believe that the serious aspects of the disease warrant the use of radical measures of control.

At the opening of the Armour Packing Plant at Jacksonville, Fla., an address was delivered on "Tick Eradication" by U. S. Veterinary Inspector E. M. Nighbert in which it was stated that about 40% of the originally tick infested country had been reduced and that in Florida where the work is just beginning, two counties and a portion of a third had been cleaned up.

Dr. Emlen Wood has removed from El Paso, Tex. to Wayne, Pa.

THE U. S. ARMY AGAINST THE ALLIES IN BUYING IT'S ANIMALS*

DAVID E. BUCKINGHAM, V.M.D., Washington, D. C.

The greatest struggle on fields of battle ever known has now been in progress over two years and still continues. France, the bloody scene of the greatest conflicts, needs more and more horses and mules and she drains American farms of 25,000 more in addition to hundreds of thousands already sent over. Italy, last to enter the fray, has been a steady buyer and asks for the best. England, with her tremendous reserve just turned loose, has taken her thousands and Greece follows with big purchases.

While we are the greatest farming people in the world with a horse census of millions, yet only the fit are taken and the old and unsound are left.

When a purchasing board of the U. S. Army was trying with difficulty to complete its quota on a contract and horse after horse was brought up for inspection, the discouraged Colonel and his veterinarian sat down to allow a great number of animals to pass into the pens from the cars ready for inspection by the Royal Italian Board next morning. They were amazed and surprised to note the many mares and the fine conformation and wonderful backs and loins and quarters of the shipment and they asked the contractors why they did not show us Americans such animals. "Oh", they replied, "you are too fussy about mares and the foreigners take all they can get." What a remark and how it shot home. Our board had travelled over 5000 miles, stopped at ranches, big stables, villages and stock yards wherever contractors had horses for us to see. We had been treated to all kinds of tricks and deceptions and even had animals substituted. We often looked at 25 head before we took one. Capt. Keyes, U. S. A., told me he turned down 114 head one morning. Another inspecting officer at Oklahoma City threw up his job and refused to look at any more culls.

Horses of the type the U. S. Army needs are scarce. Boards of purchase have had to spend intervals in idleness and go long distances and then see a mere handful of little, old, worn cow

*Presented at the meeting of the A.V.M.A., Detroit Mich., Aug. 21-25, 1916.

ponies, or light carriage horses that had a value less than \$25.00 per head.

The Southern Dept., Fort Sam Houston, San Antonio, Texas, will buy about 48,000 out of the total of 67,000 authorized. It is well that we are about through for the mill must run dry without water.

Taking the great corral at Sam Houston, with its 11,000 head of three types of mules and five of horses, to judge the work of Q. M. Corps in supplying the army with animals there will be found a great percentage of first class animals but many a misfit is seen and you wonder who has blundered. I will not go into details as to how these cow-hocked, curby, calf kneed, roach or sway backed creatures carry the U. S. brand. Suffice it to say that a sentinel is needed sometimes to watch over our purchases and prevent substitutions.

The larger the number bought on one day, the easier to slip in and out with a ringer. On this account orders came late in the buying to buy but 100 head per day. There was formerly no limit but human endurance.

Now to the point of this article—Our army against the world's armies. Away back in the Indian campaigns and the day when horses were cheap and plentiful, stallions were ridden by officers and a few mares were found on the private picket lines. Perhaps once a big general had a beautiful mare and a younger officer rode a stallion—they fell in love, the horses only, and the big general and his little officer lost their love for each other when the big general ordered that no stallion should be allowed on picket lines or to be ridden by an officer or soldier. Later on when the old general retired and the younger officer was at Washington and in command, and descriptive lists were being re-written the old sore, still tender, spurred the the new young general to leave mares entirely out in the purchase of cavalry and artillery horses. Hence today the U. S. Army with its regulars, its 1/5 increase and its militia is scantily supplied with the culls and the leavings of the European Army Boards partly because mares are barred.

Imagine my feelings as I saw beautiful 1300 to 1600 pound half-grade and three-quarter bred Percheron mares going to the Italian Army at \$50.00 per head more than we were paying for little 14.2 900 pound militia cavalry horses according to class. And these grand animals were leaving the country—they are the

very fountain and source of our future supply. We would not care so much if they paid more and took geldings—we can play a man's game there and outbid if we wish but every mare exported averages three colts less on American farms and now that so many hundreds of thousands are gone we shall need every first class brood mare to replenish our stock.

Our government should stop the exportation of mares for whatever purpose on account of economic and agricultural reasons.

And secondly, if we buy still further, to allow mares to be shown for inspection before Army Boards of Purchase for I honestly do not believe we can get enough horses of standard requirements for our army in the future unless we do buy mares.

It has been conclusively proven that mares are tougher and more resistant to wear and tear than geldings and every officer I have conferred with has agreed to this conclusion.

A NOTE ON THE PREPARATION AND USE OF AGGLUTININE FROM BEANS

M. DORSET AND R. R. HENLEY.

Biochemic Division, Bureau of Animal Industry,
U. S. Department of Agriculture.

Recently¹ we have described a process for separating the red blood cells from defibrinated hog's blood. The principal object aimed at by this process was to secure a serum which could be heated to such a temperature as to render it safe in so far as foot-and-mouth disease infection is concerned. Repeated use of the method on defibrinated blood from hogs hyperimmunized for the preparation of anti-hog-cholera serum has only confirmed our original opinion that the method described is a practical one for separating the serum from the red blood cells. However, it has come to our notice that from a commercial standpoint it is very desirable to produce a bean extract for use in this process which will keep without spoiling for at least a week or more. The bean extract prepared according to the method described in our earlier communication undergoes fermentation very quickly unless preserved in an absolutely sterile condition. Recent modifications in

¹ Journal of Agricultural Research, Vol. VI, No. 9, p. 333, May 29, 1916.

the method of preparing the bean extract have served to overcome this difficulty and it therefore seems desirable to bring the new methods to the attention of all those who are interested.

IMPROVED PROCESS FOR PREPARATION OF BEAN EXTRACT. I. The beans should be of the variety commonly known as the "Wisconsin Pea Bean," and they should be of good quality and thoroughly dry. Other varieties of the White Navy Bean (*Phaseolus vulgaris*) may prove satisfactory but some appear to be distinctly lower in agglutinative power than the Wisconsin Pea Bean.

2. The beans should be ground quite fine so that 75 per cent of the meal will pass through a sieve having twenty meshes to the square inch.

3. The bean meal is extracted as follows:

To each 20 grams of the bean meal add 100 c.c. of physiological salt solution (0.8 per cent which contains one-half per cent of crystallized phenol. This salt-phenol solution is heated to 60°C. before being added to the meal. The meal is thoroughly mixed with the extracting fluid and the flask containing the mixture is placed in a water bath, the temperature of which is to be maintained at 69° to 70° C. The flask containing the meal mixed with the extracting fluid should be kept at a temperature of from 60° to 70° C. for one-half hour.

4. When extraction is completed the entire contents of the flask containing the bean meal are poured into a cheese-cloth bag and the bag thoroughly pressed until all of the available fluid has been secured. This will be found quite milky in appearance.

5. The fluid obtained by straining, while still hot, is mixed with powdered infusorial earth (kieselguhr) in the proportion of at least 2 grams of kieselguhr for each 100 c.c. of the extract. The kieselguhr is stirred in thoroughly and mixed completely with the extract. The extract is then poured on a folded filter. The first portion of the filtrate may be somewhat cloudy, in which case this should be returned to the original container and again passed through the filter.

6. The clear filtrate, if it is to be used at once, should be passed through a bacteria-proof filter of infusorial earth. If it is not to be used immediately it may be set aside in an ice box and should keep for weeks in good condition. Before use it should be

passed through a filter of infusorial earth to remove any spores or bacteria which may have survived the heating.

7. If desired, the phenol may be omitted in making the above extraction and the clear filtrate which is obtained after filtration through infusorial earth may be evaporated rapidly to dryness in a blast of air and at a temperature not exceeding 60°C. The dry air, or partially dry mass which is secured, is usually, for the most part, readily soluble in physiological salt solution. It appears, however, that evaporation tends to render some parts of the extract slightly less soluble and therefore the dissolved dry material is never quite so clear as the solution from which it is obtained. In practice it would seem that, where the bean extract is not produced for sale, evaporation to dryness is undesirable, in view of the excellent keeping qualities of the phenolized extract described above.

Extracts prepared as described have been used on a number of different lots of defibrinated blood and appear to possess an agglutinating power which is quite as strong as that observed in extracts prepared in any other way. Furthermore, the presence of the small amount of phenol does not increase hemolysis and does not interfere in any way with the heating of the serum, which is always practiced after the serum has been separated from the cells. We do not, however, recommend the addition of more than 1 c.c. of an extract prepared as above, to 100 c.c. of defibrinated blood.

In our earlier paper we recommended the addition of one gram of finely powdered sodium chloride to each 100 c.c. of defibrinated blood after agglutination with bean extract has taken place. The use of sodium chloride in powdered form was originally thought desirable in order to avoid any dilution of the serum. Further study of this question has shown that the salt in powdered form tends to cause a slightly greater hemolysis than that which will occur if the salt be added in the form of a saturated solution. We believe the hemolysis to be undesirable and therefore now recommend that after the bean extract has been added as described above, and thoroughly mixed with the defibrinated blood, the mixture be allowed to stand for five minutes when, if agglutination is well marked, as it should be, that there be then added to each 100 c.c. of defibrinated blood, 3 c.c. of a saturated solution of sodium chloride. This is stirred in thoroughly and the mixture is then ready for centrifugalization.

The saturated solution of sodium chloride is best prepared by adding 400 grams of chemically pure sodium chloride to 1000 c.c.

of boiling distilled water. The boiling is continued for a few minutes and the solution filtered while hot. There should be a separation of salt crystals as the solution cools. This saturated salt solution should not be placed in the refrigerator but kept at room temperature.

Washington, D. C., December 14, 1916.

SO-CALLED STAGGERS IN HORSES CAUSED BY THE INGESTION OF *PTERIS AQUILINA*. THE COMMON BRACKEN*

SEYMOUR HADWEN, Agassiz, B. C.

During the months of February and January of last winter many horses died with what farmers have been in the habit of calling staggers. This disease is characterized by uncertain gait, loss of equilibrium, general unthriftiness with no loss of appetite. In some small communities losses were especially heavy, in one village out of twenty-four horses owned by eleven farmers, sixteen died of staggers, four recovered and the remainder (4) did not take the disease. This is no doubt a larger percentage of mortality than is usually the case, but on making careful inquiries similar cases could be found in every country district along the banks of the Frazer, and on Vancouver Island. Dr. F. Torrance, Veterinary Director General, upon ascertaining these facts gave authority for the experiments that were conducted later, and which resulted in the proof that bracken was the cause of the disease. These experiments were described before the association and though they are not yet fully completed, it was decided that publicity should be given with a view to warning horse owners about the danger of feeding fern to their animals during the coming winter. Remedies were forthcoming and seeing that the cause of the disease has been definitely traced to poisoning by bracken, it is hoped that the losses which occurred last winter will be obviated. The facts presented to the society are briefly as follows:

*At a meeting of the B. C. Veterinary Association held in the Hotel Vancouver on Dec. 6th, a preliminary communication was made to the members of the association by Drs. Hadwen and Bruce of the Veterinary Research Laboratory, Agassiz, on the results of their researches in regard to a disease which occurs among horses in the coast region of B. C.

EXPERIMENT NO. 1. Two healthy horses were confined in a stable. One horse was fed on hay from which all the fern had been picked, the other animal received the ferns with a proportion of hay; no other food was given to either animal and they were not allowed any exercise. The experiment began on April 1st, and on April 29th the horse which was receiving the ferny hay showed slight signs of intoxication. This symptom (staggers) became worse until on May 1st the animal had practically lost its sense of equilibrium and would nearly fall when made to get over in the stall. On May 2nd it fell down and was unable to regain its feet. On the fourth it had become so ill it was killed to end its sufferings. The other horse which had received no fern remained perfectly well. A similar experiment was conducted later on with the same results. The horse to which the ferny hay was fed developed the disease and was destroyed, and the control horse remained perfectly well. A third experiment has just been completed. In this case ferny hay purchased locally at Agassiz was fed just as received, resulting in the death of the horse on the thirty-sixth day of the experiment. This animal had previously served as a control to another horse that died, clearly demonstrating that it was the bracken which was the cause of the trouble, as no ill effects were noticed in this animal when fed on the hay out of which the ferns had been picked. Further experiments are under way and facts are being ascertained as to the exact toxin or poison which is probably present in bracken. The disease as it occurs on the average farm is brought about in the following manner:—fern is found in a great amount of the hay grown in the lower parts of the Province, especially so on newly cleared farms and it was on such farms that the disease was most common last winter. During the severe weather we experienced in the early part of the year, animals were confined indoor for a long period, in some districts hay was short and none too liberal an allowance given to each animal, the result being that horses that would otherwise have left the fern in their mangers were forced to eat it. (As a general rule horses do not eat bracken unless forced to, with the exception of greedy animals that eat their bedding, which often consists of the fern they have rejected out of the hay). These horses in nearly all cases received but little else than hay in the shape of food; where animals were given plenty of hay and roots, with occasional feeds of bran and oats, no troubles of this nature occurred, and in the city stables no cases were reported. It is evident from this that a small amount of

bracken may be eaten with impunity, but that large amounts coupled with unhygienic surroundings and lack of variety in diet bring on the trouble.

Careful weighing tests have been made and it was found that what is usually called very ferny hay contains in the neighborhood of thirty per cent bracken. The amount required to bring on staggers was found to be about two hundred pounds, fed at the rate of five to six pounds a day over a period of some thirty days. Though the cause of this disease had not been definitely established heretofore, veterinarians have been quite successful in treating the malady if they were called early enough, and when at all possible farmers are strongly advised to summon such professional aid as is available. Where this is not possible the animals must be treated by the farmer himself. The lecturers testified to valuable information which had been given to them by Drs. Tolmie and Darby, especially as regards statistics and treatment of the affection. Probably the safest form of treatment for a farmer who is obliged to treat his own animals, is first of all to remove the ferny hay and to substitute good clean hay. A dose of raw linseed oil should next be administered, taking especial care that none of the liquid falls into the lungs. Warm bran mashes and roots should be given. The horse should be well blanketed and kept as quiet as possible, owing to its nervous excitability. Warmth is a great aid in combating the affection whilst a cold drafty stable tends to lower the vitality.

SUMMARY. It has been proved experimentally that the so-called staggers of horses is caused by their eating the common bracken; the disease should then be called *bracken poisoning*.

The disease has been reproduced by feeding bracken in both winter and summer, proving that cold is not a necessary factor in the production of this disease. However, a cold drafty stable lowers the vitality and farmers are advised to take special care of their horses during the severe weather; to keep them warm, well supplied with roots and to give them occasional bran mashes.

Horses should not be left tied up for long periods without exercise, as this tends to constipate the animals.

Above all fern should be eliminated from the hay they are given and also from their bedding.

(A Dominion bulletin describing this disease will be issued upon the completion of the experiments.)

THE PHYSICAL EXAMINATION OF DAIRY COWS•

J. L. WILDER, Akron, N. Y.

I have not selected this subject with any thought of advancing some new or better method of examining cows for dairy production. My object is to try to arouse a discussion here that may lead to a better understanding as to what is a good, practical physical examination. I mean an examination that will eliminate those cows that are a menace to public health. I mean an examination that is a credit to the veterinary profession instead of being a joke. An examination that will cause the dairyman to feel a sense of satisfaction regarding the health of his herd, instead of having a feeling of being imposed upon by the health department and the veterinary profession.

When called by the dairyman to examine his cows, and I believe no veterinarian who is true to his profession, will go to a stable until called, I do not believe in making false motions simply to cause an impression but go about the examination in a practical, professional manner.

There can be no rule as to what to do first or what last, but I think each man should decide on a system of his own and then adhere to that as nearly as possible.

I am going to describe as nearly as I can my own mode of procedure, not because I think it is better than any other, but it is the easiest way I can explain what I consider a fair and practical physical examination.

First, I auscultate the lungs carefully and percuss wherever auscultation reveals any sounds not entirely satisfactory. Second, I manipulate the lymphatic glands in the pectoral region and those of the flank, and I regard with suspicion those that are hard and knotty or sensitive. Third, I examine the udder, drawing a little milk from each teat into my hand. Fourth, I examine the head for actinomycosis and manipulate the submaxillary and parotid glands. Following this I look for vaginal discharges or any suppurating wounds on the body.

Possibly this examination, that I have described, may not fully satisfy the health authorities of the State Health Department

*Read at the meeting of the Western New York Veterinary Medical Association, Buffalo, N. Y., December 1916.

but I think an examination similar to that described will eliminate a large percentage of the cows that are dangerous to the public health, if their raw products were used.

My experience of the past two years, although rather limited, has convinced me that an examination of this kind, made by a veterinarian called by the owner of the herd to make the examination inspires respect for that veterinarian and his profession. It does more than that. In a greater or less degree it removes the feeling that the milk producers are being oppressed unjustly by the health department.

On the other hand the veterinarian who goes into a dairy section, and goes from farm to farm asking the privilege of examining the cows, explaining the advantage of having it done then, because he is in that locality and can do it cheaper than it can be done at any other time, is putting veterinary services on the bargain counter. Such methods are not only unethical but are professionally dishonorable, they brand the veterinarian as a *grafter* and aid in widening the gulf between the health department and the milk producer.

No better opportunity has been presented to the veterinarian, to uphold and advance the dignity of his profession in the rural districts, than that part of the present sanitary code which provides for a physical examination of dairy cows by approved veterinarians. No work entrusted to veterinarians has been performed in a manner to cause so much dissatisfaction and criticism among cattle owners as the present health law.

In the last twenty years there has been a great step forward in the veterinary profession. This has been brought about by two great factors. First: the improved facilities for veterinary study. Second: the growing respect for and confidence in the veterinarian and his profession by the stock owners, the business men and the men of other professions.

The provision of the present sanitary code of the State Health Department, requiring veterinary inspection of cattle producing milk to be sold to the public, is one of the proofs of the growing confidence in our profession. If we make so light of the physical examination, and charge so small a fee that the dairyman feels it is a fake, the consuming public will soon share that belief.

The veterinarian who walks through a stable, makes a few complimentary remarks to the owner and fills out a health certificate,

accepting a small fee, which was not earned and hurries on to graft a little on the next neighbor is sounding the death knell of the veterinary public service.

Are we going to turn the tide of veterinary advancement backward by petty jealousies; by professional acts and by an unhealthy greed for a few dollars?

Can we not take some action here to-night that will put the Western New York Veterinary Medical Society on record as being opposed to these unethical and unprofessional methods? Let us do our part to uphold the dignity and maintain the honor and respect our chosen profession deserves.

—According to State Veterinarian C. J. Marshall of Pennsylvania, the number of horses, mules, vehicles, etc., exported on account of the European war is as follows: "From Sept. 1, 1914 to June 1, 1916, this country has shipped to the belligerent nations 611,700 horses valued at \$134,943,456; 167,387 mules valued at \$34,198,955; wagons valued at \$2,461,611; harnesses and saddles valued at \$25,739,015, a grand total of \$197,343,037. During the same time the value of motor drawn vehicles exported amounted to \$143,122,124. There was a balance in favor of the horse to the extent of more than \$50,000,000." Most of the horses exported are of the kind that would be indispensable to the United States in case of war. As a measure of preparedness, Dr. Marshall holds that the United States should encourage horse breeding in every possible way.

—Dr. A. F. Staub has been transferred from Buffalo, New York, to Dayton Ohio, and placed in charge of the meat inspection work of the Bureau of Animal Industry, vice Dr. Frank L. Gardner, who has resigned to accept a position at a higher salary outside the government service.

—Dr. I. B. Paxton, of Sacramento, California, has removed from that city, and is now an inspector on the tick eradication force of the Bureau of Animal Industry with headquarters at Fort Worth, Texas.

—Dr. Howard Baker, for many years in the employ of the Bureau of Animal Industry as veterinary inspector, has tendered his resignation.

FOWL CHOLERA AND OTHER HEMORRHAGIC SEPTICEMIA IMMUNIZATION EXPERIMENTS*

BERNARD GALLAGHER, Washington, D. C.

INTRODUCTION. In all but one of the experiments here presented, an attempt was made to produce immunity to hemorrhagic septicemia by employing as the immunizing agent living organisms of a strain of fowl cholera bacilli non-virulent for fowls. In the one case excepted a mixture of killed organisms of both virulent and non-virulent strains of fowl cholera bacilli was used. Fowls, rabbits, guinea pigs and white rats were selected for test animals and virulent strains of *Bacillus avisepticus*, *B. bovisepiticus*, *B. suisepiticus* and *B. avisepticus* were used for the purpose of determining the degree of resistance acquired.

In considering the practical importance of tests of immunity conducted along artificial lines, which is the usual method employed, it must be borne in mind that the actual value of the resistance produced is problematical. There is a wide difference between natural and artificial infection, and apparently there is an unknown factor at work in natural fowl cholera outbreaks, since such outbreaks, if due to the fowl cholera bacillus alone, would be easily produced by feeding a virulent culture to susceptible birds. We have failed to produce any symptoms of cholera by feeding several highly virulent strains of fowl cholera organisms. Also susceptible fowls have been placed with artificially infected birds exhibiting severe diarrhea without showing any indication of having contracted the disease. It is assumed of course that fowl cholera is spread through a flock by means of feed and water infected by the excretions of diseased birds. No opportunity has been presented the writer to attempt immunization against a natural outbreak of fowl cholera. The degree to which artificial immunization with fowl cholera organisms would protect against a natural infection must remain unanswered until opportunity is had to make exposure tests.

The degree of immunity conferred against artificial infection in the case of fowl cholera appears to be governed by the amount of infective culture used. The question arises as to when an animal should be considered immune; that is, what amount of virulent

*From the Pathological Division of the Bureau of Animal Industry.

material would constitute a fair test when injected in a given manner. Under natural conditions, we may assume that the amount of infectious material which the animal receives is comparatively small, and that in giving amounts of culture in dilutions lower than 0.01 or 0.001 of a c.c. by hypodermic injection, we are subjecting the animal to greater exposure than would occur under ordinary conditions.

FOWL CHOLERA. EXPERIMENT WITH KILLED ORGANISMS. Our first attempt at immunization against fowl cholera was made with killed cultures of five strains of the fowl cholera organism kindly furnished by Dr. Hadley of the Rhode Island Experiment Station. Preliminary inoculation tests on fowls, rabbits and guinea pigs showed that the strains numbered 16 and 52 were non-virulent in doses of 1 c.c. of a 48 hour bouillon culture, while strains numbered 48, 83 and 91 proved virulent. All were sub-cultured upon plain agar media, the several strains being grown separately and incubated at 37°C. for 48 hours. The growths were then washed off with sterile normal salt solution, emulsified together, standardized to 2,000,000,000 organisms per c.c. and the emulsion divided into three lots for the purpose of developing three types of fowl cholera bacterin. The first lot was heated at 60°C. for one hour and designated Bacterin A. The second lot received sufficient carbolic acid to make a 0.5 per cent solution and was designated Bacterin B. The third lot was diluted with an equal amount of ether, and after an exposure of one hour, the ether was evaporated over a water bath at a temperature of 45°C. and the product designated Bacterin C. After a lapse of 24 hours, cultural tests of the above three bacterins demonstrated that the organisms had been killed in each case by the method used. The purpose of the above procedure was to determine whether the method of killing the organisms had any influence on their immunizing properties.

Twelve fowls were selected from a flock, in which no case of fowl cholera had appeared, and were divided into three groups. Three in each group received 0.2 c.c. of their respective bacterin subcutaneously, while the fourth was not injected and was held as a control. No reaction to the injection was apparent in any of the fowls. After a period of nine days, two of the previously injected fowls in each group received an injection of 0.5 c.c. of their respective bacterin. The object of withholding the injection from

the third bird in each group, which had received one injection, was to determine whether increased resistance was conferred by successive injections. As was the case before, no apparent reactions followed the inoculation. Thirteen days were allowed to elapse after the second injection, before a test was made of the degree of immunity derived from the vaccination. All 12 fowls were then inoculated subcutaneously with 0.000,000,001 c.c. each of a 48 hour bouillon culture of the highly virulent fowl cholera strain 48. A rabbit also received the same amount and served as an additional control.

By comparing the results of the inoculation of strain 48, as shown in the following table, it will be readily apparent that no appreciable immunity had been acquired as a consequence of vaccination. With one exception, all fowls died within a period of 60 hours. In the case of fowl 8 which had received only one injection of Bacterin A, and which survived for 120 hours after inoculation with strain 48, it is quite probable that this fowl possessed a slight natural resistance, since it was observed in later experiments that certain non-immune fowls resisted comparatively large amounts of virulent fowl cholera organisms.

TABLE I.

RESULTS OF IMMUNIZATION WITH KILLED FOWL CHOLERA BACILLI

	FOWL NO.	FIRST INJECT.	INTERVAL	SECOND INJECT.	INTERVAL	FOWL CHOLERA STRAIN 48. 48 HOUR BOUILLON CULTURE SUBCUTANEOUSLY		
						AMOUNT	Result	INTERVAL
Bacterin A	6	0.2 c.c.	9 days	0.5 c.c.	(a) 13 days	0,000,000,001 c. c.	Died	44 hours
	7	0.2 c.c.	9 days	0.5 c.c.	(a) 13 days	"	"	44 hours
	8	0.2 c.c.			22 days	"	"	120 hours
	9	Control				"	"	28 hours
Bacterin B	10	0.2 c.c.	9 days	0.5 c.c.	(a) 13 days	"	"	60 hours
	11	0.2 c.c.	9 days	0.5 c.c.	(a) 13 days	"	"	44 hours
	12	0.2 c.c.			22 days	"	"	44 hours
	13	Control				"	"	48 hours
Bacterin C	14	0.2 c.c.	9 days	0.5 c.c.	(a) 13 days	"	"	60 hours
	15	0.2 c.c.	9 days	0.5 c.c.	(a) 13 days	"	"	28 hours
	16	0.2 c.c.			22 days	"	"	60 hours
	17	Control				"	"	60 hours
Rabbit	3	Control				"	"	36 hours

(a) Represents interval after second injection of bacterin.

TEST OF IMMUNIZATION BY LIVE ORGANISMS. Two fowls which 30 days previously had resisted an intra-abdominal injection of 2 c.c. of a bouillon culture of Fowl Cholera strains 16 and 52 respectively were given an injection of 0.000,000,001 c.c. each of a 48 hour bouillon culture of strain 48 subcutaneously at the same time as the above fowls. Fowl 5 previously injected with strain 16 died in 87 hours, while fowl 4 which had previously received strain 52 showed no apparent symptoms and survived the inoculation.

The result of this experiment tended to prove, as shown by Hadley¹, that inoculation with live organisms of strain 52 conferred an immunity against a subsequent exposure to fowl cholera strain 48. However, an opportunity to test fowl 4 with a larger dose of strain 48 was prevented, owing to the loss of the subject during our extended absence from the laboratory.

TABLE II.

RESULTS OF IMMUNIZATION WITH LIVING FOWL CHOLERA BACILLI

Fowl No.	(a) Fowl Cholera 16	(a) Fowl Cholera 52	Method	Result	Interval	(a) Fowl Cholera 48	Method	Result	Interval
4		2 c.c.	Intra-abd.	No. reaction	30 day	0.000,000,001 c.c.	sub-cut.	Lived	
5	2 c.c.		"	"	"	"	"	Died	85 hours
9						"	"	"	28 hours
Control 13						"	"	"	48 hours
Control 17						"	"	"	60 hours
Control Rabbit 3						"	"	"	36 hours
Control									

(a) 48 hour bouillon culture.

EXPERIMENTS WITH LIVE AVIRULENT ORGANISMS. These experiments were based upon the findings of Hadley, relative to the immunizing powers of live cultures of strain 52 in rabbits and for this purpose a series of fowls, rabbits, guinea pigs, rats and mice were inoculated with living organisms from this strain. It was observed that no apparent reaction followed the injections, with the exception of a slight induration at the point of inoculation in the rabbits and guinea pigs. Since Hadley laid some stress on the

1. Studies on Fowl Cholera. Bulletins of Rhode Island Agr. Exp. Sta.

presence of necrosis and sloughing at the point of inoculation, it was considered possible that the strain had become changed in its character or even replaced by some organism of a similar type during passage in our laboratory, and it was thought advisable to secure a new culture of the strain from Dr. Hadley. It may be stated here, however, that the original culture was later tested for its purity and was found to respond properly to the various media tests, and also its purity was proved by the complement fixation test against known hemorrhagic septicemia serum.

TEST OF IMMUNITY CONFERRED BY FIRST INJECTION OF STRAIN

52. When a period of 26 days had elapsed since the injection of strain 52, a test was made of the resistance acquired to strain 48. Two fowls, two rabbits and two guinea pigs and their controls were inoculated. The fowls received 0.002 c.c. each of a 48 hour bouillon culture, while the rabbits and guinea pigs received 0.001 c.c. each. In the case of the fowls and rabbits, the injections were given subcutaneously. The guinea pigs, because of their natural resistance to subcutaneous injections of hemorrhagic septicemia organisms, were given intra-abdominal inoculations. The following table shows that one fowl resisted the organism, while the other died in 72 hours. However, the unimmunized control also lived, proving that a certain degree of natural resistance may be present, and also that strain 48 was not as virulent for fowls as 14 months previously. All rabbits and guinea pigs were dead within 15 hours after inoculation. It will be noted that one guinea pig and one rabbit had received the original 52 strain intra-abdominally.

TABLE III.
RESULTS OF TESTS OF IMMUNITY CONFERRED BY FIRST INJECTION OF STRAIN 52

Species	Record No.	Fowl Cholera 52 (a)			Fowl Cholera 48 (a)				
		Amount	Method	Result	Interval	Amount	Method	Result	Interval
Fowl	19	1 c.c.	Subcutaneously	No reaction	26 days	0.002 c.c.	Subcutaneously	Sick	72 hours
Fowl	22	"	Subcutaneously	"	26 days	"	"	Died	"
Fowl	36	"	"	"	"	"	"	Sick	"
Rabbit	Control 5	"	Subcutaneously	Slight induration	25 days	0.001 c.c.	"	Died	15 hours
Rabbit	21	"	Intra-abdominally	No Reaction	25 days	"	"	"	15 hours
Rabbit	Control 24	"	"	"	"	"	"	"	15 hours
Guinea Pig	3	"	Subcutaneously	Slight induration	25 days	"	Intra-abdominally	"	15 hours
Guinea Pig	19	"	Intra-abdominally	No Reaction	25 days	"	"	"	15 hours
Guinea Pig	Control 20	"	"	"	"	"	"	"	15 hours

(a) 48 hour bouillon culture.

TABLE IV.
RESULTS OF SECOND INJECTION WITH STRAIN 52

SPECIES	Record No.	FIRST INJECTION				SECOND INJECTION				Result
		Date	Amount	Method	Result	Date	Amount	Method		
Fowl	26	11-9-15	1 c.c.	Subcutaneous	No reaction	12-6-15	1 c.c.	Subcutaneous	Died 2-9-16 Sarcoma	
Fowl	37	11-5-15	1.5 c.c.	Intra-abdominally	No reaction	12-6-15			Died 12-9-15. Cheesy exudate in abdominal cavity	
Rabbit	7	11-6-15	1 c.c.	Subcutaneous	Sl. in duration	12-6-15	1 c.c.	Subcutaneous	Died 3 days	
Rabbit	14	11-6-15	1 c.c.	Subcutaneous	Sl. in duration	12-6-15	1 c.c.	Subcutaneous	Died 5 days	
Rabbit	16	11-6-15	1 c.c.	Subcutaneous	Sl. in duration	12-6-15	1 c.c.	Subcutaneous	Died 9 days	
Rabbit	9	11-6-15	1 c.c.	Subcutaneous	Sl. in duration	12-6-15	1 c.c.	Subcutaneous	Died 2-3-16 Impacted Colon	
Rabbit	10	11-6-15	1 c.c.	Subcutaneous	Sl. in duration	12-6-15	1 c.c.	Subcutaneous	Died 2-1-16	
Guinea Pig	24	11-6-15	1 c.c.	Intra-abdominally	No reaction	12-6-15	1 c.c.	Intra-abdominally	Died 24 hours	
Guinea Pig	4	11-6-15	1 c.c.	Subcutaneous	Induration	12-6-15	1 c.c.	Subcutaneous	Died 18 hours	
Guinea Pig	5	11-6-15	1 c.c.	Subcutaneous	Induration	12-6-15	1 c.c.	Subcutaneous	Died 3 days	
Guinea Pig	8	11-6-15	1 c.c.	Subcutaneous	Induration	12-6-15	1 c.c.	Subcutaneous	Died 4 days	
Guinea Pig	10	11-6-15	1 c.c.	Subcutaneous	Induration	12-6-15	1 c.c.	Subcutaneous	Died 5 days	
Guinea Pig	11	11-6-15	1 c.c.	Subcutaneous	Induration	12-6-15	1 c.c.	Subcutaneous	Died 6½ days	
Guinea Pig	12	11-6-15	1 c.c.	Subcutaneous	Induration	12-6-15	1 c.c.	Subcutaneous	Died 9½ days	
Guinea Pig	14	11-6-15	1 c.c.	Subcutaneous	Induration	12-6-15	1 c.c.	Subcutaneous	Died 1-8-16	
Rabbit	25					10 c.c.		Intra-abdominally	Died 18 hours	

As a result of the above experiment, it was deemed advisable to reinoculate with the fresh culture of 52 received from Dr. Hadley, and accordingly 12 fowls, 15 rabbits and 15 guinea pigs received a second subcutaneous injection of 1 c.c. each of a 48 hour bouillon culture of strain 52. One rabbit and one guinea pig received 1 c.c. each intra-abdominally and one rabbit received 10 c.c. intra-abdominally. Seven guinea pigs and four rabbits died as a direct result of this inoculation. Extensive necrosis and sloughing were present at the point of subcutaneous inoculation in all rabbits and guinea pigs, but was more marked in the latter. No apparent reaction took place in the fowls. Table IV shows the results following the second injection of strain 52.

The severe reaction in rabbits and guinea pigs to the second culture of 52 lent the impression that our original laboratory culture had changed its potency during the continued passage on plain agar without an occasional passage through a young rabbit, a procedure which Hadley had observed affected his cultures adversely.

RESISTANCE OF FOWLS RECEIVING A SECOND INJECTION OF FOWL CHOLERA STRAIN 52 TO FOWL CHOLERA STRAIN 48. After allowing an interval of 38 days to elapse after the second injection of Fowl Cholera strain 52, experiments were begun to determine the degree of resistance acquired to the virulent Fowl Cholera strain 48. Comparatively large amounts were administered to the first series of animals, the intention being to decrease the dose for each successive series until a point was reached at which an active immunity appeared to be present.

The following table shows the results of the injection of a 48 hour bouillon culture of Fowl Cholera strain 48.

TABLE V.
RESISTANCE OF FOWLS TO FOWL CHOLERA STRAIN 48

RECORD NO.	Fowl Cholera Strain No. 52. 48 hour bouillon culture.		Interval	Fowl Cholera Strain No. 48, 48 hour bouillon culture			
	1st inj. 1cc. 48 hr. bouillon culture subcut.	2nd inj. 1cc. 48 hr. bouillon culture subcut.		Date	Amount	Result	Interval
20	Nov. 5, 1915	Dec. 6, 1915	38 Days	1-13-16	1.5 c.c.	Died	22 Hours
21	Nov. 5, 1915	Dec. 6, 1915	38 Days	1-13-16	1 c.c.	Died	36 Hours
38 Control	Nov. 5, 1915	Dec. 6, 1915	59 Days	1-13-16	1 c.c.	Died	36 Hours
23	Nov. 5, 1915	Dec. 6, 1915	59 Days	2- 3-16	.1 c.c.	Died	35 Hours
24	Nov. 5, 1915	Dec. 6, 1915	59 Days	2- 3-16	.01 c.c.	Died	22 Hours
25	Nov. 5, 1915	Dec. 6, 1915	59 Days	2- 3-16	.002 c.c.	Died	60 Hours
39 Control	Nov. 5, 1915	Dec. 6, 1915	65 Days	2- 3-16	.002 c.c.	Died	6½ Days
27	Nov. 5, 1915	Dec. 6, 1915	65 Days	2- 9-16	.001 c.c.	Died	60 Hours
28	Nov. 5, 1915	Dec. 6, 1915	65 Days	2- 9-16	.001 c.c.	Lived	
29	Nov. 5, 1915	Dec. 6, 1915	65 Days	2- 9-16	.002 c.c.	Lived	
30	Nov. 5, 1915	Dec. 6, 1915	65 Days	2- 9-16	.01 c.c.	Died	36 Hours
31	Nov. 5, 1915	Dec. 6, 1915	65 Days	2- 9-16	.01 c.c.	Lived	
32	Nov. 5, 1915	Dec. 6, 1915	65 Days	2- 9-16	.01 c.c.	Lived	
33	Nov. 5, 1915		96 Days	2- 9-16	.002 c.c.	Died	60 Hours
34	Nov. 5, 1915		96 Days	2- 9-16	.001 c.c.	Died	9½ Days
41 Control				2- 9-16	.002 c.c.	Died	7 Days
42 Control				2- 9-16	.001 c.c.	Died	3½ Days

The above table shows that of the eleven fowls receiving two injections of 52, seven died as a result of subcutaneous injections of a 48 hour bouillon culture of strain 48 in amounts of from 1.5 to 0.001 c.c. while four fowls survived injections ranging between 0.01 and 0.001 c.c. Fowls 33 and 34 which had received only one injection of 52 succumbed to doses of 0.002 and 0.001 c.c. respectively.

It will be noted that the susceptible controls showed considerable resistance as compared to a number of the treated fowls, and in this connection it may be mentioned that on November 18, 1915, susceptible fowl 35 resisted 0.01 c.c. of a 48 hour bouillon culture, although fairly severe symptoms of cholera were apparent. On February 9, 1916, this bird received 3 c.c. of a 48 hour bouillon culture of strain 48 and died in 19 hours, (See Table VI) the previous injection of 48 failing to immunize against itself. A fowl which was placed in a cage with the above while the latter was sick from first injection succumbed to 0.002 c.c. of strain 48 in a period of 22 hours. This fowl showed no indication of having contracted cholera through exposure. While a certain amount of resistance is in evidence in fowls receiving dilutions above 0.01 c.c. still too much weight cannot be attached to this fact, since susceptible controls also show a degree of resistance to similar amounts.

RESISTANCE OF APPARENTLY IMMUNE FOWLS TO LARGER AMOUNTS OF FOWL CHOLERA STRAIN 48. FOWLS which had shown resistance to varying amounts of strain 48 were later given one or even two additional doses of lower dilutions to determine the degree of immunity present. Results are shown in the following table:

TABLE VI.
SHOWING FURTHER EXPERIMENTS ON FOWLS WHICH RESISTED ONE OR MORE INJECTIONS OF FOWL CHOLERA 48

Record No.	Date of 1st injection of 48	Second injection of 48, 48 hour bouillon culture			Third injection of 48, 48 hour bouillon culture			Result
		Date	Amount	Method	Date	Amount	Method	
35	Nov. 18, 1915	2-9-16	3 c.c.	Subcutaneous	Died 19 hrs.			Died 1-3-16 Anemia
41	Feb. 9, 1916		0.002 c.c.	subcutaneous	Died 7 days			Died 15 hours
19	Dec. 1, 1915							
36	Dec. 1, 1915	1-13-16	1.5 c.c.	Subcutaneous	Lived	2-9-16	2 c.c.	Intra-abdominally
38	Jan. 13, 1916		1 c.c.	Subcutaneous	Died 36 hrs.			
*42	Feb. 9, 1916						0.001 c.c.	Subcutaneous
28	Feb. 9, 1916	3-15-16	1 c.c.	Subcutaneous	Lived			Died 3½ days
29	Feb. 9, 1916	3-15-16	1 c.c.	Subcutaneous	Lived			Died 2-29-16 Aspergillosis
31	Feb. 9, 1916	3-15-16	1 c.c.	Subcutaneous	Died 64 hrs.	8-1-16	1 c.c.	Died 4-6-16 Anemia
32	Feb. 9, 1916	3-15-16	1 c.c.	Subcutaneous	Died 24 hrs.			Lived
*43	Mar. 15, 1916							
*44	Aug. 1, 1916						0.2 c.c.	Subcutaneous

*Control

It will be noted that fowls 19 and 28 died of other causes before a second injection could be given.

Fowls 35 and 36 had not received an injection of strain 52, but had shown a natural resistance to strain 48, the former succumbed to 3 c.c. of 48 subcutaneously on second injection, while the latter failed to resist 2 c.c. given intra-abdominally on the third injection.

Of the three immunized fowls which received a second injection, 29, 31 and 32, the latter died from a dose of 1 c.c. of strain 48 subcutaneously, while the former two survived. Fowl 29 died 22 days later of anemia. On Aug. 1, 1916, fowl 31 was again inoculated with strain 48, 1 c.c. being given subcutaneously. No symptoms were observed, and apparently complete immunity was present. However, fowl 44 a susceptible control resisted 0.2 c.c. of strain 48 although it became sick and passed greenish droppings. The pathogenicity of the culture for fowls had evidently become greatly lessened since several days previously a young chicken had resisted 0.01 c.c. of a 48 hour culture of strain 48 given subcutaneously.

RESISTANCE OF RABBITS RECEIVING A SECOND INJECTION OF FOWL CHOLERA 52 TO FOWL CHOLERA 48. In this experiment ten immunized rabbits were given amounts of a 48 hour bouillon culture of strain 48, ranging from 1 c.c. to 0.0001 c.c. subcutaneously.

The following table shows that with the exception of rabbit 8, which resisted 1 c.c. of strain 48, death was produced by dilutions of 0.01 c.c. or lower. In higher dilutions the resistance was apparently complete since control rabbits were susceptible to corresponding amounts of the virulent culture.

RESISTANCE OF APPARENTLY IMMUNE RABBITS TO LARGER AMOUNTS OF FOWL CHOLERA STRAIN 48. In this experiment rabbit 8 which had resisted 1 c.c. of strain 48 was given 2 c.c. of the same strain subcutaneously. Death resulted in 41½ days, while the control died in 35 hours as a result of an injection of 0.001 c.c. of the same culture.

The other four immunized rabbits received 1 c.c. of strain 48 subcutaneously. Three died in 64 hours or less, while one lived, although it remained badly emaciated for several weeks. On Aug. 1, 1916 this rabbit was given a third injection of strain 48, 1 c.c. being given subcutaneously. No bad results followed. The control received 0.2 c.c. of strain 48 and died in less than 18 hours. Rabbit 19 had acquired an immunity to 48, which had persisted for 41½ months and was evidently complete for a comparatively large amount of culture.

TABLE VII.

SHOWING RESISTANCE OF IMMUNIZED RABBITS TO FOWL CHOLERA STRAIN 45

Record No.	Fowl Cholera 52, 1st injection 1 c.c. 48 hour bouillon culture subcutaneously		Fowl Cholera 48, 48 hour bouillon culture subcutaneously		Result	Interval
	2nd injection 1 c.c. 48 hour bouillon culture subcutaneously	Interval	Date	Amount		
5	Nov. 6, 1915	Dec. 6, 1915	38 days	1 c.c.	Lived	15 Hours
6	Nov. 6, 1915	Dec. 6, 1915	38 days	0.5 c.c.	Died	15 Hours
*27				0.5 c.c.	Died	15 Hours
11	Nov. 6, 1915	Dec. 6, 1915	59 days	0.1 c.c.	Died	60 Hours
12	Nov. 6, 1915	Dec. 6, 1915	59 days	0.01 c.c.	Died	60 Hours
13	Nov. 6, 1915	Dec. 6, 1915	59 days	0.001 c.c.	Lived	35 Hours
*28				0.001 c.c.	Died	9 1/2 Days
15	Nov. 6, 1915	Dec. 6, 1915	65 days	0.01 c.c.	Died	36 Hours
17	Nov. 6, 1915	Dec. 6, 1915	65 days	0.005 c.c.	Lived	15 Hours
18	Nov. 6, 1915	Dec. 6, 1915	65 days	0.001 c.c.	Lived	15 Hours
19	Nov. 6, 1915	Dec. 6, 1915	65 days	0.001 c.c.	Lived	15 Hours
20	Nov. 6, 1915	Dec. 6, 1915	65 days	0.0001 c.c.	Lived	15 Hours
*29				0.0001 c.c.	Died	36 Hours
22	11-6-15 Intra-abd.	12-6-15 Intra-abd.	59 days	0.01 c.c.	Died	15 Hours
26	12-9-15 "	10 c.c.	56 days	0.1 c.c.	Died	15 Hours
*28				0.001 c.c.	Died	35 Hours

*Control

TABLE VIII.
SHOWING FURTHER EXPERIMENTS ON RABBITS WHICH RESISTED ONE OR MORE INJECTIONS OF FOWL CHOLERA 48

Record No.	Date of First injection of 48	Second Injection of 48, 18 hour bouillon culture			Third Injection of 48, 48 hr. bouillon culture					
		Date	Amount	Method	Result	Date	Amount	Method	Result	
8	Jan. 13, 1916	2-3-16	2 c.c.	Subcutaneously	Died ½ Days					
*28	Feb. 3, 1916		0.001 c.c.	Subcutaneously	Died 35 Hours					
13	Feb. 3, 1916	3-15-16	1 c.c.	Subcutaneously	Died 61 Hours					
17	Feb. 9, 1916	3-15-16	1 c.c.	Subcutaneously	Died 17 Hours					
18	Feb. 9, 1916				Died 2-27-16					
19	Feb. 9, 1916	3-15-16	1 c.c.	Subcutaneously	Lived		8-1-16	1 c.c.	Subcut.	Lived
20	Feb. 9, 1916	3-15-16	1 c.c.	Subcutaneously	Died 40 Hours					
*30	Mar. 15, 1916		0.01 c.c.	Subcutaneously	Died 17 Hours					
*31	Aug. 1, 1916									

*Control

RESISTANCE OF GUINEA PIGS RECEIVING TWO INJECTIONS OF FOWL CHOLERA STRAIN 52 TO FOWL CHOLERA STRAIN 48. Eight immunized guinea pigs were used in this series. Animals 7 and 6 received 1 c.c. and 0.5 c.c. respectively. The former showed resistance, while the latter receiving a lesser amount, died in 36 hours. However, the control animal receiving a similar amount lived, thus showing the natural resistance of guinea pigs to subcutaneous inoculation of hemorrhagic septicemia organisms. The remainder of the experiments on guinea pigs were conducted with intra-abdominal injections, amounts of 48 ranging from 0.01 c.c. to 0.000,000,1 c.c. being given.

The following table IX shows that animals receiving 0.01 c.c. and 0.001 c.c. died in 22 hours, while those receiving 0.0001 c.c. or less resisted the inoculation. A control which received only 0.000,000,1 c.c. of strain 48 died in 19 hours.

RESISTANCE OF APPARENTLY IMMUNE GUINEA PIGS TO LARGER AMOUNTS OF FOWL CHOLERA STRAIN 48. In this series two immunized animals were given 0.1 c.c. of strain 48 intra-abdominally, and three including 22, a former control which resisted 48 subcutaneously, were given 0.01 c.c. in the same manner. Seven and 22 survived, the latter dying 20 days later from toxemia as a result of a severe local necrosis at the point of injection. Nos. 16, 17 and 18 failed to resist the injection.

TABLE IX.
SHOWING RESISTANCE OF IMMUNIZED GUINEA PIGS TO FOWL CHOLERA STRAIN 48

Record	Fowl Cholera 52, 48 hour Bouillon Culture		Fowl Cholera 48, 48 hour Bouillon Culture			
	First Injection 1 c.c. subcut ^{ly}	2nd Injection 1 c.c. subcut ^{ly}	Date	Amount	Method	Result
7	Nov. 6, 1915	Dec. 6, 1915	1-13-16	1 c.c.	Subcutaneous	Lived
6	Nov. 6, 1915	Dec. 6, 1915	1-13-16	0.5 c.c.	Subcutaneous	Died 36 Hours
*22			1-3-16	0.5 c.c.	Subcutaneous	Lived
9	Nov. 6, 1915	Dec. 6, 1915	2-3-16	0.01 c.c.	Intra-abdominally	Died 22 Hours
13	Nov. 6, 1915	Dec. 6, 1915	2-3-16	0.001 c.c.	Intra-abdominally	Died 22 Hours
*23			2-3-16	0.001 c.c.	Intra-abdominally	Died 24 Hours
15	Nov. 6, 1915	Dec. 6, 1915	2-9-16	0.0001 c.c.	Intra-abdominally	Lived
16	Nov. 6, 1915	Dec. 6, 1915	2-9-16	0.00001 c.c.	Intra-abdominally	Lived
17	Nov. 6, 1915	Dec. 6, 1915	2-9-16	0.000001 c.c.	Intra-abdominally	Lived
18	Nov. 6, 1915	Dec. 6, 1915	2-9-16	0.0000001 c.c.	Intra-abdominally	Lived
*25			2-9-16	0.0000001 c.c.	Intra-abdominally	Died 19 Hours

*Control

TABLE X.

SHOWING FURTHER EXPERIMENTS ON GUINEA PIGS WHICH RESISTED ONE OR MORE INJECTIONS OF FOWL CHOLERA 48

Record No.	Date of First Injection of 48	Second Injection of 48, 48 hour Bouillon Culture			Third Injection of 48, 48 hour Bouillon Culture			Result
		Date	Amount	Method	Date	Amount	Method	
7	Jan. 13, 1916	2-3-15	0.01 c.c.	Intra-abdominal	3-15-16	1 c.c.	Intra-abdominal	Died 17 Hours
22	Jan. 13, 1916	2-3-15	0.01 c.c.	Intra-abdominal				Died 2-23, Severe Local Necrosis.
*23	Feb. 3, 1916		0.001 c.c.	Intra-abdominal				
15	Feb. 9, 1916							
16	Feb. 9, 1916	3-15-16	0.1 c.c.	Intra-abdominal				Died 3-4-16 Necrosis of Liver
17	Feb. 9, 1916	3-15-16	0.1 c.c.	Intra-abdominal				
18	Feb. 9, 1916	3-15-16	0.01 c.c.	Intra-abdominal				
*26	Mar. 15, 1916		0.01 c.c.	Intra-abdominal				

*Control

No. 7 appeared to have acquired an immunity, however, as shown in Table X, an injection of 1 c.c. of strain 48 intra-abdominally 41 days later caused death in 17 hours.

RESISTANCE OF RATS AND MICE RECEIVING STRAIN 52 TO STRAIN 48. Two rats and one mouse were used in a preliminary experiment.

The following table shows that immunized rat 2 resisted 0.01 c.c. of strain 48 subcutaneously, but 35 days later failed to resist a dose of 1 c.c. of 48 intra-abdominally. Its control 3 resisted 0.002 c.c. of 48 subcutaneously, and 35 days later resisted 0.5 c.c. of 48 intra-abdominally, dying one month later of unknown cause. Control 4 resisted 0.1 c.c. of strain 48 intra-abdominally, indicating that certain individuals at least have a high natural resistance to fowl cholera organisms.

Mouse 1 failed to resist 0.001 c.c. of strain 48 subcutaneously after receiving two injections of strain 52.

IMMUNIZING POWER OF FOWL CHOLERA STRAIN 52 AGAINST OTHER STRAINS OF THE HEMORRHAGIC SEPTICEMIA ORGANISM. For this experiment 20 rabbits were inoculated on May 31, 1916 with 1 c.c. each of a 48 hour bouillon culture of Fowl Cholera strain 52 subcutaneously. Local necrosis at the point of inoculation followed in all cases, and one animal succumbed to the injection, dying apparently of toxemia.

On July 5, 1916, 35 days later, 10 of the above animals were injected with virulent strains of hemorrhagic septicemia organisms recently recovered from natural outbreaks of the disease. Three bovine strains from widely separated sources, one ovine and one porcine strain were used in amounts of 0.01 c.c. of a 48 hour bouillon culture. The organisms were introduced subcutaneously, and two rabbits and a susceptible control were employed for each strain. Table XII shows that no protection against *B. bovissepticus* A was conferred. *B. bovissepticus* B and *B. bovissepticus* C were pathogenic in each case to one treated rabbit, and its control, *B. ovisepticus* failed to affect the control animal, hence resistance on the part of the immunized rabbits cannot be considered. *B. suissepticus* failed to prove virulent to either of the immunized animals, while the control died within 16 hours.

On August 11, a treated rabbit was given 0.2 c.c. of *B. bovissepticus* B, no bad results following. Another was given 0.2 c.c. of *B. bovissepticus* C and died within 40 hours. Four treated rab-

TABLE XI.

SHOWING RESISTANCE OF RATS AND ONE MOUSE TO FOWL
CHOLERA STRAIN 48

Species	Record No.	FOWL CHOLERA 52							
		1st Injection				2nd Injection			
		Date	Amount	Method	Result	Date	Amount	Method	Result
White Rat	1	Nov, 10 1915	0.5 c.c.	Intra-abdominal	No reaction				
"	2	Nov, 10 1915	0.5 c.c.	Subcutaneous	No reaction	Dec. 6, 1915	1 c.c.	Subcutaneous	No reaction
"	*3								
"	†4								
White Mouse	1	Nov, 10 1915	0.25 c.c.	Subcutaneous	No reaction	Dec. 6, 1915	0.5 c.c.	Subcutaneous	No reaction

Species	Record No.	FOWL CHOLERA 48							
		1st Injection				2nd Injection			
		Date	Amount	Method	Result	Date	Amount	Method	Result
White Rat	1	Feb. 9, 1916	0.002 c.c.	Subcutaneous	Died 66 Hours				
"	2	Feb. 9, 1916	0.01 c.c.	Subcutaneous	Lived	Mar. 15 1916	1 c.c.	Intra-abdominal	Died 17 Hours
"	*3	Feb. 9, 1916	0.002 c.c.	Subcutaneous	Lived	Mar. 15 1916	0.5 c.c.	Intra-abdominal	Lived
"	†4					Mar. 15 1916	0.1 c.c.	Intra-abdominal	Lived
White Mouse	1	Feb. 9, 1916	0.001 c.c.	Subcutaneous	Died 36 Hours				

*3. Died April 17, 1916.

†4. Died July 29, 1916.

TABLE XII.

SHOWING RESISTANCE OF IMMUNIZED RABBITS TO STRAINS OF HEMORRHAGIC SEPTICEMIA OTHER THAN FOWL CHOLERA

Record No.	F. C. Strain No. 52, 1 c.c. 48 hr. bouillon cult. subcut.		Hemorrhagic Septicemia Strains Simultaneous Injection							
	Date	Result	Bovisep- tious A	Bovisep- tious B	Bovisep- tious C	Ovisep- tious	Suisep- tious	Date	Amount	Result
51	5-31-16	Local Necrosis	+					7- 5-16	0.01 c.c.	Died 6 Days
52	"	"	+					7- 5-16	0.01 c.c.	Died 8 Days
*53	"	"	+					7- 5-16	0.01 c.c.	Died 16 Hours
54	"	"		+				7- 5-16	0.01 c.c.	Died 4 Days
55	"	"		+				7- 5-16	0.01 c.c.	Lived
*56	"	"		+				7- 5-16	0.01 c.c.	Died 16 Hours
57	"	"		+				8-11-16	0.2 c.c.	Lived
*58	"	"		+				8-11-16	0.1 c.c.	Died 16 Hours
59	"	"			+			7- 5-16	0.01 c.c.	Died 4 Days
60	"	"			+			7- 5-16	0.01 c.c.	Lived
*61	"	"			+			7- 5-16	0.01 c.c.	Died 16 Hours
62	"	"			+			8-11-16	0.2 c.c.	Died 40 Hours
*63	"	"			+			8-11-16	0.1 c.c.	Died 40 Hours
64	"	"				+		7- 5-16	0.01 c.c.	Lived
65	"	"				+		7- 5-16	0.01 c.c.	Lived
*66	"	"				+		7- 5-16	0.01 c.c.	Lived
68	"	"					+	7- 5-16	0.01 c.c.	Lived
69	"	"					+	7- 5-16	0.01 c.c.	Lived
*70	"	"					+	7- 5-16	0.01 c.c.	Died 16 Hours
71	"	"					+	8-11-16	0.1 c.c.	Lived
72	"	"					+	8-11-16	0.5 c.c.	Lived
73	"	"					+	8-11-16	1 c.c.	Lived
74	"	"					+	8-11-16	2 c.c.	Lived
*75	"	"					+	8-11-16	0.01 c.c.	Died 16 Hours

*Control

bits were given amounts of *B. suis* ranging from 0.1 to 2 c.c. respectively, without noticeable bad effect in any individual. The control died in 16 hours from a culture dilution of 0.01 c.c.

FURTHER EXPERIMENTS ON ANIMALS WHICH RESISTED VIRULENT CULTURES ON 7-5-16. In this experiment rabbit 55, which had resisted 0.01 c.c. of *B. bovis* B was given 1 c.c. of the same strain 37 days later. No bad results followed. Rabbit 60, which resisted 0.01 c.c. of *B. bovis* C received 2 c.c. of this strain again on August 11, without showing a reaction. The three rabbits which had not succumbed to *B. bovis* were again injected with the same strain in the amount of 2 c.c. A control was given 1 c.c. Death resulted in each case within 40 hours. Apparently no special immunity had been conferred since the control had shown as much resistance as the treated animals. Rabbit 68 of the *B. suis* series was lost through death from peritonitis on August 10. Its mate 69 of the same experiment on July 5 was again inoculated on August 11 with 1 c.c. of *B. suis*. No bad effects were observed. Apparently culture 52 confers absolute immunity against this particular strain of *B. suis* and it is our intention to continue these experiments, using other strains of *B. suis* and testing the immunity produced by culture 52 in swine.

CONCLUSIONS. No noticeable resistance is conferred to fowls by the use of killed fowl cholera bacilli as immunizing agents.

Fowl cholera strain 52 in the live state confers a marked resistance to a highly virulent strain of the fowl cholera bacillus. The immunity is not absolute, since dilutions of 0.01 c.c. to 1 c.c. of a virulent culture are usually fatal in fowls, rabbits and guinea pigs.

Strain 52 also confers a fair degree of immunity to rabbits against certain strains of *B. bovis* and complete immunity to a virulent strain of *B. suis*.

—It is reported that up to October 1, 1916, the exportation from the United States of animals intended for war purposes amounted to 731,313 horses and 223,708 mules, with a value of about \$200,247,486.

—Veterinarian Daniel LeMay, 4th Field Artillery, retired December 8, 1916, with the rank of Major.

CLINICAL AND CASE REPORTS

“Knowledge is born in laboratories and in the experience of the thoughtful. It develops form in the journals and ‘when dead it is decently buried in books’.”

INTUSSUSCEPTION OF SMALL INTESTINE OF A COW

J. N. FROST, Ithaca, N. Y.

Patient was a grade Guernsey heifer sent to the surgical clinic by the Professor of ambulatory clinic, with the diagnosis of intussusception of intestine and the following history:

Animal was found standing with hind legs stretched backward, treading constantly. Feces had been passed only once in last twenty-four hours and patient had not eaten in forty-eight hours. Milk secretion had ceased. Pulse 100, temperature 101.4. Breathing was rapid and shallow. Mucous membranes were pale and the extremities were cold with the animal shivering. Peristalsis was fair on the left side but suppressed on right and pressure on lower part of abdomen on right side brought symptoms of pain. Rectal examination found the posterior intestinal tract empty except for bloody mucus. Intussusception of small intestine was found on right side of abdominal cavity.

Owing to the drifted condition of the roads the animal was not brought to the clinic for forty-eight hours after the diagnosis was made.

Mar. 20, 1916. When the animal was brought to clinic she was very weak. Movements were stiff and unsteady and the abdominal muscles were contracted and tense. Animal was straining continually and passing some bloody mucus. Respiration rapid and shallow. Peristalsis and contraction of rumen absent. Pulse 120, temperature 101.8.

Area on right flank was shaved; washed with gasoline and painted with tincture of iodine. Animal was given one ounce of chloral hydrate in two quarts of water per rectum and placed on the operating table. Cocaine was injected locally over the line of incision.

Incision was made through the skin; the muscle fibres were separated and the peritoneum punctured. An assistant then grasped the intestine and brought the intussuscepted portion up through the incision. The jaws of two pairs of dressing forceps

were covered with rubber tubing to lessen the injury to the intestines and one pair was clamped on each side and about two inches from the intussuscepted intestine. Three feet of the intussuscepted intestine were then removed and end to end anastomosis was performed in the following way: The mesentery was cut away from the diseased portion of the intestine; the blood vessels ligated and the intestine removed. The cut ends of the intestine were then sutured with two rows of intestinal sutures, bringing the serous coats together and the mesentery was folded and sutured to the intestine. During the operation the intestine was frequently washed with normal salt solution. The skin and muscle wounds were closed with a single row of sutures.

The animal was then removed from the table and given an enema of warm salt solution and a stimulating drench of capsicum and nux vomica. Drench and enema were repeated six hours later.

Mar. 21, 1916. Eighteen hours after operation the cow had passed feces three times. Drank a pail of warm water and ate a quart of bran. Pulse 90, temp. 101.8. Enema and drench repeated twice daily.

Mar. 22, 1916. Fair amount of feces mixed with mucus passed during the night. Ate bran and alfalfa and drank water. Drench and enema repeated. Pulse 88, temp. 102.

Mar. 23, 1916. Animal eating, drinking and chewing cud. Feces passed without mucus. Drench repeated daily; enema discontinued. Pulse 72, temp. 101.6.

Mar. 24, 1916. Improvement continues. Pulse 70, temp. 101.6.

Mar. 25, 1916. Improvement continues. Pulse 68, temp. 102. Slight suppuration of skin wound; surface painted with iodine.

Mar. 26, 1916. Feces passed with large amount of mucus. Pulse 65, temp. 101.7. During the day the cow aborted a two months fetus. The uterus was irrigated with $\frac{1}{4}\%$ Lugol's solution and the membranes were expelled.

Mar. 27, 1916. Pulse 70, temp. 102.2. Slight discharge from the vagina. The external genitals were washed with $\frac{1}{2}\%$ Wescol solution and the vagina irrigated with normal salt.

Mar. 28, 1916. Slight suppuration of skin wound. The stitches were removed and surface of wound painted with iodine. Pulse 65, temp. 101.

Mar. 29, 1916. Small amount of necrotic tissue removed from the skin wound and the surface painted with iodine. Irrigated uterus with normal salt solution. Milk now being secreted. Pulse 60, temp. 101.

Mar. 30, 1916. Feces normal; animal on full diet with increase in milk. Pulse 60, temp. 101.6. The external wound was treated with iodine daily until complete healing had taken place.

RUPTURE OF THE PREPUBIAN TENDON OF A COW*

M. W. SULLIVAN, Marcellus, N. Y.

The subject was a large grade Holstein about four years old. On the first visit, the owner said the cow was due to calve in two weeks and he mistrusted a dead calf. I made a careful examination and everything appeared normal and the calf still alive. Animal showed no symptoms of pain but did not care to eat very much. I administered a laxative and prescribed a tonic and bitter for the appetite. Owner called again in three days stating that the cow was no better, but on calling I could not find anything wrong except that she was still off her feed.

About four days later I was again called, the owner stating a large swelling had appeared on the belly. The cow was in a large box stall with plenty of straw on the floor and I readily agreed with him, for her abdomen nearly touched the straw. I concluded there must be a rupture of the prepubian tendon to allow this condition although I could not find any information on the subject in the cow. The cow had showed no symptoms of wanting to calve but I decided to remove the calf. The os uteri had not dilated as yet but after repeated efforts I finally delivered two calves, one a posterior and the other an anterior presentation. I was unable to save the calves for it took so long to deliver them. The first calf delivered weighed seventy-five pounds and the second seventy-eight, making a total of one hundred fifty-three pounds of calves.

I attempted to remove the placenta but, on account of the enlargement and displacement of the uterus, I could not reach the cotyledons, so very little was removed. The cow began discharg-

*Read before the Central New York Veterinary Medical Association.

ing and finally developed metritis, which I could not treat satisfactorily on account of the conditions above stated. The animal gradually grew weaker and we decided there was no help, so she was killed by owner.

LIVER LESIONS IN FOWL CHOLERA

J. B. HARDENBERGH, AND FRED BOERNER, JR., Philadelphia, Pa.

Specimen No. 7843—Three turkeys (dead).

HISTORY:—Dealer purchased large number of turkeys for holiday trade. Twenty-four hours after getting them home found several dead. Purchasers of the live birds began to return dealer the dead fowls. Veterinarian called submitted several for examination. Autopsies on all three were practically identical as follows:

AUTOPSY:—Lungs edematous; pericardial sac contained excessive amount of serous fluid; pericardium and epicardium showed petechiae and ecchymoses; spleen swollen and congested; liver congested and presented innumerable small yellow foci throughout resembling avian miliary tuberculosis but too small to be easily confused with lesions of entero-hepatitis. On section appeared macroscopically as small infarcts.

Intestinal tract inflamed throughout entire length with excessive reddening of mucous membrane in small areas. Caeca inflamed and showed in lower portion several small tumefactions with thickened mucous membrane and increased redness. Small amount of fluid in peritoneal cavity.

Smears from heart blood, spleen and yellow liver foci showed typical bipolar organisms in large numbers.

Cultures examined twenty-four hours later showed pure strains of *B. avisepticus*.

Animal inoculations on hens, rabbits and guinea pigs resulted in death of all in from twenty-four to forty-eight hours. Hens showed typical lesions of fowl cholera on autopsy including the liver lesions. One guinea pig and one rabbit showed the same liver lesions.

Histological sections of liver showed microscopically cloudy swelling—congestion and small areas of necrosis containing masses of bipolar bacilli.

The finding of liver lesions (only occasionally mentioned in the literature) and inflamed caeca in turkeys may confuse with entero-hepatitis unless a bacteriological examination is made, therefore this report.

CARCINOMA OF GLOTTIS IN COW

F. A. WALTER, D.V.M., Lemont, Ill.

Upon receiving a hurry up call on Monday, January 9, 1917, I found the cow in extreme distress. A great quantity of frothy material was oozing from the mouth and nostrils.

The history of the case disclosed the fact that she had been suffering for some time with difficult respiration and symptoms above mentioned, but the owner did not deem it necessary to call a doctor.

I proceeded to operate and inserted a tracheotomy tube which afforded instant relief.

I placed the animal on soft diet, of which she partook sparingly, and saw her next day whereupon owner told me she refused to eat any more. Upon further examination I found the omo hyoides and sterno cephalicus greatly swollen; thyroid gland enlarged and offensive discharge through the mouth and nostrils.

I pronounced the case incurable, diagnosing it as carcinoma of glottis.

The cow was destroyed and glottis removed. A typical cauliflower growth, completely filling the glottis, was found which was unmistakably cancerous.

—Action has been delayed upon the Lobeck bill in the interests of the employees of the Bureau of Animal Industry by the press of other work. It would be of material benefit to the committee if the state and local veterinary associations as well as individual veterinarians would adopt favorable resolutions and write letters to the committee and to the congressmen and senators from their districts.

ABSTRACTS FROM RECENT LITERATURE

STRANGULATED INTESTINAL AND DISTINCT INGUINAL HERNIA IN A MARE. Veterinary Major Pezet. *Rec. de Med. Veterinaire*. A ten-year-old artillery mare inflicted upon herself, in the left gluteal and mammary regions, a deep wound accompanied with excessive lameness. The wound of the gluteal region healed after a month and only the ectopia of the small intestine remained evident. It appeared to be a case of chronic inguinal hernia. After some time, the mare manifested a violent attack of colic, which suggested the diagnosis of strangulation for which the mare was to be operated. This was done with all care and the intestine was found to be normal and only slightly congested. It was reduced after some peritoneal adhesions had been broken up or dissected. Suddenly the mare stopped breathing and notwithstanding all restorative measures, died.

Post mortem.—Abundant reddish fluid collection in the abdomen—peritoneum inflamed—small intestine normal in its first half but purplish in the last. The large colon and cæcum being removed, there was exposed in the superior part of the mesentery a tear, 15 centimeters long, through which a portion of the small intestine had passed and been strangulated. The tear was ante-mortem with its edges well organized. Around the inguinal canal the parts were normal. All the organs in the body were healthy.

It was the strangulation of the intestine, passed through the tear of the mesentery, which had given rise to all the symptoms attributed to the chronic inguinal hernia. LIAUTARD.

A GRANULOMATOUS AFFECTION OF THE HORSE—HABRONEMIC GRANULOMATA (CUTANEOUS HABRONEMIASIS OF RAILLIET). Lionel B. Bull. *Jour. Comp. Path. and Therapeutics*, Sept. 30, 1916. v. 29, No. 3, pp. 187-199, 5 figs.—This paper deals with granulomata, usually located about the urethral orifice in the glans penis of the horse, but also occurring on the sheath, rarely elsewhere. The condition is said to be not very uncommon in certain parts of Australia, where these tumors are usually regarded as botryomycotic granulomata, the localities now known for the disease being South Australia and the northern part of Victoria. It probably has a wider distribution in Australia.

The tumors appear suddenly and grow rapidly for the first three or four weeks. Subsequently they gradually enlarge, and us-

usually show no tendency to disappear. The tumors are recognized by their situation, their tough, fibromatous nature, and by the appearance of small, yellowish points under the epithelium in regions where the skin is unpigmented. In size the tumors may be as large as a pea or from that to larger than a walnut, when on the glans penis, and may be even larger when on the sheath. They may be single or multiple, and are usually ulcerated on the surface. On section they are tough and firm, greyish to pinkish in color, and contain scattered, irregular, yellowish, caseous areas which may be as small as a pin point or 1 mm. by 4 to 5 mm. in diameter. These areas may contain calcareous matter; they may be close together or scattered; they may be easily enucleated in the older lesions, and on enucleation are seen to be irregular in shape and sometimes branching. Microscopic examination shows the superficial granulation tissue of the ulcers, with a marked infiltration of the tissues with eosinophiles; the stratum corneum is slightly thickened; the rete mucosum is hypertrophic and usually slightly infiltrated with eosinophiles; the cutis vera is normal except for a slight invasion with eosinophiles; immediately under the cutis vera the eosinophile infiltration is very marked, the eosinophiles at times so numerous as to fill all the lymph spaces, leaving only a connective tissue stroma supporting them; there is an increase in small blood vessels, hyperplasia of fixed connective tissue cells, and there are areas of embryonic connective tissue cells and some caseous areas. The surrounding tissue reaction is represented by a proliferation of the fixed cells, with sometimes the formation of a well defined fibrous capsule.

The particularly interesting feature about these lesions is the occurrence within the necrotic areas of the remains of larval nematodes and the presence of spaces previously occupied by these worms. An examination of these nematodes shows that they closely resemble the larval *Habronema* as figured by Ransom. (*Habronema* is the genus in which are now placed the worms formerly known as *Spiroptera microstoma* and *Spiroptera megastoma* from the stomach of the horse.) These parasites are accidental in these tumors, as they cannot possibly complete their life history here. They belong, therefore, to the cutaneous habronemiasis, such as "summer sores", "granular dermatitis", and "esponja." (For a review of papers dealing with this topic, see the Journal of the A.V.M.A. for March, 1916.) Bull does not agree with Railliet's

surmise (which is also that of Descazeaux) that the embryo worms from manure enter the skin, and is of the opinion that the worms are carried by biting flies, inoculation with the worm taking place as the fly feeds.

Bull is of the opinion that the "swamp cancer", or "equine granulomata" of Lewis, found in the Northern Territory of Australia, is a similar habronemiasis.

The treatment advised is the complete excision of the lesion before it becomes inoperable. Prophylaxis is a matter of ridding horses of the adult worms in the stomach, and attention to the breeding places of the flies.

M. C. HALL.

EMPHYEMA OF NASAL BONES IN A THOROUGHBRED STALLION. Edward Langford, M.R.C.V.S. and W. M. Scott, F.R.C.V.S. *Veterinary Record*. The stallion had never had influenza, strangles or even catarrh and his molars were in excellent condition. He had a foul smelling, grumous appearing, muco-purulent discharge from the left nostril with much swelling of the submaxillary glands. He was in good condition and served mares. Steaming of the nostrils, tonic medicines, a run to grass, insufflation of the nasal cavities with iodoform alternated with injections of chinisol solutions, all failed to relieve him. He was operated by trephining over the nasal bones, curetting of the cavity, the ethmoid bone, the frontal and superior maxillary sinuses and all detached bones were removed. The operation was accompanied with much hemorrhage. The subsequent treatment consisted in irrigations of the nasal cavities with normal saline solution, alternated with tincture of iodine and permanganate. An antigen vaccine was prepared and one ampule injected weekly. After nearly one month the wound was found granulating, the discharge was slightly intermittent and with very slight odor. After a fortnight recovery was complete.

Scrapings of the tissues removed by the curetting, revealed the presence of *Streptococcus brevis*, *Bacillus necrosis* and *Staphylococcus aureus* and *albus*. It was from them that the vaccine was prepared.

LIAUTARD.

PODODERMATITIS SUPPURATIVA RESULTING FROM A SPLIT SHOE-NAIL. A. Wenzel. *Wiener Tierärztliche Monatschrift*, Vol. 2, pp. 327-328, 1915. A stallion was lame; the right hind hoof seemed to be affected. On examination with the nippers the wall seemed a

trifle painful to pressure all over. The hoof showed no alterations; the coronet was not sensitive to pressure. The nails had been properly driven; on removing the shoe which had been worn for 10 days the horse evinced pain. No pus came out of any of the nail holes; the shoe was properly made.

After carefully cleaning the hoof a poultice was applied to soften the horn. The next day the stallion used his limb better, but did not plant the hoof firmly on the ground. I again examined the hoof with the nippers and decided to operate on a sensitive spot between the last two nails.

At first the basal or ground border was pared, and the horny sole was cut through at the white line. A deep black, thick pus flowed out, disclosing a cavity next to and behind the last nail. Since such conditions are caused by a piece of a nail being broken off, and then being driven against the fleshy wall by another nail, I looked for such a foreign body.

The basal border was further cut into for several millimeters and the opening in the horn enlarged close to the wall. The knife soon ground against a piece of iron. I removed the foreign body; it was 32 millimeters long, and consisted of the shank of a nail that had split lengthwise beginning at the point of the nail. While the outer half of the nail shank had taken the desired direction and penetrated the lateral hoof wall, the inner half penetrated the laminae and was driven into the "fleshy wall" and then broken off.

The blacksmith had not noticed the split nail and clinched the half nail in the usual manner. Recovery followed. BERG.

CHLORIDE OF ADRENALIN IN EXCESSIVE STRAINING AFTER PARTURITION. Henry Thompson, M.R.C.V.S. *Veterinary Record*. A heifer had a difficult and painful labor which left her with a live calf. After 24 hours she was taken with very violent straining. She was lying down, and, after being placed on her sternum, 12 drams of chloral hydrate dissolved in a pint of water were given to her and the os uteri smeared with the extract of belladonna. A cold water bag was applied to the loins and laxative and sedative medicines prescribed. This treatment having given unsatisfactory results, and the cow still straining, an injection of one dram of adrenalin chloride was made hypodermically, through the vaginal passage, into the neck of the uterus, on each side of the os. Ten minutes after the injection the cow seemed relieved, was appar-

ently comfortable and in half an hour was on her feet and eating. She had no further trouble. The author has resorted to this treatment in several cases with satisfactory results.

LIAUTARD.

SOURCES OF ERROR IN THE MALLEIN OPHTHALMO REACTION. J. Schnürer. *Wiener Tierärztliche Monatschrift*, Vol. 2, pp. 314-327, 1915. During the present time of war the mallein eye test has found extraordinary extensive application. Since the beginning of the war over 100,000 c.c. of mallein have been distributed from my laboratory; i. e., sufficient for 1 million horses. The reason is plain: the spread of glanders through contact with heavily infected countries (Russia, Serbia).

The incorrect results may be grouped into 2 classes: 1. Healthy horses reacted positively; 2. Affected horses reacted negatively.

I. Sound horses react positively: Causes. 1. Too early judgment of the test. Between 6 and 8 hours after beginning the test, there is a non-specific, traumatic secretion which has often been interpreted as a doubtful reaction by experienced workers. A definite positive reaction, with copious pus, strong reddening of the conjunctiva, swelling of the conjunctiva and the lid do not result from purely traumatic reaction. The secretion and other reactions due to trauma disappear in the 10th and 12th hour. This source of error may therefore be avoided by reading the test 16 to 18 hours after the beginning.

2. Reaction due to injuries to the eye; injuries to the conjunctiva from sand, particles of straw, scratches on the cornea. Particles of lime may find their way into the conjunctival sac. The horses rub against walls because of parasites, and in this way a traumatic reaction results from lime particles in the conjunctival sac. For these reasons horses that are exhausted, dirty or dusty should be given a day or two of rest before malleinisation.

3. Previously existing conditions of irritation of the conjunctiva such as occur in moon blindness, strangles, and angina. A careful clinical examination of positive or doubtful reacting horses will obviate this source of error.

In doubtful cases the test may be repeated at once in the same eye. This should be cleaned with cotton and the test observed and judged at the end of 5 to 6 hours. Glandered horses show a definitely positive reaction by this time, usually with rise in tempera-

ture. When the first eye test is positive and there is a suspicion that it is not a specific reaction, the test may be made at once on the other eye. Judgment should be made at the time previously indicated, 16 to 18 hours. If the second eye reacts positively, the reaction is specific with a very high degree of probability.

4. A frequent source of error in "healthy" horses lies in the too infrequent and improperly performed post-mortem examination. A single very small nodule in the lung is regarded as an explanation for a positive reaction to tuberculin in a "healthy" animal. With more careful post-mortem examinations, fewer positive reactions will be found among healthy horses.

11. Glandered horses react negatively. 1. Improper application of the mallein. It is absolutely necessary that the entire mucous membrane of the conjunctival sac of the lower lid come in close contact with the mallein. Streaking the mallein diagonally over the cornea, or moistening the caruncula with it, are the most frequent cause of error. A camel's hair brush is best. I do not like pipettes. I depend upon an energetic application of the mallein with the brush. Massaging the lid is not necessary.

2. Symptoms and pathological conditions are mistaken for those of glanders. Injuries to the body surface, may, through neglect, cause swellings which become very suspicious in appearance because of secondary inflammation of lymph vessels and glands. Usually, the removal of the hair, opening up the secretion of the skin, the application of moist bandages, etc., will clear up the symptoms in 24 hours. The pathological-anatomical conditions do not enable a post-mortem differentiation between purulent processes in the skin and those of glanders; a bacteriological examination likewise fails because glanders bacilli are rapidly disintegrated in the pus from abscesses known to be glandered.

In arriving at a diagnosis, the temperature is the guide in most cases of ulcer formation. Fever is always present in glandered horses which have the disease in a progressive form. Hence, I permit the destruction of horses with a temperature of 37 or below, only under exceptional circumstances.

3. The purulent secretion was removed by stable hands; sometimes the secretion is so dry that it falls off or is rubbed off by the horse, against a wall.

4. The horses are in the incubation period of reactivity. This is regarded as lasting from 2 to 3 weeks. It is therefore possible.

that a horse which reacts negatively may show glanders 8 or 10 days later. In all cases the eye test should be repeated after three weeks.

5. Horses in the advanced stages of glanders do not react to mallein. Horses in fever may be malleinized. BERG.

TRIPLETS IN CALVES. J. H. Parker, M.R.C.V.S. *Veterinary Record*. The author was called to a dual purpose Shorthorn cow from which two calves had been delivered the day before by the cowman. It was ascertained that both calves were coming at once and they had been pulling a fore leg of different calves, but finding their mistake they got the cases all right after a while. The writer said that the cow the next day, was inclined to heave but not violently. The next day she still heaved and on examining her per vaginam, another calf was found coming backwards. It was removed. The cow died.

Of the calves delivered, two were bulls coming forward and a heifer backwards. LIAUTARD.

NEW OPERATION FOR CARTILAGINOUS QUITTOR. Perrier. *Revue Générale de Médecine Vétérinaire*, Vol. 25, pp. 402-410, 1916. War conditions caused a large number of cases of cartilaginous quittor among our patients. The classical operation—excision of the periople—is a laborious one—and often gives unsatisfactory results. I have modified the technic of the operation, step by step, so that the new operation now gives excellent results.

Technic—The horse is cast, and the affected member fixed in position as in the classical procedure. Hemostasis is assured by a rubber ligature (an old air tube from a bicycle) around the pastern. The hair is cut and the field of operation disinfected. With a convex bistoury a horizontal incision is made along the entire length of the cartilage, about 1 centimeter above the periople and parallel with it. A second curved incision is made above the first or above the fistulae, with a sage knife in such fashion that the skin is incised obliquely. (The two incisions form a letter D, the flat side of the D being horizontal or nearly so, the curved side above or proximal to the flat side). In the diagram, the flat side of the D extends about half the length of the periople, the hoof being viewed from either the lateral or medial sides). The curved incision should follow approximately, the superior limit of the tumefaction produced by the affected cartilage.

The flap of the skin thus delimited is removed; the cartilage is visible. The latter is separated, except at the two extremities; from the tissues adjacent to both of its faces, by means of right and left sage knives. The part of the cartilage thus dissected is extirpated with the aid of a sage knife which is passed first along its internal face, then directed upwardly and outwardly by a turning movement of the wrist. The posterior extremity is then removed without difficulty. With regard to the anterior extremity, it is prudent to work at it progressively; making small cuts and maintaining the articulation of the foot extended in order not to injure the subjacent synovial bursae. Curetting the superior border of the third phalanx removes the remaining debris of the cartilage and closes the operation.

The fistulae are included as far as possible within the D shaped incisions; those that reach to the periople should be curetted with care. If there is destruction of the periople at any point, the wall immediately subjacent should be thinned and the borders of the wound cleaned.

Dressing—Three-quarter shoe. Cleaning the wound with hydrogen peroxide. The wound is packed with successive layers of cotton and a compress applied to avoid hemorrhage. The dressing may be held in place with tape tied to opposite heels, or with a cloth band, each turn of which passes to a nail in the opposite quarters, entirely as in the classical procedure.

After-treatment—The first dressing should be removed at the end of three or four days, the cotton which packs the wound ordinarily retards cicatrization. After cleaning the wound, a new dressing is applied (use physiological salt solution) which is renewed when suppuration appears. The wound heals rapidly, at the end of three or four weeks there remains but a small superficial wound which heals rapidly, exposed to the air, with the simple application of an alcoholic solution of picric acid.

Advantages—1. The operation is much less laborious, since paring is not necessary, and it is less delicate because one sees what is being removed and left behind.

2. Recovery in six weeks.

3. No deformation of the foot. Only a very minute examination of the foot will reveal the operation a few months afterward.

4. The animals remain fit for all services, and are not depreciated as is often the case in the classical operation.

Out of 27 cases, 23 or 24 returned to the front. It may be stated that in every case where the wall has been spared or the periople has not been completely destroyed at one point, the operation gives a rapid, certain result, without deformation of the foot or depreciation of the horse.

BERG.

CASEOUS PNEUMONIA IN A PIG. Dr. P. Chausse. *Rec. de Med. Veterinaire*. This is a case of tuberculosis in a pig, contracted by inhalation, which besides its rarity, deserves attention because of its typical form. It is handsomely illustrated and besides the description of the aspect and condition of the animal, presents minutely all the lesions which are essentially characteristic and indicates the extent of the generalization.

The lesions of the thoracic cavity, and principally those of the lungs where manifestations of the caseous pneumonia existed, were seen prevailing. The number of tubercles was enormous. The case is summarized as a rare one of caseous pneumonia with marked and most predominating lesions of the anterior part of the right lung. The maxillary lymph glands, corresponding to the buccopharyngeal isthmus and the staphyline amygdalae, proved healthy, while in ordinary cases, they are the most affected. The mesenteric glands had also two little caseous centers. The liver and spleen were also diseased.

LIAUTARD.

WOUND OF THE LUNGS—RECOVERY. R. Henderson, M.R.C.V.S. *Veterinary Record*. A three year old colt received a large wound on the chest just at the junction of the abdomen. While galloping, he was caught by the iron catch of the gate, the skin was severed, and the intercostal muscles badly torn. A distinct view of the lung could be detected and proved by air escaping through the wound. No probing of the wound was made. It was carefully washed, stitched up and the animal left to his chances, with an unfavorable prognosis. At the next visit the animal was still alive, had a temperature of 104° and complete loss of appetite. However, improvement gradually set in and final recovery ensued.

LIAUTARD.

TREATMENT OF STRANGLES. (*Traitement du "Mal de Chien" par le Serum Névrosthénique*). Veloppe. *Revue Générale de Médecine Vétérinaire*, Vol. 25, pp. 360-365, 1916. One of the most fre-

quent complications in strangles in the horse which causes considerable losses to breeders is the one known as distemper ("Mal de chien"). Its effects are disastrous, interfering with the innervation of the posterior limbs and destroying the rigidity of the vertebral column. The veterinary literature contains few remedies for this chronic myelitis. The treatment usually given in paraplegia gives results that are uncertain or entirely valueless.

By the advice of a confrere who had obtained good results in the treatment of the nervous form of dog strangles, I tried the following formula, which is analogous to the serum of Fraysee, used in human medicine. The results were excellent. Following is the formula I have found most satisfactory after numerous trials:

Strychnin cacodylate.....	0.10	grams
Sodium glycerophosphate.....	10.	c.c.
Distilled water	10.	c.c.

This mixture must be prepared with care: a solution is not obtainable. The strychnin cacodylate is practically insoluble in water, hence the required amount should be powdered very finely in a mortar with the addition of a few drops of warm distilled water. Otherwise the syringe needle will clog. Aside from this, large particles will be readily absorbed and will cause foreign body irritation if they are injected.

The nature of the strychnin salt used is not a matter of indifference; it is certain that the cacodylate gives results superior to those obtained with the sulfate or even the arsenate. Intramuscular injections should be made in the neck, shoulder or croup. In spite of all aseptic precautions, there were abscess formations, with the elimination of necrotic muscle tissue; but there is a rapid healing.

With regard to the dosage; one may well assume that nine times out of ten, we use too small doses and this is the cause of a large number of failures. Strychnin is not a cumulative poison. Numerous researches have shown that strychnin administered hypodermically or intramuscularly is eliminated in 6 hours. From this it follows that a maximal dose may be administered 3 times in 24 hours without fear of accident. I have had several occasions to administer to dogs below medium size, doses of 5 milligrams twice a day without observing a single contracture. The doses administered should therefore be progressively increased until there is hyper-excitability, beginning of course, with a minimal dose and

increasing it rapidly if the reaction is not sufficient. It is well to watch for idiosyncrasies, as animals affected with strangles are sometimes very sensitive to cardiac medicaments.

One may therefore, begin with 1 centigram, i. e. 2 c.c. of the solution, whatever the size or weight of the animal. According to conditions the dose is increased each day by 1 or 2 c.c. On the tenth day the dose may be 10 centigrams or even more. The 11th and 12th days the same dose of 10 centigrams is administered and the treatment is then abruptly stopped for about 10 days when it is resumed. I have often observed that the maximal dose may be injected for 8 consecutive days without bad effects. This of course, is due to the rapid elimination and acquired tolerance for the strychnin.

To summarize; from the favorable results that have been obtained, the treatment merits systematic application in every case of lumbar myelitis, even when it is not due to strangles. (Several cases are described in detail). BERG.

INTESTINAL STRANGULATION IN A HORSE. J. Bowmann. *Veterinary News*. An eight year old gelding had colic. His pulse went up to 80, respiration 32, temperature 99.5° F., the body was covered with perspiration, lying down and rising very carefully. Volvulus suspected. A subcutaneous injection of arecolin was given and, per os, a dose of acidum hydrochloricum. The condition remained the same. No defecation, abdomen distended. Rectal examination negative, only a dry, hard dung ball was found. Death took place at the time of the examination. The post-mortem revealed that there was, in the ileum a strangulated loop about one foot long. The strangulation was due to the peduncle of a tumor, a lipoma. A few *Teniac perfoliata* were found near the cæcum.

LIAUTARD.

AN UNSUSPECTED UNSOUNDNESS. Abraham Green, M.R.C.V.S. *Veterinary Record*. Subject: A bay gelding seven years old and to all appearances, with good legs and feet. Wind and eyesight all right. When ridden or driven, went well, answered to the bit and had perfect movements. Was put in stable to be watched, suspected of having stringhalt. On viewing quietly, and asking him to turn in the stall, the writer found that the horse took no notice. On further testing he was found to be deaf. Practitioners would

do well to watch in detecting similar cases when examining horses for soundness. Not once in a thousand times, would it strike a veterinarian to test an animal for the hearing. . . . LIAUTARD.

SEASONAL PREVALENCE OF HYPODERMA BOVIS IN 1915, TOGETHER WITH OBSERVATIONS ON THE TERRIFYING EFFECT *H. Bovis* HAS UPON CATTLE AND LESIONS PRODUCED BY THE LARVAE. S. Hadwen. *46th Annual Report of the Entomological Society of Ontario, 1915*. Observations and experiments on *H. bovis* outlined in the paper were preparatory to work planned on the prevention of egg laying and destruction of larvae. Statements in literature in regard to the seasonal prevalence of *H. bovis* and *H. lineatum* are very vague. Observations upon the seasonal prevalence were made by the author upon ten cattle kept in a field directly in front of the laboratory. Whenever the cattle were seen running someone connected with the laboratory went out to look for flies. If flies were seen in the morning, no further trouble was taken for that day. On June 14th and 22nd flies were caught. No flies were seen June 15th, but 2 were taken June 22nd. This catching of flies, the author thinks might have contributed to error in the observations. *H. bovis* invariably causes alarm among cattle. Meteorological records were kept and the changes in temperature coincided almost perfectly with the appearance and disappearance of the flies. Seasonal activity at Agassiz in 1912 was 55 days, in 1914, 57 days and in 1915 was 55 days. The observations coincide closely with the pupal period and with the time the last larvae emerge from the backs of cattle; both at Agassiz and Europe. The flies in these different observations were seen from June 1st to August 1st with one or two days' variation either way, the last of May or the first of August. Different observations place the emergence of the larvae during the latter part of May and as late as July 2d-3rd. The pupal period has been found to be from 31-44 days. The average of the times quoted gives a result of 35 days. The last larvae emerging about the first of July, the season for flies cannot extend very far into August and the records in these observations show this to be the case. The author found that if the pupa of *H. lineatum* was placed in an incubator, the period was reduced to 13 days. Larvae of *H. bovis* were kept in an incubator at 80°. The pupal period was shortened to 17.4 days. The early appearance of some of the flies may depend somewhat upon the situation in which

the larvae emerge. If in a warm place the pupal stage will be relatively shortened.

H. bovis engenders fear in cattle because of the clumsy, persistent attack launched against them and that is probably the reason they stampede when attacked by the flies. When the *Tabanidae* (or other flies) attack, the animal feels that she has control or can get away from the insect. The warble fly is not thus easily dislodged, the animal loses its head and runs away, then finding itself followed becomes wild with terror. Cattle are said to fear the fly because it resembles a bee. Two calves that had neither seen a warble fly nor bee were turned out into a paddock. Cattle had just been taken out of the paddock and *H. bovis* being present attacked the calves. The animals made the initial effort to dislodge the fly, then stampeded and tried to get away from the enemy by getting into a small water barrel together. Driven from this they hid in a corner behind some boards. Flies finding them there, and striking a few times, they got up and ran as if possessed. Cattle cannot fear the fly because of a belief of future trouble. It cannot cause pain because it has no organs capable of piercing the skin. Other insects do not cause cattle to "gad." Other insects cause anger rather than fear. Animals at play or after having been roughly handled may give evidence of "gad." *H. bovis* is much rougher than *H. lineatum* in its attack and lays one egg at a time. *H. lineatum* may not even be felt when its eggs are deposited.

The passage of the larvae of *H. bovis* into the skin was proven by cutting circles in the hair around new laid eggs, and later, after the eggs had hatched, finding the swellings underneath the skin. Hewitt's observations on the penetration of the skin by the larvae are thus confirmed. The swellings do not show so much exudation as in the case of *H. lineatum* and they seem rounder and more raised. There is not so much swelling or dermatitis of the skin in *H. bovis*. These differences in lesions are caused by the difference in the laying of eggs. *H. lineatum* deposits several on one hair. *H. bovis* generally lays one. The amount of damage done depends upon the bacteria entering the lesions and the resistance of the animal to them. Swellings and skin lesions from both species of larvae are confined almost entirely to the older animals. No appreciable lesions have been noticed below the knee or hock. *H. bovis* does not lay as many eggs around the hoof as does *H. lineatum*. As a result there is less lameness from *H. bovis*.

HAYDEN.

ASSOCIATION MEETINGS

AMERICAN VETERINARY MEDICAL ASSOCIATION

SECOND REPORT OF THE SPECIAL COMMITTEE FOR THE DETECTION OF GLANDERS.

E. B. Ackerman, Chairman.

Adolph Eichhorn.

C. D. McGilvray.

Charles Cotton.

Charles Keane

John Reichel, Secretary.

This committee submitted its first report at the Fiftieth Anniversary Meeting of the American Veterinary Association New York City in 1913. The report included the following outline regarding a complete study of the disease.

1. Cause, variation in virulence.
2. Animals susceptible.
3. Period of incubation.
4. Modes of infection.
5. Manifestations; symptoms; prognosis.
6. Diagnosis: Mallein-subcutaneous; ophthalmic; cutaneous; laboratory-cultural; animal inoculation; blood tests; conglutination; precipitation; agglutination; complement-fixation.
7. Differential diagnosis, clinical and laboratory.
8. Pathological anatomy.
9. Quarantine-clinical, occult and exposed cases.
10. Disposition-clinical, occult and exposed cases.
11. Treatment.
12. Disinfection.
13. Re-testing and subsequent control.
14. State and Federal regulations.

With the duties of the committee confined to the study of the modern diagnostic methods to determine *the best method for the reduction of glanders*, that portion of the outline dealing with the diagnosis received first consideration and the first report of the committee was practically confined to a brief review of modern diagnostic methods. After three years, these methods have been subjected to the test of time, and it is imperative, at this time, to review the substance of the first report before continuing with the consideration of *the best methods for the reduction of the disease*.

1. *Cause.* The bacillus mallei described by Loeffler and Schütz in 1882 is not only the undisputed and accredited specific cause of glanders, but it is a type of organism fairly constant in its characteristics. The variation in virulence of infective strains largely accounts for the various clinical manifestations of the disease. Aside from this difference in virulence the cause of glanders conforms to but one type with the usual cultural characteristics.

2. *Animals Susceptible.* Under natural conditions the disease is one of equines and occasionally among carnivora, particularly those confined to Zoological Gardens and fed on infected meat. Man is not infrequently a victim from direct contact with the infection.

3. *Period of Incubation.* Following natural infection there is a distinct period before the development of the most occult signs of the infection which varies with the degree or size and virulence of the infective dose. The fact that this period may vary from several days to weeks emphasizes the importance of repeatedly examining animals that have been exposed at intervals of 8 to 15 days preferably 8 days. In the interval of 8 days animals with no occult signs of the disease may develop some of these signs and an animal with any appreciable occult positive sign can never be dealt with too soon.

4. *Modes of Infection.* Infection is invariably accounted for by contact with the infective material, secretions, particularly nasal secretions, directly or indirectly, and in the determination of the best method for the reduction of glanders it is not a matter of importance how the infection enters the body.

5. *Manifestations; symptoms; prognosis.* Aside from the characteristic clinical signs, nasal discharge, nodule formation and ulceration, enlargement of the submaxillary lymph glands, cording of the lymphatics and fluctuations in temperature range, at least two types of occult signs should be accepted as manifestations of this disease, the allergic reactions as brought by the various mallein tests and the appearance in the blood of specific antibodies revealed in the blood tests. The insidious character of the disease emphasizes the importance of accepting these occult signs of the disease as seriously as the clinical manifestations and the prognosis as far as an animal is concerned should never arise as a question, in the best method for the reduction of the disease.

6. *Diagnosis.*

- A. Clinical Diagnosis
- B. Mallein Tests
 - (a) Subcutaneous
 - (b) Ophthalmic
 - (c) Cutaneous
 - (d) Palpebral
- C. Laboratory Diagnostic Methods
 - (a) Examination of Secretions
 - I. Microscopic
 - II. Cultural
 - III. Animal Inoculation
 - (b) Examination of Blood
 - I. Precipitation Test
 - II. Agglutination Test
 - III. Complement Fixation Test
 - IV. Conglutination.

A. *Clinical Diagnosis.* The cardinal manifestations may be enumerated as follows: characteristic nasal discharge; nodule formation or ulceration, enlargement of the submaxillary lymph glands; cording of the lymphatus and fluctuation in temperature range.

B. *Mallein Tests.* Mallein first prepared by Hellman and Kalling in 1891 is the toxic substance produced in cultures by the *Bacillus mallei*. Pearson working independently prepared mallein and further proved that mallein like tuberculin produces a temperature rise in sensitized infected animals.

The name *Mallein* like tuberculin, abortion and kindred preparations, should be reserved to the final product obtained in the following way: one or more highly virulent strains which are capable of producing a characteristic orchitis in a guinea-pig in twenty-four hours following intraperitoneal injections, or death in fourteen days following subcutaneous injection, are transferred to a medium containing 1.5 per cent. glycerin in peptone bouillon and incubated for no less than six weeks at 37° C. The purity of the cultures and virulence of the strains should be determined before sterilizing the glycerin-peptone bouillon cultures. After filtering out the killed bacilli note the exact volume of the filtrate, and concentrate the filtrate to one-tenth of its original volume over a water bath. The resulting product represents, after it is filtered through a sterilizing filter, concentrated mallein or mallein.

Mallein Solution for the subcutaneous and palpebral test is mallein diluted with 3 volumes of a 0.5 per cent. carbolyzed salt solution.

Ophthalmic Mallein. Two forms of mallein are used as such:

precipitated or purified mallein is a dry powder obtained from mallein which has been precipitated with many volumes of absolute alcohol. After filtering off the precipitate, it is re-dissolved in normal salt solution precipitated again and washed repeatedly with absolute alcohol. The precipitate is finally dried over calcium chloride or sulphuric acid. A 5 per cent. solution is generally used. The keeping quality of the dry powder and of the 5 per cent. solution has been questioned, but it has been conclusively shown that when the sterility of both is assured they will keep as well as mallein which is a very stable product. (B.) Mallein, pure, undiluted, filtered and preserved with 0.5% carbolic acid is most frequently used as ophthalmic mallein.

Inasmuch as it has been conclusively demonstrated that the value of mallein can be materially affected by the action of bacterial contamination it is important that this be borne in mind in handling and using any form or dilution of mallein.

(a) *Subcutaneous Mallein Test.* Mallein Solution (Mallein diluted with 3 volumes of 0.5% carbolized salt solution) is injected and in the sensitized infected animal, this is followed by a characteristic temperature rise and a local and general reaction. The characteristic *temperature rise* begins in from 4 to 8 hours and the maximum temperature is reached in from 10 to 20 hours with a gradual return to normal. At least two temperatures should be taken before the injection of mallein solution, three hours apart, and five temperatures after the injection beginning not later than the tenth hour continuing to the twentieth hour at intervals of not less than two hours. The smallest difference between the temperatures before and after injection should be 2.5°F., with a temperature rising to 103° or above. The *local reaction* appears in several hours as a hot, painful, oedematous swelling at the site of injection which may persist for several days enlarging considerably and gradually disappearing. Normal horses may show a local swelling which does not enlarge and rapidly disappears. The *general reaction* is characterized by a lessened appetite, dullness, staring coat, muscle tremors, respiratory difficulties, altered pulse rate—one or all of which may or may not be present. This test while reliable when properly carried out and interpreted is not being used as extensively as formerly, inasmuch as some of the other tests, notably the *ophthalmic test*, is proving more practical and reliable.

(b) *Ophthalmic Mallein Test.* This test has the advantage of being simple, easy to apply, and the results are as trustworthy as any. The percentage of error is relatively small. The test has the advantage over the subcutaneous test in that an animal tested may be retested within 24 hours on the same or other eye, and the local applications of mallein in no way influence the results of subsequent blood tests or other mallein tests, should it be necessary to finally resort to any of them. The results of the ophthalmic test during the past five years fully justify the tendency for this test to replace not only the other mallein tests, but also the blood test resorting to these only in a confirmatory way. Before applying the test, examine the eye for conjunctivitis or purulent discharge. Should a conjunctivitis exist the eye test should not be tried. Take temperatures before the ophthalmic test. Fever need not hinder the test. Place 4 to 5 drops (0.1 to 0.2 c.c. for one test) of ophthalmic mallein undiluted mallein or 5 per cent. solution of precipitated mallein, within the lower eyelid with a dropper, glass rod or camel's hair brush. Nothing is put in the other eye because it serves as a control. The same brush or glass rod may be used from animal to animal. Great care should be exercised in the use of the brush or rod to prevent injury to the eye or subsequent irritation. It is a good precaution to use a separate brush or rod for each test and not dip the used brush or rod into the ophthalmic mallein. The unused portion of ophthalmic mallein should be discarded and a new series of tests started with a sterile product each time. Not only may a contaminated product prove worthless but the contamination may bring about false reactions. As soon as the mallein is applied a flow of tears nearly always appears with reddening of the conjunctiva and photophobia. These phenomena have no significance and disappear in several hours. The characteristic manifestations of a positive reaction begin after five to six hours and last thirty-six to forty-eight hours, sometimes longer. A purulent secretion or discharge with reddening of the conjunctiva alone is significant of a positive reaction. Swelling and glueing of the eyelids may be seen in severe reactions. The eye should be thoroughly examined and compared in good light sixteen to eighteen hours after the application of the test. The conjunctiva and the eyeball should also be examined after noting the discharge. Generally the positive reaction is not accompanied by a rise in temperature or a general reaction. A temperature variation does

not occur in negative tests on normal animals. In positive reactions the rise may be observed. The temperature should be taken twice—the first time just before the test is applied and the second when the readings are made sixteen to eighteen hours later.

The results of the test to be recorded and interpreted as follows:—

Eye unchanged	N	Negative
Seromucous discharge	S	Suspicious
Seromucous discharge with purulent flakes	P +	Positive
Distinct purulent discharge	P ++	Positive
Purulent discharge with swelling of lower eyelid	P +++	Positive
Purulent discharge with glueing together of both eyelids	P ++++	Positive

If twenty-four hours after the first application the result of the test is negative or doubtful it may be repeated at once on the same eye or the control eye. If the repetition is also negative or questionable the test can be repeated after the lapse of three weeks. It is particularly noteworthy that the percentage of error of the test is made up chiefly by infected horses with *local* or *cutaneous lesions* failing to react and for this reason emphasis is made on the value of a complete and thorough *physical examination* of every animal tested in one way or another and the weakness of the ophthalmic test in this respect to be borne in mind.

(c) *Cutaneous Mallein Test.* In the cutaneous-dermo-intra-dermal mallein tests the concentrated mallein is applied with a knife or vaccinating needle, rubbed into a shaved area or injected into the skin. In the latter test a highly diluted mallein is used in preference to a concentrated mallein. In positive cases a spreading, warm, painful, and oedematous swelling will be observed in twenty-four hours. The reactions are positive when distinct visible swellings in contrast to the unaffected control areas develop. In severe reactions vesicular eruptions may appear. Since the skin tests are complicated and require special instruments, skill and practice, they have not proven practical.

(d) *Palpebral Mallein Test.* This test is practically one of the forms of the intradermal test but since it is being extensively tried out at this time it will be treated as a distinct method. Mal-

lein solution in a 0.1 c.c. dose is injected directly into the horizontal fold of the lower eyelid, made with the left thumb and index finger, about 1 c.m. from the edge. A fine needle 10 to 15 mm. long is preferable, and the needle should be shoved into the skin of the eyelid about 3 mm. A small swelling may appear within a few hours, but this nonspecific swelling will disappear in 10 to 12 hours. In a sensitized infected animal, the swelling will increase in from 10 to 12 hours and reach its maximum size in 24 to 36 hours. The bulky oedema of the lower lid may even extend around and over the upper lid and almost completely close the eye. The oedema is hot, and painful. The reaction may extend to the conjunctiva observed in congestion and mucopurulent discharge. At times the reaction is confined to the lower eyelid, the oedema is localized but persistent for 24 to 36 hours. A reaction seldom persists for more than 3 days. In doubtful tests the injection may be repeated in from 5 to 6 days. It is necessary to use a twitch or restrain the animal by other effective means when the injection is made. The comparative value of this test over other mallein tests is not established, but indications are that it is as reliable as the ophthalmic test, and more reliable than the subcutaneous test.

C. *Laboratory Diagnostic Methods.* (a) Examination of secretions by microscopic or cultural methods or by animal inoculation are now obsolete methods of diagnosis although the demonstration of the bacillus in smears by the microscopic examination and isolation of the organism culturally or the demonstration of the presence of the infection by the injection of suspected material into male guinea pigs resulting in an orchitis or Strauss reaction and then the demonstration of the organism is positive evidence of the disease. Failure to reveal these findings, however, does not warrant a negative diagnosis.

(b) *Examination of Blood.* I. *Precipitation test*, while of value in experimental work, particularly where the development of specific antibodies are noted after infection, is of little or no practical value. II. *Agglutination Test*: Depends upon the power of the undiluted immune serum to clump bacteria suspended in carbolyzed salt solution. The presence of agglutinins is determined quantitatively by using measured amounts of serum and test fluid. The readings are to be made after incubating the tubes and their contents for a half hour at 37° C. and centrifugalizing at 1600 revolutions for ten minutes and then allowing the tubes to stand at

room temperature for two hours. The same results may be obtained by incubating the tubes and contents at 37° C. for twenty-four hours and allowing them to stand at room temperature for twelve hours more. The appearance of a veil-like membrane with turned-in edges or small clumps of grayish-white or brownish flakes on the bottom of the tube may be regarded as a positive agglutination. A sharply circumscribed sediment in the center of the centrifuge tube having the shape of lentil seeds indicates an absence of agglutination. An agglutination value of over 1 to 1000 is indicative of glanders; but since high agglutination titers are obtained only in the acute form of the disease it is advisable to combine this test with the complement-fixation test and not make the diagnosis on the basis of this test alone.

III. *Conglutination Test.* Conglutination embodies two phenomena, agglutination of red blood corpuscles and hemolysis of the same. The test embodies the use of bovine serum, fresh horse serum complement, washed sheep corpuscles, *Bacillus mallei* antigen and serum to be tested. The technique is more difficult than the complement fixation test, as the chances of error are greater. The one advantage of the test over the complement fixation test is its possible application on serum from asses, mules and those horses with anticomplementary substances in the blood, and for this reason alone it is especially referred to here.

IV. *Complement Fixation Test:* This test has stood the test of time and along with the ophthalmic mallein test it is held as one of the two most reliable methods. Nothing has been developed to simplify the test and it remains a highly technical laboratory procedure in which the following take part:—Complement=normal guinea pig serum; sheep-rabbit amboceptor=sensitized rabbit serum with washed red blood corpuscles of sheep; glanders antigen=shake extract of killed glanders bacilli; sheep corpuscles and the clear serum of the suspected animal. The results of the test are interpreted as follows: horses in which the serum produces a complete fixation of the complement in quantities of 0.1 c.c. and 0.2 c.c. should be considered glandered. Horses in which the serum gives a complete fixation with a quantity of 0.2 c.c. and an incomplete fixation with 0.1 c.c. should likewise be considered glandered. Horses in which serum produces an incomplete fixation of the complement in quantities of 0.1 c.c. and 0.2 c.c. should also be considered glandered. Horses in which the serum shows no fixation of

complement in either tube should be considered free from glanders.

9-14. *Control.* In attempts at eradicating glanders from individual stables, and also from infected localities, it is desirable that uniform methods of eradication be employed. Such regulations should provide for immediate action as soon as an outbreak is brought to the attention of the authorities. All infected animals should be destroyed without loss of time, and owners should be compensated for their losses, in order to encourage reports of any suspicious case. It is a well known fact that unscrupulous owners or dealers in horses dispose of infected animals to unsuspecting persons, and thereby spread the disease. With proper compensation for infected animals such practice is greatly reduced.

The best method for the reduction of glanders, in the opinion of the committee, may be briefly summarized as follows:—immediately upon the discovery of a suspected or an actual case of glanders the proper authorities should be notified, who should immediately quarantine and isolate the infected, suspected, and exposed horses. Thereupon a careful physical examination should be conducted of all animals, and those showing clinical manifestations of the disease should be immediately destroyed. All other animals should be subjected to the ophthalmic eye test, and if practicable at the same time blood should be drawn for the application of the complement fixation test. The animals reacting to the eye test or blood test should be destroyed. Those which give an atypical or an indistinct reaction in the blood test should be quarantined for a period of 15 days and retested with the eye test at the end of that time. Should any animal on retest give a positive reaction it should be destroyed, and the remaining horses again subjected to a test after a period of 15 days, which test should be continued, with the same intervals, until no further reactions are obtained. The blood test (complement fixation) can be made a week after the first eye test and every 15 days thereafter between the time of the eye tests. The blood test in between the eye test brings these animals under observation every week, which is an advantage.

Authorities should provide for the proper disposal of the destroyed animals. The skinning of the carcasses should be prohibited.

The stables in which glanders has been found should be thoroughly disinfected without any loss of time, the utensils, harness, etc., which might be contaminated should also be carefully disin-

fectcd. The procedure of disinfection carried out should be as follows: all woodwork, such as mangers and partitions should be removed and burned. Rough surfaces should be scraped preparatory to disinfection. Wooden floors should be removed, and the material under the same should be scraped off and treated the same as the manure. Any parts of the stable which are not tight should be properly prepared in such a manner that the disinfectant will reach all exposed surfaces. Adherent particles on the walls and ceilings should be removed with the aid of wire brushes, and all parts of the stable should be so prepared that the disinfectant to be applied will reach all parts of the premises. Manure and other coarse litter, bedding, remnants of feed, etc., should be collected in one place outside of the stable, and disinfected with any recognized disinfectant, preferably with chloride of lime, 1 pound to 3 gallons of water, following which it may be spread over ground other than meadow land or land not to be plowed under. Care should be taken that the disinfecting fluid will thoroughly permeate all parts of the manure, collected litter, dirt, etc. Where this procedure is not practicable the manure may be burned or buried. The interior of the stable, after being prepared for disinfection, should be thoroughly disinfected with any of the recognized disinfectants, which may be best applied by a force spray pump, in order to assure a satisfactory penetration into all exposed parts of the building. Careful supervision of the disinfection should be exercised by a competent person. The following disinfectants are some that have proven satisfactory:—5 per cent solution of pure carbolic acid; chloride of lime U. S. P. strength. 30 per cent available chlorine), 1 pound to 3 gallons of water; formaldehyde 1 quart of 40 per cent to 5 gallons of water: 3 per cent solution of cresol compound U. S. P., or accepted substitute therefor, containing at least 50 per cent cresylic acid.

The stables in which the presence of glanders has been established should be continuously kept under veterinary supervision for a period of six months. After the destruction of all reactors horses remaining should be subjected to a modified quarantine, during which the animals may be permitted to work, but with a strict understanding that they can not be stabled at any place where other animals may become exposed, and they should also be prohibited from using public watering places.

The committee respectfully recommends that the association urge the sanitary authorities of the various states and provinces to formulate uniform measures for the control and eradication of the disease, since this committee is of the opinion that by adopting the procedure as outlined, and stringently enforcing above measures for the control of glanders, this disease may be successfully eradicated. It should, however, be recognized that sporadic attempts will not yield the desired results, and that it requires concerted action and persistent efforts to successfully combat the disease.

SECRETARY'S OFFICE A. V. M. A.

The following is the personnel of the committee appointed to serve as official tellers of the election of district members of the Executive Board:—Drs. N. S. Mayo, Chairman, A. H. Baker, L. Enos Day, D. S. Jaffery, George B. McKillip, John F. Ryan, and A. C. Worms.

At this writing—January 10th—between 1400 and 1500 votes have been cast. The polls close February 10th and the announcement of the successful candidates will appear in the March issue. The ballots have been stamped with the day of receipt and each day's quota has been sealed in a separate packet each evening without keeping even the slightest mental account of the trend of the voting. These packets will be opened for the first time by the above committee. The successful candidates will be notified by mail February 11th, and upon receipt of a letter of acceptance the tenure of each will begin.

Members who paid their dues after November 18th are not credited for their remittances in the new directory. The printer's copy was sent to the Editor of the Journal on that date and it was not found feasible to make changes thereafter.

The following errors in the new directory are hereby acknowledged:—Dr. Harrison Whitney, New Haven, Conn. should have been listed among the Fellows, having been in good and regular standing since 1891, and Dr. W. F. Crewe, Bismarck, N. D. should have been credited with the dues of 1916. The former error is due to an oversight and the latter is typographical. L. A. M.

A TRIP SOUTH

Acting upon urgent invitations the secretary has visited several interesting meetings during the past month. The trip was made for the mutual benefit of the association, its southern members, the worthy practitioners of these states and particularly the local organizations themselves; for if there is any movement in this country today which merits help from outside sources it is that which brings the local practitioners of states, counties or cities together for mutual improvement. In this country where state rights prevent the nation from regulating intra-state affairs, the progress which interests the individual most must come from local movements. The state associations and the community organizations must therefore always be looked to for local progress. It is here the temporal welfare of the individual is promoted; it is here the personnel of the profession is improved socially, scientifically and financially; it is here the practitioner—the man—is guided along the straight path of professional ethics; it is here the laws under which we work and under which the nation lives are actually born, enacted and enforced; it is here the roots of the profession absorb the nourishing elements needed to maintain the life of a national organization: it is here, we must all agree, the national association finds its main support; and finally it is here the personal equation operates to cultivate the respect for one another upon which the pleasures and the profit of our professional life depends.

The first meeting attended was that of the Mississippi Valley Veterinary Medical Association at Galesburg, Illinois, January 5th. The sphere of influence of this live organization is over the central river counties of Illinois and Iowa. It has, however, more Illinois than Iowa members. This region includes within its boundaries such important cities as Peoria, Galesburg, Monmouth, Aledo, Burlington, Blandinsville, Little York, Avon, Sycamore, Prairie City, and Roseville, as well as the richest agricultural districts of both of these two great states. It is a thriving district. The hog, the cattle and the horse industries of this territory are probably not excelled anywhere, and its veterinarians are correspondingly prosperous and alive to the needs of the day. The membership is sixty in good and regular standing, more than half of which attended the meeting. The executive officers for the com-

ing year are: F. E. Brown, Blandinsville, Ill., President and W. Lester Hollister, Avon, Ill., Secretary-Treasurer.

The subjects discussed at the meeting were contagious abortion, verminous infestation of swine, hog cholera, mastitis of cows, strictures of the teat, and the difficulties of field surgery.

The paper of Dr. A. T. Peters read before the annual meeting of the Illinois State Veterinary Medical Association at Chicago, December 8th, 1916 in which incontrovertible success in the eradication of contagious abortion from herds had been obtained by internal treatment was argued pro and con at great length, and the relations of retained placenta to contagious abortion was also a subject of a long controversy. While nothing especially new was brought out the trend of the discussion showed that a serious study of this fell disease is now under way wherever resolute veterinarians meet. The statement of several members of unquestioned ability and experience that abortion exacts its greatest toll among cows infeeble by exposure, shipping, unbalanced ration or insanitary environments is worthy of reiteration and in a measure at least confirms the conclusions of Peters that supplying the tissues with elements lacking in the feeds of herbivorous animals is helpful in the management of the disease in a badly infected herd; but that such measures alone should not be depended upon to the exclusion of others known to be essential seems to have been the consensus of opinion.

In the discussion on mastitis of milch cows it was shown that cases threatening life or the udder with gangrene are best handled by free evacuation and drainage of the galactophorus sinus with an incision directly into it. By evacuating the stinking, purulent accumulation the temperature soon drops, the inflammation subsides and a state of good health rapidly ensues. The affected quarter is damaged less by this radical measure than if the inflammatory process had been left to run its rampant course through the gland. The surgical aperture heals before the next period of lactation which sometimes finds the gland restored, at least, to partial usefulness. Direct surgical extirpation of nodular obstructions of the teat were also recommended in the place of the old prodding and slitting operations, or the catheterization of the milk with teat siphons. It was shown that obstructions located along the teat duct can be ablated with impunity either through the meatus or else through an incision in the wall of the teat.

The hog industry of this community is so vast that the writer was much impressed with the conclusions about the best treatment of worms in swine. There are two plans of treatment discussed which were evidently regarded as standard, effectual, curative. The one is to give the herd of hogs continual access to a mixture composed of equal parts of coal screenings (fine) common salt and air slacked lime. This is placed in a common self-feeder whence the hogs can partake of the mixture *ad libitum*.

The best vermifuge for individual treatment applicable of course more particularly to small herds recommended was santonin and calomel. Two and a half grains of each is given to shoats in a capsule after eighteen hours of fasting. This is administered with a balling gun while the mouth is held open with a block of wood. Several hours later a purgative slop is given. This slop should contain about one ounce of magnesium sulphate for each animal. Being both thirsty and hungry they will drink this ravenously.

Late in the afternoon the members took the trolley for Monmouth (ten miles distant) where a clinic was held at the hospital of Dr. R. P. Frans. Here was found a modern veterinary hospital, of brick construction and cement floors, divided into a spacious office, a modern pharmacy and a neat, well equipped operating room. There was an operating table with a polished hard-wood top, a stocks, porcelain table and basins and large gas-heated sterilizer and a sink with running hot and cold water. The hospital has ample accommodations for many patients, in single stalls, double stalls, box-stalls of the usual dimensions and a large roomy enclosure for colics and for operating where casting with ropes is thought preferable to the operating table. The whole establishment is profusely lighted with electric lights, bright enough to turn darkness into daylight, which were needed, for the clinic lasted way into the night.

The cases exhibited were legion and exceptionally interesting to practitioners. There was a case of ventral hernia in a large draft horse, located along the costal margin eight inches below the transverse process of the lumbar vertebrae, the size of a cocoanut; a case of recto-vaginal fistula in a trotting mare; a mule affected with ringbone; a very bad case of bilateral stringhalt in a draft horse; three fistulae of the withers; a conjunctival carcinoma in a horse; a case of rupture of the tibialis anterior; and several horses

lame from various causes submitted for diagnosis. In all, it was a very creditable exhibition for a small association. With the exception of the recto-vaginal fistula which was pronounced incurable, all were submitted to operative treatment. While a description of these operations would be too voluminous for this report, the procedure against the ventral hernia being more unusual than the others is worth a little space. The flank was clipped and shaved before being brought into the operating room to avert the flying about of loose hairs around the operation. The field was disinfected with mercuric chloride and ethereal iodine. The skin layer of the sac was incised perpendicularly and dissected away from the inner (peritoneal) layer way down until the circumference of the aperture was entirely exposed. Then this layer was folded inward and firmly sutured in the folded position with a continuous suture running across the whole diameter of the aperture. Following this the redundant skin was drawn up, edges out, and ribbed up also with a strong and close continuous crucial suture. Thus was formed a rib of peritoneum folded into the abdomen and one of skin to support it externally. A firm antiseptic pack and a strong abdominal bandage were then applied before the patient was placed again into the upright position. When upright this wrap was rearranged and instructions given to keep the patient on its feet for eight days, at which time the bandage was to be removed for dressing the wound and attending to the sutures.

The next meeting visited was that of the Mississippi State Veterinary Medical Association, at Clarksdale, January 9th and 10th. Clarksdale is a live modern city of 5,000, located in "The Delta." This region, once a worthless waste of unsalable swamps, has been developed into a very rich agricultural district with its land now at almost a prohibitive price. Its products are cotton, corn and mules with hogs and cattle as a small side issue, and there is a serene contentment reaching into every line of trade, commerce and professional life from the prosperity the high prices of these commodities have brought. The veterinarian has already shared in this prosperity, and with the state-wide tick eradication in sight the prospects of the profession are indeed bright. Even today it seems evident that Mississippi affords room for many more good veterinarians. There are now only about a hundred graduates in the state and while these are harrassed somewhat by twice as many licensed non-graduates, the new veterinary practice act and other

laws in the making promise to curb their activities in the near future.

The State Association has seventy-five members in good standing, more than half of whom attended the meeting. It was organized by a mere handful of practitioners in 1906, and each annual meeting has shown an increasing interest, an increasing influence and an increasing membership. It is through its influence that the veterinary practice act was enacted in 1914. The veterinary law of Mississippi compares favorably with that of the larger states. Its administration is in the hands of five veterinarians, three of whom are elected by the association and two appointed by the Governor. Applicants must be graduates of veterinary colleges recognized by the American Veterinary Medical Association, and must pass an examination.

The personnel of this board is now as follows: Dr. James Lewis, Greenwood; Dr. J. A. Beavers, Canton; Dr. O. M. Norton, Greenville; Dr. W. P. Ferguson, Granada; Dr. W. L. Gates, Clarksdale. The officers of the association elected at the meeting were: Dr. Hudson Chadwick, President, Jackson; Dr. W. R. Edwards, Vice-President, Vicksburg; Dr. E. S. Norton, Secretary-Treasurer, Greenville.

The headquarters of the association were at the Hotel Alcazar, a new, modern hostelry that would do credit to a much larger city, and the sessions were held in the roomy dance hall of the Elks Club.

An interesting address of welcome by Hon. J. C. McNair, Mayor of Clarksdale was responded to by Dr. W. P. Ferguson. Both these addresses were impressive and forecasted the serious attitude toward the work at hand that prevailed throughout the whole meeting.

The subject of choke in solipeds presented by Dr. E. M. Alderman was covered in the greatest possible detail in regard to its etiology and treatment. All of the important points about esophageal obstructions were brought out. He recommended particularly the radical operation when the palliative measures have failed. This operation is the washing out of the impacted mass through a stomach tube after arranging to prevent reflux of the water by ligating the oesophagus with a tape through an incision at the middle of the neck.

Prof. R. C. Moore, Dean of the St. Joseph Veterinary College, addressed the meeting at great length, giving a solemn sermon on

professional conduct and the attributes and accomplishments of a successful practitioner as a man and as a surgeon. This was responded to by the writer in a few remarks on "Field and Hospital Surgery." These addresses and the discussions that followed brought out the fact that the field surgery, once thought to be fraught with insurmountable obstacles against aseptic work, after all, is the cleanest surgery we do. A cleaned patient brought out and cast on a clean grass plot after a studious effort has been made to sterilize the materials to be used was pronounced to have at least equal advantages to the hospital where pus cases, air dust and "surgical dirt" are rampant.

The paper of Dr. W. H. Dalrymple and the discussion that followed, brought out a wealth of information on anthrax which seems never to have been heretofore reported. It was supplemented by the paper on serum treatment of anthrax by Dr. D. M. Davenport. These two papers, together with Dr. H. K. Wright's address on vaccination, covered the entire subject thoroughly. It must be remembered that anthrax is an important disease to the veterinarians of the Southern States, more particularly of Mississippi and Louisiana, where it has been rampant and an animal scourge for a good many years. It is evident, however, judging from the trend of these discussions that vaccination, serum treatment and sanitation is doing much toward controlling it. Dr. Dalrymple laid particular stress upon the importance of sanitation which, after all, must be depended upon as the chief measure by which it can be controlled. The paper of Dr. Dalrymple proves conclusively that the carcasses of animals dead of the disease are the chief menaces and are the media through which it is carried about by different animate and inanimate agents. It was brought out that the immediate destruction of carcasses by incineration, would in itself actually control anthrax, and that where this measure has been taken on large plantations the disease no longer occurs.

Another interesting paper was that of Dr. H. Chadwick, President-Elect of the association, on tick eradication in Mississippi. This work began nine years ago and since that time 51 counties have been released from federal quarantine, 12 of which were during the last year. It was recommended in this paper, as well as in the discussion that followed, that progress in tick eradication demands that cattle should be dipped in arsenical solution every 14 days.

What tick eradication means to the State of Mississippi is shown in the fact that the state during this campaign had started 16 creameries, has seven thousand head of pure bred bulls, and many show herds that acquit themselves very creditably in the state shows of the northern states. The statement made by one of the members is worth reporting—that in the little town of West-point, Miss., where cream separators had never before been known, 75 of these were sold by a single hardware man during the last six months.

According to records available there have been 491,251 dippings of herds representing 4,832,240 dippings of cattle. There has been 257 county and 14 state inspectors engaged in this work, an outlay of \$13,146.00 by the state and \$121,254.00 by the various counties engaged in the work. 7,652 square miles of territory during the year were released from federal quarantine.

This work has been done at a minimum cost of 46 cents per head for freeing the cattle of ticks, or \$11.59 per square mile of territory released from federal quarantine during the year just closed. 3,577 vats were in operation during the past year. Marked progress has been made in the counties doing clean-up work (that is, in the counties which have been previously released from federal quarantine) but in which there still remain some herds that are under local quarantine. In the counties in which tick eradication is to be conducted during the coming season, more than 1000 vats have already been built, and from all indications they will be ready to begin regular dipping by March 1st, 1917. Every one was profuse in his comments of the hearty co-operation of the federal forces in Mississippi.

On the morning of the 5th, the meeting was convened at the hospital of Dr. W. L. Gates, where more than 40 cases of mules, horses and swine were assembled for a medical and surgical clinic. There were medical and surgical cases of many varieties; fistulae of the withers, hernias, cryptorchids, and various forms of lameness.

Dr. Gates' Hospital, which is a fair specimen of hospitals in southern cities, is a spacious building divided into offices, single stalls, box-stalls, paddocks, mule pens, and an operating room, all of which are very creditably equipped. It is in fact the largest veterinary hospital the writer has ever had the privilege to visit in a city as small as Clarksdale. Those who operated and lectured at

the hospital were Dr. S. L. Stewart, of Kansas City Veterinary College; Dr. W. L. Gates; Dr. John Oliver, of Columbus, Mississippi; Dr. O. M. Norton, of Greenville, Mississippi. The principal interest in this clinic seemed to center upon the best surgical technique of fistula of the withers.

The annual banquet of the association, which was held at the Alcazar Hotel on the evening of the 10th, we were unable to attend on account of the necessity of making train connections for Little Rock, Ark., where the Arkansas association was to meet the following day.

The meeting of the Arkansas Veterinary Medical Association was convened at the Marion Hotel, Little Rock, Arkansas, on the morning of January 12th. The officers of the association are Dr. Geo. Temple, President; Dr. R. M. Gow, Secretary; Dr. Gow is also State Secretary for the American Veterinary Medical Association. This association has 32 members, of whom twenty-five attended the meeting. As there are only 32 graduated veterinarians in the whole state this is an exceedingly high percentage of attendance to a state association. Until last year there was no law regulating the practice of veterinary medicine in this state, but through the energetic efforts of this association, a law was enacted in 1915. This law created a Board of Veterinary Examiners to whom its administration is intrusted. The personnel of this board is Dr. R. M. Gow, Secretary; Dr. B. Merchant and Dr. Geo. Temple. The first session of the association was devoted to the discussion of the livestock sanitary problems of the state, in which Dr. S. L. Stewart and the writer participated. The subjects discussed were: vesicular stomatitis, tick eradication, milk inspection and shipping fever. There have been several outbreaks of the former disease at different parts of the state due to the shipment of exposed animals from the various remount stations of Missouri and Nebraska. The dangers of mistaking this rather harmless affliction for foot-and-mouth disease was emphasized, but more stress was placed upon the dangers to the horse industry from shipping fever which is being spread out into the plantations of the state by the shipments of exposed and affected horses originating in the large horse markets. The needs of stock yard and ear disinfection for the purpose of controlling shipping fever was thought to be the one important factor upon which the eventual control of this disease must depend. Dr. S. L. Stewart and the writer gave a stereopticon lecture illustrat-

ing the clinical aspects of vesicular stomatitis. In addition Dr. Stewart gave a very interesting stereopticon lecture on navel-ill of colts.

Dr. Herbert Shull, municipal inspector of Texarkana, spoke at length on the subject of city milk inspection, and Dr. A. E. Wight, Federal Inspector of the Bureau of Animal Industry, engaged in tick eradication in the state of Arkansas, spoke on his work and the progress that has been made toward state-wide eradication.

The status of tick eradication in Arkansas was reported by Dr. A. E. Wight. When the work was started in a small way in 1907, the entire state was below the federal quarantine line. In 1911, many dipping vats were constructed by the people and arsenical dippings were used that year to a considerable extent. Since that time dipping vats have been constructed in every county in the quarantined area, so that today there are about 1500 dipping vats in existence in the state. These have been built by the people, as in the state there are no public funds as yet appropriated for the use in construction of dipping vats. Twenty-three counties and part of eight counties in the northern part of the state have been freed of ticks and released from federal quarantine. This means about 45 counties in the quarantined area but in these counties a large amount of preliminary work has been completed, so that several of these counties are already to take up systematic work. There are now 18,268 square miles of territory released from quarantine, or putting it otherwise 35 per cent of the whole state. The veterinary association is looking to the present legislature to pass legislation necessary to the promotion of this work and to hasten state-wide eradication. It is the aim of the federal and state authorities engaged in this work that the state should be free in the year 1919.

Tick eradication in Arkansas is conducted in two districts—the northeast district and the northwest district. Cattle are taxed five cents per head per year to raise money for the purpose of employing inspectors to work in co-operation with the United States Bureau of Animal Industry.

During the year 1916, five whole counties were released from federal quarantine after one year's work, and this has demonstrated the fact that ticks can be eradicated in Arkansas in one year from the time the work begins. The cattle were dipped every 21 days throughout the season and about 85,000 head were dipped each month. In the future it is planned to dip the cattle every 14

days during the season as is now the custom in Mississippi and other states.

Farmers throughout the infested area are becoming more and more interested in tick eradication and are offering less opposition. In fact the opposition against tick eradication in southern states is fast disappearing. Those who are in charge of the work feel confident that the job can be completed within three or four years. The great stimulus to this work is the improvement that is seen in the stock of the tick-free territory where Pure Bred Cattle Associations are being organized and many good cattle introduced from the northern states. Cattle in the free counties are worth from one to two cents per pound more than those in the infested counties, and there is a ready market for all the live stock that can be produced. The great advantage is that they can go to any market in the country without restriction. One county in the State of Arkansas that was freed from ticks in 1916, has shipped 60 carloads of cattle since last September at an increase of about \$200 per car, and there are 10 or 12 cars of cattle on feed in that county.

In the afternoon the association convened at the office of Dr. H. C. Rice, 710 Broadway Street, where a clinic was held. This hospital is a large one story building with a 100 foot frontage. As is the custom in this part of the country it has a ground floor and a wide aisle between the stalls. The enclosures for animals are large paddocks, box-stalls, single stalls to the number of about 100. There is also a large operating room in a separate enclosure equipped with an operating table, cement floors and a good supply of instruments and other apparatus needed for surgical work. There are also accommodations here for the treatment of a great many dogs. Canine practice seems to be no small part of the work of a veterinarian in this city. Only two animals were operated upon at the clinic—poll-evil, the other was a recent ventral hernia. Dr. A. L. Hearn of Texarkana, was elected president; Dr. R. L. Pryor of Clarksville, Vice-President and Dr. R. M. Gow of Little Rock, was re-elected Secretary-Treasurer.

In closing we should not omit mention that Dr. Gow, with whom the veterinarians of America have just become acquainted, is a mighty busy man. His personality is being felt everywhere that veterinary work is undertaken. He is State Veterinarian of Arkansas; Secretary of the State Board of Veterinary Examiners; Secretary-Treasurer of the State Association; State Secretary of

the National Association, and Secretary of the Arkansas Stock-breeders' Association, an association maintained for the mutual benefit of breeders of all kinds of livestock. With Dr. Gow at the helm it is very safe to predict that progress in veterinary and livestock affairs in Arkansas will not lag.

The trip was undertaken with certain definite ideas in view:

First: to determine the attitude of southern veterinarians toward the American Veterinary Medical Association, especially to find out if the association is doing its full duty toward the members in this section of the nation.

Second: to study at close-range the problem of quackery in the southern states. It seems to be a real menace to the progress of the veterinary practitioners and official veterinarians in these states. The states of Mississippi and Arkansas were thought best for this purpose. The first is taken as the state in which the best conditions exist in the south and the second is the one in which conditions should be at their worst. In Mississippi there are two quacks to every graduate veterinarian, while in Arkansas they show there at about five to one. I take it without being positive, however, that between these two extremes the actual condition of the rest of the southern states would be reflected.

Third: to get first hand information about tick eradication and the prospects its culmination holds out for the veterinary profession.

Fourth: to investigate the conditions under which veterinarians of the south must practice, in regard to the value of animals, weather conditions, roads over which they must travel, compensation for their work, and the prevalence of disease which call for veterinary service.

In regard to my first object, I find contrary to expectations and reports which had reached the office of the secretary, that a more friendly attitude toward the American Veterinary Medical Association does not exist anywhere on the continent, for in spite of direct inquiry and direct observation not a word of complaint was heard from either members or non-members about the National Association. The failure of the National Association to meet in New Orleans in 1914, which was once criticised by some of the southern members, seems no longer to be the source of complaint, in view of the prospects of holding a meeting in this section of the country in the near future.

In regard to the problem of quackery: we believe that the south is in no different position than other states have been during the development period of the veterinary profession, for here are large states with a spare livestock population, where whole counties have no veterinary graduates; where livestock is not yet very valuable, corresponding to pioneer conditions in the northern states. Here we find, as in the northern states that the new veterinary laws passed for the purpose of restricting quackery, meet with the same bitter opposition, and it is very evident that this opposition will prevail and continue until the profession is numerically strengthened with graduate members, and this cannot, of course, come to pass until the livestock interests have developed beyond their present limits. It seems rather evident that this progress must wait for state-wide tick eradication, which, once in reality, will soon make the southern states a veritable haven for the veterinarian. The land of Mississippi and Arkansas seems to compare in fertility very favorably with that of the central counties in Illinois and Iowa, where it is selling for \$200 to \$300 per acre and where the human and animal population is more concentrated. With ticks eradicated from these states they will, acre for acre, excel Illinois and Iowa in almost every count.

With no other assurances than that of Dr. Chadwick of Mississippi, and Dr. Wight of Arkansas, it is safe to advise the young men who are now graduating at our veterinary schools to "Go south and grow up with the country."

L. A. MERILLAT, Secretary.

SOUTHEASTERN STATES VETERINARY MEDICAL
ASSOCIATION, ATLANTA, GA.

Dec. 27th and 28th, 1916

In the absence of the temporary chairman, Dr. C. A. Cary was nominated and elected to fill the chair. Dr. G. A. Roberts was first called upon to state briefly the purposes of the new organization, which were:

Promotion of acquaintance and good fellowship among the members of our profession in the southeastern states.

The popularizing of our profession in the eyes of the public and our clients.

Enhancing our own "preparedness" through exchange of ideas.

Affording every veterinarian within the described territory an opportunity to serve his profession in a larger measure than through his state association alone.

Dr. N. S. Mayo then presented his paper on "Some New Therapeutic Suggestions". He mentioned specifically many uses of the newer preparations of emetine, lobeline and chlorazene.

The temporary chairman, Dr. Cary, next presented his paper on "Operations for Abdominal Hernias". He illustrated his paper by drawings on the blackboard. He advocated correct diagnosis and operating under complete anesthesia. His method was to dissect around the sac removing the same but leaving at least one-half inch of the base around the ring for a granulating surface. Stitches of heavy silk were put in and the ring closed by them. Drainage was supplied and a many tailed bandage put on.

After dinner, the chair called for the paper of Dr. B. F. Kaupp, on "Healing of Fractures in Fowls". He discussed the subject from three view-points, namely: the histology and regeneration of bones, reparative processes and setting of the fracture and care of the bird.

At this juncture, Mayor Woodard, of Atlanta, put in his appearance and was called upon for an address of welcome. He assured us that we were welcome and that he was delighted to make his farewell greeting to Atlanta as mayor, to so worthy a calling as the veterinary profession.

Dr. Mayo happily responded to the address of welcome urging better training for the veterinarian and holding up the ideal through a thorough examination, but not an unreasonable one, by the State Examining Board.

Dr. J. W. Salter followed with his paper on "Open Joints in Equines". He took the position that thorough cleansing of the surrounding parts was good treatment but that no material of any kind should be injected into the joint nor any probing permissible.

Dr. G. A. Roberts next presented his paper on "'Contagious Abortion' Infections in Animals". He contended that while there was a possibility of attributing too much from such infections, by some, the average veterinarian did not begin to appreciate the full significance of such infection. Again, while the attributed results

of such infections might possibly also occur from other causes, the most satisfying explanation for such results was on the theory of infection.

Dr. M. R. Blackstock then read his paper on "Cotton Seed Meal as a Feed". He reminded us that a quantity of one quart twice daily mixed with other feeds to average sized cows was a useful and safe feed. However, he believed excessive feeding of cotton seed meal might be responsible for some abortions and many retained placentae.

"Hemorrhagic Septicemia of Cattle" by Dr. F. P. Caughman proved a very entertaining paper, dealing with prevalence of the disease, types and citations of several outbreaks.

The last paper of the first day's meeting was by Dr. D. A. Piatt on "The Veterinarian and Some of His Problems". Among the more or less difficult problems of the veterinarian, he stated, was that of collections. He gave us several unique suggestions as to the character of "follow-up statements".

At this point, the association went into a business session. They adopted constitution and by-laws and the following resolutions were accepted:

- 1st. Resolution of condolence to the temporary secretary, G. A. Roberts, in the recent loss of his beloved wife.
- 2nd. Resolved that the Southeastern States Veterinary Medical Association in regular annual meeting assembled, urge the A.V.M.A. to hold their 1917 meeting in the City of Atlanta, Ga. Nothing that the A.V.M.A. could do would have a more uplifting influence on the profession in the South than to grant this urgent request.
- 3rd. Resolved that the committee recommend Chattanooga as the next place of the annual meeting.

The following officers were elected for the ensuing year:

President—Dr. C. A. Cary, Auburn, Ala.

First Vice-President—Dr. F. W. Morgan, Chattanooga, Tenn.

Second Vice-President—Dr. J. W. Schiebler, Memphis, Tenn.

Third Vice-President—Dr. Benj. McInnes, Charleston, S. C.

Secretary-Treasurer—Dr. G. A. Roberts, Raleigh, N. C.

To serve with the above as executive committee:

Dr. M. R. Blackstock, Spartanburg, S. C.

Dr. W. W. Webb, West Point, Ga.

RESIDENT STATE SECRETARIES:

Alabama—Dr. D. A. Piatt, Birmingham

Florida—Dr. Major Scofield, Miami

Georgia—Dr. P. F. Bahnsen, Atlanta

North Carolina—Dr. A. C. Jones, High Point

South Carolina—Dr. F. P. Caughman, Columbia

Tennessee—Dr. Wm. M. Bell, Nashville

Mississippi—Dr. E. M. Ranck, Agricultural College.

It was voted to leave the list of charter-membership open for ninety days.

Drs. D. M. Campbell and N. S. Mayo of Chicago were elected to honorary membership.

An enjoyable banquet was held at the Piedmont Hotel after which the theatres were patronized liberally by the association members.

The first paper presented on the second day was "Interstate Health Certificates" by Dr. P. F. Bahnsen. He urged fair but reasonable charges to be made for examinations and that all veterinarians making such examinations should consider themselves agents of the state into which shipment was to be made, and be willing, therefore, to comply with such states' requirements. He stated that Georgia would accept a hog breeder's certificate sworn to by a notary public; that serum injection had been made not more than fourteen days previous to shipment and not less than three weeks after the simultaneous injection.

Among the more interesting papers of the whole program was that of "Some Legal Phases of Veterinary Practice" by Dr. D. M. Campbell. The good points mentioned in his paper are too numerous to note here, but we hope all will have opportunity to read his entire paper when published.

The last paper on the program was "The Veterinary Profession and its Future" by Dr. S. O'Toole. He insisted on good preparation at college, efficient control by State Boards and a high ambition of all members of the profession.

A goodly number of veterinarians in attendance spent the

second afternoon in observing hospital cases of Dr. H. W. Burkland at the Atlanta Stock Yards.

The meeting was attended by something like sixty veterinarians and all present expressed themselves as greatly pleased and agreeably surprised at the number present and the interesting program.

G. R. ROBERTS, Secretary.

MISSISSIPPI STATE VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Mississippi State Veterinary Medical Association, held at Clarksdale on January 9 and 10, 1917, was without a doubt, the best ever held in the state for the papers and addresses, the large clinic at Dr. W. L. Gates' hospital and the entertainment by the city of Clarksdale could not be excelled.

The members met at the Elks Club Tuesday morning at 9 A. M. where the Mayor, Hon. J. C. McNair welcomed us to the city with a short address which was ably responded to by Dr. W. P. Ferguson, of Grenada. Dr. E. M. Alderman then read his paper on Choke in the Horse. Dr. R. C. Moore gave an address on the Requisites for Successful Surgery and was followed by Dr. L. A. Merillat on Field and Hospital Surgery who claimed that Dr. Moore had taken all the thunder that he had prepared. Dr. Moore and Dr. Merillat gave well prepared addresses covering the field of surgery in a very thorough manner.

At the afternoon session Dr. John Oliver read a paper on The Surgical Treatment of Hernias. Dr. B. M. Davenport gave a report of the Serum Treatment for Anthrax prior to Dr. W. H. Dalrymple's paper on Anthrax. Dr. Dalrymple covered the subject of Anthrax and his paper was thoroughly enjoyed by the members, especially those in the sections of the state where anthrax was prevalent last year.

Owing to sickness, Dr. N. C. Nelson was not present but Dr. H. K. Wright of Mulford & Co., replaced him. Dr. Wright told us about the preparation of hog cholera serum and took up the various phases of vaccination. Dr. H. Chadwick spoke on Tick Eradication and What it Means to the Veterinarian. We were told of the work and the difficulties that had been met and that by January 1918 the State of Mississippi would probably be free from the Texas fever tick.

Dr. S. L. Stewart gave an interesting address on Navel Ill, illustrating his paper with lantern slides showing the various conditions that were met with in the disease.

Tuesday Night, Jan. 9th, 1917. *Business Session.* We were called to order by the President, James Lewis. Twenty-four of our forty-eight members responded to the roll call. Owing to the length of the minutes they were approved without reading. The treasurer then gave his report showing a balance of \$135.89 in the treasury.

The President's address reviewed the veterinary situation in the state. Dr. Lewis mentioned especially the fact that the County Farm Demonstrators and members of the Medical Profession were doing a great deal of practice.

The executive committee then gave their report and recommended for membership the following men who were elected viz:—R. H. Mohlenhoff, C. W. Demman, A. I. Jones, J. W. Burras, F. L. Parse, B. T. Huston, C. McMillian, T. S. Mason, W. J. Lacy.

Considerable discussion was brought up about the Farm Demonstrators, the students of the A. & M. College and the members of the medical profession vaccinating live stock for anthrax, cattle for black leg, testing cattle for tuberculosis, using virus for the simultaneous vaccination of hogs, castration of colts, etc. The matter was finally dismissed by the President appointing Dr. J. A. Beavers, Dr. W. P. Ferguson, and Dr. John Oliver to draft resolutions to present to Mr. R. S. Wilson, in charge of the County Farm Demonstrators in Mississippi; P. P. Garner, President of the Miss. Livestock Sanitary Board and the President of the A. & M. College and also a copy to be presented to the veterinary journals for publication.

Dr. James Lewis of Greenwood and Dr. J. A. Beavers of Canton were elected to serve four years on the Examining Board. The following officers were elected to serve the association for the coming year:—Dr. H. Chadwick, Pres.; Dr. W. R. Edwards, Vice-Pres.; Dr. E. S. Norton, Secy.-Treas.

By vote it was decided to hold the next meeting on the second Tuesday and Wednesday, January, 1918 at Meridian, Miss.

Wednesday, Jan. 10, 1917. *Clinics.* The entire day was used in clinical work. Some thirty-five animals were gathered together by Dr. Gates for operations and diagnosis. Following are the operations performed and the veterinarian performing the same:—

Gray horse mule—Fistula on inside of right hind leg between hock and stifle joints by Dr. O. M. Norton.

Bay Gelding—Fistula of withers by Dr. L. A. Merillat.

Bay horse mule—Fistula of withers by Dr. L. A. Merillat.

Sorrel Mare—Tenotomy by Dr. John Oliver.

Black Mare—Ringbone by Dr. L. A. Merillat.

Bay Mare—Extracting teeth and trephining sinus by Dr. L. A. Merillat.

Bay Mare—Spavin—Acuneon tenotomy by Dr. L. A. Merillat.

Pig—Double scrotal hernia by Dr. S. L. Stewart.

Gray mule—Fistula of withers by Dr. John Oliver.

Ridgling boar by Dr. Merillat.

Fistula of withers by Dr. John Oliver on mule.

Dog—Removal of eye and replacing with glass eye by Dr. John Oliver.

The balance of the clinic was for diagnosis and treatment. Dr. Gates showed us a mule that had been giving milk for about two years. There were several cases of lameness, one horse with sleepy staggers, a horse with a broken hip, one horse with cyst in the gluteal muscles, a mule with crooked feet, a dog with mange, etc.

The banquet at the Aleazar Hotel brought the meeting to a successful close and it was voted by the members that this was the best meeting that we had ever held.

Drug and Instrument displays by Sharp & Smith, The Abbott Laboratories, H. K. Mulford Co., and John T. Milliken & Co., were present. These displays were large and appropriate and received much favorable comment by the members.

E. S. NORTON, V.M.D., Secretary.

SOUTHERN TIER VETERINARY MEDICAL ASSOCIATION

The third semi-annual meeting of the Southern Tier Veterinary Medical Association was held at Binghamton, N. Y., December 30, 1916. During the morning an interesting clinic was held at the Hospital of Dr. P. J. Axtell, after which the members had luncheon at the Hotel Bennett.

The afternoon session was called to order by President Pearce at 2:30. Thirty-three members and visitors were present. In the absence of Dr. Fitch, Dr. H. J. Milks was elected temporary secretary.

The following papers were given :

President's Address—Dr. C. D. Pearce, Binghamton.

The Limitations of the Use of Tuberculin—Dr. V. A. Moore, Ithaca.

Veterinary Practice in the State of Washington—Dr. J. H. Woodside, Groton, N. Y.

Some Recent Applications of Physiology to Veterinary Science—Dr. C. E. Hayden, Ithaca.

A Discussion on Azoturia—Drs. Faust, G. A. Knapp, Stone, Vorhis and others.

The following motions were passed :

That a committee be appointed to investigate the subject of associate members.

That the proceedings be published as usual.

That the next meeting be held at Elmira.

There was also considerable discussion of the plan of the meeting but no definite action was taken upon this subject.

Meeting adjourned.

H. J. MILKS, Secretary Pro. Tem.

The following cases were examined and treated at Dr. Axtell's, 65 Carroll Street, Binghamton at 9:30.

I. Fistula in the right side. Brown Gelding, as result of infection from tapping about two months previously. About two quarts of pus were let out and wound and abscess cavity packed with iodine gauze. Operation by Drs. Faust and Axtell.

II. Dog. Chronic case of distemper, examined and prescribed for by Dr. Quinn of Norwich.

III. Sorrel Gelding. Diseased third superior molar. Trephined and punched out by Drs. Baker and Knapp, under chloral narcosis and cocain anesthesia.

IV. Black Gelding examined by Drs. Frost, Baker and others. Adhesion of the penis to the prepuce and necrotic abscess. Nothing done in the way of treatment.

V. Brown Gelding, Paraphimosis of penis. Operated on by Drs. Frost and Harding. Amputation performed under chloral narcosis and cocaine used locally. Operation successful.

VI. English Setter Dog. Tumor in side of neck anterior to point of shoulder. Tumor about size of goose egg. Operated by Dr. Milks under morphine narcosis. Some trouble was experienced with hemorrhage. The vagus nerve passed over it so it

had to be dissected away carefully. A very nice operation when completed. Dog died from trouble with vagus nerve, January 3rd, 1917.

VII. Two Year Old Heifer. Sterility, cystic ovary. Cyst ruptured and uterus irrigated by Dr. Knapp.

VIII. Cow. Cornual pregnancy. Fetus about size of a cat. Situated far up in the cornu of the uterus. Impossible to be reached through the uterus, could be felt plainly through the rectum, but not movable in the horn. The peculiar thing of this case was the absence of the corpus luteum in the ovary. Examined by Drs. Frost, Knapp and Faust.

Cow is being washed out daily with hopes of washing the fetus away. The condition has existed for six months. Cow in fairly good condition but with a bad fetid discharge.

All cases doing very nicely up to the present time, with the exception of the dog as previously stated.

P. J. AXTELL.

THE NINTH CONFERENCE FOR VETERINARIANS, ITHACA, N. Y.

The conference was held January 16 and 17 at James Law Hall, the main building of the New York State Veterinary College. Dean Moore, in his opening address: "Opportunities for the Average Veterinarian", among other things, called attention to the fact that the veterinarian should be a factor in legislation; that he should exert an educative influence upon animal owners and with their cooperation assist in formulating proper livestock sanitary laws.

Dr. Fitch's paper upon "Some of the Common Parasites of the Domesticated Animals and their Importance to Veterinarians", was of a practical and interesting character. He believed, in this connection, that a microscope was a paying investment for the veterinarian. A brief description of the more common parasites and their habitat was given with a very excellent series of lantern slides.

Illness prevented Dr. Reid Blair from giving his paper on "Tuberculosis in Carnivorous Animals." It was, however, read by Dr. Fitch. Attention was called to the growing importance of the disease in this class of animals, and its possible menace to the family.

Dr. A. R. Ward, of the Bureau of Animal Industry, in his paper on "Suppurative Lesions in Pigs and Cattle due to *Bacillus pyogenes*" emphasized its importance in suppurative processes. It was formerly thought to have a relation with swine plague. It is also associated with arthritis in pigs. Its relation with cattle is quite as important as pigs. The organism is frequently found in bronchopneumonia as well as in inflammation of the udder. The bacillus as well as the streptococcus may be concerned in mammitis. *Bacillus pyogenes* has also been found in keratitis.

Dr. Hayden, in his paper on "Salivary Digestion in the Horse", emphasized the fact that enzymes were found not merely as the products of the glands but that they were found also in certain secretions and excretions of the body, mentioning particularly the bile, urine and blood. He also suggested the importance of enzymes in connection with pathological processes.

The address on the "Relation of the Veterinarian to the Farm Bureau Work" was given by Professor Burritt of the College of Agriculture. He referred to the development and history of the movement and the widespread and growing interest that is being manifested. In this state, there have thus far been harmonious relations and a spirit of cooperation between the veterinarians and farm managers.

The symposium on Poisoning Among Animals included two very interesting papers: one by Professor Harshberger of Pennsylvania on "Poisonous and Stock Killing Plants"; the other by Professor E. M. Chamot of Cornell on "The New Toxicology". Considerable interest was manifested and much discussion ensued.

In the absence of President Schurman, Professor W. A. Hammond, Secretary of the University Faculty, gave a very cordial address of welcome. This was followed by the principal address of the evening by Dr. John W. Adams on "The Veterinarian Himself, His Reputation and Success". Dr. Adams spoke in his usual happy way and advanced much valuable material for the reflection of his auditors. Dr. W. Horace Hoskins spoke in a dignified and eloquent manner of the services of the late Dr. Salmon, and urged renewed interest in the Salmon Memorial Fund. A smoker with light refreshments, closed the exercises of the first day.

The exercises of the second day opened with an interesting address by Dr. W. L. Williams on "Infectious Abortion". This was accompanied by a series of excellent lantern slides. It was

stated that it was not proven nor disproven that the bull conveys the disease, but there nevertheless seems to be some evidence to incriminate the bull. In the treatment of calves, he recommended the plentiful use of calf scours serum and enemas of salt solution.

The paper by Dr. Frost on "Formalin in the Treatment of Mastitis" was received with much welcome by the practitioners. His description of its successful use in a number of cases indicates that it is a valuable method of treatment.

In his paper on "The New Pharmacopoeia", Dr. Milks suggested the desirability of having veterinary representation upon the Board of Revision, and further pointed out interesting changes that had been made in the new edition.

The paper by Doctors Udall and Birch on "Diagnosis of Tuberculosis" was presented by Dr. Udall. It contained much valuable information and discussed in some detail the value of physical examination and the use of the sputum cup. The program was followed by meetings of the various alumni associations.

The afternoon was devoted to clinics and post-mortems in the surgical, small animal and medical buildings. The interest in the clinics was as keen as ever and it was apparent that much valuable and practical knowledge was gained. A number remained over another day to see the experimental farm where hog cholera serum is produced. A special demonstration of the method of using serum was given to a large number of veterinarians on Monday afternoon and Thursday morning.

The conference closed with a banquet at the Ithaca Hotel with 140 in attendance. Dr. Fish acted as toastmaster and introduced the following speakers: J. W. Adams, A. R. Ward, C. Way, G. S. Hopkins, Professor Savage and J. G. Wills.

In point of numbers this conference exceeded previous ones. The interest and enthusiasm exhibited indicated that in all other respects a high standard had been maintained.

P. A. F.

THE MONTANA STATE VETERINARY MEDICAL ASSOCIATION

A hearty welcome was delivered to the association by Mayor Wilkinson when it convened at the Chamber of Commerce building at Missoula, January 5. State Veterinarian W. J. Butler responded to the address of welcome. The president's address was delivered by Dr. M. E. Knowles.

Much interest centered around the Symposium on Meat and Milk Inspection to which the general public was invited. An interesting event of the program was the luncheon given by the Missoula Chamber of Commerce at the Florence Hotel in honor of the veterinarians. More than 100 of the residents of the city met with the association.

William F. Wayne delivered the welcoming address. He praised the profession for the good work it was doing in preventing animal diseases and protecting mankind from becoming contaminated with those diseases.

Dr. M. E. Knowles, president of the association, told of the work of the profession and thanked the people of Missoula for their hospitality.

Dr. E. C. Anderson made a plea for the authorization of more far-reaching methods in safeguarding public health by the people through proper legislation. He also told of the work of the veterinarians along this line.

The future of Missoula as the center of the best cattle raising district in Montana was the theme of the talk by Dr. W. J. Butler, state veterinarian. He said that the valleys of this section of the state afforded protection for the animals, while the flat stretches furnished the pasture. In closing the doctor thanked the chamber of commerce for the use of the hall for the convention and the luncheon that had been tendered the members of the association.

It was voted that the next winter session should be held at Great Falls in January 1918. The names of Dr. A. D. Knowles of Missoula and Dr. O. J. Johnson of Miles City were selected for an appointment by the Governor to the State Board of Veterinary Medical Examiners.

MISSOURI VALLEY VETERINARY ASSOCIATION

The next meeting of this association will be held at St. Joseph, Mo., Wednesday, Thursday and Friday, February 14, 15 and 16. A permanent local committee has been formed with Dr. R. C. Moore as chairman, Dr. Stone as vice-chairman and Dr. B. R. Rogers as secretary. The chairmen of each committee meet at the veterinary college every Thursday evening up to the time of the meeting.

Every effort is being made to make this one of the most successful and valuable meetings of the Missouri Valley. The Com-

merce and Rotary Clubs and the veterinarians extend an invitation to any of the profession who may be in that locality to attend the meeting.

THE FIRST ANNUAL CONFERENCE FOR VETERINARIANS AT AMES, IA.

The following program was prepared for the meeting held at Veterinary Division of the Iowa State College at Ames, January 11 and 12.

Anatomy and Physiology of the Udder of Cows	H. S. Murphey
Pathology and Bacteriology of the Udder.....	W. W. Dimock and Chas. Murray
Judging and Types of Dairy Cattle.....	L. S. Gillett
Dairy Farm Sanitation. Illustrated	Cassius Way
The Bacillus Abortus and Tests for the Detection of Abortion in Cattle	
	Chas. Murray and L. E. Willey
Abortion: Its Complications and Their Treatment.....	II. E. Bemis
Production, Handling and Distribution of Clean, Sanitary Milk. Illus- trated.	Cassius Way
Abortion from the Practitioner's Standpoint	C. E. Cotton
Correlation of Our Present Knowledge Regarding Infectious Abortion in Cattle	V. A. Moore
Tuberculin Tests for Tuberculosis	R. R. Bolton
Tuberculosis: Its Prevalence, Lesions and Interpretation of Tests. V. A. Moore	
Therapeutics of Acute Mastitis	H. D. Bergman
Vesicular Stomatitis (A brief statement of the recent outbreak among horses and cattle)	W. W. Dimock

KANSAS VETERINARY MEDICAL ASSOCIATION

For the thirteenth annual meeting of the Kansas Veterinary Medical Association held at Wichita, Kans., Jan. 3 and 4, the following program was prepared:

Address of Welcome	Mayor of Wichita
Response to Address of Welcome	Dr. R. B. Rogers
President's Annual Address	Dr. W. J. Guilfoil
Urethral Calculi	Dr. L. D. Eastman
Some Useful Instruments and Appliances.....	Dr. C. E. Bassler
Chronic Diseases of the Mammary Glands of Cows	Dr. R. C. Moore
Case Reports.	
The Practitioner's Round Table	Dr. H. Jensen
Question Box	
Vesicular Stomatitis	Dr. A. T. Kinsley
Infectious Abortion in Cows	Dr. O. W. Noller

Proprietary Remedies and Their Advertising Media	Dr. B. W. Truax
Announcement of Clinic Program	
Adrenalin Demonstration	Dr. J. H. Burt
Dental Anaesthesia	Dr. R. R. Dykstra
Clinic	

IOWA VETERINARY ASSOCIATION

The following program was arranged for the annual meeting of the Iowa Veterinary Association at its meeting at Ames, January 9, 10, 11.

President's Address	Wm. Drinkwater
Report of the Secretary-Treasurer	H. B. Treman
Some of the Most Common Parasites of the Digestive Tract. With report of Cases and Specimens.....	Fred R. Maxwell
Periodic Ophthalmia	R. F. Avery
Report of Committee on Therapeutics	W. J. Miller
Some of the More Common Diseases of the Heart.....	W. W. Dimock
Report of the Committee on Diseases and Treatment.....	A. L. Wood
A Brief Résumé of the Principal Differences Between the New and Old Anatomical Nomenclatures	Burton R. Rodgers
Address of Welcome, for the College.....	President R. A. Pearson
Address of Welcome, for the Town	Mayor Geo. E. Baker
Response for the Association	Past President G. W. Blanche
Address on Therapeutics	E. L. Quitman
Recent Notes on Poisonous Plants	L. H. Pammel
Progress of Hog Cholera Control Work in Iowa.....	J. S. Koen
Case Report	R. C. Mills
My Observations in an Outbreak of Hemorrhagic Septicemia	J. H. McLeod
Report of Committee on Sanitation	G. A. Johnson
Case Reports	R. R. Bolton
Report of Committee on Legislation	J. I. Gibson
Lecture and Demonstration in Judging Horses	W. H. Pew
Report of Committee on Surgery	H. E. Bemis
Chlorinated Lime as an Antiseptic in Practice.....	N. A. Kippen
Vesicular Stomatitis. Illustrated	S. Stewart
Some Points on the Surgical Anatomy of the Foot. Illustrated	H. S. Murphey
Report of Committee on Neurology	L. W. Russell

WISCONSIN VETERINARY MEDICAL ASSOCIATION

For the second annual meeting of the Wisconsin Veterinary Medical Association held at Madison, January 16 17, 18, the following program was prepared:

Address of Welcome	C. P. Norgard, Commissioner of Agriculture
Response	J. D. Lee
President's Address	L. J. O'Reilly

Some Personal Experiences with the Tuberculin Test	W. G. Clark
Discussion by R. S. Heer, T. H. Ferguson, J. F. Roub, C. M. Crane.	
Summary of the Entire Situation	O. H. Eliason
Brachial Paralysis	A. W. Lange
Azoturia	W. H. Dreher
Infectious Gastro-enteritis in Calves	R. E. Schuster
The Fox Industry	J. S. Collins
Twins versus Free Martins	R. S. Heer
The Business Side of Practice	N. S. Mayo
Canine Distemper	N. S. Terry
Symptomatic Alopecia	F. W. Sutcliffe
Forage Poisoning	R. D. Shireman
Lympharagia	V. F. Wauke
Immunization of Farm Animals	G. A. Johnson
Practical Castration of Cryptorchids	B. Royer
Communicable Skin Diseases from Animal to Man.....	Karl W. Smith
Sero-toxin Treatment of Tuberculosis	E. H. Agnew
Supplementary Dietary Relationship Among Our Natural Food Stuff's	
	E. V. McCullough
Hemorrhagic Septicemia	W. R. Clausen
The Pathology of Sterility in Infectious Abortion	W. L. Boyd
A Paper	F. J. Cole
Ptomaine Poisoning	J. W. Beckwith
A Case Report	Herbert Lothe
Report of the Clinic of the Summer Meeting	J. D. Lee
Clinic at the Infirmary of West and Woleott.	

PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION

The program of the thirty-fourth annual meeting of this association, held at Harrisburg, January 23 and 24 was prepared as follows:

The Veterinary Profession as a Part of Agricultural Development.	H. H. Havner
Livestock Inspection on Farms.....	Hon. Frank B. McClain
State Milk Hygiene	John P. Turner
The Diagnosis of Infectious Abortion of Cattle with Special Reference to the Intradermal Abortus Test	John Reichel and M. J. Harkins
Treatment of Sterility and Contagious Abortion of Cattle.....	C. J. Marshall

Reports:

Medicine and Surgery (including descriptions of Vesicular Stomatitis)	
	R. M. Staley
Legislation	J. N. Rosenberger
Milk and Meat Hygiene	W. S. Gimper
Salmon Memorial	W. H. Hoskins
Trustees	C. J. Marshall
Therapeutics of Some of the Digestive Disorders of Bovines....	Louis A. Klein

The Caesarean Operation Harry W. Barnard
 Experiments with Different Treatments for Shipping Fever at a Sales
 Stable Wm. J. Lentz

JOINT MEETING WITH ALLIED AGRICULTURAL ASSOCIATIONS

1. Should the State Pay Indemnity for Animals Destroyed to Prevent the Spread of Disease?
 2. State Dairy Inspection.
 3. Pennsylvania Dog Laws.
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U. S. LIVESTOCK SANITARY ASSOCIATION COMMITTEES

FINANCE. W. F. Crewe, Bismarek, N. D.; S. W. Allen, Watertown, S. D.; V. A. Moore, Ithaca, N. Y.

LEGISLATION. John R. Mohler, Washington, D. C.; Lester Howard, Boston, Mass.; C. E. Cotton, Minneapolis, Minn.

CREDENTIALS. P. F. Bahnsen, Atlanta, Ga.; W. J. Butler, Helena, Mont.; C. Way, New York City.

RESOLUTIONS. O. E. Dyson, Chicago, Ill.; T. E. Munce, Harrisburg, Pa.; G. Dunphy, Lansing, Mich.

PROGRAMME AND PUBLICATION. S. H. Ward, St. Paul, Minn.; D. M. Campbell, Chicago, Ill.; J. J. Ferguson, Chicago, Ill.

TICK ERADICATION. M. Jacob, Knoxville, Tenn.; C. A. Cary, Auburn, Ala.; E. M. Ranck, Agricultural College, Miss.; P. F. Bahnsen, Atlanta, Ga.; Penn Anderson, Kansas City, Mo.; R. M. Gow, Little Rock, Ark.

HOG CHOLERA CONTROL. J. W. Connaway, Columbia, Mo.; A. L. Hirlman, Atlanta, Ga.; F. A. Bolser, New Castle, Ind.; E. A. Cahill, Boston, Mass.; J. I. Gibson, Des Moines, Ia.; A. S. Cooley, Columbus, Ohio.

GRIEVANCES. S. F. Musselman, Frankfort, Ky.; A. W. French, Cheyenne, Wyo.; O. H. Eliason, Madison, Wis.

ADVISORY COMMITTEE TO SECRETARY. E. Pegram Flower, Baton Rouge, La.; J. J. Ferguson, Chicago, Ill.; C. H. Stange, Ames, Ia.

COMMITTEE ON DISEASES. John Reichel, Glenolden, Pa.; A. T. Kinsley, Kansas City, Mo.; H. Preston Hoskins, Detroit, Mich.; J. A. Kiernan, Birmingham, Ala.; J. B. Hardenbergh, Philadelphia, Pa.

COMMITTEE ON INFECTIOUS ABORTION. Ward Giltner, East Lansing, Mich.; G. M. Potter, Washington, D. C.; B. B. Flöwe, Raleigh, N. C.

COMMUNICATIONS

Editor of the Journal of the American Veterinary Medical Association, Ithaca, N. Y.

THE BULL AS A FACTOR IN ABORTION DISEASE

In the January number of the *Journal*, near the bottom of page 644, in the article by Dr. J. F. Devine on the Twentieth Annual Meeting of the U. S. Livestock Sanitary Association, the following statement is made regarding a paper by Dr. W. E. Cotton and myself on "Practically Significant Facts About Abortion Disease":

"Does not believe the bull is an important factor in the spread of abortion disease."

This statement I believe should be corrected, because it is not in harmony with any opinion concerning the part the bull may have in the dissemination of abortion disease Cotton or I have ever expressed, and may be seriously misleading.

What Cotton and I actually did say in our paper concerning bulls, and I wish specially to call attention to the last three or four lines, follows:

"Before ending our paper, we wish to say a few words about bulls and virgin female cattle. As we know, such animals at times react with abortion tests; but, apart from the fact that the reactions must be accepted as evidence to prove that infection with abortion bacilli occurs through other channels than the udder, we know virtually nothing about their significance.

"As we have emphasized that our tests indicate that abortion bacilli do not persist in the bodies of cattle elsewhere than their udders and gravid uteruses, it is important that we should record one noteworthy, possibly though not certainly unique or very rare, exception to the common rule. This was a bull, whose history, briefly, is as follows: Reacted with abortion tests; was at once killed and a searching post mortem examination made. The only lesion found was an abscess involving the epididymis of one testicle. The abscess was proved by cultural and animal inoculation tests to be infected with abortion bacilli. No other portion of the bull's body proved infected. Tests with blood, liver, spleen, lymph glands, testicles, different portions of the penis, seminal fluid, synovial fluid, etc., alike failed to reveal abortion bacilli.

"Our attempts to produce a similar case of infection artificially failed; and, in agreement with the difficulties many investigators have had to obtain incriminating evidence against bulls, we have thus far failed to infect bulls in a way that justifies the assumption that they are important factors in the dissemination of abortion disease. Our attempts include subcutaneous and intravenous injections of suspensions of abortion bacilli, feeding of abortion bacilli and exposures through copulation. One bull

failed to become infected though he served a chronically bulling cow so frequently that his organ of copulation became abraded and inflamed. Prior to the copulations in this case suspensions of abortion bacilli were injected into the vagina and uterus of the cow.

“Regarding the dissemination of abortion disease by bulls we may say, however, that it would be foolhardy in the dim light of our present knowledge to take liberties with reacting bulls, or bulls from infected herds, or promiscuously used bulls.”

With the hope that you may be able to give this correction a place in the *Journal*, I am, very sincerely yours,

E. C. SCHROEDER.

Editor of the Journal of the American Veterinary Medical Association, Ithaca, N. Y.

RETAINED PLACENTA

In the December issue I notice a discussion on the treatment of retained placentas. In my experience of 12 years, Dr. DeVine's treatment is the only safe and curative one. Important is his advice and warning not to drag on the membranes; that is what causes more inflammation, etc.

I have had the chance to see three cows die from adherent membranes, and one mare. On autopsy I found membrane attached in horn. I cannot describe the looks and condition of that swollen organ. I am at a loss to know how any drug could cure. If hot irrigations would not cure, they would cleanse and reduce conditions somewhat. There is no drug equal to hot water for reducing congestions or for cleansing, soothing and stimulating.

If practitioners will follow Dr. DeVine's advice, use plenty of water, and not pull on membranes, there will be no shock or death. I had several die from dragging on membranes and not using sufficient water and often enough. They were in a bad condition and I made it worse.

WALTER LAWSON.

Editor of the Journal of the American Veterinary Medical Association, Ithaca, N. Y.

INFLUENZA AND BRUSTSEUCHE

In the *Journal* of the Association for September, 1916, there appears on page 848 an abstract of the work on Brustseuche reported by Gaffky and Lühr from the Imperial Health Office in Berlin. This abstract in the *Journal* is from an abstract of the original printed in the *Weiner Tierärztliche Monatsschrift* for December 1915, entitled: “Zur Epidemiologie der Brustseuche der Pferde.” The original report made by Gaffky and Lühr is printed in the “*Zeitschrift f. Veterinärkunde*” in the years 1912 and 1913. This work was originated by Koch in 1905, and the final report by Gaffky and Lühr in 1913 presents one of the most

important publications in veterinary literature. Without discussing the details of the report I wish only to mention that their investigations confirmed those of previous workers, in establishing the fact that equine influenza and Brustseuche (equine contagious pleuro-pneumonia) are not different forms of the same disease; but that they vary widely in their period of incubation, as well as in their epidemiology, two facts of great importance in the control of pneumonia.

In the abstract in the *Journal* made by Mr. Berg, the conclusions of Gaffky and Lühr in regard to Brustseuche are made to apply to influenza. In other words "Brustseuche" has been translated into "Influenza." Thus the report of their conclusions is entirely erroneous.

I have no desire to discuss the opinion that there is only one disease, namely influenza, at a time when the American Veterinary Medical Association holds annual symposiums on these diseases under the subject of "Shipping Fever or Influenza," and the United States Live Stock Sanitary Association resolves that the alarming losses from influenza or shipping fever should be controlled; but I would respectfully call attention to this important publication, and request that the authors be correctly reported.

Very truly yours,

D. H. UDALL.

REVIEWS

LAMENESS IN THE HORSE

J. V. LACROIX, D.V.S.

Professor of Surgery, The Kansas City Veterinary College.

Author of Animal Castration.

Illustrated.

Chicago.

American Journal of Veterinary Medicine.

1916

This book, which contains 261 pages, covers rather comprehensively the entire subject of lameness, giving in detail the principles of lameness and the specific diseases producing the various types of lameness. This book is divided into four sections.

Section 1. This section deals particularly with the etiology and occurrence of lameness, with a thorough description of the general diseased processes bringing about the symptoms of disturbed motion. This section also gives an interesting description of different classes of fractures, explaining the conditions found in each

class; luxations, the classification and significance of each; arthritis, classification and pathological condition found in each; affections of muscles and tendons, nerves, blood-vessels, lymph glands, bursae, etc. This section is quite an important one on account of a thorough explanation of the etiological factors producing the various types of lameness.

Section 2. The diagnostic principles of lameness are of great importance to the student and the practitioner. One of the weak points in treating lameness has been the lack of a systematic and thorough examination of the patient in order to arrive at a correct diagnosis. This section deals particularly with the methods of examination of the animal, the attitude, the passive movements, the character of the gait, and the various special methods of examination which are so essential in a great many cases before a diagnosis can be made positive. The student and practitioner will find much information in this section, and should be read carefully by every diagnostician of lameness.

Section 3. Lameness in the fore limb is discussed fully in this section, beginning with an anatomico-physiological review of the parts of the fore limb, followed by a systematic and thorough description of all the diseased conditions from the scapula to the foot. Each one of the conditions found in this location is well illustrated and described, the characteristic features of each pointed out, so that it would be of great assistance in making a positive diagnosis in the subject.

Section 4. Lameness in the hind limb in this section is treated in a similar manner to that of the fore limb, all of the diseased conditions are thoroughly and systematically described and well illustrated.

The descriptive matter in this book is all that one could desire, and the illustrations (particularly the anatomical cuts) are excellent. This latter feature materially adds to the value of the book. The book is neat in appearance, well bound, and should be obtained and read carefully by every student and practitioner. The author should be commended for giving to the veterinary profession such a valuable treatise on the subject of lameness.

J. H. S. and O. V. B.

PATHOLOGY AND THERAPEUTICS OF THE DISEASE OF
DOMESTIC ANIMALS

HUTYRA AND MAREK: Edited by MOHLER AND EICHHORN
Alexander Eger, Publisher, Chicago, Ill.

This well known work of two handy volumes scarcely needs introduction to the veterinary world. It is the second authorized American edition from the fourth revised and enlarged German edition. In the new English edition the editors included not only all of the new features of the last German edition, but in many instances they have added such data as relate especially to conditions prevalent in this country. The illustrations were given special attention: the half tones and partially colored cuts were increased in number from 361 to 438, and the colored plates from 15 to 19. There are 2346 pages in the two volumes, an increase of 220 pages over the first English edition. Small print was more liberally used than previously, in order that the publication would be increased in volume as little as possible.

In Volume I, on infectious diseases, an important change has been made with reference to the catarrhal form of influenza and contagious pneumonia of horses, which in view of the most recent investigations of the German Imperial Board of Health appeared to justify the separation and differentiation of these two diseases. This volume, in addition to the new chapters on paratyphus of hogs and on sporotrichosis, also contains many elaborations in most of the chapters, especially with reference to etiology, allergic reactions, serodiagnostic methods, immunization and chemo-therapy. The chapter on protozoan diseases has been carefully revised and brought up to date by the necessary additions. Hutyra and Marek, in their German edition have changed the name of the causative agent of calf diphtheria, from *Bacillus accrophorus* to *Bacillus accrososus*. The American editors have retained the older name.

In Volume II, on organic diseases, new chapters have been prepared on catarrh of the sphenoidal sinus, dysentery, localization of the cerebral affections, etc. Section VII, on disease of the pancreas, should be of particular interest to the research veterinarian of the future. This chapter contains not quite three pages. In human medicine, whole volumes have been written on this subject

—a striking illustration of the undeveloped condition of certain parts of veterinary medicine.

The German edition is naturally written in idiomatic German. The difficulty of translating into idiomatic English can only be appreciated by those who have wrestled with it. There is a pitiful lack of medical dictionaries in foreign languages, suitable to the needs of the veterinarian. Under the circumstances the translators have certainly done a splendid piece of work. A selected list of publications at the end of each disease, will enable the reader to obtain directly from the library, the literature on any disease of particular interest.

Those veterinarians who speak and read English only are fortunate in having this standard work on the subject of Veterinary Medicine presented in such a masterly form by the most representative men in our profession. The writers, translators, editors, and publishers are each entitled to our most hearty congratulations for the masterly way in which the entire work has been performed.

C. J. M.

A TEXT-BOOK OF GENERAL BACTERIOLOGY

EDWIN O. JORDAN, Ph.D.

Professor of Bacteriology, in the University of Chicago and in
Rush Medical College.

Fifth edition thoroughly revised. Octavo of 669 pages, fully illustrated.
Philadelphia and London: W. B. Saunders Company, 1916. Cloth, \$3.25 net.

The fact that the fifth edition of this book has followed the fourth in less than two years, indicates the value and attractiveness of its contents. Although it has been thoroughly revised it remains small enough for a text. The more essential additions of new material are concise discussions on the Scheek reaction, mouth entamebae, Hodgkin's disease and a chapter on typhus fever. There are minor changes throughout the volume.

Although a comparatively new subject, bacteriology has developed extensively in so many different directions that it is no longer possible to prepare a text book that adequately covers the entire subject. The student of medicine, veterinary medicine, dairying, agronomy, sanitary science and certain of the industries each require a treatise containing, in addition to the general classifications and principles of bacteriology, certain definite information

about microorganisms immediately associated with their respective subjects. While there is considerable over-lapping, the subject matter in each is quite different from that in the others. Again the scientifically trained person needs for his general understanding of the phenomena of nature, including health and disease, a somewhat broad knowledge of microorganisms—what they are, where they are and what they do.

Dr. Jordan believes that bacteriology should have a place in every general scientific course. As he teaches this subject both to university students in scientific courses and to medical students, his book, as would be expected, is designed for the use of students in such courses. As the author is a distinguished epidemiologist, it naturally follows that the greater part of the description of species is devoted to those microorganisms causing human infections and epidemics. There are, however, in addition to these strictly medical phases of this subject, interesting and instructive chapters on higher bacteria and protozoa pathogenic for man; filterable viruses; bacteriology of milk and milk products; nitrifying bacteria; bacteria in the arts and industries; bacteria of air, soil and water; and bacterial diseases of plants.

The chapters that are perhaps the most noteworthy for their excellence in explaining difficult technical subjects are those on the structure and mode of development of bacteria; composition of bacteria; the effect of physical and chemical agents upon bacteria; and the effect produced by bacterial growth. The other chapters on classification and general bacterial technique are good.

The organic structure of the book is commendable. In style it is clear and the space devoted to the various topics is well proportioned. In selecting data from the voluminous literature the author has exercised a delicate discrimination and presented only that which seems to be of the most importance. There are numerous references to the literature which add to its value. The text illustrations, of which there are 178, are excellent.

There are several minor points on which opinions may differ as to the interpretation of phenomena and in a few instances slight changes suggest themselves. However, these are in connection with topics that are as yet more or less controversial. As the author is a research worker of authority and a teacher of high standing, the text, as well as the subject matter, is admirably adapted to the needs of students. It is difficult to suggest how a greater number of im-

portant bacteriological facts could be more fully or concisely presented. For medical students or for those wishing a knowledge of the role bacteria play in nature's economy, this volume is to be highly recommended.

The publishers have done their part in a very acceptable manner.

V. A. M.

NECROLOGY

JOHN TEMPANY

Dr. John Tempany died at his home in Walla Walla, Wash., December 6, 1916, at a ripe old age. He was a native of Ireland and was formerly an enlisted man in the U. S. Army and was appointed Senior Veterinarian in the 9th Cavalry after the army reorganization about 1869. He occupied that position for many years until retired recently under the former law.

LEVI E. JOHNSON

It is with sincere regret that we announce the death, after a brief illness, of Dr. Levi E. Johnson on January 17, 1917, at San Antonio, Texas. He was graduated from the Veterinary Department of the University of Pennsylvania, in 1896, and pursued a post graduate course at the San Francisco Veterinary College in 1901, and the McKillip Veterinary College in 1903. He entered the service of the Bureau of Animal Industry May 1, 1905, and was detailed to field work with headquarters at Kansas City, Missouri. He rendered very efficient service and July 1, 1911, was placed in charge of the inspection of live stock for importation and exportation along the boundary line between the United States and Mexico, with headquarters at San Antonio, Texas. He showed great energy and ability in the performance of his duties during the recent disturbance along the Mexican Border, and his many friends will be grieved to learn of his sudden demise.

MISCELLANEOUS

—The next meeting of the Hudson Valley Veterinary Medical Association will be held at Albany, N. Y., February 14.

—DR. HOSKINS BECOMES DEAN OF THE NEW YORK STATE VETERINARY COLLEGE AT NEW YORK CITY. Dr. W. Horace Hoskins, who for many years has been associated with the Veterinary School at the University of Pennsylvania at Philadelphia, has been appointed Dean of the New York State Veterinary College at New York City. At present Dr. Hoskins will retain his residence in Philadelphia and spend a portion of his time at New York.

—The next meeting of the Alabama State Veterinary Medical Association will be held February 23d and 24th.

—Dr. G. E. Corwin, has removed from Canaan, Conn. to 741 Albany Ave., Hartford, Conn.

—Dr. O. E. McKim of Watertown, N. Y. was one of the Americans aboard the steamer Georgie, one of the vessels recently sunk by the German raider. It was not definitely ascertained whether or not he was among those saved.

—The next meeting of the California State Veterinary Medical Association will be held at Petaluma, Cal., on March 14th, 1917.

—NO FOOT-AND-MOUTH DISEASE IN ENGLAND. A cable states that the former diagnosis was an error and the Board of Agriculture has removed all restrictions which were promptly placed on the trade after the first diagnosis.

—Dr. Guy T. Cole has removed from Oklahoma City, Okla. to Moultrie, Ga.

—It is reported that the mutton deficiency in the United States in 1914 was 8,000,000 pounds, in 1915, 12,000,000.

—Dr. S. J. Horne has removed from Lexington, Ga. to Thomson, Ga.

—Dr. F. D. Russell, formerly of Hebron, Ill., is now deputy state veterinarian, located at Presho, Lyman Co., So. Dak.

—CONFERENCES OF CATTLE TICK ERADICATION WORKERS. Problems involved in the elimination of cattle fever from the Southern States and methods of furthering the work were discussed at a con-

ference of employees of the U. S. Department of Agriculture engaged in cattle tick eradication and officials of state live stock sanitary organizations held in Atlanta, Georgia, January 8 to 12. The conference was attended by the Federal and State employees engaged in tick eradication work in the seven states east of the Mississippi still not free from tick infestation.

A similar conference of the tick eradication workers of the four states west of the Mississippi in which the pest is still present will be held in Dallas, Texas, January 29 to February 2. The papers and discussions at these conferences will deal with general organization, preliminary activities, the work of systematic tick eradication, the advantages of state-wide tick eradication laws, the construction of vats, educational publicity, etc.

—Dr. Lester E. Willyoung, veterinarian of the 11th Cavalry, U. S. A., has been retired under the new law, after a service of more than 15 years, with the rank of Captain.

—Dr. Anderson Crowforth is convalescing after a course of the Pasteur treatment for rabies. Dr. Crowforth was bitten, by a rabid dog, in seven places about the lips and lower jaw.

—Dr. Samuel Glasson, Jr., of the 7th Cavalry, U. S. A., after more than five years of service, has been placed upon the retired list with the rank of First Lieutenant.

—Dr. James B. Haynes of the Coast Artillery, U. S. A., is a patient at the Sanitarium at Fort Bayard, New Mexico.

—Dr. J. I. Handley, formerly assistant professor in veterinary science at the A. and M. College, West Raleigh, N. C., has accepted the position of assistant professor of veterinary surgery and clinics at the Michigan Agricultural College, East Lansing, Mich.

—The marriage of Miss Pearl Peacock of Eastman, Ga., to Dr. Joseph J. Vara, occurred at the home of the bride, December 26, 1916.

—MEDAL FOR DOG OF PRINCESS PAT'S REGIMENT. In recognition of a dog's devotion to his master and a man's sacrifice for his country, friends of the Toronto Humane Society have given a medal to Bobs, a fine Collie. The dog's master, Private Bob Monroe, formerly Mayor of Elk Lake, has been serving with the Princess Patricia's in the trenches. For eight months master and dog were

in the trenches. Both were wounded and treated in the same hospital.

—Dr. J. B. Clancy has removed from East St. Louis, Ill. to Jacksonville, Ill.

—Dr. H. E. Lent has removed from Akeley, Minn. to Park Rapids, Minn.

—Dr. Chas. B. Breininger of Washington, D. C. has removed to Chevy Chase, D. C.

—According to a report from Zurich, Switzerland, the veterinary school at Hanover has conferred upon General Hindenburg the degree of Doctor of Veterinary Science *honoris causa*.

—Dr. H. C. Johnson has removed from Brighton to Adel, Ia.

—Dr. D. B. Stewart has removed from Kasson, Minn. to 938 W. 87th St., Chicago, Ill.

—The Report of the Veterinary Director General of Canada for the year ending March 31, 1915, states there has been a further reduction in cases of glanders. Four provinces have been entirely free from the disease. Hog cholera gives trouble and anxiety and causes serious losses in the districts where it appears. Delay in notification hampers the successful prosecution of the work. A serious outbreak of dourine the previous year has occupied the attention of the staff in southern Alberta. Progress has been made. Horse mange continues to furnish work for the inspectors, but the outbreaks have been small, isolated and readily controlled except when the owners of the animals are careless in carrying out the necessary treatment. Progress has been made in dealing with cattle mange. The area under special mange quarantine has been further reduced. In the control of rabies it was necessary to impose quarantine in limited areas in Ontario, Saskatchewan, and Quebec. The measures taken were successful in stamping out the disease. There were no human fatalities. A few flocks in Manitoba were affected with sheep-scrap. After dipping and a period of quarantine the disease was eradicated. The origin of the trouble was untraced. Tuberculosis in Canada, as in other countries, is widespread and no district or province has escaped infection. Outbreaks of anthrax occurred in two provinces, but were controlled by the application of the Pasteur method of vaccination of all exposed animals.

Ergotism was also found in two herds of cattle in Alberta. Ergot was found upon the rye straw used for fodder. The prevalence of foot-and-mouth disease in the United States during this period required much vigilance on the part of the authorities to protect Canada from its ravages. There are appendices containing reports from the inspectors of the various provinces and from the research laboratories by pathologists, Higgins, Watson and Hadwen.

—At the last meeting of the Nebraska Veterinary Medical Association, the following officers were elected: President, Dr. G. J. Collins, West Point; Vice-President, Dr. G. A. Young, Syracuse; Secretary-Treasurer, Dr. S. W. Alford.

AMERICAN RED STAR ANIMAL RELIEF

As most of our readers know, the American Red Star Animal Relief was organized, on the suggestion of the Secretary of War of the United States, in order to perform for animals the same relief work which the Red Cross undertakes for soldiers. This work is being carried on under the auspices of The American Humane Association. Recently this Association sent its special representative to the Mexican border to examine into the condition of the army horses and mules. Thousands upon thousands of these animals were rushed to the border, from distant states, when the first alarm over possible war was heard. There were no suitable stables or shelters to receive the animals. Contagious diseases soon broke out among them. Shipping fever was rampant and large numbers of the animals have died. The intrinsic loss to the government has been great. The suffering of the poor beasts has been severe. Quantities of animals which did not die have been incapacitated for good service. There can be no doubt but what there is a great need here for efficient volunteer veterinary relief, under the auspices of the American Red Star organization. If any desire to help in this meritorious work, which combines a labor of patriotism and humanity, let them send a generous subscription promptly, addressed to "Headquarters American Red Star Animal Relief," Albany, New York.—*The National Humane Review*.

JOURNAL

OF THE

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PIERRE A. FISH, Editor

ITHACA, N. Y.

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No. 7.

Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary L. A. Merrillat, 1827 S. Wabash Ave., Chicago, Ill. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

SERVICE

The events which have recently made it necessary for this country to sever relations with Germany are too well known to need extended discussion. At this writing there is the relative calm which may precede the storm. The storm is expected because there is little hope that Germany will abandon her announced plan of ruthless submarine warfare in which, without inquiry, without warning and without mercy she will sink vessels of neutral, as well as belligerent nations, within a prescribed area of the high seas. It will be incredible if this procedure does not add to the list of more than two hundred American men, women and children who have already gone to their doom, through German instrumentality, although supposedly protected by international law. It matters little from which nation a declaration of war comes: there has been sufficient cause.

Germany, in effect, acknowledged the lawlessness of her acts a year ago when she yielded conditionally to the request of this nation that they should cease or friendly relations would forthwith terminate. She has weighed in the balance the friendly relations of this country and the illegal acts which may accrue to her benefit,

She has decided against us. Her resumption of these acts is therefore a virtual declaration of war.

A sovereign nation, with any self respect, cannot have its citizens destroyed while conforming to the code of international law, and entertain a sentiment of friendship for the one who strikes the blow. The patience of our President has been phenomenal. When it is proposed, in order to strike a belligerent, that we should stand by and look from the "lofty heights of impartiality" upon the destruction of our own citizens engaged in their legitimate rights of commerce or possibly even in relief for a stricken nation, then there should be some limit to patience.

In time of war, or even in the shadow of war, all loyal Americans should have but one thought and that is the honor of their country—their homeland. At such a time we must consider a man as for or against his country—a patriot or a traitor; the middle ground merges into one or the other. We are a heterogenous nation. With the belligerent nations our sympathies may be divided but our own crisis has made it necessary with many to decide, not without mental anguish, between fatherland or homeland. Our country has not been anxious for war; it has utilized every honorable method to escape it. If it must come, it will be entered into with sorrow, but with the firm determination to fight to the utmost for honor, justice and law. Without law, civilization is doomed. Whatever alignment, or realignment, of nations may occur these principles must not be obscured. Principle must not be sacrificed for expediency.

War involves service; each individual can contribute his bit in one field or another. The veterinary field is not exempt. Veterinary service has reached a high and efficient stage of development in the foreign armies. In all of the greater nations it is much superior to our own. The lack of recognition, so long withheld by Congress, has but recently been granted. The European war has demonstrated the value of this service. The long indifference of the past has been melted and a living stream of interest must replace it. Whatever improvement has occurred, the time has been too limited to make it very extensive. There is much to be done.

Separated from the jurisdiction of laymen; with the dignity of rank and working in cooperation with the medical corps of the army, the outlook for the veterinary branch is promising. Stronger than the improved conditions, however, should be the call of our

Country in her time of need. There has been a deficiency rather than a surplus of competent veterinarians in our Army Service. With the prospect of war many more will be needed in the regular branch and there should be, in addition, a large reserve corps of veterinarians to be drawn upon as needed. There are doubtless many in the profession who are so situated that they cannot enter the regular service but can join with a reserve corps and give their services when called upon. Such a plan is in effect in the medical branch and surely veterinarians have as much patriotism as physicians.

The first veterinary college established was an outgrowth of war. In 1762 such a school was organized by Claude Bourgelet at Lyon, France, primarily to fit men to care for sick and wounded horses in the army. Even in this early but war-torn period, the devastation of animals was so great that the importance of having especially trained men to care for them was recognized. Although the ravages of plagues and pestilences called into existence other schools later, the military factor was not ignored and, in our modern days, this has been featured in the schools at Berlin and Vienna. These facts have significance for us now. Recent graduates especially, and those soon to graduate, those not as yet firmly established in practice have a great opportunity opening before them. Veterinary colleges may cooperate by offering the use of their equipment and services for state or national purposes.

We have much unprepared potential strength in our country; it should be prepared as intensively as possible. Our inertia must quicken into activity. If war does not materialize or if it touches us in but a comparatively mild and gentle way, we are none the worse for our efforts at preparedness. With no thought of aggression, "with malice toward none and charity for all", we should take a determined stand for civilization and law and give to the utmost of our service.

P. A. F.

EUROPEAN CHRONICLES

Bois Jerome.

OXALEMIA OF DOMESTIC ANIMALS.—Dr. J. Rogers is a veterinary major and has written on this subject, to call attention to what will be new to many.

Oxalemia is the retention of oxalic acid in the blood.

Oxaluria is its condition and represents the presence of oxalic acid in the urine.

Oxalemia is to oxalic acid what azotemia, hemoglobinemia and glycemia are to urea, hemoglobin and glucose.

The history of oxalemia is short. As a morbid entity, it is unknown in veterinary medicine. Only oxaluria, one of its symptoms, has been mentioned by some authors, who have misunderstood the signification of hyperoxaluria. Malkmus speaking of oxalate of lime in the alkaline urine, says, that it has no diagnostic importance. Cadeac says that oxaluria is little known in domestic animals. Friedberger and Fröhner and Albrecht have found crystals of oxalate of lime in intestinal chronic catarrh.

Normal oxalemia is almost imponderable. Physiological oxaluria, constant in our subjects, varies in small amount. On the contrary, in the pathological condition, the quantity of oxalic acid increases considerably in the blood and in the urine and to be able to appreciate its varieties, it is necessary to know the biochemistry of oxalic acid.

Oxalic acid may be *Ex* or *Endogenous*. The former is that which exists in food. The latter that which is developed in the organism of animals. It is far the most important.

In the normal state, the blood contains but traces of oxalic acid. It has rid itself of it by organic combustion or by the kidney.

In the pathological state, oxalemia can be realized in various ways, intestinal fermentation, hepatic insufficiency, reduced nutrition, want of elimination.

Normally, oxalic acid is eliminated by the kidneys in the form of oxalate of lime. Some drugs, such as belladonna, opium, pilocarpine and eserine promote a *medicinal, hyper-oxaluria*.

Urinary elimination is proportional to the oxalemia, but only the amount of oxalic acid in the blood will give information on the oxalic retention, and the distinction to be established between *apparent* and *real oxalemia*, which to be well established, demands several delicate reactions. Some of which, like that of Salkowski are quickly made and others require more careful manipulation. The amount of the acid in the blood demands long and delicate methods and there are two principal ones to bring it out: one which utilizes the molybdate of ammonia and the other the phosphungstate of soda.

The elimination of the oxalic acid in case of an over amount

or of renal insufficiency, takes place by the digestive apparatus or by the lungs, under the form of oxalate and carbonate of lime in the dejecta.

The experimental and the clinical studies of oxalemia are also the subjects of the article of Dr. Rogers. He recalls the observations made by several authors and relates among the symptoms principally the presence of a large quantity of oxalate of lime in the feces of some animals. Referring to the fact that peculiar foods are likely to be the cause of the formation of oxalic acid in the organism, the treatment indicated in oxalemia is almost altogether dietetic. Exclude all oxaligenous foods—diminish the absorption of oxalates by the administration of alkalines—avoid over work—destroy the oxalic acid of the tissues by chloride of calcium and citrate of magnesia in small doses. Pilocarpine and piperazine as well as purgatives are indicated.

Following this consideration relating to oxalemia, as manifested in the human, and applying these practical conclusions and applications, to veterinary practice, Dr. Rogers gives the description of a few cases of oxalemia which he has observed, the most frequent being in muco-enteritis.

In the first case, the precipitate from the defecation of a horse revealed the abundant presence of oxalate of lime in its typical form (octagonal) or atypical (crystals or spheres). A change of diet, purgatives and alkalis brought recovery in a few days.

One case of azotemic nephritis and oxalemia with typical crystals of oxalate of lime in quite a large proportion was relieved of symptoms by blood letting with diet and alkalis.

Hepatic insufficiency and oxalemia were diagnosed in a horse in which a profusion of crystals of oxalate of lime and an extremely rare quantity of carbonate were found. The animal died with intestinal congestion and portal hypertension.

A last case is then described as one of false anasarca and oxalemia in which also the crystals of oxalate were found in a very large number. The same treatment brought relief.

After the consideration of these four cases which to his mind were characteristic by the presence of the oxalate of lime, the author closes his interesting article by saying that oxalemia should occupy a place in veterinary pathology, where it probably plays an important part.

Let practitioners keep on studying it.

CARDIAC ABNORMALITY IN A DOG.—It is to Prof Moussu that this very interesting observation is due.

This dog had no pathological history. Up to seven years of age, he had lived with the same owner and was destroyed because of ailments and a disagreeable condition brought on by old age. The post mortem was made without expecting the discovery of anything peculiar except that the heart revealed itself at once as deserving careful attention on account of its very abnormal conformation.

What was noticed first, was the irregularity of its external surface. The anterior aspect presented at its middle a depression, sufficiently deep to be considered at first as if there were a lesion of the myocardium. The comparative examination of the two ventricles showed that there was none. Both auricles were normal in their position and development, but in the ventricular mass it was not possible to make a distinction between the right and left ventricle. There was a single arterial trunk rising from the base of the heart, the pulmonary artery did not exist. It seemed as if there was no right ventricle nor pulmonary artery. The posterior aorta appeared normal, except in the region of the bifurcation of the trachea, where, on the right superior border, it gave off a big collateral, varicose, branch of variable diameter, which after a vertical course of a few centimeters, passed around the right bronchus at the hilum of the lung, then to the left bronchus and to the hilum of the other lung in which it terminated.

Nothing else was to be noticed in the circulatory apparatus, but the minute examination of the heart was remarkable. Of the two auricles, perfect in normal development, one received the two venae cavae anterior and posterior, the other the pulmonary veins. Both communicated freely by an oblique canal, the foramen of Botal.

In the ventricular mass, the left was found normal, but if the right existed, from the physiological point of view, it could be considered as useless. Its walls were thick, but it was rudimentary only, and its cavity was so small than an hazel nut could scarcely go into it.

The communication with the right auricle was scarcely apparent as it presented a small tract permitting only the introduction of a knitting needle. Therefore, there was no auricular ventricular opening, no tricuspid valve, no pulmonary artery, but a single collateral of the aorta to take their place. Two auricles

and one ventricle was all there was from the physiological point of view. A true heart of an amphibious animal. The mechanism of the circulation could be compared to that of batrachians.

This mechanism is considered as follows by Prof. Moussu. The venous blood of the general circulation, brought back to the right auricle passed directly and easily into the left auricle by the foramen of Botal, and mixed with the oxygenated blood running through the pulmonary veins. The mixture of the blood, by the contractions of the left auricle, was pushed into the left ventricle and afterwards pumped into the aortic tree. Part of the blood went into the peripheral arterial current, the other emptied into the functional branch of the lungs, was oxygenated and returned to the left auricle by the pulmonary veins. In every point of the arterial system, the nutrient fluid was then represented by a mixture of arterial and venous blood, the pulmonary veins alone contained oxygenated blood and the veins of the general circulation contained blood exclusively venous.

With this peculiar circulatory organization, this dog had lived for many years, in apparent excellent health. The only manifestation he ever presented was to tire easily and showing labored breathing after brief exercise, when he ceased moving.

SAND COLIC. This name is generally given to colics due to the accumulation of sand at the level of the curvative of the large colon. Mr. F. Forez lately had the opportunity to observe a number of cases among army horses and has written on the subject an interesting article published in the *Revue Generale de Medecine Veterinaire*.

First the etiology is considered. It is simple. Whenever horses having an opportunity to eat soiled, dusty or sandy oats, the possibility of sand colic can be looked for. The prehension of food from the ground, the feeding of dusty hay, the drinking of muddy water, all these belong to the etiology.

The symptoms vary according to the obstruction of the intestine, which may be incomplete or complete. For the last the position assumed is very suggestive. The horse puts himself in the position of micturition, straining more or less but remaining in the position without passing urine. Rectal examination is of the utmost importance. Sand colic lasts some times several days, although in severe cases death may take place in two hours.

In relation to the lesions, it is generally at the pelvic curvature of the colon that the mass of sand is found, but also in the second portion of the folded colon where it exists in larger quantity. This in one case reached, says the author, nearly 25 pounds (12 kilog 250 grammes).

The treatment indicated is divided into preventive, that is avoiding the cause, and curative.

If the obstruction is incomplete, a drench of sulfate of soda in water and oil may be given followed ten minutes after by eserine. Rectal injections every half hour of 10 litres of water. The purgation is renewed six hours after if the first has had no effect.

For complete obstruction the treatment is more complicated. 1st give the above drench, 2nd prepare an injection bock of 10 litres of tepid water containing 75 grammes of common salt. The bock is to carry a rubber tube at least 2 meters long. 3rd introduce the trocar at the place of puncture of the cecum, allow only a small quantity of gas to escape, 4th adapt the rubber tube to the mouth of the trocar and let the contents of the bock run into the intestine, being careful that this does not withdraw too much as then the liquid might penetrate into the abdominal cavity. 5th the injection completed and all the liquid being in the intestines, pull the trocar out, close the opening with wadding and apply tincture of iodine, cast the horse on the left side. Have him placed in dorsolumbar position, inclined to the left, 6th give a subcutaneous injection of eserine, while by rectum, the pelvic curvature is carefully massaged, 7 let the animal rise after half an hour. As soon as he is up, let him have tepid water to drink, give him a friction of spirit of turpentine on the flanks and a walk, during which he may have enemas of salt water.

Results obtained: a few borborygmi are soon heard. Gas escapes. Sand is passed out 2 or 3 hours afterward and even until the next day. Another purgative will activate it if the first effects are too slow in being produced. Many cases have been saved by this method although there may be a few which remain unbenefitted.

SWINE TUBERCULOSIS IN MAN, REINOCULATED TO CALF. Dr. Markus, the learned Director of the Veterinary school of Utrecht, has published in *Panisset Revue* a most detailed account of a case of inoculation of tuberculosis of swine to a man which was reinoculated to a calf and thus proved its original source.

A veterinarian had several scratches on the right hand, especially on the inner face of the thumb. He had often been engaged in the inspection of tuberculous swine. Some time after that work he attended some cases where cows suffered with retention of placenta. Pain soon became quite severe in his thumb, and medical attention and treatment were required. This trouble was properly treated but it soon returned, then the axillary lymph glands became involved and more severe treatment required as the case was growing worse. After several months, the possibility of an infection different from what might have resulted from the attendance to the cows suffering with placental trouble, was suspected. The axillary lymph gland was removed and its examination revealed the existence of a diffused tuberculosis with numerous caseous centers.

Inoculations were made on guinea pigs and the results were the development of a generalized tuberculosis, which in one of them occurred in 40 days. Cultures of various kinds were then resorted to and on account of the different aspects these presented, it was decided to test one on potato and inoculate a calf with it, so as to find out what virulency the bacillus of Koch would have for the bovine organism.

A strong, healthy heifer, 16 weeks old, was inoculated under the skin of the right side of the neck. The inoculation was followed by the various gradual manifestations in similar instances; swelling at the point of inoculation, elevation of temperature, lymphatic gland enlargement, etc., etc., until finally the calf 53 days after the inoculation, died, showing lesions of the lymphatic, axillary, bronchial and mesenteric glands, also in the lungs, spleen, liver, kidneys, the pleura, etc., etc.; in fact lesions of the most extensive generalization.

The bacillus of Koch cultivated in the guinea pig and coming from the axillary lymph gland of the veterinarian had for the calf the degree of virulency ordinarily found with bacilli of bovine origin.

This proved evidently that the veterinarian was infected while examining the tuberculous swine, which is almost always of bovine origin.

The study of this case of tuberculosis in man, concludes Dr. Markus, has demonstrated that the bacillus of Koch, from tuberculous swine can have equally pathogenic properties for the human organism.

Fortunately the disease remained somewhat local in the veterinarian who, after removal of his axillary gland, gradually recovered without further bad results from the infection.

SPECIFIC VULVO-VAGINITIS IN EWES. The object of this article in the *Veterinary Record* by W. M. Scott, F.R.C.V.S., is to contribute principally to the literature of ovine pathology, which, says the author, does not boom largely in professional journals.

In several instances, Mr. Scott has had the opportunity of witnessing among flocks of ewes a disease which assumes sometimes quite alarming proportions. In one outbreak eighty-five per cent of the sheep were affected with the disease. In others the extent of the ailment seemed less serious as only 10-15 and 20 per cent of the animals required professional attention.

The symptoms are described as those of vulvo-vaginitis, although individual cases are often met which begin and end as a vulvitis only. However, in the more severe cases the vagina becomes involved by continuity of tissue, yet the entrance has no doubt been by the vulva. The first symptom noticed is a swelling of the lips of the vulva which if separated show pustules on the mucosa, red in color and sometimes cyanotic. After the first few days there comes a muco-purulent discharge. The vulva lips are first soft but soon become indurated. Ulcers appear on the mucosa, which are soon covered with scabs under which granulations develop. In the most severe cases, the lesions extend to the vagina, where the same phenomena can be noticed. During the course of the disease constitutional disturbances, in varying degrees of severity, may also be observed, such as loss of flesh. The temperature is usually from one to three degrees above normal.

In investigating the nature and etiology of the disease, the author found in cultures of the fluid from the pustules, *Streptococcus brevis*. The fluid taken with swabs from the vulval mucosa in advanced cases gave mixed infection, streptococci, staphylococci and *B. coli*.

Smearing the mucosa of a healthy ewe with a pure streptococci culture gave negative results. Inoculation with streptococci on the vulval mucosa gave positive results: so also did the smearings of the mucous membrane of the vulva with streptococci over an area to which a pair of artery forceps was applied to produce temporary compression anemia.

From these results the author concludes that the streptococcus is the cause of the infection and that the normal healthy mucosa appears to be a sufficient barrier to natural infection. Flies are considered by the author as the carriers of the germs, if not in producing the infection, acting probably as an inoculant upon the delicate vulval mucosa.

It has lately been the habit among flock-owners to practice close amputation of the tail and thus expose the parts underneath to better advantage, and to the author, this has been the means of introducing this mild disease, which can be prevented by stopping the amputation method and can be cured by bathing with normal salt solution and embrocations of hydrargyrum sozoiodolicum and acidum boricum applied daily.

SOAP IN THE TREATMENT OF WOUNDS. This is a new application for the treatment of wounds which is related in the *Presse Medicale* and is recommended by many eminent surgeons.

After thorough disinfection of the hands of the surgeon, some pieces of castile soap (*Marseilles soap*) are dissolved in tepid distilled water or simply boiled water in the proportion of 20-40 per cent. With pads of sterilized gauze dipped in that solution the bleeding surface of the wound is first washed.

Then a free irrigation with soap water is made and followed by the *soap embalming of the part*.

One or several pads of gauze of 16 to 20 thicknesses each are impregnated with the same solution and vigorously rubbed against a piece of soap, until there is a complete saturation. This done, and it is an important stage of the operation, the pads are rolled, squeezed between the palms of the hands *until a fine abundant foam has thoroughly penetrated into the pores of the gauze*. In this way a spongy tissue is made, formed by the many minute bubbles of soap, which will give to the dressing a porosity analogous to that of a sponge.

Only the irregularities and interstices should be covered with the gauze and the surface of the wound with this porous application, spread and lightly pressed upon it, leaving it at least one centimeter thick. A thick layer of hygroscopic wadding and a roller terminate the dressing, which must be renewed every two or three days.

After the first application of the dressing, it is observed that there is a marked diminution and even complete disappearance of

the pain. With the following dressings the soap pad is no longer adherent, it no longer adheres either to the wound or the surrounding tissues. It is easily taken off without giving rise to any bloody exudation. The wound cicatrizes very rapidly, the irritated red and edematous surfaces assume a rosy, healthy appearance. Fleshy granulations and the border of the cicatrization assume a great vitality from the very beginning of this treatment.

SUMMARY FROM RECENT PUBLICATIONS RECEIVED AND BIBLIOGRAPHIC ITEMS*

LA CLINICA VETERINARIA—Nov. 15—Hepatic Aneurism in Distomatous Cirrhosis.

IL NUOVO ERCOLANI—Oct. 10-20—Anaphylactic Reaction Secondary to Intravenous Injection of Equine Serum in Horses.

Contribution to the Study of Lesions of the Penis in the Horse.

Contribution to the Studies of Coccidiosis in Birds. Nov. 10—Anaplasmosis—Findings in the Blood of Some Ovines.

On the Value of Polyvalent Antipyrogenic Serum of Lanfranchi. (O) A Case of Equine Adenitis with Brain Localization.

RECUEIL DE MEDECINE VETERINAIRE—Oct. 30—Contribution to the Study of Spirochetes of the Digestive Apparatus of Swine in Relation to Swine Pest.

(O) Curious Case of Fatal Complications of Pericarditis in a Heifer.

(O) Case of Coenurosis in a Gazelle.

BULLETIN DE LA SOC. CENT. (X) Lameness as a Diagnosis Sign by Subcutaneous Malleination.

(X) Fibroma of the Long Vastus.

(O) Anasarea and Malleination.

REVUE GENERALE DE MED. VET—(X) Mange and Air Cure Treatment.

Diagnosis of Sarcoptic Equine Mange on the Front.

(O) Upon the Treatment of Tetanus in Horses.

VETERINARY JOURNAL—Notes on Indian Hemp, Cannabis Indica, and Henbane (Hyosciamine) in Canine and Other Practice.

Clinic Canine. (O) Calculus in Dog.

(X) Modification in the Castration of Mares.

VETERINARY NEWS—Nov. 4th.—A Serum Treatment of Influenza in Horses and Mules.

(O) Hemorrhage from the Spleen.

Nov. 16—(O) Fracture of the Mandible or the Inferior Maxilla.

VETERINARY RECORD—Nov. 4—(O) Poisoning by Veratrine.

CORNELL VETERINARIAN—Growing of Sound Calves. Common Diseases of the Ear of Small Animals. Treatment of Navicular Disease by Shoeing. Giant Nematode in the Liver of Dogs.

Bureau of Animal Industry—Cause of Spewing Sickness of Sheep.

LIAUTARD.

*Titles marked "X" will be summarized. Those marked "O" will appear as abstracts.

PRELIMINARY REPORT ON THE RELATION OF ANAEROBIC ORGANISMS TO FORAGE POISONING*

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It is assumed that the practicing veterinarians in this assemblage are sufficiently familiar with the disease known variously as cerebro-spinal meningitis, leuco-encephalitis, forage poisoning, staggers, etc., as to make unnecessary a definition of the disease, or to give a description of the symptoms by which the same is characterized.

The etiology of the disease is yet an open question. Various investigators have thought at various times that they have uncovered the causative agent. The needle in the hay stack or corn crib or oat bin may have been seen by someone, but when reached for it has always disappeared or was later proved to be the wrong needle.

One of us (Buckley) has had extensive opportunity to study many cases of the disease in various parts of the country, and to make repeated bacteriological research for the causative agent in tissues from affected animals, and in the suspected feed and water.

In only one case out of all animals investigated did the death of an inoculated horse appear to be due to the injection of a culture obtained from an affected animal killed for investigation purposes. As a matter of record and to be specific this was a growth obtained on slant glycerin agar from the thoracic duct of a colt belonging to a Mr. Cal Trent at Dodge City, Kansas, in 1912. It was the final test of the few promising growths obtained from a number of horses in the outbreak of disease in Kansas in that year, but on account of all other negative results probably sufficient importance was not attached to it. The growth appeared to be a pure culture of streptococcus but it was impossible to recover it from an inoculated animal at autopsy which was unavoidably delayed.

During this epizootic Dr. Chas. Thom, Mycologist to the Dairy Division, was directed to cooperate in the investigation, and detailed studies were made by him of the vegetation upon which the horses grazed, particular attention being paid to the parasitic

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fungi and rusts and saprophytic molds, etc. A few feeding experiments were conducted with samples of grasses and hay which were considered to be possibly contaminated with an infectious or toxic agent. The results of these tests were negative.

Later, at the Ringling ranch in Montana, he had opportunity to renew his studies of the mycological flora of the grasses on an 8000 acre range where horses were dying apparently from this same disease. It was found in this instance that there was an intense infection of certain grasses with *Claviceps purpurea*, or common ergot. One feeding experiment with a small quantity of this ergot resulted negatively and it was not possible to make further feeding trials, as a few weeks later snow prevented the collection of sufficient material. A short time after this Drs. Ranck and Brown published a report in technical bulletin No. 6 of the Mississippi Agricultural College on forage poisoning in cattle induced by feeding grasses infected with *Claviceps paspali*.

Other investigators have reported forage poisoning of animals due to certain heavy growths of molds on feed and these observations cannot be questioned. A. F. Blakesley and R. A. Gortner have demonstrated a powerful toxin in juice expressed from the common bread mold *Rhizopus nigricans*. A. B. Clawson worked with a strain of *Aspergillus flavus* which readily killed rats when fed to them. Many veterinarians have submitted to the Pathological Division samples of rotted oats, corn and potatoes, which they claim undoubtedly caused clinical symptoms of forage poisoning. Dr. Eichhorn, Chief of the Pathological Division, investigated forage poisoning of horses used in army maneuvers at Gettysburg several years ago. This outbreak was definitely traced to musty hay. Pearson demonstrated experimentally beyond doubt that a certain silage was responsible for an outbreak of the disease. However, such instances could be cited almost indefinitely but it is noteworthy that the same ultimate causes could not possibly be the specific causative factor in the production of a definite disease. Hutyra & Marek recognize this and suggest that the disease is probably not a clinical entity. In other words, forage poisoning or cerebro-spinal meningitis of horses as recognizable by the symptoms may have different etiological agents.

Pearson appears to have been the first to call attention to the likeness of the disease to meat poisoning, although others long before him considered it due to spoiled feed. J. C. Michener in 1882

suggested the name "Fungosus Toxicum Paralyticus" in view of the exciting cause being found in foods undergoing fermentation.

In Departmental Bulletin No. 65, Dr. J. R. Mohler called attention to Pearson's analogy of the disease to meat poisoning of man, in an effort to explain the understanding that there is a toxic element in certain animal feeds that will produce the disease, in contradistinction to the idea that poisonous plants are the cause.

Graham, Himmelberger and Pontius have recently been sowing seed thoughts for investigators contemplating new lines of attack in elucidating the cause of the disease. They have made very important observations at the Griffith stock farm near Lexington, Kentucky, in which they were able to demonstrate that oat hay, on this farm, when fed to experimental animals, independent of other feed on the farm, resulted in clinical manifestations of the disease. They further showed that the feed was contaminated by chicken excreta, and this, independent of the original oat hay, when mixed with wholesome feed would also produce the disease. Their paper shows that they very carefully reviewed previous work and they pertinently remark regarding Pearson's observation that "forage poisoning is a disease resulting from the ingestion of an infective agent incorporated in the feed wherein there exists an inseparable relation between the feed and the poisonous material," that, though it seems to be true, and this relation cannot always be established, there is no conclusive evidence that such a relation might not exist.

In discussions with Dr. Thom regarding the Kansas outbreak of disease in 1912, which certainly bore some of the ear marks of an infectious disease, and after our failure to uncover an infectious or toxin producing organism from an animal or a poison producing parasitic mold, yeast or bacteria in the forage plants, it was planned that at the next opportunity an endeavor would be made to hunt down a possible anaerobic organism which would produce powerful toxins as this seemed to be a plausible line of attack and as our previous work had been principally, though not wholly, directed at aerobic germs and none had been found that offered any hope.

Opportunely, therefore, in August and September, 1915, excellent material was obtained in Maryland, and an endeavor was made to isolate such an organism. The result proved a failure.

At about this time Dr. Thom, who was now in charge of the Laboratory of Bacteriology, Bureau of Chemistry, which Bureau continued the cooperative agreement of work on this disease, dis-

cussed the problems of the disease and the various phases of the investigation with L. P. Shippen, M.D., one of the laboratory force. Dr. Shippen suggested that the disease, as described to him, bore a close resemblance to botulism or sausage poisoning of man, and he was directed to take up experimental work with a culture of the *Bacillus botulinus*, the experiments to be extended if it were deemed advisable to larger animals, the disease in the horse being the objective point.

The similarity of the symptoms of botulism of man to forage poisoning of horses, the peculiar biological characteristics of the bacillus, the recent observations of Graham & Himmelberger with oat hay and chicken excreta and an unpublished observation of Dr. Eves, of Wilmington, that horses in bank barns facing damp dark walls, when feed could easily ferment, were most prone to develop the disease, all tended to make the investigation seem worth while.

Dr. Shippen was able to get two strains of *B. botulinus* but soon found that one strain possessed no pathogenic properties for laboratory animals, and this was therefore discarded. The other strain secured from Dr. Nevin of Albany, New York, had been isolated from cheese, the eating of which had caused the deaths of several people.

Dr. Shippen was able to show that this strain possessed intense toxin producing powers, the toxin being apparently much stronger than that produced by the bacillus first isolated by Van Ermengem, the Belgian scientist who first discovered the cause of meat poisoning in 1895. After demonstrating by bacteriological methods that the Nevins' strain of the bacillus conformed in essentially all particulars to that of Van Ermengem, the exception being its reaction to lactose culture media and milk, Dr. Shippen proved its pathogenicity for small experimental animals, such as the cat, rabbit, guinea pig, etc., and found that it corresponded in detail with its acting on these animals as enumerated by Van Ermengem, in Kolle & Wasserman's Handbook of Pathogenic Microorganisms. He was able also to grow the organism which is saprophytic in nature but strictly anaerobic in character, in symbiosis with yeast on slant lactose agar and in a 0.5% alkaline Rideal Walker broth to which 2% lactose had been added. It was thereby shown that the possibility existed of its growth in nature on a proper culture medium and with the possibility of it being animal feed. It is well to mention that the optimum temperature for growth is 25-

to 30°C., i. e.; a warm weather temperature and not a body temperature.

The work on horses and donkeys was carried out at the Bethesda Experiment Station. Previously little seems to have been done in experimentation with horses except to use them for the production of an antitoxin for botulism, by injecting the *B. botulinus* toxin. For the purpose of testing the toxicity of the culture for horses Dr. Shippen made use of a 4-day old anaerobic culture grown in the above mentioned modified Rideal Walker broth: 10 c.c. of this growth was poured upon oats and fed to a very vigorous 2-year old colt. Opportunity for close study of any symptoms was not available, but up to 5:00 a. m. of the second day after feeding, the animal appeared to show no symptoms to the stable attendants. At 8:00 a. m. the same day the colt was found dead. A post-mortem held that morning revealed slight injection of the meninges, petechiae on the heart walls, intense engorgement of the lungs, inflammation of the jejunum, engorgement of the lymph glands bordering the intestines, and the one near the spleen. Culture media inoculated from the blood, liver and spleen, and held under aerobic and anaerobic conditions remained sterile.

A culture grown aerobically but in symbiosis with yeast was now tested for its toxicity on small laboratory animals, and was found to be deadly. Accordingly 0.2 c.c. of a 3-day old culture was placed in 10 c.c. of sterile physiological salt solution and poured on a little bran, which was fed to a mature vigorous donkey. The donkey became sick four days after feeding. At this time he was found to be lying down in his stall unable to rise. On the next day after he was breathing heavily with dilated nostrils, from which a mucus fluid was dribbling. The animal was too weak to rise or walk when raised and unaided. When raised he took a few steps, supported by several men. Pushed back into his stall he stood 10 minutes unaided, then fell. No symptoms indicating paralysis were observed. The following morning the donkey died. Opportunity for "post-mortem" did not occur until the next day, when decomposition had masked any lesions that might have been present. The temperature remained subnormal during the entire illness.

Another mature donkey in prime condition was fed bran upon which had been poured .5 c.c. of a similar culture. On the second morning after eating the bran, i. e., after about 42 hours, he was observed to paw the ground and tremble in a manner suggestive of in-

testinal colic. No other symptoms were manifest. On the evening of the same day he seemed to be sluggish but there was no definite sign of illness. On the morning of the third day, about 66 hours after eating the bran, he was found with the tongue completely paralyzed and protruding three or more inches from the mouth. Food and drink were refused and the breathing produced a clicking sound in the throat as though the hanging palate was also paralyzed. Pulse 30 beats per minute and somewhat weak. Temperature 99°. The sluggishness was more marked than on the preceding day but there was no sign of paralysis other than those mentioned. At 2:00 p. m. the same day the condition was approximately unchanged. At 4:00 p. m. the donkey was down, too weak to rise without aid, and when lifted could not stand alone and when put back on the ground lay quietly, apparently conscious of his surroundings. Tongue still protruded but no other signs of paralysis. At midnight the donkey died, or about three days and eight hours after having eaten the bran, and 15 hours after the first serious symptoms, paralysis of the tongue was observed. Temperature was slightly subnormal throughout. The "Post-mortem" performed 10 hours after the animal's death and before decomposition had set in showed the following changes: subcutaneous vessels slightly injected, lungs markedly congested, kidneys markedly congested, stomach outer wall injected, stomach inner wall showed shallow erosions with mucosa pale and covered by a thick sticky layer of mucus; duodenum outer wall showed areas of hemorrhages in patches, while inner wall showed punctate and larger hemorrhages. Jejunum, outer wall like duodenum, except that punctate hemorrhages were also present: the inner wall showed an intermediate condition between duodenum and ileum. Ileum showed outer wall like jejunum, but more marked: inner wall diffuse hemorrhagic enteritis. Caecum showed outer wall apparently normal, while inner wall was studded with numerous punctiform hemorrhages. Colon normal and lower part filled with feces. Large mesenteric vessels injected. All else appeared normal. Cultures made from blood and organs developed no growths. It thus appears that Van Ermengem's statement that it is the toxin alone which is responsible for death is a fact. Whether the organism produces any toxin in the alimentary canal after its ingestion is not certainly known.

Dr. Shippen concludes from his work that there are sufficient differences between *B. botulinus* of Nevins and *B. botulinus* of Van

Ermengem as to warrant the supposition that they are distinct varieties, and that what is known of etiology, symptomatology and pathology of forage poisoning indicates that the disease may be caused by a toxin similar to that produced by *B. botulinus*, or even that some cases of forage poisoning may be due to certain strains of *B. botulinus*.

Since the above experiments were concluded others have been made with the same organisms grown in a medium containing dextrose instead of lactose, under strict anaerobic conditions, and it has been shown to be fully as potent to produce death in both small laboratory animals and horses and donkeys, as did that grown in the modified Rideal Walker broth.

A donkey was fed oats over which was sprinkled 10 cubic centimeters of physiological salt solution into which was placed .05 or 1/20 of a cubic centimeter of a week old anaerobic culture. The donkey died in 4 days showing symptoms as enumerated above, and on post-mortem showed lesions practically identical in character.

Chickens and dogs were found to be refractory to the cultures when fed in such quantities as 30 c.c. daily for 3 or 4 days.

On account of the observations of Graham and Himmelberger regarding the pathogenic action of certain chicken droppings for horses, these were saved from the chickens under the above experiment, and about a heaping tablespoonful of the droppings were stirred in with one-half peck of oats, the oats being fed in two feeds to still another donkey, on a Friday morning and afternoon. This donkey died on the following Sunday morning. A post-mortem examination was not made.

It was found that the bacilli-free filtrate of a week old culture would kill rabbits and guinea pigs in doses as small as 1/20000 of a c.c. in a week, while 1/2000 killed in 4 and 5 days, 1/200 in 2 to 3 days, and 1/20 c.c. in 1 to 2 days.

Twenty-five c.c. of a month old culture kept at room temperature was sprinkled and mixed with one peck of moistened oats and after standing another week at room temperature 1/4 of the oats were mixed with clean oats and fed to an aged but vigorous horse on Saturday at noon. This horse was found dead Monday morning, no symptoms having been shown. At the same time another horse was fed an equal quantity of oats treated with bacilli free filtrate that had been kept in an ice box for a month. The oats

and filtrate had also been allowed to stand a week at room temperature. The horse in this case showed no symptoms of disturbance of any kind.

One rabbit has also been fed on three different occasions with cultures that proved fatal to other rabbits, and while appearing somewhat depressed and refusing food for several days, showed no other symptoms of disease. A sheep and a calf fed with 10 c.c. of virulent cultures were not affected at all.

In conclusion it should be stated that while the few symptoms exhibited by the donkey and horses that succumbed greatly resembled some of the characteristic symptoms of forage poisoning, and while the post-mortem findings are yet more characteristic of this disease, it will require further research to establish a definite relationship to the natural or spontaneous so-called forage poisoning. Certain it is that the *B. botulinus* is capable of producing a form of forage poisoning should conditions exist in nature for the development of the organism and the elaboration of its toxin as on pastures or in masses of feed material. We can see no good reason why such a development may not take place. Symbiosis is probably the rule rather than the exception in the development of anaerobes in nature.

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SHIPPING FEVER OF HORSES*

JOHN R. MOHLER, Washington, D. C.

It was with some surprise that I observed a recent copy of the program for this meeting indicating that I would present a paper on shipping fever. When I received a request from Dr. Merillat to present such a paper, I sent my declination at once on the ground that I had addressed the Oakland meeting of the association on this subject, which paper was published in the *Journal of the American Veterinary Medical Association* so recently as May, 1916. I further indicated that in the meantime there had been no new discoveries made nor any definite facts observed which would be of general interest. I also stated that it would be highly desirable to have a series of papers on this subject, especially from the practitioner's viewpoint, which information could be used by the State and Federal authorities with a view to adopting some definite line of procedure in dealing with the disease. I pointed out that there had always been more or less just criticism of the American Veterinary Medical Association program because sanitary science was given more relative consideration than therapeutics. In the Oakland symposium on shipping fever the treatment of the disease was the principal subject that came up in the open discussion. This was neither surprising nor objectionable, but indicated very strongly that the majority of members attending these meetings wish information regarding the best method of making sick animals well. Hence my suggestion that this meeting would derive the greatest benefit from papers of practitioners who have had large experience with shipping fever. However, despite my arguments, the program for this section has been printed with my name down as a contributor, so I shall speak for a few minutes on certain plans which the Bureau of Animal Industry has in mind relative to this disease which I trust will meet with your support.

The name "shipping fever" is a general term applied to any one of a group of epizootic infections of equines which occur after the shipment of young western animals eastward, or of country horses to city stables. However, most authors recognize and describe these shipping infections under three distinct names, as follows:—strangles, influenza and contagious pneumonia.

*Presented at the meeting of the A.V.M.A., Detroit Mich., Aug. 21-25, 1916.

In my paper at Oakland it was stated that the experiments of the Bureau gave support to those investigators who believe that the *Streptococcus equi* of Shütz is the cause of strangles, the filterable virus of Poels the agent of influenza, and the cellular inclusions of Gaffky and Lührs the causal factors of contagious pneumonia. While Huttyra and Marek in their third German edition, which was the first edition translated into English, refer to the latter two diseases as two manifestations of but one disease, calling them the catarrhal and pectoral forms of influenza, they have changed this nomenclature in their recent fourth edition, and are now following the English and German views that each disease is a distinct entity, referring to the catarrhal disease as influenza and to the pectoral disease as contagious pneumonia. However, it is well known that in many instances a veterinarian, even with the possession of considerable diagnostic skill and experience, may be unable to state definitely to which of these two diseases an outbreak should properly be attributed, as it is not infrequent that both diseases may be found in the same stable. The differential diagnosis of these affections is all the more baffling for the reason that influenza may manifest itself in as many varieties of forms as does its human analogue, la grippe. Thus the filterable virus of influenza has been shown to be present in horses affected with pink-eye, infectious pharyngitis, infectious laryngitis, infectious laryngotracheitis, infectious bronchitis, as well as in the intestinal, pulmonary, and nervous forms, all of these manifestations being only varieties of one and the same etiologic entity and resulting most likely from the concentration of the virus in the one particular organ or tissue responsible for the variation in the symptoms and lesions. Undoubtedly the many failures of the scientific investigator in the study of this disease must be disappointing to the practitioner who is very anxious to learn of the true facts about this baffling malady; but it should be recognized that while there still remain many obscure features to be determined, nevertheless the more recent investigations have revealed many points which shed valuable light on the nature of this infection.

In this connection two facts which have been established stand out preeminently, the one by Gaffky, Poels, Lührs, Bassett, and others, who successfully demonstrated the filterability of the virus of influenza, and the other by Poels, Jensen, Grimme, Rieks, and others, who proved that the so-called virus carriers play an im-

portant part in the dissemination of the disease. The findings of the first group of investigators have apparently eliminated the many different germs which have been regarded by some as etiological factors of the disease, while the virus carrier question points to the difficulties which will confront any attempt at controlling the disease. While it is recognized that the infection occurs primarily in association with the transportation of, and trading in, susceptible animals, there are, however, no accurate data available as to the principal locations of the infection. It would be desirable to obtain conclusive information on the relation of the various manifestations of the disease, and while these different types are no doubt dependent on the localization of the infection in the various tissues as well as on the character of the secondary infections, nevertheless there is still an inclination to regard these different types as distinct diseases.

It is recognized that in order to determine these various obscure points involved, it is necessary to undertake investigations at the most favorable places where ample opportunity is afforded for study and observation. Realizing the advantages which might be gained from such investigations, the Bureau is now proceeding along certain definite lines by which it is hoped that valuable data will be secured in relation to equine influenza.

It is evident from information we have received that during the past year and a half there has been a marked increase in the prevalence of the disease, and it has been unusually virulent in type, as shown by the increase in the death rate. Some eastern dealers state that from 30 to 70 per cent of the horses and mules purchased by them in rural districts and handled through western and central-western markets come down with the disease while in transit or within a few days after arriving at destination, and that the loss from death in some shipments was as high as 25 per cent. There have been much more of the pneumonic and enteric forms of the disease than in previous years and they have proved highly fatal.

It is generally believed that the disease is contracted through exposure to infection harbored in shipping pens, sales stables located at market centers, and in the cars used for transporting animals. Susceptibility is no doubt increased through excitement and faulty methods to which the animals are subjected in shipping and handling. The various forms of medicinal and preventive treatment have been used with varying success, but judging from the

reported increase of the disease and the high mortality it does not seem that the results obtained from treatment have been entirely satisfactory either in preventing or curing the disease. The very good results obtained from quarantine, cleaning, and disinfection in connection with the foot-and-mouth disease eradication work were a valuable demonstration of what can be accomplished through these means. Those immediately interested in the horse and mule industry desire assistance along these lines to the end that the losses may be reduced, and the sanitary officials of various States have expressed a desire to cooperate with the Bureau for this purpose.

It seems that the best results in suppressing the disease can be accomplished through the cooperation of the Bureau, the live stock sanitary officials of the various States, the officials of transportation and stock-yards companies, the veterinary practitioners, and the shippers of horses and mules at points where large numbers of these animals are assembled and reshipped interstate for army or other purposes. One of the preliminary steps taken by the Bureau has been the detailing of Dr. H. W. Hawley, a veterinary inspector, to make investigations of the conditions in the field with a view of ascertaining what means might be adopted to control the disease. Dr. Hawley, who before entering the Bureau service had a large experience in the Chicago horse market, is now visiting eastern markets and assembling points to ascertain facts in regard to losses and to consult State officials, veterinary practitioners, and dealers concerning their experience with the disease. It is intended that he shall trace some shipments back through the market centers direct to the points of origin, whether it be a ranch in Montana or a farm in Iowa. He will then trace other shipments from the points of origin through the market centers and assembling points to locate the heavily infected centers and probable sources of infection where these shipments cross, and to determine to what extent ear infection figures in conveying the disease. The methods of handling, the care of the animals, and also the sanitary conditions at the various markets will be studied and the defects noted.

Thus we have information from one dealer to the effect that horses shipped from Indiana and Illinois have developed a severe type of the disease with heavy losses, while those from Iowa have shown very little of the trouble. Likewise another dealer has had very slight losses in Canadian horses unloaded at Buffalo, while an

eastern practitioner reports a heavy loss in a similar shipment sent to New York City for export. The Bureau purposes to get all the data available of specific shipments of this character and trace them back to their origin, in order to ascertain if possible the reason for the small losses, for instance, in the Iowa shipment as compared with the heavy losses in the Indiana and Illinois shipments.

That horses handled and transported under ideal sanitary conditions and with better feed and care are less liable to contract this disease than those handled in the ordinary way is shown by the condition of the large numbers of valuable horses stabled at Horse Haven and Saratoga. Dr. McCully, the attending veterinarian, states that there had been no trouble with shipping fever among the 1,600 horses, although 75 per cent of them were yearlings and 2 year-olds, and therefore not immune.

It will require some time to collect reliable information along these lines and get it in shape for use, but it is suggested that in the meantime the State sanitary officials study the conditions in their respective States and confer with each other and with the Bureau in regard to prospective protective measures, with the view of securing uniformity in action in the various States. By such methods the irritation and perplexities that might result from dissimilar requirements in different States will be avoided. As soon as the investigations have progressed sufficiently we hope to be in position to make further suggestions in regard to cooperation.

This investigation is expected to show the necessity of disinfecting all cars carrying horses from the large stock markets as well as the unloading barns, shipping yards, and sales stables at regular intervals, or, failing this, the need for stabling "green" horses in open corrals with a small amount of shelter against inclement weather, but where the disinfecting properties of the sun will be available. The States may then make regulations compelling the shipments to be made in disinfected cars and to be unloaded in transit in disinfected yards or barns, while the Bureau could furnish inspectors to supervise the disinfection of cars and yards for those States requiring it and then to placard the cars appropriately after their disinfection.

Kentucky is the first State to take action along these lines. This State has quarantined by proclamation against all horses coming from St. Louis and the National Stock Yards unless the animals have been inspected and the shipments made in disinfected

cars approved by the Bureau. According to the statement of State Veterinarian Graham, this cooperation has resulted in a marked reduction of the shipping disease in that State. It is presumed that other States will take proper action to assist in controlling this disease, in which case the Bureau will cooperate with them to the fullest extent.

Experience has failed to establish any marked degree of reliability of biological products in preventing outbreaks of this disease, but there are a number of practitioners who believe that these products possess certain curative properties, especially in overcoming the tendency toward secondary complications.

During the past two years the representatives of foreign countries purchasing horses in the United States have been especially confronted with the seriousness of this disease, and have used all the lines of treatment generally advocated. While the mortality losses were not insignificant, these were unimportant as compared to the loss of time resulting from the incapacitation of the animals, thereby preventing their shipment in time of need. The observations made by those in charge of the army remount depots have been very valuable, especially since they were provided with a corps of capable veterinarians to assist them in their work. At the request of Dr. Eichhorn, Dr. James Gregg, veterinarian in charge of the English horse and mule remount depot at Newport News, has prepared for this symposium a report on his observations regarding the treatment of influenza, and I respectfully recommend that the paper be read, especially as it contains very interesting data on the serum treatment of the disease.

In this connection it is well known that *prophylactic* treatment with blood serum from horses which had shortly before recovered from severe attacks of influenza has not given uniform results. At best such treatment affords the animals only a passive immunity which lasts but several weeks. The *curative* treatment with such serum has likewise been tried, especially among the horses of the German army and elsewhere, with similar contradictory results. The unfavorable reports might be explained to some extent by the fact that the effectiveness of the serum varies in accordance with the intensity of the symptoms that were manifested in the animal furnishing the serum, with the time elapsed since its recovery, and with its condition at the time it produced the serum. Furthermore, it should be definitely known that the horse furnishing the immune

serum has recovered from influenza and not from some similar disease. For this reason it is probable that the most satisfactory results will follow the use of serum from recovered horses in the same outbreak. Gregg brings out most of these points quite strongly in his paper, which, it should be remembered, advocates such immune influenza serum in the *curative* treatment of animals sick with the disease and not as a *prophylactic* for well or exposed animals. This method of treatment is similar to that which is being advocated so strenuously at the present time in cases of infantile paralysis in New York, and I trust all those who have the opportunity will give this curative treatment of influenza a trial and report their results.

ABDOMINAL HERNIAS*

C. A. CARY, Auburn, Ala.

ANATOMY OF ABDOMINAL WALL. (a) Skin, (b) Fascia, (c) Panniculus, (d) Linea Alba, (e) Tunica abdominalis, (f) External oblique, (g) Internal oblique, (h) Rectus abdominalis, (i) Transversalis.

Chauveau says the lateral and inferior walls of the abdominal cavity are formed by a wide musculo-aponeurotic envelope and results from an assemblage of four pairs of large membranous muscles arranged in superposed layers. Reckoning from without inwards, these are designated as the great or external oblique, the small or internal oblique, the great straight, and the transverse muscle. Covered outwardly by an expansion of yellow fibrous tissue, the *tunica abdominalis*, and separated from the opposite side by the *white line*, (*linea alba*), a median raphe extending from the sternum to the pubis. These muscles support the intestinal mass, and by their relaxation or contraction adapt themselves to the variations in volume these viscera may experience.

KIND OF HERNIAS. (a) As to location: Ventral, Prepubic, Umbilical, Inguinal, Scrotal, Crural, Perineal or Pelvic, Diaphragmatic.

(b) As to condition: Reducible, Irreducible, Strangulated, with Adhesions, without Adhesions.

*Read before the Southeastern States Veterinary Medical Association at Atlanta, Ga., Dec. 27, 1916.

CAUSES OF HERNIAS. The muscular or aponeurotic tear or rupture may be produced by violent muscular contraction, by external trauma, by internal pressure (possibly) by predisposing muscular degeneration and by a combination of external or internal pressure and violent or strong muscular contractions.

SYMPTOMS. In acute ventral hernias there may be a gravitating edema, or a fluctuating, reducible or non-reducible enlargement. In the early stages the enlargement may exhibit inflammatory symptoms of fever, sensitiveness. If the intestinal content of the hernia is strangulated there will be signs of more or less pain, the pulse may be accelerated, the animal may move about in a restless manner and assume various positions in search of relief from pain.

In non-strangulated hernia the gravitating edema may gradually disappear and the well defined reducible hernia may become definitely outlined. By careful compression the hernial contents may be forced into the abdominal cavity and the size, shape and entire outline of the opening (ring) in the abdominal wall may be determined. Sometimes in a large hernia it may be necessary to put the animal upon its back to reduce the hernia. However, in some instances a rectal examination may permit one to outline the abdominal opening. Rectal examination is always helpful in rupture of the prepubic tendon.

DIAGNOSIS. Ventral hernia may be confounded with a sero-haematoma. Upon two occasions I placed animals (mules) upon the operating table preparatory to doing a ventral hernia operation and upon removal of the excess of serum I found there was no hernia. These were both cases of sero-haematomas. The large sacs of serum had been present for four to eight weeks and no positive opening could be found. It is, however, possible that a small opening may have existed in the beginning or at the time of the injury. In the edema stage, wait until it disappears and the hernial sac and ring may be definitely outlined or located.

Prognosis depends upon: (a) age of animal, (b) condition of animal, (c) size of sac and ring, (d) outline of ring or abdominal aperture, (e) location of ring, (f) sex of animal.

(a) Young animals, as they grow, are liable to natural recovery from serotal, inguinal and sometimes umbilical and ventral hernias: and they are also favorable subjects for all kinds of surgical or operative treatment.

(b) Thin or relatively lean animals are safer for operative treatment than fat ones. Thin, lean abdominal wounds heal more safely and quickly than abdominal walls containing thick layers of fat.

(c) A small ring and a small sac are more favorable for operations than large rings and sacs because there is less tissue involved, less danger of infection, less time required in the operation, less danger of stitches tearing out, less difficulty in bringing the edges or borders of the ring together and less space to fill up with granulating tissue.

(d) Outline of ring or aperture is extremely important in operative procedure. A small oval or a large narrow opening can readily be co-adapted by sutures and sometimes by clamps. A large, broad or circular ring makes it difficult and often impossible to bring the borders together and thus obliterate the aperture by an ordinary operation. Generally such cases require difficult, tedious and dangerous plastic operations. The most difficult type of ring to treat by operation or otherwise, is the wide, ragged and irregular aperture. Fortunately this is rarely found.

(e) Other conditions being equal, a hernia in the anterior parts of the inferior abdominal wall is more favorably located for operative treatment. To some extent, internal pressure may be slightly greater here; yet the great advantages of this location are the relatively favorable accessibility for the operation, for pressure bandaging, the freedom from urine and fecal contamination and dependent drainage. Hernias in the posterior part of the lower abdominal wall are inaccessible, difficult to pad or to apply pressure bandages, readily contaminated and hard to keep clean.

(f) Hernias in mares, especially in the posterior regions of the abdomen are more readily and easily pressure bandaged; they can be kept clean and free from urine. The sheath and penis of the gelding or stallion or bull or steer or dog are hindrances to pressure bandages and the urine from males is always a source of danger of contamination. Strangulated, inguinal and scrotal hernias are more common and intractable in stallions, bulls and geldings.

METHODS OF TREATMENT. The natural or waiting or growing treatment will suffice in young colts and calves in some cases of scrotal, inguinal and umbilical hernias. But in many cases a suture operation will save time, feed and worry by hastening the repair.

Clamps, ligatures, blisters, acids, rubbing, trusses and bandages may suffice in some hernial conditions. Generally speaking they may be applicable in small hernias in young animals but in nearly all large chronic or old hernias they are contraindicated. In reducible hernias where the operator can get at them within one to three hours after appearance of the rupture, a tight, broad bandage will do more good to fix the abdomen; prevent movements; co-adapt the raw edges and permit primary union than all the wooden trusses ever made. Sometimes it may be necessary to place a broad, flat layer of absorbent cotton or gauze over the hernia and then over this the broad bandage. This bandage should be kept tight and in place for ten days or longer, and the animal kept standing and on small laxative rations. The bandage or truss is of no value or is contraindicated when there is edema or fluctuating enlargements and in old standing cases.

SUTURE OPERATIONS FOR VENTRAL AND UMBILICAL HERNIAS.

When the hernial aperture is small or long and narrow and in a favorable region for operation and for pressure bandaging, the ordinary suture method should be employed. It is relatively safe and when properly done it usually results in permanent repair.

INSTRUMENTS REQUIRED. One or more sharp scalpels; a probe-pointed curved or straight bistoury; four to six artery forceps; two vulsellum forceps, four to six large, full curved or half curved needles; plenty of No. 25 sterile silk braid, or large silk tape; some large sterile cat gut; an abundance of sterile cotton; plenty of gauze; one roll of absorbent cotton; four broad, many tailed, sterile bandages and six to eight side lines or hobble ropes and casting ropes or harness.

The animal should be prepared by withholding all or nearly all feed for two to six days. Get the alimentary canal empty and the abdomen small without purgatives. The day previous to the operation clip or clip and shave the skin over and around the hernia: wash; disinfect and apply absorbent cotton and a bandage to be retained until the animal is cast and fixed and anesthetized for the operation.

If you have an operating table to which the animal can be fixed and turned upon its back, use the table, providing it is where you can get good natural or artificial light. If such a table is not available select a grass plot as a place for operating. Secure four to six posts or pieces of timbers 6 x 6 or 6 x 8, twelve feet long; put

at least four of them three feet into the ground and firmly tamp them. Each post is placed at the corner of a rectangle four or five feet long by two to two and one-half feet wide. Spike a piece of 2 x 6, eight feet long on each side at the top of these posts and short pieces from side to side.

The prepared animal is placed upon the table or cast; totally anesthetized with chloroform or chloroform and ether or the A. C. E. mixture. As a rule never depend upon local anaesthesia. Place the animal on its back on the table and elevate his hind parts, especially if the hernia is in the posterior abdominal region. If the improvised stocks are used, place the animal between the posts with the head down hill, pull up the limbs with hobbles and ropes running over the horizontal pieces at or near the top of the posts, protect and pad the withers, back, croup and head with sacks well filled with straw or hay (wet these sacks to keep down dust). The hind parts may be elevated or raised if necessary by using a sufficient number of wet sacks.

The operator should have an assistant to give the anesthetic, another to assist on the operation, another to pull up hobbles and ropes and look after the sacks and padding, and another for emergencies.

Remove the bandage and absorbent cotton; wash and disinfect a wide area around the hernia; apply antiseptic cloths or pads over the feet. Cut the skin parallel to the long axis of the hernia. Sometimes I cut obliquely across the long axis of the hernia to avoid surface vessels. Dissect the skin from the sac down to the abdominal wall and then dissect the sac from the wall to the ring of the hernia. Avoid cutting into the sac and do not cut away skin, no matter how large the sac or hernia.

Carefully open the sac at or near its fundus and avoid cutting an intestine or any viscera that might be in the sac. If adhesions are found, carefully separate the viscera from the sac or if no adhesions are present, enlarge the opening in the sac, push the hernial contents into the abdomen and let the assistant retain them there by pressing on a pad of sterile gauze.

The operator should now note the shape, outline and condition of the ring. If the aperture is small and narrow and the borders can be readily brought together, cut away all of the sac down to the ring, scarify or rub the borders of the ring and place large No. 25 braided silk sutures 12 to 18 m.m. apart. Place all of the sutures

before tying them. Begin tying at the ends and pass toward the middle of the long axis of the aperture. If the ring is rather broad, three inches or more, leave one-half to one inch of sac along the broad part on each side of the aperture. At the ends of the aperture very little if any of the sac may be left. Now stitch as before and always take deep sutures, one-half to three-quarters of an inch beyond the fibrous ring and entirely through the abdominal wall (except the skin). Let the raw edge of remnant sac come into contact with the same from the opposite side of the aperture and pull up the stitches so that the edges of the remnant sac will touch or come together and crumple or be a little rough and uneven. In placing stitches avoid pricking or penetrating the intestines with the needle. A little fecal matter means a center of infection and the loss of an animal. Also, be careful to exclude all intestines and viscera from the stitches when they are pulled up and tied. I do not use mattress or quilled sutures because they are too difficult to keep aseptic or clean.

In case the aperture or hernia ring is very large after dissecting out the sac as previously directed, cut open the sac along the line of the long axis to each end of the ring. If the aperture is in the flank, the sac should be cut from above to below. This divides the sac into two parts and each half remains attached to the border of the ring. Each half of the sac is now cut so as to nearly reach the opposite side of the ring. One-half is first stitched to the opposite border of the ring with large fourteen-day cat gut or it can be stitched with large No. 25 braided silk by passing the needle through the abdominal wall one-half inch from the ring on the opposite side, then through the cut border of the sac from the other side and then out through the base of the sac near the ring. All of the stitches can be placed before drawing and tying them. This pulls the sides of the aperture toward each other and the tough fibrous sac fills the remaining opening. Next the other flap is pulled over and stitched to the ring on the opposite side with No. 25 silk sutures. This places a double layer of thick, tough, fibrous sac over the hernial opening and the opening is decreased in size. Care should be taken to exercise aseptic precautions since the sac flaps will be exposed for some time and must be handled in order to fit them to the opening.

In small hernias, the small sac after it is dissected from the skin may be pushed into the abdomen and the sutures may be

passed through one side of the ring and then over the outside of the sac to and through the opposite ring border. After thus placing sufficient sutures they are pulled so as to bring the opposite borders together and then securely tied. Asepsis should be carefully observed here lest an infected sac be forced into the abdomen and there retained as a focus to terminate in an abscess or septi-cemia or peritonitis.

One thing that will be rather strikingly impressed on the operator is the toughness and thickness of nearly all ventral and umbilical hernia sacs. This is always the case of hernias, in horses and mules, of long standing.

After stitching up the ring, stitch up the skin and if baggy, do not be alarmed. Let it alone. Before the animal rises, apply a large pad of absorbent cotton and then a broad, many tailed bandage. Pull this bandage rather tight. After the animal gets up, apply a second bandage over the first one, for safety and further protection. These bandages protect the seat of the operation and immobilize the abdomen. Leave these bandages on for 10 or 12 hours. Remove them and the cotton and let the bloody serum escape between the stitches in the skin. If necessary, cut one or two of the most dependent skin stitches and remove all blood clots. Repeat the dressing once every 12 hours for three or four days; then dress once a day. Use sterile water and cotton in washing and a little tincture of iodine may be used in the water; just enough to color it. One set of many tailed bandages may be washed and boiled and disinfected while the other set is in use.

Keep the animal on his feet and give water for one to two days and then feed a little scalded oats or bran. Feed little or no hay for 10 to 15 days. In 15 to 18 days the silk sutures may be removed. The skin will have healed and it may be necessary to cut it open again. Some sutures will suppurate and be easily located but rather hard to remove. With a twitch on the nose of the animal and one front foot lifted up, the operator feels for the stitches with the finger of one hand, and grasps the stitch with the forceps in the other hand. The stitch is cut with a hook castrating knife or a probe-pointed tenotomy knife. When the stitches are placed, they should be counted so that when removing them one will know how many to remove. I have removed a few suppurating silk sutures one year after the time they were placed. In case sutures become covered with granulations and do not suppurate, let them

alone. However, most of them will suppurate and show up in time and they can be thus located and removed.

It is essential that the operator remember that there will be free drainage from the abdomen when the hernia or aperture is located in any dependent part of the abdomen. No drainage tube or gauze is required or advised. If the operation is upon the lateral wall then there may be some internal drainage and that cannot be overcome unless adhesions wall off the area involved. The fact is temporary and sometimes permanent adhesions wall off the hernial region following the operation and thus peritonitis is often prevented.

As a rule, after two or three months, the repair or scar tissue is stronger and less liable to be torn than any other part of the abdominal walls.

Space does not permit the handling of other kinds of hernias in this article. Strangulated inguinal or scrotal hernias demand immediate attention and often can not be safely or permanently relieved in stallions or other whole males without castration. Prepubic, most perineal, diaphragmatic and crural hernias are inoperable. Inguinal, scrotal, ventral and umbilical hernias of dogs and swine are amenable to radical operations.

—Dr. A. W. Smith, President of the Illinois Veterinary Medical Association, has appointed the following members as official representatives to attend the Better Community Conference, to be held at the State University, Urbana, Illinois, on April 10th-12th, 1917: Dr. N. S. Mayo, Chairman, Chicago; Dr. W. J. Martin, Kankakee; Dr. H. A. Greer, Danville; Dr. F. H. Burt, Chenoa; Dr. A. T. Peters, Peoria.

It is gratifying to know that the influence of the country practitioner for the betterment of rural life is recognized by those who are shaping the efforts directed to the general uplift of rural life. There is probably no one who comes into closer touch with the farmer and stock man than the veterinarian and we feel sure that the veterinary profession will do its share for the betterment and advancement of rural life.

ANTHRAX (CHARBON)*

W. H. DALRYMPLE, M.R.C.V.S., Louisiana State University
Baton Rouge, La.

Anthrax or charbon is, as we all know, a very old disease, and its occurrence and devastations have been recorded since very early times. It would be of little interest, therefore, to enter into an academic discussion of the subject on this occasion, as that may be obtained from text-books, but rather confine our remarks to certain phases of a more practical nature concerning its more effective control, and, if possible, the eradication of the infection, although I am afraid this may not be so easy of accomplishment as might appear on the surface.

Of course we are all aware that there is one and only cause of this disease, viz., its own specific organism—the *Bacterium anthracis*, sometimes referred to as the bacillus of Duvaline; but for a knowledge of its life-cycle, namely from the spore to the rod, and vice versa, we are indebted, I believe, to the late Prof. Robert Koch.

It should be borne in mind, therefore, that whatever other measures we may adopt, as accessories, if you will, in the fight against charbon, our chief effort must be directed toward the destruction of the infection, which is the germ itself in one or other of its stages, and through which the disease is perpetuated and permitted to spread through the medium of various agencies.

As a concrete statement, I may say that the infected tissue in anthrax is the blood, which, of course, permeates the entire body, the disease now being classed as a bacteremia, to differentiate it from what we know as septicemia, in which class anthrax also was once placed. However, in order to prevent confusion, evidently, the term bacteremia is now employed in the case of specific diseases where the organisms are found in the blood, as the one under consideration, and septicemia, to the condition in which the septic organisms proper, only, are found.

I believe we would get a much more intelligent grasp of how to more effectually control anthrax, if we would only get the fact impressed upon our minds that the blood is the infected tissue, and realized that any agent which may come in contact with that fluid, and is capable of moving, or being moved, from one place to another, while it may be some inert substance, or not, itself, suscep-

*Presented at the meeting of the Mississippi Veterinary Medical Association, Clarksdale, Miss., January 9 and 10, 1917.

tible to the disease, may be the carrier of anthrax infection. Or, in other words, we need to realize that the control of anthrax infection has mainly to do with sanitary science, aided by the various accessory means employed to afford protection to the animal. But while prophylactic agents in use, for the protection of the individual, are of the greatest importance, as adjuncts, the best results will never, in my humble judgment, be secured, until combined with the strict enforcement of sanitary procedure, and the hearty co-operation of everyone interested, in order to destroy the infection, which, in reality, is the main object to be attained.

As I have already suggested the blood, as the chief source of the infection, it being surcharged with the specific organisms of the disease, it may be of interest to note a few of the agencies through which the virus may be carried, and which has been verified by actual tests.

In some diseases, such as piroplasmiasis or tick fever, malaria, yellow fever, etc., which are caused by protozoa, the organisms are spoken of as two-host germs. That is, they require the bodies of two hosts, or individuals, in order to be able to complete their life-cycles.

In the case of tick fever, for example, and the same application may be made in the case of the other two diseases mentioned, with their mosquitoes, the common cattle tick is an obligatory host of the tick fever germ, without which the latter could not complete its cycle of existence, and would consequently die—a condition we are earnestly endeavoring to bring about in our Southern campaign of tick eradication.

In the bacterial diseases, however, the organisms, which belong to the vegetable kingdom, do not seem to have to depend upon secondary or obligatory hosts, but are transmitted in more or less mechanical ways.

The common house-fly, for example, which, in walking over typhoid-laden feces, does not require to take the *Bacillus typhosus* into its own body to be able to transmit the fever to the individual, but may do so in a purely mechanical way by contaminating the food of the individual through the medium of its infected feet.

So it is in the case of anthrax infection; a secondary host is not essential in the same sense as in tick fever; and whatever the transmitting agent may be, the transmission, itself, is of a purely mechanical nature, just as one would bring about contact by artificial means.

If looked at from another point of view, however, it may be considered that any of the media through which anthrax may be transmitted, is, in reality, essential for the transmission of the infection; but not in the sense of any one being specifically so, to the exclusion of all others, as is the case with the tick in Texas fever.

During certain seasons which afford favorable climatic conditions, anthrax is usually more prevalent where previous infection had existed; and when such occurs, it is believed to be due, not only to the lack of sanitary care of the victims and their surroundings, but in large measure, also, to the activities of certain living agents which come in contact with the virulent tissues, and, therefore, capable of obtaining and distributing the virus. These may be carrion feeders, in the form of animals or birds, or insects of the blood-sucking species. Such have been suspected for some time, but I am not aware of any systematic investigations having been conducted, until the past few years, to verify the suspicion, although referred to in text-books in a general sort of way.

About four years ago, some experiments were undertaken by Dr. Harry Morris, Bacteriologist and Assistant Veterinarian of the Louisiana Station, at Baton Rouge, to determine, if possible, the likelihood of anthrax infection being carried by the following living agencies: buzzard, dog, cat, hog, opossum, rabbit, guinea-pig, and the chicken, with the following results briefly summarized:

Anthrax was *not* found in the feces of the buzzard after eating spores, but the infection *was* obtained from the feet, beak, and vomitus, after feeding upon an anthrax carcass, or upon the anthrax flesh.

It was found that anthrax spores were *not* destroyed after passing through the digestive tract of the dog, and were found in the feces as long as six days after anthrax material had been fed.

The feces of the hog also contained the infection for a period of five days after the ingestion of spores.

The feces of the cat gave similar results, the infection passing out during four days after eating anthrax spores; and it was also found that the organism was *not* destroyed after having passed through the alimentary canal of the opossum.

Susceptibility to anthrax, through ingestion, was also found to be low in the case of the rabbit and guinea-pig, but spores *were* found in the feces; and the same may be said with reference to

chickens, anthrax infection being found in the feces for 24 hours after being fed spores.

Here, then, we have a considerable list of living creatures, the majority being carrion-feeders, which, while of more or less low susceptibility to the disease themselves, are, nevertheless capable of scattering infection far and wide through the medium of their infected feces; and in the case of the buzzard, through its infected feet, beak, and vomitus, which, to my mind, teaches a most important sanitary lesson.

The question here obviously arises as to where, under natural conditions, these carriers are likely to obtain the infection. Is it not mainly, if not solely, from the infected anthrax carcass, with its seething mass of charbon organisms? Personally I believe it is; and I further believe, that neglect to sanitarily dispose of our anthrax carcasses in the past, and even now, has been the cause of such fatal and wide-spread infection, through the medium of agencies such as I have mentioned and in the manner I have attempted to describe.

There are still other living agents capable of spreading the infection, and to which I would further direct your attention, viz., insects of different kinds, but more particularly the blood-suckers, although those with suetorial habits, only, may also play their part.

However, in either case, the work of transmission is performed, as before mentioned, in a mechanical way.

During the past year, or so, Dr. Morris, to whom I have already alluded, has been carrying on some tests with the view of substantiating the belief that certain insects were responsible for the transmission of anthrax infection, and his results will shortly be published in bulletin form. However, I am fortunately in a position to give here a brief summary of his findings up to the present time.

The experimental insects used were the horn-fly, some of the *Tabanidae*, or horse-fly family, and two species of swamp mosquitoes.

In order to secure a source of infection, guinea-pigs, rabbits and sheep were inoculated, either subcutaneously or intra-abdominally, with anthrax spores. Specially-prepared cages were used, and from 100 to 300 horn-flies placed in each cage, the top of which was composed of fine mesh wire screening. An infected guinea-pig

was then secured over the top, so that the flies could feed upon it from the inside of the cage. After the flies had been permitted to feed for a time (one minute) upon the infected blood of the pig, the latter was removed, the screen top sterilized with bichloride solution, and a healthy pig secured in the place of the infected one, when transmission occurred.

It was found that the nearer to the point of death of the infected pig, the larger the percentage of infections occurred. If within the last hour before death, about 60% of the experimental pigs would succumb to anthrax. But even four hours before death, inoculations were obtained.

An interesting observation here made, was, that if the flies were allowed an interval of 20 minutes, or so, between feeding upon the infected and the healthy pigs, or in other words, if they were given sufficient time in which to clean their contaminated probosces, inoculations were not made, which is further verification, I think, of the mechanical-transmission claim.

Anthrax organisms were not found, however, in the feces, or "specks" of horn-flies that had been feeding upon anthrax blood; although, in the case of the common house-fly, after feeding upon infected material, the feces were contaminated, as shown from subsequent cultures made from them. The experiment with the house-fly was on a previous occasion to those I have been discussing.

It was also found that the horn-fly would not feed upon the carcass of a guinea-pig for any length of time after death had taken place, although a few transmissions were obtained from 5 to 10 minutes after that occurrence. This may possibly be accounted for by the more rapid cooling of the blood in the body of such a small animal, which might not hold good, however, in the case of a larger one, under natural conditions, where the body-heat would be retained for a greater length of time.

In one of the experiments an infected sheep was used, the flies being permitted to feed upon it for one-half minute. Healthy guinea-pigs were then immediately secured on cages, and kept there for a period of one minute, with the result that out of 9 pigs used, 8 of them died of anthrax.

In some of the earlier experiments the hair was removed from the abdominal surface of the pigs, but, in order to simulate natural conditions as closely as possible, others were left unshaven, with the result that as many infections were obtained with the hair on, as

with it off; which I consider is an important observation, as it shows that the flies are capable of transmitting infection under natural conditions.

It is difficult to get horse-flies to feed in captivity, but in one experiment, with the green-head horse-fly, it was found that infections could be produced by the bite of a single insect, and that as many infections were produced with this insect as with the horn-fly.

Further, stains were made from the drop of blood escaping from the puncture in the skin of the pig produced by the proboscis of the fly; and in each case, anthrax organisms were found on microscopic examination.

This would suggest another source from which infection could spread by means of suctorial varieties of flies which do not pierce the integument.

It may be added, that anthrax infection could not be found in the specks from the horse-fly.*

Another part of these experiments was devoted to mosquitoes to test the possibility of their being transmitting agents. Two species of swamp mosquitoes (*Psorophora*) were collected, and after having gone through the routine of infection from guinea-pigs, transmissions were obtained in from 4 hours before, until 10 minutes after, the death of the pig. About 40% of the susceptible animals were inoculated when the diseased pig was near to the point of death, and a few transmissions were secured a short time after death.

The feces of the infected mosquitoes did not seem to contain anthrax organisms.

The work that has already been done in this connection goes far to establish the fact that the living agents in the transmission of anthrax infection are quite numerous, and, doubtless, there are many others that have not, as yet, been investigated.

However, it serves to emphasize the difficulties confronting the veterinary sanitarian in his effort to control this disease, especially if the main source of infection, the anthrax carcass, has not been effectually destroyed.

In this discussion I have confined myself to some of the living agencies responsible for the spread of this disease, and have left

*In the current number (January) of the American Journal of Veterinary Medicine, Dr. Frank C. Hershberger reports anthrax being transmitted to both animals and people in Manchuria, China, by the bites of members of the *Tabanidae* family, or horse-flies.

out numerous others that might be termed inert, or, in some cases, of an exotic nature. I refer here to running water that has been contaminated: instruments and utensils; infected feeding materials; infected fertilizers made from diseased animal tissues; infected hides, leather, hair, wool, etc. But whether the carrier of the infection be alive or dead, it all points to some primary source, and that source is, mainly, if not solely, in my judgement, the germ-laden anthrax carcass left carelessly exposed, and from which the disease may be carried and spread through the medium of the various agencies which come in contact with its infected tissues.

But to digress just for a moment, if you please. Do we not find, all through Nature, the perpetuation of species through more or less mechanical transmission, a great part of which is, fortunately, economic; while in other instances it is pathogenic, so far as we are concerned, at least, as in the disease under consideration?

Is not the pollen of the higher plants carried, largely, by insects which feed upon the nectar, and transfer the pollen grains to the generative organs of the female plant, in order to perpetuate the species? And may not a similar question be asked regarding birds as carriers; and in some cases, the wind, etc.?

This is, of course, an economic provision of Nature, and one that is beneficial to man. But a similar condition also occurs in the lower forms of plant life, which are prejudicial to both the higher plants and to animals, as illustrated by the various molds or fungi, and the bacteria, which perpetuate themselves, and flourish at the expense of their hosts, unless resistance in the latter should be sufficiently powerful to overcome their attacks. The spores of the fungi have their carriers, in the form of insects, the wind, etc.; then why not the bacteria, which belong to the lowest form of vegetable life?

Sometimes we hear it suggested that outbreaks of an infectious or contagious disease are sent to us as "visitations of Providence" as a means of punishment for some wrongdoing, creating the impression that germ life arises *de novo*, if you will, or had some sort of mysterious spontaneity of origin to be called into being on special occasions, or to meet certain conditions. This, however, is the sentimental, or I might say supersitious, aspect of the matter. Nature, on the other hand, has a very different explanation to offer, viz., that these lowly forms of bacterial life have their part to perform, just as the higher forms have theirs. Or, in other words,

all through her domain, Nature endeavors to maintain an equilibrium, through what might be termed a system of parasitism, with one form existing at the expense of another, and so forth; and while the higher creatures suffer, and succumb to the invasion of the lower parasitic forms, such as the one we are discussing, as well as others, it is Nature's way by which the latter are able to reproduce themselves and maintain their existence.

At the same time, while it is well that we should realize these facts, it is of course essential, for our own protection, that we wage an incessant and destructive warfare, with the view of interrupting Nature's plan, in this connection, in order that we may gain the mastery over, and win the battle from, these microscopic enemies, which, while endeavoring to live and flourish themselves, are, at times, so exceedingly costly to us.

It is chiefly to consider and suggest ways and means by which to gain this mastery, that is the occasion for our discussion of some of the agencies by, and through, which these minute, but deadly, forms are able to, and do, carry on their decimating work when left unchecked.

It will be necessary, of course, to allude, also, to the protective agents used in assisting to combat the ravages of the anthrax organism, although unnecessary, I think, to enter into their history, as that must be more or less familiar to all. Suffice it to say, that the anti-anthrax vaccine prepared by the Pasteur method, and introduced by that great French scientist, has been in use in my State, and I presume in Mississippi, also, for over twenty years, with varying success, which variation may have been due to several factors, such as lack of potency in the vaccine itself; lateness in its administration; its use in animals already infected; exposure to infection before animals are protected; the use of the vaccine by persons wholly incompetent to deal with it, etc.

So far as my observation has been, fairly good results have been secured when the vaccine has been potent and reliable; when it has been used sufficiently early in the season to allow time for immunity to have been reached; when it has been used regularly every season where the infection is likely to have been more or less permanent; and when its administration has been in the hands of those thoroughly familiar with it, and, at the same time, with the dangers and untoward results attending its misuse, or mal-administration, as it is, or is presumed to be, at least, the virus itself in attenuated form.

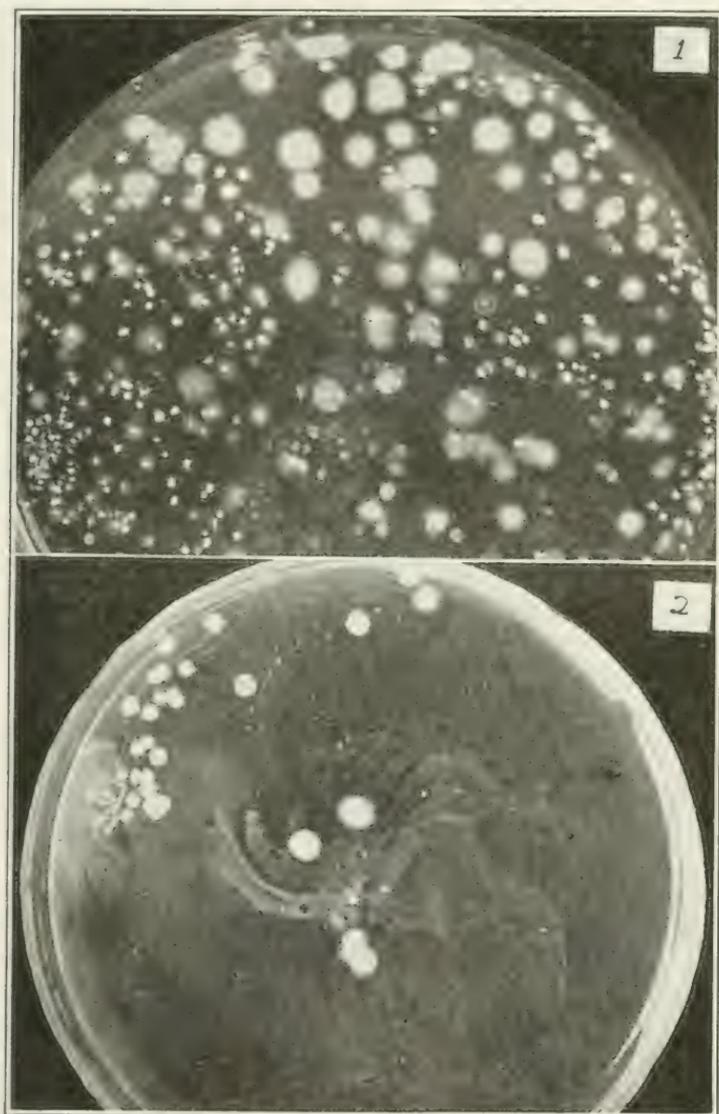


PLATE I.*

Plate I, Fig. 1, photograph of Petri dish containing anthrax colonies which grew from a single fly "speck," slightly enlarged. Fig. 2, photograph of Petri dish containing anthrax and other colonies. This plate was inoculated by a fly which had previously walked over an anthrax carcass; natural size.

*La. Bulletin No. 136.

Besides this attenuated virus, usually spoken of as the Pasteur vaccine, there has been more recently in use an anti-anthrax serum.

It seems that we are indebted to Dr. Marchoux, of the Pasteur Institute, in France, and to Selavo, in Italy, for the first investigations bearing on the possibility of obtaining a serum possessing anti-bacterial properties, they having demonstrated that rabbits and sheep immunized against anthrax were capable of standing large doses of virulent culture, and that the serum of those animals could, in certain cases, protect a rabbit weighing a little over 4 pounds. This work was, later, verified and confirmed by Sobernheim.

What is known as the Sobernheim method is the simultaneous use of vaccine and the protective serum. That is, vaccine is injected, subcutaneously into one side of the animal, while into the other side is injected the serum.

The advantages claimed for this method are, that only one treatment is required, and that the animals are said to be protected after ten or twelve days. This is sometimes referred to as the sero-simultaneous, or sero-vaccine, method, and Sobernheim claims to have had signal success with it, especially in the Argentine and in Uruguay, having used it on nearly 300,000 animals with almost perfect success, and was not, in itself, productive of any loss.

Frasey, of the Pasteur Institute in France, has experimented with an anti-anthrax-serum obtained from the horse, and recommends its use in the case of an outbreak of the disease where the animals had not previously been vaccinated; or, where vaccination had been regularly resorted to for several years, then neglected or abandoned for a time, with a subsequent outbreak occurring. In such a case, says Frasey, anti-anthrax-serum may be of great service. And while its application may be more expensive than simple vaccination in a region free from the disease, it can check an outbreak to a very considerable extent. A lecture by Frasey on this subject, before the Society of Practical Veterinary Medicine, in France, has been reproduced in our professional journals during the past year, and may be referred to for more detailed information.

Considerable attention has been given to the preparation of a spore vaccine, which seems to have been successfully employed in different countries, such as Russia, Hungary, Japan, and others; and Dr. Adolph Eichhorn, Chief of the Pathological Division, of

the Bureau of Animal Industry, seems to have obtained encouraging results, both with the serum-alone treatment, when infection has already occurred, and with the simultaneous use of a spore-vaccine and the serum, as an immunizing agent. Dr. Eichhorn also claims for the serum a high curative value, the dose being regulated according to the severity of the infection.

Further, since the serum, alone, confers only a passive immunity, it is advised to re-vaccinate in from three to five weeks by the simultaneous method. Bulletin No. 340, U. S. Dept. of Agriculture, gives a report of Dr. Eichhorn's work along this line.*

For the present, however, I scarcely think it would be wise to discard, entirely the Pasteur method of protection for others, until they have been thoroughly tried out in our particular section of the country, especially if the former is used under the most favorable conditions, both as to the potency of the vaccine, and its intelligent and careful administration.

However, in cases where the Pasteur vaccine might not be indicated, such as lateness in the season, or during outbreaks, and on account of the length of time required to obtain immunity, it is possible, I think, if not quite probable, that satisfactory results may be anticipated from the use of these newer products when judiciously employed and in proper hands.

I have already alluded to the fact that the use of anthrax vaccines has not always been uniformly successful with us, and I have mentioned some of the reasons which I think account for part, at least, of this variation. There is another point in this connection, however, to which I would like, briefly, to refer. All bacteriologists are aware that the same organisms may differ considerably in their potency; or, in other words, there are different strains of the same germ; and products prepared from a strain of anthrax organisms found in one part of the country may not be sufficiently potent, or vice versa, to successfully combat the disease in another. Or, to bring it closer home: products prepared from a strain of anthrax organisms secured in some more northern territory, may not

*Dr. Hershberger, in the report already referred to, seems to have secured excellent results from the use of both the anti-anthrax serum alone, and the simultaneous method with spore vaccine and serum. The serum was used both in preparing the animals for the double dose, and also as a curative agent, in larger doses. Both products were obtained from Russian laboratories.

be so effective in combating the disease in our section, as if the product had been prepared from the strain of the germ that we have. While I may be very much mistaken in this matter, I am rather confirmed in the conviction, that we will not secure the best results until we can have these products prepared from our "parent" organisms, or those with which we have to deal in the Lower Mississippi Valley.

In summing up, let me say, that, in my humble opinion, there are three principal factors to be considered in connection with our



Anthrax bacilli from blood smear.*

successful fight against anthrax. These are, *protection, sanitation, and co-operation.*

It is unnecessary, I think, to further enlarge upon the first of these, as I have already alluded to the different protective agents in use, or suggested.

To sanitation and co-operation, however, I will briefly refer conjointly.

In the first place, let me say, that sanitation on the part of individual stockowners, is of the utmost importance for their own protection; but I would refer, more especially, to sanitation as may be required by state law.

When livestock sanitary regulations are adopted and promulgated by the state, it is presumed that they have been considered

*La. Bulletin No. 152.

necessary for the general well-being of stockowners, individually and as a whole, and not intended to work a hardship on anyone; but, on the contrary, are for the benefit of the individual, the community, and the state. Besides, legislation of this character is generally framed by those having a more or less intimate knowledge of the minute forms of life which cause the different infectious diseases of animals, and how best to control and eradicate them; and not by those unfamiliar with them and their methods of attack



Buzzards feeding on a small carcass*

and dissemination. Hence the importance of stockowners, not only accepting and abiding by state regulations of this nature, but aiding and co-operating, to the fullest extent, in their enforcement.

An individual, who, through ignorance, indifference, or otherwise, tries to evade such regulations, is not only an enemy to himself, but a dangerous menace to the livestock interests of his community, and of his state.

Human nature seems to rebel against any measure which requires a person to do something which may cause him a little inconvenience, or against his inclination, and especially if he does not

*La. Bulletin No. 136.

fully realize its importance. But in the case of a dangerous and fatal disease like anthrax, for example, with which stockowners in general cannot be expected to be thoroughly conversant, unless some line of sanitary procedure should be required by law to endeavor to control it, there would be no end to the losses that might accrue therefrom.

On the other hand, if each stockowner in the state had made an accurate study of this disease, and the life history of the germ which causes it, and would apply this knowledge intelligently, there would then be little or no use for a law to require him to adopt such measures for his own, and the general, good. However, everyone must know that such a condition does not at present exist, nor is it reasonable to presume that it ever will. Hence, for the good of everybody concerned, it has become necessary for states to enact just such legislation.

A law of this nature, in order to be effective, must necessarily receive the hearty co-operation of all for whose special benefit it was enacted, otherwise, the greatest good cannot be expected from its operation. Unfortunately, up to the present, it is mainly due to the want of this co-operation that this fatal animal disease has been permitted to remain with us, and spread, when favorable conditions have existed.

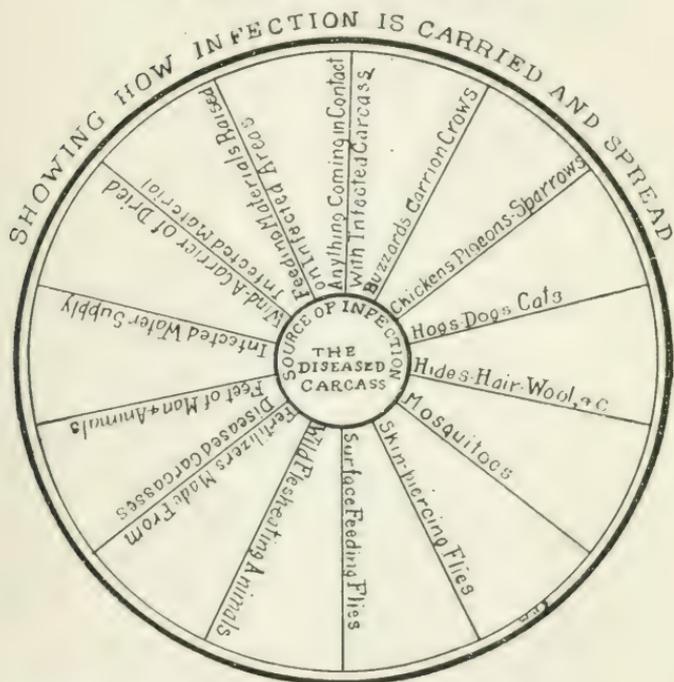
Anthrax has been responsible for tremendous losses to our stockowners in the past, and there is perhaps no other of this class of diseases that calls for greater strictness in the enforcement of sanitary measures to control it and prevent its spread. Fortunately, there are artificial means, in the form of vaccines and serums, which have already been alluded to, to help protect our animals against it; but these are only aids, and not all that is necessary to obtain the most satisfactory results. The infected carcass left carelessly exposed, the neglect of thorough disinfection of premises, etc., are sufficient in themselves to cause fresh outbreaks on the same place as well as on others.

It is the strict sanitary control, therefore, that is so often overlooked, and which requires enforcement, where such is likely to be, or is, neglected.

The fact should be thoroughly understood, by laymen especially, that what is usually spoken of as infection, is, in reality, living germs, each being the cause of its own specific disease; and while vaccines and serums are extremely valuable as protective

ANTHRAX (CHARBON) WHEEL

“DESTROY THE HUB”



Explanation:

The HUB represents the undestroyed diseased Carcass. The SPOKES represent various carriers of infection from the diseased carcass.

Recommendation:

Destroy the HUB, the SPOKES will fall out, and the WHEEL collapse—Destroy the Carcass, the carriers will be rendered harmless, and the spread of infection prevented.*

Notification:

For all practical purposes, the “Recommendation” may apply also to Hog Cholera and other infectious animal diseases.

*The destruction of carcasses is required by State Live Stock Sanitary Board Regulation No. 9.

agents, the main object should be to destroy the infection by strict sanitary means, not merely to clean up the infected premises, but to prevent the disease being carried to other places which may yet be free from infection. The value of co-operation in this important work, therefore, must be very evident to every intelligent person.

True, there are states, like your own and mine, that have livestock sanitary boards or commissions which are legally at the head of this work; but every thoughtful individual must know how helpless such boards must be, with meagre funds at command to handle such an extensive undertaking in the absence of the necessary co-operation on the part of all who should be interested, whether it be the individual, the community, or the county. On the other hand, with such sanitary effort, thoroughly organized, and heartily co-operated in, throughout the state, such a disease as anthrax, and some others, might be considerably shorn of its terrors, and the losses occasioned by it, very materially lessened.

In short, then, if we can only manage to obtain protective biologic products, the uniformly-potent-effects of which we can be assured by actual experience, in our southern section of the country, and these placed in the hands of only competent individuals; when we can have our state livestock sanitary laws rigidly enforced, especially with regard to the proper disposal of anthrax carcasses—and, parenthetically, I might suggest, that a beneficial regulation would be to require, during the warm season of the year at least, all carcasses, irrespective of the cause of death, to be carefully and effectually destroyed by incineration; when we can depend upon, and obtain, the hearty co-operation of everyone in this important sanitary work; and when our uncultivated and undrained, and presumably infected, areas can be brought under cultivation and more effectually drained, where such are possible and practicable; then we may anticipate results in the control of anthrax infection that should be far-reaching.

On the other hand, however, until we are able to secure such combination of effort as I have alluded to, and every factor working smoothly and harmoniously, and with the one chief end in view, viz., the control, and, if possible, the eradication, of the infection of this fatal and expensive plague, I am afraid, while we may continue to achieve some measure of success, it is going to remain fragmentary in comparison with what we could wish it to be, or what it really would be, under the combination of aggressive forces which I have, but feebly, endeavored to set before you.

THE DIAGNOSIS OF INFECTIOUS ABORTION OF CATTLE (Bang's Disease) WITH SPECIAL REF- ERENCE TO THE INTRADERMAL ABORTIN TEST¹

(Part I. Review of Bang's Disease)

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Williams² states that "The diagnosis of contagious abortion in cattle may be made by:

- (a) "the occurrence of sterility, abortion, premature birth or inflammation of the uterus, with or without retained afterbirth (Measured by this standard essentially all herds of size are involved).
- (b) "the recognition of the abortion bacillus in the uterus or in the milk (According to this standard, the disease has been recognized in most dairies where search has been made),
- (c) "the agglutination and complement fixation tests upon the blood (According to this standard, the infection exists generally. In single tests we find frequently an animal whose blood will not react, but if we repeat the test we find ultimately that the blood of so many individuals reacts, whether the animal be a cow, bull, heifer, or a young calf, that it is unsafe to assume that a given individual is wholly free)."

By combining these "standards" then "all herds of size are involved"; "The disease has been recognized in most dairies where search has been made"; "it is unsafe to assume that a given individual is wholly free". The question might very properly be asked why dwell on the diagnosis of the disease when such are the conditions. While it is believed that the disease is very prevalent and of as much, if not more, economical importance as tuberculosis of cattle, there is every reason to believe that one can be reasonably certain in assuming that a given individual is free from the disease when circumstances and results of the agglutination and complement fixation tests so indicate and that there are many dairies

¹The Mulford Laboratories, Glenolden, Pennsylvania.

1. Presented at the thirty-fourth annual meeting of the Pennsylvania State Veterinary Medical Association, Jan. 23, 1917.

2. Circular No. 4, Feb. 1916, N. Y. State Veterinary College, Cornell University.

and herds free. Much confusion exists as to the relationship between this disease and such conditions as sterility, retained afterbirth, granular venereal disease, white scours, metritis, etc. and also as to animals susceptible and for this reason we believe that it is highly important to have a better understanding of the specificity of the disease and this can be accomplished in using a name that is more specific in itself. The name of *Bang's Disease* is more specific than Epizootic Abortion, Contagious or Infectious Abortion or Abortion Disease, for the following reasons:—

1. Epizootic Abortion, Contagious or Infectious Abortion or Abortion Disease, are not terms limited to the specific disease caused by the *B. abortus*, Bang.

2. Bang's Disease is the disease caused by the Bacillus of Bang or *B. abortus*, Bang and includes Epizootic Abortion, Contagious or Infectious Abortion or Abortion Disease when caused by this organism.

3. The presence of *B. abortus*, Bang, in an animal resulting in an infection, however slight or occult establishes the existence of the disease which may never develop to the extent of producing abortion or causing sterility, retention of afterbirth or metritis and still the animal may be highly infected with Bang's Disease.

4. Epizootic Abortion, Contagious or Infectious Abortion or Abortion Disease of Cattle, of Hogs, of Guinea Pigs or other domestic animals when caused by *B. abortus*, Bang, is Bang's Disease.

5. By recognizing the infection with *B. abortus*, Bang, as a specific disease the proper relation of this infection with certain ailments or sequel, as for example, abortion, sterility, retained afterbirth, metritis, can be better understood.

6. The relation of Bang's Disease to other afflictions or diseases including granular venereal disease, white scours, epizootic abortion, contagious or infectious abortion, or abortion disease of horses, of sheep or of other animals, can be more clearly defined.

Nocard³ investigated abortion in cows in 1885 and further established the contagious nature of the disease. The bacteriological study made at the same time did not include the test to infect pregnant cows with any of the bacteria isolated nor do the descriptions of the various bacteria apply to the organism isolated and later described by Bang, who in 1897 published the results of a

3. Report of Departmental Committee on Epizootic Abortion, "Epizootic Abortion in Cattle", London, 1909. Part 1, page A 3.

very thorough study of Epizootic Abortion in Denmark. A cow with premonitory symptoms of abortion was slaughtered and Bang found an abundant odorless exudate, between the uterine mucous membrane and foetal envelopes, dirty, yellow, somewhat thin pul-taceous material of a slimy and lumpy character. This exudate was demonstrated to be rich in a very small bacterium apparently in pure culture. Bang recognized this bacterium as a bacillus, non-motile, not stained by Gram's method. The bacilli were also found in the contents of the foetal stomach and in the blood from the foetal heart.

Bang subsequently supplied experimental evidence that pregnant cows, mares and ewes could be infected with pure, artificially grown cultures of the bacillus. These observations justified the conclusion by Bang that Epizootic Abortion should be regarded as a specific uterine catarrh caused by a specific bacterium.

In the light of recent knowledge, the narrowness of the name saddled upon the disease based upon a not infrequent symptom—*abortion*, a name more applicable to the infection as a specific disease should be welcomed and as the *Bacillus* of Bang means but one thing, then the name Bang's Disease will not be misunderstood or add to the confusion now existing in the nomenclature, symptoms and results of this specific disease.

It is highly desirable at times to establish a diagnosis with reference to a given animal but as a rule it is of more economic importance and only necessary to ascertain the presence or absence of the disease in a given herd. We are forced to give way to the latter, namely *the consideration of the herd as a unit* because of the imperfect, impractical means at our disposal to deal with each animal and thereby the herd. To consider the herd as a unit, rather than the individual is amplified by Sir Stewart Stockman⁴ in discussing the control of the disease by preventive measures.

“Having regard to the facts that the disease prevails in an enormous number of dairy herds and that a very high proportion of the animals are infected, State measures which are based on effective restrictions on the movement of infected animals would be ruinous to the business of farmers, while partial measures of the same kind are not worth the expenditure which would be incurred owing to administration. It is more than questionable, even assuming their application to be practicable, if the severest re-

4. Jour. of Comp. Path and Therap., Sept. 1914, Vol. XXVII, Part No. 3.

strictions on movement, comprising compulsory isolation for long periods of aborted animals and those still pregnant but known to be infected would accomplish eradication, for we now know that cows may become carriers of infection for a prolonged period during which the bacilli may be excreted in their milk.

“It would be possible by serological methods, assuming that a sufficiently large number of trained men are available throughout a country, to establish the infected cows in a herd and on many premises it would also be possible to isolate these animals before they abort or calve and so prevent large quantities of virulent material being excreted into the cowsheds or to the pastures, but even then the “carrier” of infection would have to be reckoned with. On the majority of farms, however, there is no provision for isolating any considerable number of animals, and the best that can be done in such cases, and it should be done, is to provide against gross infection by the immediate removal of infected material, discharge, foetus, membranes, and prematurely born calves—by thorough disinfection of the cowsheds, including the feeding trough, stable implements, drinking places, as well as the hands and boots of attendants.”

In this consideration of the diagnosis of the disease, the individual will only be considered because of the bearing a positive diagnosis has in establishing the disease in the herd. The means of establishing the diagnosis may be classified into the consideration of the

1. History
2. Symptoms
3. Bacteriological Examinations
 - I. Microscopic
 - II. Cultural
4. Biological Tests
 - I. Serological
 - II. Diagnostic Reagents

1. HISTORY. With increased difficulty to get heifers or cows with calf, the dropping of calves prematurely or the occurrence of one or more abortions, retained afterbirths, and complications thereto, metritis, etc., all considered is ample proof that the suspicion of the presence of Bang's Disease is more or less well founded. The mistake, however, should not be made that any one of these developments considered singly or collectively is proof of the existence of the disease in a herd. Abortion, i. e. the expulsion of the

foetus in cattle is invariably due to the diseased condition caused by the *B. abortus*, Bang, but occasionally the same result is brought about by other causes. The causes other than the infection with *B. abortus*, Bang; the drinking of very cold water, consumption of frozen roots, fodder, etc., mechanical injury, poor nutrition resulting from insufficient food, certain grasses, fodder and weeds, severe diseases, mental causes as excitement during storms, etc., will not be dwelt upon here because the impression must not be made that they are sufficiently important in considering the cause of one or more abortions in a given herd. It is a safe rule to regard the occurrence of two or more abortions as probably the result of Bang's Disease, but this is only sound reasoning and not real proof of the actual existence of Bang's Disease. The same may be said for sterility, retained afterbirth and other complications. When these troublesome conditions are met with, an honest effort should be made to learn the presence or absence of the disease in the herd and then every effort should be made to control and eradicate it. Aside from the sequel mentioned it is undoubtedly true that Bang's Disease not only predisposes the old, but the young, even prior to birth of full time calves, and new born calves where the disease exists are more susceptible to white scours, pneumonia, and other diseases of the young. These diseases, white scours, pneumonia, granular venereal disease are specific infections not caused by *B. abortus*, Bang, although at times but rarely so is the Bang's disease coexistent. When diseases of the young are prevalent the existence of Bang's Disease in the herd should be determined, as the control and eradication of this insidious disease will very likely eliminate the attending diseases. While these matters are carefully considered in reviewing the history of a herd it is equally important to know whether the continuity of the herd has been broken sometime previous, i. e. have any new animals been introduced which can be traced to have come from an infected herd. Not infrequently all the troubles with a herd can be dated back since the addition to the herd of this or that new member and it is not difficult to establish the case that the particular animal in question is responsible for the introduction of the disease. Steps should then be taken to definitely demonstrate the presence of the disease in the herd.

2. SYMPTOMS. Bang's Disease is a chronic insidious disease not characterized by any definite symptoms unless the infection

has proceeded in a heifer as cow with calf to cause the animal to abort, cause premature calving, or the result in the birth of a weakling, or followed by a retained afterbirth or other complications. In the light of recent knowledge the disease must be regarded as one confined to the pregnant uterus and udder. As to this, Schroeder and Cotton⁵ state,—

“Truly, if abortion bacilli live and multiply elsewhere in the bodies of cows than their udders and pregnant uteruses, no matter how small their number, our numerous tests should have given us at least an occasional positive result with other material than that derived from udders and associated lymph glands.”

With the localization of the infection and development in these organs there are no accompanying pathognomonic symptoms. The course of the disease is invariably slow and not infrequently a pregnant animal will arouse the first suspicion of the presence of the disease by the expulsion of the foetus—abortion. Sometimes distinct premonitory symptoms are noticeable a few days or only a few hours before aborting, including the swelling of the udder—“makes a bag”, animal is uneasy, the vulva is slightly swollen and the ligaments are somewhat relaxed. Quantities of mucus, which may be tinged with blood, may be seen at intervals and later a yellow discharge may make its appearance. The expulsion of the foetus may occur at any time and in the early months of pregnancy abortion may occur unnoticed and only discovered when the foetus and membranes, which usually come together during the early months, are found lying near the animal. Later in pregnancy the foetus may come away alone and the membranes may be retained wholly or in part. The retained afterbirth may give rise to the well known complications and even when removed a thin yellowish discharge may continue to appear for several weeks in the unsuccessfully treated animals. Should a herd be studied when an animal shows premonitory symptoms an effort should be made to be at hand when the abortion occurs or shortly after, in order to examine the discharge including the exudate, membranes and aborted foetus. The exudate is usually of a light yellow with a brownish tinge and occasionally dark chocolate color, probably due to an admixture of blood. The nature may be distinctly glutinous and vary from fluid pus to a tough doughy consistency, with solid floe-

5. Practically Significant Facts About Abortion Disease. Twentieth Annual Report, U. S. Livestock Sanitary Assoc., 1916.

culi in the more fluid parts. The membranes including the umbilical cord may be distinctly dropsical. The foetus for its age may present a normal appearance, but sometimes the tissues are oedematous and dropsy of the abdomen or chest may be observed. At times the foetus may be mummified, varying considerably in degree. If the mother animal is sacrificed, particularly in advanced cases, i. e. in the later stages of pregnancy, a slight oedema may be appreciable in the neighborhood of the neck of the uterus, the cotyledons in well circumscribed areas are softer than normal and pulpy, and distinctly yellow and necrotic in appearance. All of these findings or observations may be accepted as additional evidence of the disease, and steps should be taken to have its existence established.

3. BACTERIOLOGICAL EXAMINATION; I. Microscopic. The examination is limited to the demonstration of the presence of *B. abortus*, Bang, in the uterine discharges or scrapings, placental exudate and foetal alimentary canal contents. This procedure is only fairly satisfactory. It is primarily a laboratory procedure and therefore has its practical limitations. Only positive results, including the actual demonstration of *B. abortus*, Bang, are of any value. If the organism is not found, it is by no means certain that it might not be found in additional material from the same source. Not infrequently the material collected is undergoing putrefactive changes, particularly in warm weather and the bacteria of decomposition are likely to cloud the field for microscopic examination so as to make the identification of the *B. abortus*, Bang, although present, impossible. Failure therefore to demonstrate the *B. abortus*, Bang, does not mean that the diagnosis is negative, but the demonstration of the *B. abortus*, Bang, absolutely confirms the diagnosis.

3. BACTERIOLOGICAL EXAMINATION; II. Cultural. Aside from the microscopical examination, the material may be cultured on suitable media for the cultivation and growth of the *B. abortus*, Bang, which if grown, conclusively establishes a positive diagnosis. Failure to accomplish this, however, does not signify that the infection does not exist in the animal from which the material was obtained. The methods of procedure are the usual methods involved in the cultivation and isolation of a specific organism, care must be exercised to exclude or rule out all other bacteria and secure the growth of the specific organism on a favorable culture media. Material from the stomach or intestines of the aborted foetus, serves

well for the isolation and growth of the *B. abortus*, Bang. Failure to grow the *B. abortus*, Bang, after its presence by microscopic examination has been demonstrated only means that circumstances surrounding the attempt have not been satisfactory or favorable for the growth.

According to Fabyan⁶—

“The presence of *B. abortus* in the milk of cows was foreshadowed in some investigations published in 1894 by the Bureau of Animal Industry, Department of Agriculture. In a footnote to experiments made by E. C. Schroeder, Theobald Smith, then Chief of the Division of Pathology, called attention to the peculiar lesions in a guinea pig caused by the intra-abdominal injection of milk, and warned against its identification with tuberculosis”.

Schroeder⁷ reported that milk from certain cows produced a disease in guinea pigs owing to the presence of an organism, first regarded Gram-positive and when later shown to be Gram-negative and recognized as *B. abortus*, Bang.⁸ This proved *B. abortus*, Bang, an udder invader and widened the scope of our knowledge of Bang's Disease beyond the narrow limits that it was but a uterine infection. All recent attempts, however, to demonstrate that the infection is more than an udder or uterine or any more an infection of both have thus far been futile.

Schroeder and Cotton⁹ revealed that

“Cows attacked by abortion disease (Bang's Disease) often remain carriers and disseminators of abortion bacilli (*B. abortus*, Bang) long after they have ceased to abort, and cows which have been exposed to infection but have never aborted may be carriers and disseminators of abortion bacilli.” “The proportion of infected udders among cows exposed to abortion disease (Bang's Disease) has not been definitely determined.” “The udders of practically all cows which actually abort are at least temporarily infected”. “In one herd numbering more than 150 cows, among which abortions had occurred with varying frequency for several years, a single test of the milk of each revealed that 14% were expelling abortion bacilli from their udders.” “The period of time during which the udder remains infected varies greatly. After hundreds of tests with milk from many cows we concluded though the infected condition of the udder

6. Journal of Med. Research, 1913, Vol. XXVIII, No. 1, p. 85.

7. Proceed. of Amer. Assn. of Med. Milk Com., Phila. 1911.

8. Bureau of Animal Industry, Dept. of Agric. Bul. 198, 1912.

9. Practically Significant Facts About Abortion Disease. Twentieth Annual Report of the U. S. Livestock Sanitary Assoc. 1916.

may terminate quickly, it tends, as a rule, to persist indefinitely. In one of our cases it persisted from its discovery until the cow died seven years later and we have a number of cases in which it persisted from one to four years".

These observations are extensively referred to here for the bearing they have on the value of milk examination for the *B. abortus*, Bang, as an aid in establishing the diagnosis or presence of Bang's Disease in a given herd. The examination of milk may be referred to as the milk test which may be cultured for the *B. abortus*, Bang; or injected into experimental animals to determine its infectiveness and thereby the presence of *B. abortus*, Bang.

Evans¹⁰ recently described cultural tests for the demonstration of *B. abortus*, Bang, which led to the noteworthy observation that there are possibly four types of *B. abortus*, Bang, a variety-lipolytic because it decomposes butter fat, pathogenic type and two other types differing considerably from the lipolytic variety, but resembling the pathogenic type. What bearing the revelation of types of *B. abortus*, Bang, has on the etiology of Bang's Disease can not be foretold at this time.

Giltner, Cooledge and Huddleson¹¹ point out the weakness of cultural milk tests and the time consumed, 8 to 10 weeks in the experimental animal test to determine the ineffectivity of an injection of milk. Knowing that *B. abortus*, Bang, is a frequent udder invader they concluded that antibodies must necessarily be in the milk and they practiced the agglutination test on the milk serum.

"In every case in which *B. abortus* (Bang) was found present in the milk by guinea pig inoculations the agglutinins for this bacterium were also found, but the bacterium was not found in every case in which agglutinins were demonstrated."

As long as this statement stands the results of the agglutination test on milk serum cannot be accepted as absolute proof of the presence of *B. abortus*, Bang, in the milk or udder or elsewhere. Unless the actual presence of the organism is demonstrated the results of the agglutination test on milk serum can not be regarded of any more value than on blood serum.

As an additional means of establishing a diagnosis, milk samples may be drawn from any number or all of the animals, in the herd and submitted for cultural, experimental animal inoculation

10. Jour. of Inf. Diseases 1916, Vol. 18, No. 5.

11. Jour. of Amer. Vet. Med. Assoc. 1916, Vol. 3, No. 2, p. 157

or agglutination tests. Positive results in the first two, namely the cultural or experimental animal inoculation may be accepted as conclusive evidence of the presence of *B. abortus*, Bang, but a positive agglutination test is of no more value than a positive agglutination test on blood serum.

4. BIOLOGICAL TESTS; I. Serological Tests. Under serological tests may be included the agglutination, complement fixation, conglutination and precipitation tests. These are all tests made with the serum obtained from the blood drawn from the suspected animal and all may be classified as laboratory procedures. Without going into the merits of any of these tests, it will suffice to say, that a so-called positive reaction signifies that the animal is sensitive or sensitized to the *B. abortus*, Bang, which may mean that the animal is actually infected with the *B. abortus*, Bang, at the time or that the animal was at one time infected and the sensitization signifies a degree of immunity. The interpretation of a so-called positive result is a very important matter because it may have reference to two extreme conditions—an actively infected animal or an animal that was infected and that may now be in possession of some immunity. Negative results on the other hand clearly establish that the animal is free of the infection of the *B. abortus*, Bang, although a very recent infection may not have had sufficient time to become an active infection, and one, demonstrable by these tests.

4. BIOLOGICAL TESTS; II. Diagnostic Reagent Tests—Include the abortion test as applied heretofore and the intradermal abortin test, which we desire to bring out at this time.

Bang¹² observed that artificially infected animals, reacted with a marked temperature rise, loss of appetite and slight diarrhea when injected subcutaneously with a culture of the *B. abortus*, Bang, while no such reactions were obtained in the few normal animals tried. The English Commission¹³ subsequently reported results with a glycerine extract of *B. abortus*, Bang, prepared and used, as tuberculin or mallein. Subcutaneous and intravenous injections, led to the following conclusion:—“There has not been time (1909) yet to verify the result of the test in the two pregnant reactors, but the great frequency, if not constancy, of the reaction in

12. Zeitschrift f. Tier., 1897, Vol. I, p. 241;

Archiv. f. Wissen, und Prakt. Tierheil. 1907, Vol. 33, p. 312.

13. Report of Departmental Committee on Epizootic Abortion. “Epizootic Abortion in Cattle”—London, 1909, Part I.

the tested animals which have aborted, and in those which are known to have been experimentally infected at the laboratory, makes it highly probable that the reaction is a specific one".

Meyer and Hardenbergh¹⁴ comparing the "abortin" as prepared by the English Commission with a "precipitated purified abortin" concluded that the results with the latter especially following intravenous injection, were more specific. The published account of this work is concluded with the statement "By means of the 'abortin' test we cannot decide whether an animal has been recently infected and will abort, or whether it is recovering from an invasion with *B. abortus*". The same must be said for the results in the various serological tests. Abortin as prepared by the English Commission or the precipitated purified abortin, used subcutaneously or intravenously as diagnostic reagents, fail to give specific results as supported by Meyer and Hardenbergh in the following conclusions:—

"From the above stated experiments with 'abortin' on 209 animals with our own preparations, we learned that the product permits a conclusive diagnosis in 59.3 per cent of the cases of infection, if the serum reaction is taken in consideration for comparison. In healthy animals about 29.1 per cent failures are recorded, or only 70.9 per cent of the 'abortin' reactions are supported by positive serum reaction. The reactions are mostly typical but only when a 'purified precipitated abortin' is used. The failures in the healthy animals can be reduced as far as 10 per cent when this preparation is used. The injections of the biological product should always be made intravenously; the dangers of general anaphylactic symptoms are very small in number. In recently infected herds the results are better than in old infected ones. In several instances, also, aborters reacted to the 'abortin' test when there were no immune bodies in the serum of the tested animals".

It would seem, therefore, that abortin or precipitated purified abortin as diagnostic reagents are not to be relied upon, in affecting the diagnosis on the individual animal. Uniformly negative results, however, on each and every animal in a herd under test may be accepted as some assurance of the non-existence of the disease in the herd, no attempt, however, should be made to interpret suspicious or positive reactions on individual animals. Uniformly positive reactions in a herd, may be accepted as cooperative proof

14. Jour. of Inf. Dis., 1913, Vol. 13, No. 3, p. 351.374.

of the existence of the disease in the herd and of some assistance in establishing an accurate diagnosis, not on individual animals, but only as to the presence of the disease in the herd.

Briefly summarizing the means at hand to establish a diagnosis of Bang's Disease we must realize that an entirely different interpretation can be drawn from the results of the various methods or tests in passing on one animal as an individual and all of the animals as a herd. The demonstration of *B. abortus*, Bang, in the bacteriological tests proves conclusively that the animal from which the material was obtained is actively infected with the disease and if the animal is one of a herd then the presence of the disease in the herd is established. If, however, material is not available for the bacteriological tests and the biological tests are resorted to or "abortin" or "precipitated purified abortin" are used then a positive reaction, does not necessarily indicate an actual and active infection of the individual animal, as the animal may be reacting to these tests, owing to an infection now non-existent. A reaction under the latter circumstances only proves that the animal was infected at one time and is now either showing a result of the previous infection or giving some indication of a degree of immunity. No positive statement one way or the other can be made from the results of these tests alone or combined as far as the individual animal is concerned but if all or the majority of the animals of a herd react, then the conclusion may be drawn that the disease actually exists in the herd.

The veterinarian in practice is confronted with the question, is this animal infected and does the infection exist in this herd? With all of the means at hand it remains impossible to distinguish between the positive reacting actually infected animal and the positive reacting recovered or immune animal. It is, however, safe after the application of some of the tests or several with uniformly negative results to venture the conclusion that the animal is not actively infected at the time the tests are made, but if exposed may be incubating the disease producing organism—*B. abortus*, Bang. The demonstration of one actually infected animal establishes the infection in the herd, and uniformly negative results in all of the animals of the herd with more than one of the diagnostic methods is ample proof of the freedom of disease. With these facts in mind we will venture to discuss in detail the intradermal abortin test.

PREPARATION OF INTRADERMAL ABORTIN. From 6 to 8 strains of *B. abortus*, Bang, are grown in Blake bottles of neutral glycerin agar at 37°C. until the maximum growth of each strain is obtained; the growths are then removed with sterile physiological salt solution and collected as one mixture, heated to 60°C. for one hour and then centrifugalized. After washing the killed bacteria once more with physiological salt solution, the emulsion is shaken up mechanically in a definite amount of salt solution, then filtered through four thicknesses of sterile cheese cloth, then diluted so that each c.c. will include approximately 5 billion bacteria, cultured for sterility and preserved with 0.5 per cent phenol.

METHOD OF APPLICATION. The intradermal abortin test is applied by injecting with a sterile syringe and fine needle, 0.1 c.c. of the emulsion (intradermal abortin) in the skin over one of the caudal ligaments, after the area is wiped with any harmless solution of a disinfectant. Results are recorded 48 hours later. The injections can be made by one individual by allowing the tail to hang and drawing the skin over the left caudal ligament from under the tail, as demonstrated by Haring and Bell¹⁵ in applying the intradermal tuberculin test.

The results may also be observed, measured and recorded by one individual by holding the tail up with the right hand so as to stretch the caudal ligaments and palpating the site of injection with the left hand. The swelling may be measured or approximated in centimeters.

THE REACTIONS. In many animals no evidence of the material injected can be seen or felt, while in some the material actually injected with no change in size, of the small firm area as a direct result of the injection can be detected. These results are regarded negative. In others distinct swellings, from 0.5 x 1 cm. to 5 x 6 cm. occur, at the site of injection, i. e. in the skin over the caudal ligament. Any increase in swelling, at the end of 48 hours over the swelling caused by the direct injection of the intradermal abortin itself is regarded as a positive reaction. It was observed that some of the larger reactions persisted for as long as 10 days.

Table I and II include animals of herds actually infected with *B. abortus*, Bang, or Bang's Disease in which animals not only have aborted, but in which the majority of animals show positive

15. The Intradermal Test for Tuberculosis in Cattle and Hogs, Bul. No. 243, 1914, College of Agric. Exp. Station, Berkeley, Calif.

reactions to the serological test, agglutination and complement fixation. Only a few of those that reacted positive to the agglutina-



FIG. 1.



FIG. 2.

tion or complement fixation test and some that aborted as well, gave a positive intradermal abortin test showing that this test will not pick out animals actually infected with any degree of certainty. Not one animal with a negative history and negative to the



FIG. 3.



FIG. 4.

serological tests reacted to the intradermal abortin test which speaks for the specificity of the reaction when the result is positive.

NUMBER or IDENTIFICATION	Approx. Age	Date of last calving	No. of normal calves	Date when last bred	Date of expected calving	Date of abortion	Aggluti	
							10-31	1-320
ersey Bell	5 yrs.	—					.2	1-320
eamy	—	4-25-16	3	5-7-16	2-7-17	12-12-16	++++	++
ancy	2 yrs.	7-20-16	4	4-28-16	1-28-17	9-15-16	+++	+++
ellie	5 yrs.	—	4	1-1-16	10-1-16	7-5-16	++++	+++
ammy	3 yrs.	—					+++	+++
essie	—	5-27-16	2	12-12-16	9-12-17		+++	—
ney	2 yrs.	11-7-16	2	12-9-16	9-9-17	—	++	+++
o. 20	5 yrs.	5-19-16	1	12-14-16	9-14-17	—	+++	+++
o. 10	5 yrs.	—					++++	+++
o. 15	3 yrs.	—	4	8-18-16	5-18-17	—	++++	+++
o. 13	7 yrs.	12-19-16	3	11-23-16	8-23-17	—	+++	++
o. 27	9 yrs.	—	3	12-5-16	9-5-17	—	++	+++
			1	—	—	—	+++	+
o. 26	6 yrs.	—	4	11-21-15	8-21-16	7-10-16	++	—
o. 25	2 yrs.	—	3	4-13-16	1-13-17	10-7-16	+	++++
o. 16	3 yrs.	—	3	11-29-16	8-29-17	—	++++	+++
o. 5	5 yrs.	—	1	10-2-15	7-21-16	5-4-16	+	+
o. 17	3 yrs.	2-19-16	2	12-19-16	9-19-17	—	++	—
o. 18	3 yrs.	12-19-15	4	10-23-16	7-23-17	—	+	—
o. 19	6 yrs.	—	1	—	—	—	++++	—
No. 23	3 yrs.	5-25-16	1	11-20-16	8-20-17		+++	—
No. 1	7 yrs.	8-16-16		—	—	—	++	++
No. 2	7 yrs.	—	1	11-14-16	8-14-17		++	—
No. 3	6 yrs.	—	1	10-30-15	7-30-16	5-10-16	++	++
			1	12-10-16	9-10-17	—	+++	—
No. 28	6 yrs.	—	1	10-18-15	7-16-16	5-3-16	++	—
			1	3-5-16	12-5-16	10-1-16	++	++
No. 29	6 yrs.	—	1	1-21-16	10-21-16	7-5-16	++	++
No. 22	4 yrs.	3-8-16	3	2-9-16	11-9-16	—	+	—
No. 7	9 yrs.	9-17-16	1	3-3-16	12-3-16	—	++++	—
			4	5-15-16	2-15-16	—	+++	—
			4	3-11-16	12-10-16	—	+++	+++
			4	3-20-16	12-20-16	—	++	—
			5	7-29-16	4-29-17	—	+++	+
			4	5-18-16	2-8-17	10-19-16	++++	—
			0	3-15-16	12-15-16	10-10-16	++	—
			4	4-16-16	1-16-17	10-15-16	++	—
			5	9-18-15	6-18-16		++++	+
			5	7-22-15	4-22-16	2-31-16	+	+

nation Test					Result	Skin Test		
1-640	1-1280	1-2500	1-5000	C.C.		10-25-16	11-1-16	
+	-	-	-	-	-	+	-	-
+++	+++	++	+	-	-	+	-	-
+++	++	+-	-	-	-	+	-	-
++	+	-	-	-	-	+	1x1 c.m.	1x1 c.m.
-	-	-	-	-	-	-	3x5 c.m.	5x5 c.m.
++	+-	-	-	-	-	+	1x2 c.m.	2x2 c.m.
++	+	-	-	-	-	+	-	-
+++	+++	-	-	-	-	+	-	-
+++	++	+	-	-	-	+	-	-
+	-	-	-	-	-	11-3-16+	-	-
++	+	-	-	-	-	+	-	-
-	-	-	-	-	-	+	-	-
-	-	-	-	-	-	-	1x0.5 c.m.	-
+++	+++	+++	+++	-	-	+	-	-
++	+	-	-	-	-	+	1x1 c.m.	-
-	-	-	-	-	-	+	1x1 c.m.	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
+	-	-	-	-	-	+	-	-
-	-	-	-	-	-	+	-	-
++	+	+	-	-	-	+	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	1x1 c.m.
+	-	-	-	-	-	+	-	-
+	-	-	-	-	-	+	-	1x2 c.m.
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	2x2 c.m.
++	++	++	+	-	-	+	-	-
-	-	-	-	-	-	-	-	5x5 c.m.
-	-	-	-	-	-	+	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
+	-	-	-	-	-	+	-	-
-	-	-	-	-	-	+	-	1x1.5c.m.

Table No. 3 includes a small herd with a negative history and negative serological tests and none of these animals reacted in the intradermal abortin test to the slightest degree.

Inasmuch as Meyer and Hardenbergh¹⁶ report "In several instances, also, aborters reacted to the abortin test when there were no immune bodies in the serum of the tested animals", we believe it highly important to seek and consider the history of each animal before regarding any animal as probably free of the disease even though the results of serological laboratory reagent tests would so indicate. That the intradermal abortin should prove more specific for a *B. abortus*, Bang, infection past or present, than abortin as prepared by the English Commission or precipitated purified abortin as prepared by Meyer and Hardenbergh is evident from the very nature of the products. Intradermal abortin is a suspension of washed killed *B. abortus*, Bang, freed of all culture media or substances most likely to produce non-specific or pseudo-reaction, while abortin of the English Commission includes not only the products resulting from the growth of the bacillus in the culture media, but the culture media as well. That the media alone may include substances, responsible for non-specific reactions is now unknown. The precipitated purified abortin of Meyer and Hardenbergh includes only the precipitable substances of the "abortin" of English Commission and, therefore, it probably does produce non-specific reactions to a smaller extent than abortin.

The Intradermal Abortin Test is not destined to assist in establishing a diagnosis as far as the individual animal is concerned, but as an aid in determining whether or not the infection actually exists in a herd it is a test for the veterinarian in practice. As much can be said for a positive reaction in the test as a positive reaction in any of the serological tests and when the history of the herd is such as to arouse the suspicion that Bang's Disease may exist then positive reactions with the intradermal abortin test in several animals would show that the suspicion is well founded, whereas uniformly negative results would tend to indicate that the infection was not present. Outside of clinical observations including the history of the herd, and deductions made of material aborted, the veterinarian must rely on the results of tests that include laboratory procedures, the results of which as a rule are very difficult

16. Jour. of Inf. Dis., Vol. 13, No. 3, p. 371, 1914.

to interpret. With much to be desired in the application and interpretation of all of the tests or means at hand to establish a diagnosis, the intradermal abortin test deserves recognition in that it can be made by the veterinarian without assistance. The test can be made while the history of the herd is being completed and studied and material for the bacteriological or serological tests is being collected and forwarded. When the results of the bacteriological or serological tests are available, the results of the intradermal abortin test can be used as additional confirmation and if circumstances prevail where bacteriological or serological tests cannot be made then the intradermal abortin test can serve as an additional means or procedure open to the veterinarian in practice.

PULMONARY STRONGYLOSIS

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The invasion of the lungs (bronchioles, bronchi and tracheae) of domesticated animals by nematode worms of the family Strongylidæ is known by a variety of technical and common names. The parasitologist is inclined to use the term *pulmonary strongylosis*, while the veterinarian, intent on the more explanatory terminology, designates the same as *verminous bronchitis*. The layman, however, habitually uses the homely and expressive term *lungworms*.

The worms causing this disease are thread-worms of the subfamily Metastrongylinae and although they were previously all placed in the one genus, *Strongylus*, they are now divided between the genera *Dictyocaulus* and *Metastrongylus*.

Of the several species now described, but three have come to the authors' attention as of economic importance. *Dictyocaulus filaria* (Rudolphi), commonly referred to as the lungworm of goats and sheep, also reported from calves, deer and camels, is a slender, whitish threadlike worm varying from 2½ to 3 inches in length in the male to three and four inches in the female. *Dictyocaulus viviparus* (Bloch), the common lungworm of calves, also found in deer, sheep and swine, is very similar in appearance to *D. filaria*, but is somewhat more slender and shorter, the male being about an inch and a half in length while the female varies from two to three

and a quarter inches. *Metastrongylus apri* (Gmelin) occurring in swine, rarely in humans (children) is much shorter than either of the foregoing, the male scarcely reaching the length of three-fourths of an inch, while the female rarely exceeds two inches.

Two other species, *Dictyocaulus arnfieldi* (Cobbold), the lung-worm of colts and *Metastrongylus brevivaginalus* (Raillet and Henry) another parasite of swine, are sometimes of economic importance, but occur far less commonly than do the other three species mentioned above.

Lungworms are probably rarely the direct cause of many deaths, however, the economic importance of the disease is quite considerable¹ and lies in the fact that the resistance of infested animals is impaired, causing them to fall an easy prey to other infections. Fatalities directly due to an infestation of lungworms are generally traceable to suffocation, because of the worm knots (clumps of worms) which collect at the lumina of the bronchi and bronchioles. These knots may entirely exclude the air from that portion of the lung supplied by the occluded bronchiole. This closure is aided by the muco-purulent matter always associated with the worms. The affected portions of the lung form ideal media for certain pathogenic organisms, hence broncho-pneumonia is commonly associated with pulmonary strongylosis.

DIAGNOSIS. The infected animals have a dry hacking cough which becomes more and more loose and racking as the disease progresses. They stand or lie with their necks out-stretched. When the animal attempts to inhale there is a convulsive hunching of the flanks. There is usually present a more or less profuse muco-purulent discharge from the nostrils. Diarrhea is generally associated with the infection. The blood becomes thin and watery. As the disease progresses the animals become emaciated and in sheep and goats there is a tendency toward "papery skin". These symptoms, although uniformly present to a greater or less degree are not distinctive enough to insure a correct diagnosis, i. e., other infections may manifest similar symptoms.

It is at times possible to demonstrate the presence of ova or even larvae in the nasal or oral exudate. By holding the animal's

1. Lungworms affecting domesticated animals in California and the chloroform method of treatment. William B. Herms and Stanley B. Freeborn; Proceedings Quarterly Meeting California State Veterinary Medical Association, pp. 6-10, September 13, 1916.

tongue and tickling the larynx with a foreign body sputum may be obtained in which ova or larvae may or may not occur. If evidence is thus secured, the proof is conclusive, but unfortunately these exudates have been found negative in many cases proved to be infected by post mortem examination. Therefore a conclusive diagnosis depends upon post mortem examination. In some cases the worms will be found in the trachea as well as in the bronchi and bronchioles. In the majority of cases the parasites are confined to the smaller air passages.

TREATMENT. The administration of anthelmintics which may be excreted through the lungs has been widely advocated for many years, but has proved only mildly successful owing to the impossibility of giving a sufficient dose to be effective in the air passages. Placing infested animals in rooms filled with the dust and fumes of air-slaked lime or sulphur has been practiced by many stockmen, removing the animals as soon as they are overcome. This practice usually resulted in saving about half of the animals and killing the other half, but the owners reasoned that it were better to save half of the number treated than to lose all of them by the disease.

It was in the hope of determining an anthelmintic which could be applied directly to the air passages and effect a cure without attendant fatalities that a series of experiments was instituted by the Laboratory of Parasitology at the University of California during the autumn of 1914² and carried on for a period of over a year. Various substances, such as turpentine, benzine, ether, and chloroform were administered singly and in combinations, both intratracheally and nasally. Based on these experiments, involving about 250 animals, both goats and calves, it is believed that chloroform (either chemically pure or commercial) administered nasally in doses sufficient to nearly anaesthetize the animal is a valuable and simple method of treatment.

Experiments have shown that although the worms were not killed immediately, death and disintegration of the majority of the parasites takes place a few hours after treatment, when it has been observed that large numbers of the worms may be expelled in the act of coughing and swallowed. It is hardly to be expected that

2. Lungworms; a preliminary report on treatment, with some observations regarding the epidemiology and life history of the parasite. Herms, William B., and Freeborn, Stanley B., University of California, Agr. Exp. Sta. Circular 148, 8 pp. (March, 1916).

one, or for that matter, many treatments would kill all the worms, particularly those located in the deeper collapsed portions of the lungs.

The chloroform is administered nasally (first into one nostril then into the other) by means of an all-glass syringe or a medicine dropper. Chloroform dissolves the lubricant on the piston of the all-metal syringe and destroys the rubber ring of the ordinary veterinary syringe, hence the use of a common medicine dropper.

It is impossible to prescribe an exact dosage for two reasons; (1) animals vary in the amount necessary to anaesthetize them, and (2) the effectiveness of the dose depends on whether the animal at the time of treatment is inhaling or exhaling. With these two factors in mind the authors have consistently hesitated to prescribe an exact dosage, but have recommended that sufficient chloroform be administered to produce "grogginess" with a repetition of the treatment at five or six day intervals until recovery is secured. Where proper care in food and shelter is exercised three injections have been the maximum required in any one case. Dosage varies from one and a half to three cubic centimeters for angora goats and from four to eleven cubic centimeters for calves,—one-half the quantity to each nostril.

Prolonged chloroform anaesthesia is known to produce necrosis of the liver, and for this reason the authors were somewhat hesitant to recommend the above treatment until this complication was shown to be negligible by the absence of fatalities in several hundred cases treated over a period of nearly three years.

It is highly important that infected animals whether under treatment or not should receive sufficient nourishing food easily and be afforded shelter against inclement weather.

LIFE HISTORY OF THE PARASITE. Adequate knowledge of the cycle through which the lungworm passes from egg to adult would almost certainly suggest a clear cut method of prophylaxis. In this we are unfortunately lacking, in that there is a gap in our knowledge relative to the stage immediately following the larva. Where does the larval lungworm disappear to, and how do the worms reach the lungs, and in what stage? To these questions we still have but vague answers.

In the lungs of the infested animal there occur the adult lung-forms, both male and female. The females are ovoviviparous, hence eggs containing well developed active larvae occur here also. Ovi-

gerous females when taken from the lungs at post mortem readily extrude myriads of eggs if placed either in tap water or physiological salt solution. The larvae hatch readily in either within twenty-four hours after extrusion. We have carried on many futile experiments to rear the larvae in various media at various temperatures. Such media as bouillon, normal salt, distilled water and moist earth have been used. In the last named at room temperature larvae lived about three months while in all other media they died in from five to nine and a half days.

Nasal, intratracheal and oral administration of eggs and larvae taken from an infested animal failed to produce an infestation in a healthy animal although the experiment was carried on over a period of about four months.

Eggs can be demonstrated in the contents of the small intestine of an infested animal on post mortem. They may be found throughout the entire length of the small intestine, but are absent in the large intestine and feces. If therefore oral administration of eggs and larvae could cause infection (which by experiment was proved negative) the parasites would seem to penetrate the small intestine and be carried to the lungs in the blood stream. With oral administration of eggs and larvae negative, the natural assumption is that these (eggs and larvae) disintegrate in the small intestine. That the animals must swallow numerous eggs, larvae and even adult worms, brought up from the lungs in the act of coughing seems quite evident.

Epizootics of lung worms are generally associated with pasturage on low, damp ground, or if on highland pastures there is invariably present a swale or poorly constructed watering trough with its attendant muddy pools. In the light of further investigation this condition may be shown to be merely a coincidence, but at present with what knowledge we have, these pools or muddy conditions seem significant.

Because of the negative results obtained by nasal and oral injection of eggs and larvae, it would seem that the parasite must pass a part of its life history, immediately following the newly emerged larva, outside the body of its primary host. It is highly probable that the free living form of the parasite, if this exists, or its intermediary host, if such exists, requires a moist or swampy habitat.

Von Linden¹ claims that the larvae are of two types, one adapted to a free living, weather-resisting existence, capable of initiating an infestation in the lungs of a healthy animal; the other type a parasitic form which remains and grows to maturity in the lungs of the original host, thus adding to the number of mature worms. This theory would fit exceedingly well with the epidemiology if it were not for the fact that the early intermediate forms of her so-called "parasitic type" cannot be demonstrated in the air passages, and furthermore the figures accompanying the article are not characteristic of lungworms coming to our notice, particularly the drawings of the male (Plate II, Fig. 8a), in which there is shown no caudal bursa.

The introduction of lungworms into flocks or herds and the infestation of ranges is evidently accomplished in a variety of ways. In one case a flock of 150 angora goats free from infestation was placed on a range to which wild deer had easy access and which used a certain swampy swale as a watering place. The deer of this locality were on previous occasions shown to be heavily parasitized with *Dictyocaulus filaria*. Four months after the introduction of the goats there occurred a serious epizootic of lungworms with *Dictyocaulus filaria* as the causative parasite, pointing strongly to the deer as the disseminators.

Other epizootics point to older stock as the means of introduction. Animals which recover from an infestation of lungworms in their youth may persist as carriers.

SUMMARY. 1. Pulmonary strongylosis is caused by certain nematode worms present in the air passage of the lungs.

2. Death from pulmonary strongylosis is brought about by direct suffocation, but the economic importance of the disease is greatly enhanced in that an infestation of the parasites paves the way for secondary infections, such as broncho-pneumonia.

3. Where all optimum conditions of food and shelter can be given, an extremely successful method of treatment consists in the administration of chloroform, introduced nasally in sufficient quantities to produce "grogginess"

4. The entire life history of the parasite is not known, hence the epidemiology of the disease is not completely understood and in

1. Von Linden, Gräfin. Untersuchungen über die Entwicklung der freilebenden Generationen der Lungenwürmer. Centralblatt für Bakt., Parasit., und Infekt. Orig. Bd. 76, Nr. 2-3, pp. 147-178 (20 May, 1915).

consequence prophylaxis is rendered uncertain. That the lung-worms, in their developmental stage immediately following the newly hatched larvae are dependent on swampy locations seems evident.

5. Based on circumstantial evidence it seems clear that the disease is readily introduced by adult carriers including wild deer.

VACCINATIONS AGAINST HEMORRHAGIC SEPTICEMIA, No. 2

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In 1891, Brimhall and Wilson¹ proved that the bacillus of hemorrhagic septicemia was the cause of a disease occurring among cattle in Minnesota, which disease they also proved to be identical with the German "Rinderseuche".

In 1902, Ravenel and Gilliland² proved that the disease known as "Mountain Disease of Cattle" or "Carbon County Disease" in Pennsylvania was identical with the hemorrhagic septicemia described by other investigators and in that year outbreaks were reported to have occurred in fourteen different counties.

These last mentioned investigators gave a good description of the symptoms, post-mortem findings, differential diagnosis and outlined a few precautionary measures to be used in its control. They also mentioned that numerous experiments had been made with a view to obtaining a vaccine against the disease and that these had met with a certain amount of success. At that time vaccination had been practiced extensively only in Russia and Italy and no information was available regarding this system of protection in the United States.

Since that time further experiments to produce something in the nature of a serum or vaccine have been made with varying degrees of success.

The work in this country in recent years has possibly been stimulated by the increase in what is commonly termed as "stock-yards pneumonia" developing in steers and cattle, after railway transportation and passage through various stock-yards.

That many cars and public stock-yards are infected, there is probably little doubt and we feel that work by others, and some of the facts mentioned later in this paper, tend to show that this pneumonia is often caused by an organism belonging to the hemorrhagic septicemia group and that the vaccine prepared for hemorrhagic septicemia is of value as a prophylactic agent.

In April 1916³ we gave a report of the work done by this Board for a period of twelve months, December 1914 to January 1916. This work was carried out with a living vaccine, i. e., using forty-eight hour bouillon cultures of *B. bovissepticus* isolated from outbreaks of hemorrhagic septicemia, but with which we had taken no special measures to attenuate. The reasons for using such a product were stated in this contribution. Briefly we may say that we were unable to attenuate our strains in such a manner that standardization on laboratory animals would give us uniform results, also that repeated attempts to isolate strains of *B. bovissepticus* which, when immediately reinjected into calves would reproduce the disease, invariably failed.

That living vaccines, barring certain factors, are better than attenuated vaccines or dead bacterins is obvious and generally conceded.

Kolmer⁴ in discussing living and dead vaccines covers this point nicely as follows:—

“Barring accidents, the employment of a living virus is the most certain way of calling forth a maximum output of anti-bodies. There is at present no satisfactory explanation for this except that heat-labile substances destroyed in the ordinary preparation of bacterial vaccines have antigenic properties (Smith). Living vaccines are also capable of penetrating into deeper tissues, whereas dead vaccines may remain where they are deposited. Similarly living viruses are capable of exerting a continuous action and delivering an infinite number of blows, whereas the injection of a dead virus produces an interrupted action and deals but a single blow. The actual danger of using a living vaccine, as the possibility of its being too virulent and thus producing the disease, or of regaining virulence or producing chronic ‘carriers’, preclude their general employment in human practice.”

In other words, heating, drying, passage through animals, the action of germicides, etc., may destroy some antigenic powers of a vaccine and render it inferior to a living antigen. This is also rec-

ognized in veterinary medicine and because of the reason that the disease may be produced, centers of infection established, or chronic "carriers" set up, bacterial vaccines employed by the profession are almost invariably carefully attenuated or killed.

The first to use a living vaccine was Pasteur in 1879 and his discovery was accidental, for, after an absence from home, he found upon examination of some cultures of fowl cholera that they had become attenuated and that hens would easily withstand the injection of an amount which would previously have caused death.

Mohler and Eichhorn, Holmes, McGowan and Gallagher have all worked with various preparations of organisms belonging to the hemorrhagic septicemia group and their results have added much to our knowledge concerning this disease.

TABLE NO. 1.

Herd No.	No. in Herd	Dead prior to vac.	Sick at time of vac.	No. vac.	Date of vac.	Dead following vac.	New cases 1916	Date of Last Report
1	170	30	3	140	9-14-15	5	0	12-23-16
2	36	2	0	34	9-20-15	0	0	
3	(31 * (74	4 0	0 0	27) *74)	9-21-15	0	0	12- 1-16
4	43	3	0	40	10- 2-15	0	0	12- 1-16
5	36	1	1	34	10- 4-15	0	0	12- 1-16
6	44	0	0	44	10- 4-15	0	0	12- 1-16
7	24	0	0	24	10- 5-15	0	0	12- 1-16
8	19	2	2	17	1- 5-16	0	0	12- 6-16
9	46	1	0	0	Control		0	12- 1-16
10	20	0	1	0	Control		0	12- 1-16
11	18	0	1	0	Control		0	12- 1-16
12	40	7	0	0	Control		2	12- 1-16

*Sheep.

The above table is practically the same as that given in the previous article on this disease covering report for the year 1915. A comparison of these tables will show that we added a column covering new cases reported in these herds during the following year 1916. It will also be noted that not a single death or outbreak occurred among the vaccinated herds during 1916, while herd No. 12, in which seven animals died of hemorrhagic septicemia in 1915, and which was left as a control herd for subsequent outbreaks, showed the infection the following year with the loss of two animals before vaccine was applied. This merely shows that from the herds vaccinated new centers of infection were not established. The dis-

ease might not have recurred if vaccines had not been used. In fact, such was the case in herd No. 9, Table No. 1, although later in this paper history on some of the herds shows new outbreaks, several occurrences two years in succession and others with intervals of two years.

For the year 1916 our work was therefore carried on along the same lines and with a vaccine prepared in exactly the same manner. A total of thirty-one herds was vaccinated as shown in Table No. 2.

TABLE NO. 2.

Herd No.	No. in Herd	Dead prior to vac.	Sick at time of vac.	No. vac.	Date of Vac.	Dead following vac.
1	30	1	2	29	9-13-16	0
2	29	1	4	28	9-13-16	0
3	23	0	0	23	9-13-16	0
4	29	1	3	28	9-14-16	0
5	44	1	1	43	9-21-16	0
6	24	0	3	24	9-22-16	0
7	8	0	2	8	9-23-16	0
8	16	0	1	16	10-24-16	0
9	15	1	1	14	11-17-16	1
10	26	1	1*	24	10- 6-16	0
11	21	0	6	21	11- 3-16	0
	265	6	24	258		1
12	8	0	0	8	6-24-16	0
13	7	0	0	7	6-24-16	0
14	22	1	1	20	6-24-16	0
15	10	1	1	9	8-20-16	1
16	41	3	0	38	10-26-16	1
17	19	1	0	18	10-28-16	0
18	24	6	0	17	7-20-16	0
19	9	0	2	9	8- 3-16	0
20	9	1	0	8	9- 5-16	0
21	16	1	0	15	9-12-16	3
22	9	4	1	5	8- 2-16	0
23	26	4	2	22	8- 3-16	1
24	46	1	1	44	8- 6-16	0
25	50	0	0	50	8-25-16	0
26	108	14	6	94	9- 8-16	10
27	6	2	0	4	9-11-16	0
28	24	4	2	20	9-11-16	5
29	15	1	0	14	9-15-16	0
30	29	5	0	24	9-14-16	0
31	9	4	3	5	9-16-16	0
	487	53	19	431		20

*Not vaccinated.

The first eleven herds vaccinated are what we term "exposed" herds. By that is meant herds into which steers passed through public stock yards during September, October or November and becoming infected, were taken to the farms and mingled with the native cattle. It will be noticed that these exposed herds totaled 265 animals with six deaths prior to vaccination and twenty-four animals sick at the time of vaccination. With one exception all sick animals were given the vaccine and but one death followed its administration. In one case we received a report to the effect that the sick steers had transmitted the disease to one of the native animals. The reports on these eleven herds are not complete in that they do not give a history of the symptoms, physical condition of the animals, development of the disease in the different cases, etc. One unvaccinated steer recovered.

History in connection with herd No. 11 states that eleven steers were purchased in Lancaster after being shipped direct from one of the western stock-yards. Shortly after arrival at the farm six of these animals became sick. Forty-eight hours after vaccination marked improvement was shown and one week from the date of vaccination all had entirely recovered. All the healthy animals remained healthy.

Herds No. 12 to 31 inclusive are native herds in the mountainous districts of Pennsylvania in which the disease appeared during June, July, August, September and October. These herds total 487 animals, fifty-three deaths before vaccination, nineteen animals sick at the time of vaccination and twenty deaths following the vaccination. The table also shows that these twenty deaths occurred in six herds, the largest number, ten, following vaccination of 108 animals in a community pasture of approximately 1,000 acres, in which six of the ninety-four vaccinated were showing clinical symptoms of the disease.

Herd No. 12 was pastured with herd No. 14 in which one yearling was found dead and one sick. The sick animal died three or four days following the vaccination and the autopsy findings showed typical lesions of hemorrhagic septicemia.

Herd No. 13 was pastured in the field adjoining herd No. 14.

Herd No. 15 is shown in Table No. 1 as herd No. 12, the unvaccinated control herd in 1915 which showed a recurrence of the disease in 1916.

In herd No. 16, two animals, which the owner had not noticed as showing any signs of illness some hours previous, suddenly died. They were skinned and opened by the owner but nothing infectious was suspected until some days later when a yearling was found dead in the field. The veterinarian called performed a careful autopsy, found a jelly-like exudate on the right shoulder and along the same side of the neck, small intestines covered with petechial spots. The same condition existed in other sub-serous tissues throughout the abdominal cavity.

In herd No. 17 the disease was first noticed when a yearling died about six hours after being taken sick and diagnosis was based upon characteristic autopsy findings. Herds Nos. 12 to 17 inclusive were all treated by the same veterinarian.

Herd No. 18 was vaccinated following the loss in three days of six young animals about six months of age. The last of these died shortly after being seen by the veterinarian and the autopsy findings corroborated his clinical diagnosis.

Herd No. 19 was given the history of having been pastured in a field of very short grass, one corner being very marshy and the water supply poor.

Herds Nos. 20 and 21 were sporadic outbreaks diagnosed by the same veterinarian following autopsy findings.

Herds Nos. 22 and 23 were both spontaneous outbreaks on mountain pastures showing typical lesions on two autopsies performed.

Herd No. 24 pastured in the field adjoining that in which herd No. 23 was kept and the outbreak developed a few days later.

Herd No. 25 was pastured on fields adjoining those in which herds Nos. 22, 23 and 24 were pastured and the vaccine was used prophylactically with no outbreak following.

Herd No. 25 consisting of 108 animals belonging to seven different owners was kept on a 1,000 acre community pasture, the disease starting among the young stock, of which there were about seventy, and ten animals died before anything was done in the nature of treatment or isolation. The owners then became alarmed and thought that the removal of cattle from the infected pastures would check the losses. A number therefore took their cattle and put them on their home farms with the native herd, with the result that in some instances new cases developed and the disease also spread to the farm animals with several deaths. The trouble was

then reported to one of the State Field Agents who visited one of the farms, performed an autopsy, and established the diagnosis. The table shows that ten animals, six of which were sick when vaccinated died following the vaccination. Inasmuch as one of these animals died between four and five months after the vaccination and was not seen by the veterinarian in charge of the outbreak, some question exists as to whether this loss was due to hemorrhagic septicemia infection.

Herd No. 27 was kept in a pasture where cattle died one year ago showing symptoms of hemorrhagic septicemia but on which no vaccinations were at that time made.

Herd No. 28, the herd in which the second largest number of animals died following the vaccination, was also kept in a pasture where losses occurred the year previous from the same disease and on which autopsies at that time confirmed the diagnosis. Herd not vaccinated in 1915.

Herd No. 29 was pastured in a field where losses occurred three years previous due to the same disease.

Herd No. 30 was on a partly open and partly wooded rough mountain pasture, was handled by a state representative and the diagnosis confirmed by autopsy.

Herd No. 31 was in a pasture and the only history in connection with same is to the effect that this pasture contained a pool of stagnant water from which the animals drank.

DISCUSSION. All of the infected herds have been handled by veterinarians familiar with hemorrhagic septicemia and practically all diagnoses were confirmed by autopsy, some also by laboratory examination. The outbreaks occurred in counties where the disease has been more or less prevalent for years.

Internal medication with various drugs has for many years proven of little value.

During two years, 1915 and 1916, twenty-five native sick animals were vaccinated, twelve recovered and thirteen succumbed to the disease. In 1916, five sick animals not vaccinated recovered. Twenty-two of the twenty-three sick steers vaccinated in 1916 completely recovered.

In sixteen out of twenty-three native infected herds on pasture, the disease was immediately checked without a single further loss. In five of the seven where deaths occurred following vaccina-

tion, animals were sick when vaccinations were made. In the other two herds deaths had occurred prior to vaccination.

One hundred and fifty-six cattle and seventy-four sheep were vaccinated in 1915 on farms which adjoined infected premises with not a single case of the disease reported among same since vaccination.

Ninety (90) per cent of our outbreaks occurred during August, September and October.

The mortality among infected herds prior to vaccination in 1915 and 1916 was twelve and one-half (12.5) per cent.

The mortality among *apparently* healthy animals vaccinated in 1915 and 1916 was one and eight-tenths (1.8) per cent.

The total mortality of apparently healthy and sick animals following vaccination was two and eight-tenths (2.8) per cent.

The difference in mortality prior to and following vaccination was nine and seven-tenths (9.7) per cent (mortality decreased 77.6 per cent).

CONCLUSIONS. A living hemorrhagic septicemia vaccine prepared as described has not in any way proved harmful for our field work. Living vaccines, providing they do not produce the disease—establish new centers of infection or set up chronic “carriers” are obviously better than dead bacterins.

Experiments thus far have failed to give us a standard animal test for this vaccine, other than that it is virulent for rabbits and guinea pigs but not for sheep and calves.

Shipped steers “feeders” which pass through various public stock-yards may develop an infection that they are capable of transmitting to native herd cattle.

Vaccination of these herd cattle and the unaffected steers apparently gives good protection.

Twenty-two (22) recoveries among twenty-three (23) vaccinated steers with but twelve (12) recoveries among twenty-five (25) native cattle on pasture seems to indicate a therapeutic value for the vaccine in chronic cases of hemorrhagic septicemia taking the form of pneumonia. This form is seldom seen on pasture in Pennsylvania, but instead the acute form.

The absence of a single case of hemorrhagic septicemia in herds since 1915 vaccinations may indicate considerable immunity, but the non-appearance of the disease in part of the unvaccinated 1915 control herds left for 1916, detracts from the value of such a deduction.

Death of a few apparently healthy animals within one week following vaccination seems to indicate that sufficient immunity is not developed within that time to protect. The use of an anti-serum simultaneously with the vaccine may eliminate such losses.

This work will be continued until such time as we can prove conclusively some of our deductions.

1. *Am. Vet. Review*, Vol. XXVII (1903-4).
2. *Report Penna. Dept. Agriculture* 1902.
3. *Journal Am. Vet. Med. Assn.*, Vol. XLIX, new series Vol. II, No. 1.
4. Infection, Immunity and Serum Therapy—Kolmer.

CLINICAL AND CASE REPORTS

“Knowledge is born in laboratories and in the experience of the thoughtful. It develops form in the journals and ‘when dead it is decently buried in books’.”

ESOPHAGEAL SPASMS IN COLTS

R. R. BOLTON, Ames, Iowa.

On March 6, 1916, a colt nine months of age, was brought to us for diagnosis and attention. The owner reported that the colt had been acting strangely for about ten days. On several occasions he had been seen lowering his head and discharging from the nostrils and mouth a great mass of saliva. The act was repeated at short intervals, for ten to fifteen minutes, when the colt suddenly recovered and appeared normal.

There seemed to be no regularity as to the occurrence of the attacks. On some days the colt would suffer several seizures, occurring sometimes at intervals of an hour or more and sometimes at intervals of less than an hour.

At other times, two or three days would elapse with only one or two short seizures. The attacks appeared to have no relation to mastication or deglutition. The only additional history available in the case was that the animal had previously shown evidence of severe infestation with selerostomes and ascarides for which we had treated him, using an intravenous injection of atoxyl and following with anthelmintic powders containing tartar emetic and ferrous sulphate.

On examination the following symptoms were in evidence:— R. 20; P. 36; T. 101; colt bright and showed spirit. Cough easily induced by pressure upon first three rings of trachea. A slight bilateral nasal discharge present. Appetite good.

We had the colt brought to the hospital for observation until a diagnosis could be made or until some line of treatment might be indicated.

March 7, 1916. R. 22; P. 34; T. 100.8; general condition unchanged. Passed the stomach tube meeting no obstacles. A number of ascarides were voided with the feces. Withheld food preparatory to administering an anthelmintic.

March 8, 1916. R. 20; P. 36; T. 100.5; general condition remains good. Gave colt one and one-half drams of tartar emetic dissolved in a pail of drinking water in the early morning with instructions to feed him lightly.

March 9, 1916. R. 18; P. 38; T. 101.2; general condition unchanged. Gave an aloetic ball containing aloes four drams, calomel one-half dram, and nux vomica one-half dram. No worms were seen in the feces.

March 10, 1916. R. 22; P. 38; T. 101.4; general condition good. No worms were seen in the feces.

March 11, 1916. The colt appeared perfectly healthy and was discharged from the hospital.

On March 17, 1916, the colt was returned to the hospital with a history that the peculiar attacks as above described were so frequent the animal could neither eat nor drink.

Symptoms: R. 24; P. 60; T. 102.2; some depression. Cough frequent and painful. Bilateral muco-purulent nasal discharge. Offered the colt a pail of water from which he took a few swallows and was then suddenly seized with an attack in which he lowered the head, became very restless and attempted to vomit, giving a low, moist cough and discharging through the nostrils and mouth a quantity of water and saliva.

He began at once to make frequent swallowing movements continuing until the esophagus became filled to the pharynx with saliva. Then he lowered his head, attempted to vomit and expelled the saliva through nostrils and mouth again. The attack lasted for half an hour or more when suddenly the frequent swallowing movements ceased and the colt became quiet and drank water.

March 18, 1916. The groom found the colt anxious for his

morning feed but before he had finished the meal he was seized with another choking attack, which continued the entire forenoon.

We administered immediately on arrival, a hypodermic injection of strychnine sulphate $\frac{1}{4}$ grain, and followed it shortly with another hypodermic injection of arecoline $\frac{1}{4}$ grain. No relief followed the administration.

We then decided to attempt an exploration of the esophagus with the stomach tube, and placed the colt on the operating table for confinement. The tube was passed into the stomach with little difficulty. On removing the tube the colt appeared relieved. After about fifteen minutes with the colt in the same position we attempted to pass the stomach tube a second time. The tube passed to a point about ten inches posterior to the pharynx and could be passed no further. No obstruction or lesion of any kind could be palpated externally. The tube was removed and the colt released from the table. He was restless, and depressed, and made attempts to vomit frequently. We could not relieve him.

On returning to the hospital after the noon hour I found the colt had made a sudden recovery, and on offering him a pail of water he drank without interruption.

Diagnosis: Spasms of the oesophagus.

Treatment: The animal was discharged and instructions were given to feed nothing but soft foods, reduced to a fluid consistency for a period of a month or so. This was done for about six weeks or more when the animal was turned out to pasture. A complete recovery had resulted.

Within the past six weeks the same owner has reported the occurrence of similar attacks in another seven months old colt, a full brother to the colt described above.

Discussion: The occurrence of oesophageal spasm in animals is very rare. Veterinary literature contains the reports of only a few cases. Various factors are mentioned as primary causes such as: stricture or dilatation of the oesophagus; ulcers of oesophageal mucosa; draughts of cold water; larvae of *Gastrophilus equi* attached to oesophageal mucosa above the cardia; hereditary family trait in animals of specially nervous temperament; and neuropathologic conditions.

Aside from the fact that the two animals here reported were known to be infested with *Ascaris* and *Sclerostome* the occurrence of the malady in two colts which are full brothers in a herd of

twenty-one young colts suggests the possibility of it being an hereditary family trait.

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PERITONEAL ASCITES WITH HYDROCEPHALIC FOETUS IN A MARE

F. A. WALTER, Lemont, Ill.

Upon receiving a hurry up call, and upon questioning my client, he informed me that the mare had been suffering about a week and that her suffering had been caused through the foolishness of a hired hand trying to lift her off her feet. The weight of the mare was 1700 pounds. No doubt he caused a rupture of the



abdomen. Upon examination I found the abdomen greatly distended and full of fluid.

I immediately made a vaginal examination and found a dead foetus but could not make a delivery on account of the great quantity of fluid.

I inserted a trocar and several gallons of fluid escaped. After the escape of the great quantity of fluid I succeeded in removing the foetus and the mare is doing nicely with no after effects.

A LARGE TUMOR*

X

The following is a picture of a case presented at the Iowa State College, Veterinary Department, Ames, Iowa in the spring of 1901. A Percheron stallion, history indefinite, with tumor on anterior portion of prepuce. When removed it weighed about 56



pounds. Dr. J. H. McNeil successfully removed this growth by amputating the penis superior to it.

*Although occurring a number of years ago, this report was but recently received. As it has not hitherto been published we believe it will be of some interest to our readers.

URINARY CALCULI

JAMES A. WAUGH, V.S., D.V.M., Pittsburgh, Pa.

Subject: large draft bay mare, purchased to work for Thorn Hill Industrial School for Boys, a public institution in Allegheny County, Pa. Mare later proved in foal and dropped and raised a mare colt.

History: it was later observed this mare experienced diffi-

culty in retaining urine, and it was voided involuntarily and soiled the hind limbs and caused extensive dermatitis. I was called two years later to see the case. Examination revealed much urinary calculi about the consistence and color of coarse river sand and lodged in the vagina, urethra and bladder. Urethra dilated and indurated and hypertrophied; bladder examined through rectum and found indurated, contracted and capacity reduced.

Diagnosis: chronic urinary calculi

Prognosis: unfavorable, but advised treatment.

Treatment: administered three pounds of Parke, Davis and Co.'s uretone in medicinal doses for a period of three months. Washed bladder and vagina with warm boracic acid lotion once



daily and patient ran at large in pasture. Tail was bobbed and an antiseptic and astringent ointment was used to relieve the dermatitis. The photograph shows improved condition following the treatment. The management decided three months later to have the animal destroyed. I did not have any opportunity to make any post mortem observations. I met, on my first visit, an expert who was sent out by the firm who installed the plumbing system, and he informed me that they were having trouble with stoppages in the water pipes due to an excess of lime salts in the water, and they would have to use alum or copper in the main reservoir to overcome that condition. The mare would undoubtedly have done better if we could have removed her to some more favorable locality with

river water. I believe this condition is rare in horses and mules but our authors mention it as quite common in cattle and sheep in certain districts. I have only seen and recorded one case in the dog. The calculi specimens collected from this case were sent to the Veterinary School of University of Pennsylvania.

“INFECTIOUS STOMATITIS”

P. E. JOHNSON, Pierre, South Dakota.

The following is a description of the recent outbreak of stomatitis as it was found among the range stock of South Dakota, and the methods used in controlling same. There were one thousand head of horses and cattle affected.

Judging from the description of this disease as found in other states, and also the way it affected the range stock, it may take either a very mild or a severe course, both in regard to its contagiousness, and the way it attacks the animals.

During the latter part of November, the disease was first recognized in a feed and livery barn in Fort Pierre. Five horses were shipped in from Sioux City, and were placed in this barn; as was afterwards learned, these horses were exposed to the disease in the Sioux City horse and mule barns; one of the horses showed the disease in one day after being shipped in. The symptoms as they appeared in the first horse were not alarming to the livery man, as he thought the horse might have received some irritating medicine which acted as a blister, and thus produced the slobbering which was seen. On the following day, as it showed up in several of the other horses, it induced him to notify the State Veterinarian, Dr. J. E. Phelps. As he examined these horses, he diagnosed the disease as, “Infectious Stomatitis”, and placed the stock in the barns and yard under quarantine, it now being noticeable in several of the cows and among more of the horses.

On the same day, immediately preceding the quarantine, and also on the two previous days, there were thirty-five different ranchmen from the various parts of the county, that had stabled and fed their teams and saddle horses in the barn, and were thus exposed, but had removed their horses before the quarantine was placed on the barn. From ninety to ninety-five per cent of the exposed animals developed the disease. It was found that all the

horses that were shipped in developed the disease except one, and only five out of a total of forty, in the barn and yards, escaped from the disease. Among the first animals it spread more rapidly than it did later, and it affected the first animals in a herd more severely than the ones that developed it later.

The disease develops in from three to five days after exposure, and is recognized by the animals refusing to eat and showing a great deal of slobbering. They generally have a rise of temperature of from two to three degrees, and also show some lassitude. The lesions are found mostly on the lips and the dental pad of the cattle, and on the tongue and the sides of the mouth in the horses. In some of the horses the whole upper surface of the tongue was entirely raw, and there was an odor of necrosis, especially in the neglected cases. In some, where the tongue was not already raw, it was easily made so, by a little curetting.

In order for the disease to spread the animals must come in direct contact with the infection. Perhaps the greatest source of infection is the infected hay, made so by the saliva from the infected animals dribbling on the hay. It is a question whether or not some of the infection was not spread by the owners, by palpating the lesions of the infected animals and then examining their healthy animals. The period that an infected animal will spread the infection will probably not be over one week, depending upon the severity of the attack.

The loss in life of live stock, as a direct result of this disease has been practically nil. The animals are left in a run-down condition from the attack and therefore are more subject to the prey of other diseases as well as the severe storms.

The Bureau of Animal Industry furnished three men part of the time in investigating the disease and the state of South Dakota furnished one other deputy besides the writer, and in addition the State Veterinarian kept in close touch with the condition. There were thus six veterinarians on this work part of the time, and one other deputy and the writer were quite steadily employed in investigating and doing quarantine work for two months.

The treatment that has been carried out consists in quarantining the exposed stock, separating the affected from the non-infected, and washing the mouths of the affected animals with a solution of permanganate of potash once daily. In the very severe cases the lesions were curetted and tincture of iodine applied once.

ABSTRACTS FROM RECENT LITERATURE

INFESTATION OF A YOUNG DOG THROUGH SUCKLING. TRYPANOSOMIASSES OF HORSES IN MOROCCO. Velu and Eyraud. *Bulletin de la Société de Pathologie Exotique*, Vol. 9, pp. 567-568, 1916. The researches of Mattan-LARRIER have demonstrated that *Schizotrypanum Cruzi* passes constantly into the milk of infested females: while the trypanosome of *dourine* may only exceptionally be found in the lacteal secretion. Those of Lanfranchi have shown that animals infested with the virus *brucci* and *gambicense* may infest the newly born through the milk.

During the course of an investigation on the trypanosomiasSES of horses in Morocco, we have ascertained a similar fact: a bitch infested with the virus *marocain* transmitted the malady to one of her offspring.

A bitch in advanced pregnancy was brought in, in the beginning of March 1916. Parturition, March 8. On the 13th she received subcutaneously, 20 c.c. of the blood of a goat infested with the trypanosome of horses in Morocco. She gave a first thermal reaction March 16, but the parasites did not appear in the peripheral circulation until the 27th, disappearing the next day: they were again found in large numbers from April 21-26 and May 3-18, the date of death.

The puppies were separated from the bitch March 22; at that time she no longer reacted. Two of the puppies came no more in contact with her; they grew normally until May 15; one of these then seemed undeveloped, became apathetic, somnolent, then emaciated with progressive enfeeblement, continually lying down. June 10, ocular troubles appeared: conjunctivitis: then keratitis. He was brought to us June 14: we immediately thought of trypanosomiasSES; the blood examination was positive. The trypanosomes were few; plentiful on the 17th; numerous on the 21st; very numerous beginning with June 23. Temperature constantly between 39° and 40° from the 14th to the 23d. The dog died of hypothermia on the 25th, temperature 35.8. At death he weighed 4850 grammes; the spleen weighed 135 grammes. BERG.

DISINFECTING IMPORTED HIDES. Public Health Notes. *American Jour. of Public Health*, Vol. VI, No. 12, p. 1358. December 1916. — Effective January 1, new rules and regulations have been issued by the treasury department and the department of agri-

culture directed toward the exclusion of anthrax carried in imported hides: also against foot-and-mouth disease and rinderpest. Hides from countries not shown by the United States consular agents or official veterinary or sanitary inspectors of the countries to be free from anthrax, if such hides are to be admitted on certificate, must be certified to have been immersed in 1:1,000 solution of mercuric chloride for twenty-four hours instead of thirty minutes, as under the present regulations. Hides in bales, unaccompanied by certificate of freedom from anthrax, rinderpest or foot-and-mouth disease, or by certificate of disinfection, will be admitted if such bales have been whitewashed under United States consular supervision and the importers agree to ship them in custom-sealed cars to a tannery provided with adequate facilities for disinfection, and to disinfect them in accordance with the requirements of the Bureau of Animal Industry under the supervision of an agent of the bureau. Sun-dried hides from countries certified to be free from anthrax will be admitted without disinfection."—*Journal of the American Medical Association*, Nov. 18, 1916.

REICHEL.

PHENICATED AND GUALACOL THERAPEUTICS. Mr. Poret. *Rec. de Med. Vet.*—If there are new medicines not introduced in veterinary practice, the use made by Veterinary Major Poret is probably new and certainly the results that he has obtained are deserving of notice. He has resorted to intravenous injections of a solution of phenic acid and of guaiacol in the treatment of distemper, of anasarca and contagious pneumonia. He gives the concise records of a few of the cases where he has employed this therapy.

A case of well marked anasarca was relieved in five days, after receiving the first day, 440 grammes of phenicated water at 15% in the morning, and 250 in the evening. On the second day 500 grammes in the morning, 800 in the evening and on the third day 500 grammes once only. Caffeine followed for two days and complete recovery on the fifth.

Another case of anasarca received somewhat the same treatment and was cured in seven days. With him the injections of phenic solution were 160-350 grammes the first day, 500 the second, none on the third, 480 on the fourth, 500 on the fifth and 300 on the sixth. Full convalescence in seven days.

With guaiacol, Major Poret has treated a number of cases of pneumonia. Besides the application of mustard, and of abscesses of fixation and according to indications of camphorated ether subcutaneously injected or of caffeine, doses of guaiacol water at 10% have been administered varying between 200 and 420 grammes and recoveries have been obtained in an exceedingly short time, in 8-16 days and even less. One case of purulent pneumonia is recorded as the only one that proved fatal. LIAUTARD.

A COMPARISON OF THE "DEFIBRATION" AND "OXALATE" METHODS OF SERUM PREPARATION AS APPLIED TO HEMORRHAGIC SEPTICEMIA AND ANTHRAX SERA TOGETHER WITH SOME ANALYSES OF BUFFALO AND HILL BULL BLOOD. Roland V. Norris. *Bulletin No. 60*, 1916, Agricultural Research Institute, Pusa, India.—The defibrination method shows great simplicity and rapidity. The blood is drawn into bottles containing a coil of copper wire and defibrinated. There is considerable deposit and the color becomes extremely dark on standing. Ten c.c. of 10% potassium oxalate solution are mixed with each litre of blood in the oxalate method. The corpuscles settle, in the case of buffaloes, in a few hours. An amount of plasma equal to 50% of the blood can be siphoned off. The residue in the bottle being centrifuged another 10 to 15% of plasma is obtained. The corpuscles settle with extreme difficulty and the whole blood has to be centrifuged in the case of the hill bulls. The clear oxalated plasma is clotted by adding 10 c.c. of a 12% calcium chloride solution to each litre of plasma. A tough white clot forms. The serum obtained by this process is greater in quantity, relatively clear, does not show so much precipitation when carbolized as does the defibrinated material. It does not darken in color so rapidly. For the determinations three bleedings were taken, all being at the rate of 6 c.c. per pound body weight and with an interval of four days between each bleeding. The amount of serum increases with each bleeding. This is true in both hemorrhagic and anthrax bleedings. The oxalate method yielded an amount of serum equal to 90% of the plasma. The oxalate method saves 50% of the centrifuge work and makes for a considerable saving in expense.

Buffalo and hill bull blood were analyzed to determine why the corpuscles in the hill bull blood did not settle. The serum of the hill bull contains a considerably larger percentage of globu-

lins than does that from buffaloes. Such a difference is very likely to have a pronounced influence on the physical properties of the blood. The use of the buffalo in the preparation of serum for hemorrhagic septicemia and anthrax is considered to be more expedient and economical.

HAYDEN.

A CONTRIBUTION TO THE STUDY OF THE TREATMENT WITH SUGAR OF SURGICAL INJURIES OF THE FOOT IN HORSES. Bimbi Paolo. *Il Moderno Zoiatro*, Vth Series, Vth Year, No. 4, pp. 109-114. Bologna, Abst. copied from *International Rev. of the Science and Practice of Agric.*, Year VII, No. 8, August 1916, p. 1129. A description of several cases of foot injury which the writer treated with sugar. His observations agree with those of Prof. Bussano, as regards the absorbent, antiseptic, cicatrising and cleansing powers of sugar. They also prove that sugar possesses the property of promoting the formation both of the soft tissue of the foot and of the horny tissue. As regards this latter property, sugar exceeds all substances in common use hitherto in the treatment of surgical injuries of the foot (Socin's powder and paste, naphthaline, carbolic oil, etc.).

M. J. HARKINS.

SUBCUTANEOUS SARCOMA. George Yates, F.R.C.V.S. *Veterinary Record*.—An aged terrier had a number of minute elevations covering almost the whole surface of the skin, somewhat resembling urticaria. He also had enlargement of the left eye ball, which later on had to be removed, on account of the pain accompanying its presence and of its unsightly appearance. The animal, notwithstanding proper treatment and excellent nursing, became much emaciated, the cutaneous swellings increased in size and number and some of them ulcerated. One of these was excised and examined microscopically to establish its nature. This was pronounced a sarcoma. The history of the dog was that during the first three months he did not suffer in condition, but vomited occasionally. Later he became greatly prostrated. The growths were present by the hundreds and some of them on section were soft, watery and colorless.

LIAUTARD.

RABIES. Apropos of an order for the permanent police, dated July 20, 1916; on the movements of dogs. O. Lebrun. *Recueil de Médecine Vétérinaire*, Vol. 92, pp. 311-314, 1916. Under date of

June 29, 1916, the Minister of Agriculture forwarded instructions to the chiefs of departments concerning rabies, outbreaks of which have been noted by the sanitary service. The alarming extension of this malady in France, the very numerous and grave accidents make necessary the application of rigorous and permanent legal measures aiming at its total and final extinction.

Accompanying the instructions was a copy of the order to the chiefs, copies of which had been forwarded to the veterinary agents of the sanitary service. It was the evident intention of the Minister of Agriculture to make uniform, for all France, the measures taken to eradicate rabies.

On looking over these documents several questions have arisen in my mind, about which I would like to address the society.

The law of June 21, 1898 of the "Code rural" reads:

Article 16. The mayors . . . order that stray dogs and all those found on public roads and in fields, not provided with a collar bearing the name and address of the owner, shall be taken to the pound and destroyed after 48 hours if not claimed or if the owner remains unknown. The delay is extended to 8 days for dogs with collars or carrying the marks of their masters.

On the contrary, the permanent police order provides:

Article 2.—That dogs found on the public roads not provided with the required identification collars or tags; and stray dogs that do or do not carry a collar or tag, whose owners are not known in the locality, shall be seized and destroyed without delay.

Lebrun points out the obvious difficulties created by the contradictory character of the terms of the two laws. The first requires that dogs be held from 48 hours to 8 days before destruction; the second calls for the immediate destruction of all stray dogs, with or without collars; and the destruction of all dogs whose owners are not known in the immediate neighborhood.

In the law of June 21, 1898, there is the following:

Article 38.—Dogs and cats suspected of rabies must be immediately destroyed; the owner of the suspected animal is required, even in the absence of an order from the agents of the administration, to comply with the provisions of this order.

According to the decree of October 6, 1904:

Article 12.—Dogs and cats that have been bitten or molested by a rabid dog, or have been in contact with him, shall be immediately destroyed in conformity with Art. 38 of the Rural Code.

What says the order of the Permanent Police?

Article 3.—Dogs and cats bitten or molested by a rabid animal, or having been in contact with him, shall be immediately destroyed. The destruction may be deferred only if he has bitten persons or other animals; in this case he is placed under the surveillance of the sanitary service and destroyed after a period of observation judged to be sufficiently long.

The restriction contained in this article, on the execution of the measures of the sanitary law, seem to be absolutely valueless, because illegal. It has given rise to many disputes, because of the great difficulty of enforcing the sanitary measures against rabies.

The owner of a dog or cat that was bitten by a rabid animal can always arrange to prove that his animal bit another and in this way, prevent the immediate destruction of his animal. If need be, an obliging friend might state that the animal in question bit him, because he is not obliged to take the anti-rabies treatment.

No provision is made in the order, as to how long the period of quarantine shall be; under whose surveillance, etc. Apparently the new order does not supersede the older law. In the discussion which followed Moussu said that the contradiction in terms was most regrettable, and under the conditions, those who are charged with the enforcement of the law may become liable or extremely uncomfortable.

(Note by Abstractor.—The spread of rabies in France, together with the confusion above described, tend to confirm certain suspicions entertained by General Sherman regarding the nature of war. See the next abstract.)

BERG.

RABIES. Rouayx and Leclainche. *Recueil de Médecine Vétérinaire*, Vol. 92, pp. 328-333, 1916.—Dr. Moussu—Gentlemen: Apropos of Dr. Lebrun's communication read at the last meeting, I have received a letter from Dr. Rouayx, pertaining to rabies and the sanitary police.

With Dr. Lebrun, Dr. Rouayx regrets that there are such contradictions between the various official documents, which renders difficult, any intervention on the part of the officials charged with the enforcement of the law. With regard to the method of killing, he prefers poisoning.

Dr. Leclainche.—In a paper presented at the previous meeting, Dr. Lebrun, veterinarian at Percy, has seen fit to vigorously criti-

cise the measures aimed at the eradication of rabies, contained in a recent circular of the Minister of Agriculture.

Dr. Leclainche discussed the old and the new regulations in detail and attempted to show that they are not incompatible, and the proposed measures are legal. He stated that the veterinarian was not charged with the enforcement of the law under consideration and his responsibility should not be involved in any such cases. His contentions are not convincing to the abstractor. He closed his discussion after stating the utter fallacy of destroying a suspected animal immediately after it was caught: that the law did not contemplate this: in no case should the suspected animal be destroyed immediately, but be kept under observation from 8 to 10 days.

BERG.

AN UNEXPECTED FOREIGN BODY. L. W. Wymm Lloyd, M.R.C.V.S. *Veterinary News*.—The history of an army horse suffering from an ordinary attack of strangles, which during convalescence had an abscess formed at the inferior part of the neck close to the breast. It was a deep seated abscess, which was opened with much care and as free hemorrhage accompanied the operation and the vessels were too deeply situated to be secured with artery forceps and ligated, the cavity was plugged with carbolized tow with directions to remove it the following day before attending to the care of the abscess. The case seemed to be doing well, until three weeks after, with the exception of a small opening remaining of the former abscess. There was also another hard swelling which had made its appearance. This was freely opened, and the finger introduced into the cavity came in contact with a hard body in its lower part. This, when extracted, proved to be a hard lump of tow which had become encapsulated. After its removal it was found that the original plugging had been overlooked and left in the first abscess. After removal the healing process progressed in a satisfactory manner.

LIAUTARD.

HYDROPHOBIA IN ALASKAN FOXES. *Public Health Notes, American Jour. of Public Health*, Vol. VI, No. 12, December 1916, p. 1352. The fallacy that rabies is solely a hot weather disease is well disproven by the following incident, which was originally published in *The Military Surgeon*, and reprinted in the *Medical Record* of November 4th:

“Captain Fernebaugh, United States Army, mentions the fact that so-called crazy foxes were seen in the Yukon Delta region in the spring of 1915. With mouths hanging open and dripping with foam they would approach settlements and try to bite the dogs. Demented, stiff, and emaciated, they were easily killed. Nevertheless, five dogs were bitten and succumbed to rabies. In the interior of Alaska the disease seems to have been unknown until 1914, when a man died of the disease three weeks after the bite of an Esquimaux dog. During the crazy fox episode a soldier was bitten by one of the infected dogs. He was hurried to San Francisco, took the Pasteur cure and has since remained well. The Esquimaux have in general regarded the craziness of the fox as the result of starvation. But any naturally shy animal which, unprovoked, attacks men and dogs is best regarded as rabid.” REICHEL.

PELVIC FRACTURE. Harold C. Driver. *Veterinary Record*. A four year old retriever had been lame for five days. The day his condition was detected, he was running about the field chasing rabbits and jumping over fences. When walking slowly he seemed to be lame in both hips. Standing he held one leg in front of the other, with hock extended and the foot pointing downwards. On manipulation no bones of either leg seemed to be broken. There was no pain in handling the hip joint, but in manipulating the pelvis the dog manifested great pain, especially about the perineum. Occasionally there appeared to be a distinct crepitation. A diagnosis of fracture of the pelvis with favorable prognosis was given, providing great quietness was enforced. After seven weeks the recovery of the dog was perfect. LIAUTARD.

AUTOPYOTHERAPY IN VETERINARY MEDICINE. Belin. *Recueil de Médecine Vétérinaire*, Vol. 92, pp. 346-350, 1916. In the beginning of the campaign I attempted to treat at the front, persistently suppurating wounds of horses, using pus that had been treated with ether long enough to destroy microorganisms, then diluted with boiled water and injected subcutaneously. But it is extremely difficult to efficiently protect wounds on animals in the field; they are incessantly re-infected and I was forced to abandon this procedure.

However, I thought of repeating this vaccinothrapy, when, a few months ago, I came across two horses affected with small ab-

cesses around old sores, and which could not be made to heal by the usual treatment.

Case 1. A horse with a very severe wound on the withers. When he was first presented, the wound was almost closed, there was slight suppuration. There were numerous small abscesses disseminated about the affected region; the lymph channels were involved. Puncture permitted the escape of a creamy pus. The usual treatment with powdered potassium permanganate was given, but healing was slow; each day new abscesses appeared further removed from the initial sore.

The general condition of the subject was good; mallein test negative: it was probably a case of epizootic lymphangitis. I then decided to treat with an autopyovaccine. After treating the abscess to be punctured, with tincture of iodine, 4 c.c. of pus were obtained, transferred to a sterile (boiled) flask: 10 c.c. of ether are gradually added and continually agitated. Let stand for 12 hours, with frequent shaking. Then add 5 c.c. of boiled and cooled water; an almost homogeneous mass is thus obtained.

Each day for 6 days the horse received an injection, under the skin of the neck, of 1 c.c. of the vaccine. The horse made a nice recovery, the abscesses disappeared.

This vaccinotherapy at first aggravates the conditions treated, but is soon followed by improvement. These are the negative and positive phases that are well known in such treatments.

Case 2. A horse had been wounded by a shell, between the external angle of the ilium and the sacrum. There resulted a large depression in the bottom of which there was a persistent, non-cicatrizing superficial sore. There was abscess formation as in the preceding case. The horse was treated with an autopyovaccine as before, with good results, but the final outcome cannot be stated because of the frequent shifting of the animal.

Conclusions.—Autopyotherapy deserves a place in veterinary therapeutics. The preparation of the vaccine, as I have indicated, is extremely simple, it can be easily prepared by the veterinarian without laboratory aid, it demands but a few elementary aseptic precautions. The injections should be made every day, for 6 to 10 days.

Rapid healing cannot always be obtained: one should not hesitate in making a second or third series of vaccinations, allowing an interval of 8 to 10 days between each series. The vaccine is

absolutely inalterable because of the ether present. Tightly stoppered flasks must be used to prevent its evaporation.

BERG.

A FISH HOOK, A DOG AND RADIOGRAPHY. L. W. Wymm Lloyd, M.R.C.V.S. *Veterinary News*.—A dachs-hound accompanied its owner on a fishing excursion. He seized the bait, including the hook. The owner tried to pull it out, the line broke off and the result was that the dog swallowed the hook. The policy of *wait and see* was declined by the owner, a radiograph was taken, the location of the hook was made out. A dose of H. M. C. (Hyoscine hydrobrom gr. 1/10, Morphine hydrobrom gr. 1/4 and Caetin gr. 1 64) was administered and repeated after 45 minutes. The excitation was such that chloroform was then given with great care. All of a sudden, the dog collapsed and respiration ceased, but with artificial respiration the dog revived. After the period of excitation with violent barking, it was decided not to go on with the operation but to wait and see. After a month nothing having been observed, it was concluded that the hook had not been swallowed, but the experience with the H. M. C. was a good lesson.

LIAUTARD.

SPONTANEOUS AMEBIC DYSENTERY IN MONKEYS. Eichhorn and Gallagher. *Journal of Infectious Diseases*, Vol. 19, Sept. 1916.—This report is of an outbreak of a disease in monkeys in which the lesions and protozoal organisms resembled those found in human tropical dysentery. There appears to be no record of a similar case. The disease was probably introduced by one or more imported monkeys kept in the same cage with healthy ones. Such animals are considered as possible carriers of the disease to human beings. In the outbreak 8 animals out of a total of 15 exposed died, and of 7 showing symptoms only 1 recovered. The character of the lesions is so specific that the organisms there found are thought to be the important, if not the only, etiologic factor in the pathologic process.

The species of the amebas was not determined. The ameboid forms were especially numerous in liver abscesses, and could also be readily found in intestinal matter where the encysted forms were most numerous. Those from the liver abscesses and intestinal exudate were most motile. Those found in the feces were less motile, where the encysting forms probably represented a later stage of the life cycle.

The monkeys involved were received at the National Zoological Park at various times from July until December, 1915. One received October 26 was ill and probably carried the infection. Since the date of the introduction of the disease is uncertain, the period of incubation cannot be defined. Transmission experiments upon cats were negative and suggest that the parasite is specific for the spider monkey. Detailed symptoms, gross lesions, histology, and case reports are given. A severe diarrhea was the principal symptom. Cecum, colon, and to a less degree the rectum, showed the pathologic changes. Liver abscesses were present in two cases.

HAYDEN.

MELANO-SARCOMA IN THE DOG. H. R. Seddon, B.Vs. *Veterinary Journal*. An Irish terrier had eczema and had been treated for such for several years, but had never presented pigmented warts nor subcutaneous growths. He was brought to the author in a semicomatose condition and was found dead the next day in his kennel. The post mortem was interesting as it revealed a condition of melano-sarcoma with metastasis in the lungs, spleen and other organs, which is commonly associated in Victoria (Australia) with primary ulcerations of the skin and the presence of a varying number of pigmented cutaneous warts. In this dog, the abdomen presented numerous pigmented nodules in the mesentery and omentum. The kidneys were enlarged and also had nodules. There were some in the spleen but the liver though congested was free from new formation. The lungs had black nodules on their surface and in the parenchyma. The pericardium and the endocardium showed some also. They were present on the right costal pleura and on the anterior face of the diaphragm. The histological study of the nodules revealed that their nature was that of a melano-sarcoma.

LIAUTARD.

REPORT OF ACTINOMYCOSIS (HUMAN). N. O. Ramstead, Bismark, N. D. *Journal-Lancet*, Minneapolis, Dec. 15, 1916, XXXVI, No. 24, p. 732. *Abstract Jour. A.M.A.*, Vol. LXVIII, No. 1, Jan. 6, 1917, p. 67.—The best treatment of actinomycosis in Ramstead's hands has consisted in the removal of the primary focus, and as much of the infected tissue as possible, with prolonged free drainage. Internally iodids were given to the point of saturation, and of late he has given copper sulphate internally and uses a solution of it for the daily dressing of the wounds. The effect of the iodids is increased by giving them intermittently.

REICHEL.

ASSOCIATION MEETINGS

AMERICAN VETERINARY MEDICAL ASSOCIATION

REPORT OF COMMITTEE ON DISEASES

J. R. MOHLER, Washington, D. C.

Of the various problems now confronting the people of this country, the problem of national preparedness stands paramount. To the lay mind such preparedness refers to the naval and military equipment and armament, but to the veterinary profession preparedness means the health and physical condition of our live stock and the healthfulness and wholesomeness of our animal food products. As guardians of the health of live stock and of the purity of their food products, it is fitting for the members of this association to receive from the committee on diseases at this time a brief statement regarding some of the more important infections which threaten our live stock industry.

HEMORRHAGIC SEPTICEMIA. During the fall of 1915 and the spring of 1916 there was an unusual number of outbreaks of hemorrhagic septicemia in the central and northwestern states.

Reports were received from various state sanitary authorities, local veterinary practitioners and others calling attention to a disease that appeared among cattle in public stock markets or in shipments that had recently been handled through public stock yards, and it was believed that the infection was picked up in the stock yards or from cars in which the animals were transported.

The disease was variously designated under the name "stock-yard fever," "shipping fever," "contagious pneumonia" and "hemorrhagic septicemia." It was quite contagious, for frequently native cattle would become affected within a week after coming in contact with other animals that had contracted the disease from stock-yard exposure. In some instances native cattle appeared to become affected from contact, although the owners failed to detect any visible symptoms of disease in the cattle that had recently come from the stock yards.

It was evident from the reports of sporadic outbreaks in districts remote from trading centers that the infection was not confined to animals that had been exposed in public stock yards. There were no indications that the infection was confined to any particular district or stock yards, but there appeared to be more outbreaks

among animals handled through the northern live-stock markets and the territory immediately tributary to the Mississippi and Missouri river markets than in the eastern and southern states.

Post-mortems were held in various parts of the country on animals affected with the disease, and bacteriological examinations, including animal inoculations, were made of many pathological specimens obtained from sporadic outbreaks and from outbreaks attributed to stock-yards infection in 14 different states. The findings showed the disease to be hemorrhagic septicemia, caused by the *Bacillus borisopticus*. In several instances infected cattle have transmitted the disease to sheep upon the farms to which they were shipped, and in one instance a colt that was running with diseased sheep became infected.

This disease has been recognized in this country for the past twenty years, and every year there have been some outbreaks, but the losses have been unusually large during the past year. The large number of outbreaks during the last fall and spring seasons and the increase in mortality in north central and northwestern states attracted so much attention that the sanitary authorities of certain states were seriously considering the advisability of applying protective quarantine measures against cattle from public stock yards.

During the foot-and-mouth disease outbreak of 1914 and 1915 rigid sanitary measures were enforced in regard to the cleaning and disinfection of public stock yards and the cars used for transporting live stock. Relaxation in these requirements with the eradication of the disease was marked by an increase in the number of outbreaks of hemorrhagic septicemia.

All cattle are susceptible to the disease regardless of age and condition, but young animals are naturally more susceptible than mature animals. Cows whose vitality has been lowered by heavy milking and exposure from shipping and yarding during cold and stormy weather prove quite susceptible, and the dealers in this class of animals have suffered considerable losses during the past year.

The most fatal outbreaks of the disease occurred among stocker cattle that were thin and not well nourished. Their physical condition and their exposure during shipping and handling in severe winter climate rendered them especially susceptible, and the pulmonary form of the disease, which is very fatal, predominated. It

was customary at one of the northern markets to stable stocker and dairy cattle at night. They were crowded into long, low, poorly ventilated sheds, and early the following morning they were driven out and exposed for sale in open pens where the snow and slush was knee-deep. If they were not sold that day they would be returned to the sheds at night. More outbreaks of hemorrhagic septicemia were reported among animals from this market than any other, and it was noted that in nearly every instance the outbreaks occurred among cattle that had been stabled in those faulty quarters. These sheds are being replaced by new sanitary shelters with the view of preventing recurrences of the disease.

Furthermore, in two of the largest cattle markets in the central west conclusive evidence has been produced to show that infection is more prevalent in the pens of firms handling speculator animals. Post-mortem condemnations at abattoirs in these cities show lesions of hemorrhagic septicemia in calves and cattle which are kept for 7 to 10 days in such pens prior to being sold, whereas calves and cattle which go through the yard in the regular channels and are slaughtered within 3 or 4 days after entering the yards have not revealed any of these lesions on post-mortem. As a result of these findings the inspectors in charge at these points have been directed to have these infected pens cleaned and disinfected in order to avoid further losses from the infection.

Considering the number of animals that are handled through the public stock yards of this country, the mortality from hemorrhagic septicemia is not alarming, although in several instances losses from death were reported amounting to 50 per cent of the herd. The loss from this disease usually ranges from 2 to 20 per cent of the herd, although the mortality among affected animals is from 75 to 90 per cent.

As the disease is so acute and rapidly fatal, medicinal treatment is of little value, and veterinarians must therefore resort to necessary precautions to avoid losses.

Plenty of good water, good feed and good care during shipping and yarding will help to maintain the strength and the resistance of the animals against disease and thus obviate losses.

Since the publication of Mohler and Eichhorn on the immunization against this disease by the use of bacterins, these products have been employed to a greater or less extent in the control of hemorrhagic septicemia, but their use has been confined principal-

ly to herds in which the disease had already appeared. As the outbreaks in untreated herds usually terminate abruptly with losses varying from 2 to 20 per cent, the value of the preventive treatment is not yet definitely known; but from analogy and from the results obtained in the field there is every reason to believe this preventive treatment with bacterins is effective.

HOG CHOLERA. During the past year there has been no more interesting event in the domain of veterinary research than the claim made by Dr. Duval of Tulane University before the Committee on Agriculture of the United States House of Representatives that he and his co-worker Couret had discovered a new vaccine for protecting hogs against hog cholera. The two important factors upon which stress was laid were the decreased cost of the product, namely, 10 to 15 cents a dose, and the ease with which it could be applied to hogs, thus doing away with the need of hypodermic syringes. From the first published accounts this product was said to be an attenuated virus or vaccine, but in the latest account the material is described as a sensitized virus. Thus in the published hearings above mentioned Dr. Duval says:

“We take the organs of one hog and grind them up with the blood and get rid of all the moisture, and the resulting residue or powder will immunize a million hogs***

“I do not hesitate in saying that when this vaccine is introduced and used, we will not bother any longer with hyperimmune serum.”

In the following verbatim statement taken from the *Journal of the American Medical Association*, July 8, 1916, page 98, Sewall, Mitchell and Powell say:

“Duval and Couret have recently reported highly successful vaccination with ‘desiccated, sensitized hog cholera virus.’ They incubate the diseased tissues with hyperimmune serum, then dry and reduce them to a powder which is found effective for prophylaxis in exceedingly small amounts.”*

Your committee understands that the Bureau of Animal Industry is at present conducting a series of tests to ascertain the value of Duval's vaccine, but that the results will not be published

* (Duval and Couret, read before the Association of American Physicians, May 11, 1916.)

until the Department has had an opportunity to study the whole matter and reach a definite conclusion.

In this connection it is interesting to note that Besredka was the first to propose the use in practice of sensitized viruses. Probably most of his work has been done with the bacillus of typhoid fever. He states that the ordinary vaccines, consisting of the killed bacilli, result usually in a firm immunity, but the immunity is a long time being established and the injections of such vaccines are frequently attended by severe reactions. The severity of the reaction he claims may be overcome by mixing killed bacilli with appropriate immune serum. However, mixtures of serum and bacilli do not produce the prolonged immunity which is desired, but result merely in a temporary immunity just as is secured from the use of serum alone. Besredka¹ states that the method of preparing true sensitized viruses is to place the serum and virus in contact for a suitable length of time, finally removing the supernatant fluid and washing the sedimented bacilli until the last traces of serum have disappeared.

In their work on rabies, Kraus and Fukuhara were unable to establish either preventive or curative action for rabies immune serum, but they observed that such serum will neutralize rabies virus *in vitro* by direct contact. Marie and Remlinger, however, proved that serum-virus mixtures (sensitized virus) possess a marked immunizing action against rabies. The experiments of Marie especially have shown that these properties are characteristic of mixtures which contain a small excess of the virus of rabies.

Attached to the final report of the Departmental Committee appointed by the British Board of Agriculture and Fisheries to inquire into swine fever, dated August 12, 1915, there is a report by Sir Stewart Stockman on experimental work with hog cholera. In this paper he discusses immunization against hog cholera (swine fever) by means of sensitized virus. The sensitization was carried out by taking defibrinated blood from pigs sick of hog cholera and removing the serum from such blood. The remaining blood cells constituted the virus. Immune serum was added to the virus in the proportion of from 1 to 2 up to 1 to 4 volumes. The mixtures of serum and virus were allowed to stand in contact for a number of hours, when the mixture was centrifuged and washed three times

1. "De la Vaccination par les Virus Sensibilises." *Bulletin de l'Institut Pasteur*, March, 1910, tome 8, p. 241.

with sterile physiological salt solution. The virus thus sensitized was used as a vaccinating agent. As a result of tests on pigs the author concluded that prolonged contact *in vitro* between the virus of hog cholera and antiserum can not be relied upon to diminish the activity of the virus. Most of the pigs inoculated with such sensitized virus died of hog cholera. The author found that the virus so sensitized could be used successfully for purposes of vaccination, *provided the pig received a suitable dose of immune serum at the same time*; and yet with respect to this he states that the inoculation of sensitized virus subcutaneously gave more irregular results in practice than the other methods, that is, simultaneous inoculation of immune serum and ordinary virus, or inoculation of serum alone and feeding of ordinary virus.

Since our last meeting Dorset and Henley have described a new process for producing anti-hog-cholera serum which will remove any danger from foot-and-mouth contamination. The process is based upon the fact that extracts of the common garden bean are powerful agglutinants of the red cells of hog's blood, which it is necessary to eliminate in order that a proper amount of heat may be applied to destroy contaminations without changing the physical properties of the immune serum.

To insure the freedom of hog-cholera serum from the virus of foot-and-mouth disease it is not sufficient merely to filter the product through bacteria-proof filters, because the virus of this disease itself is known to pass through such filters. Nor are the preservatives which are commonly used and which are suitable for the preservation of serum effective against foot-and-mouth virus. Therefore the application of heat seems to be the only means by which serum may be sterilized in so far as foot-and-mouth disease is concerned. For this purpose the defibrinated blood which has been treated with the bean extract is centrifuged and the clear supernatant serum is poured off and then heated for 30 minutes at 59 or 60° C. or for 12 hours at 50° C. The advantages of this process are that there is produced a clear product which retains its potency, which is readily absorbed, which will probably keep longer than the ordinary serum, and which, as the result of heating, is safeguarded against the possibility of infection with the virus of foot-and-mouth disease.

FOOT-AND-MOUTH DISEASE. At the time the last report of our committee was submitted, (September, 1915) foot-and-mouth dis-

ease had been eradicated from every state in which it had appeared during the outbreak of 1914-15, with the exception of Illinois, where it still persisted in two counties. Through the diligent efforts put forth by the authorities of the state and the Bureau of Animal Industry the disease was finally controlled in Illinois. The last diseased herd in McDonough county was slaughtered in November, 1915. In Christian county the last herd to become infected through the spread of the infection was slaughtered in February, 1916, but on May 2, 1916, reinfection appeared on a previously infected farm among some animals that had been placed thereon for the purpose of testing the efficiency of the disinfection before the owner was allowed to restock fully. As these premises had been cleaned and disinfected under very unfavorable weather conditions, this outbreak was not entirely unexpected, and the diseased animals were slaughtered before the infection spread to the susceptible animals on adjacent farms.

There have been no outbreaks from the natural spread of the disease since February, 1916, and there is every reason to believe that foot-and-mouth disease again has been effectually eradicated from this country.

All quarantine restrictions were removed June 5, 1916, but a corps of twenty experienced veterinary inspectors was left in Illinois until July 1, 1916, to supervise the restocking of farms where the disease previously existed and to investigate reports of suspected outbreaks. All of the previously infected farms in Illinois but one, the owner of which refuses to place test animals on his premises, have been restocked for a sufficient time to lead us to believe that there is no further danger from harbored infection; but as a precaution the services of competent veterinary inspectors will be continued indefinitely in Illinois to investigate suspicious rumors and to inspect animals placed on restocked farms.

Conscious of the possibility of a recurrence of the disease in this country, the Government is exercising all reasonable precautions against invasion of the infection from abroad and is on the alert for unexpected outbreaks.

During the outbreak of 1914-15 about 450 veterinary inspectors of the Bureau of Animal Industry were detailed to the work of eradicating foot-and-mouth disease, and likewise a large number of veterinarians in state work and private practice took an active and important part in suppressing the epizootic. Should we again be

called upon to combat this disease it is believed that with the experienced veterinarians that the States and Government are able to call into action, an ordinary outbreak could be speedily eradicated. Congress has recently appropriated \$1,250,000 as an insurance fund to be available for the eradication of foot-and-mouth disease and other contagious diseases of animals which may threaten the live-stock industry and it is important that the various state legislatures should also appropriate available funds in order to facilitate the work of eradication should we be so unfortunate as to be visited again by such a dreaded animal scourge.

DOURINE. Dourine in horses has increased somewhat in prevalence in certain states during the past year. This condition is due to the spread of the disease among the horse stock of the Indian reservations and to the inability of the Bureau of Animal Industry to prosecute vigorously the work of inspection and eradication at the round-up season because of lack of funds. Of 45,100 samples of blood serum tested by complement fixation by the Bureau during the fiscal year ending June 30, 1916, 1,400 gave positive reactions. This is 3.1 per cent, as compared with 2.7 per cent for the preceding fiscal year. The infected states are Montana, Wyoming, North Dakota, South Dakota, Nebraska, and Arizona. Notwithstanding the difficulties, good results have been accomplished in the work of eradication.

TUBERCULOSIS. At the Oakland meeting of this association the complement fixation test for tuberculosis was discussed, but inasmuch as the discussion was inadvertently omitted from the minutes, the following brief statement is presented.

Extensive investigations have been made by the Bureau of Animal Industry with reference to the reliability and practicability of this test in the diagnosis of tuberculosis. Blood from 816 cattle was tested, and almost all of these animals were immediately slaughtered under Federal supervision. Of the 320 negative sera, only 279 (85.9 per cent) proved distinctly negative, while of 360 positive sera, 290 (80.5 per cent) proved positive. Eighty-one (25.8 per cent) of the affected animals gave only slight positive reactions, and 80 were atypical.

The grand total of 81.6% of accurate reactions obtained is by no means sufficient to make the test practical for the control of the disease, especially since the allergic tests, which we have at our command, are more reliable. No satisfactory explanation can be given

as to the failure of reactions in known tubercular infections or for positive reactions in apparently healthy individuals. There exists a possibility, however, that some of the positive reactions in the negative cases may have been due to a previous tuberculinization of the cattle, since the histories of the animals furnishing the sera were not available. In order to determine the effect of a tuberculin injection, two young cattle were subcutaneously injected with 2 c.c. each of Bureau tuberculin. Blood samples were obtained from these animals prior to the injection, and were subjected to the complement-fixation test with negative results. Subsequent to the tuberculinization, blood was drawn twice weekly from them. On the fourth day following the injection a positive reaction was obtained. After ten days the fixation was complete, persisting for four weeks; then it was followed by partial fixation, and completely subsided after six weeks. As it is possible that in some animals the fixation might persist for a longer period after the tuberculinization, it is essential to determine if an animal has been injected, and if so, how long a time has since elapsed.

SWAMP FEVER. That swamp fever is of increasing economic importance is evidenced by the fact that it has gained a foothold in New York, where it was not recognized prior to 1914. That the diagnosis should have been confused with "other septicemic diseases," suggests that there may be still other localities where swamp fever may be present without having been recognized. Within the last 10 days this disease has been reported from Louisiana where it was causing considerable losses on at least one plantation.

Unfortunately continued experiments in sero-diagnosis have thus far failed to yield a satisfactory diagnostic procedure. Likewise experiments in insect transmission of this infection have been entirely negative. A recent experiment has shown that an animal in good condition and without showing any outward appearance which would arouse suspicion, may retain the virus of swamp fever in the blood even after 6 years. The blood of this animal when inoculated into another horse produced swamp fever in 13 days. The former animal therefore furnished a source of infection for insects during 6 years, but during this time no spontaneous cases developed, even though healthy horses were kept in the same stable without protection against insects. During this time both *Tabanus* and *Stomoxys* flies have been present, as well as many other species of insects.

CONTAGIOUS ABORTION AND INFLUENZA. This report should naturally include some reference to these two diseases which are exacting such a heavy toll from our cattle and horse industries respectively. However, since both these diseases will be the subjects of separate symposiums, no further reference will be made to them at this time.

SECRETARY'S OFFICE

The official count of the votes cast for the nominees in each of the five districts into which the country is apportioned by the new constitution was made at this office on the evening of February 10th by the authorized committee. There were present Chairman, N. S. Mayo, L. Enos Day, D. S. Jaffray, George B. McKillip, John F. Ryan, and A. C. Worms. A. H. Baker was absent.

The following is a summary of the committee's report:—

Votes cast in District No. I, 105; District No. II, 693; District No. III, 190; District No. IV, 326; District No. V, 292. Total, 1606.

DISTRICT NO. I.

F. Torrance, 38; George Hilton, 29; J. G. Rutherford, 21; Fred H. S. Lowery, 9; C. D. McGilvray, 8.

DISTRICT NO. II.

W. Horace Hoskins, 179; O. H. Eliason, 140; D. S. White, 136; S. Brenton, 123; L. A. Klein, 115.

DISTRICT NO. III.

J. R. Mohler, 83; C. A. Cary, 42; A. D. Melvin, 26; M. Jacob, 20; G. A. Roberts, 19.

DISTRICT NO. IV.

C. H. Stange, 93; L. Van Es, 80; J. S. Anderson, 69; J. I. Gibson, 47; W. F. Crew, 37. (The final count of the votes in this district is withheld pending returns from the Philippine Islands since the above plurality does not exceed the number of members in these remote possessions).

DISTRICT NO. V.

R. A. Archibald, 113; A. T. Kinsley, 67; C. F. Keane, 52; W. H. Dalrymple, 37; George Glover, 23.

Eleven ballots were returned unsigned and twelve unclaimed. Granting that no change will arise in the election of Dr. Stange from the vote of the Philippine members the personnel of the Ex-

Executive Board is now as follows:—V. A. Moore, member-at-large, Chairman; F. Torrance, 1st district; W. Horace Hoskins, 2nd district; J. R. Mohler, 3rd district; C. H. Stange, 4th district; R. A. Archibald, 5th district.

Presidential appointment:—E. Pegram Flower, Baton Rouge, La., Committee on Resolutions, vice, C. H. Stange, resigned.

ANNUAL MEETING

The exact dates set for the coming meeting at Kansas City, Missouri are August 20th, 21st, 22nd, 23rd and 24th, from Monday until Friday inclusive. The headquarters will be at the Meulbach Hotel and the sessions will be held in the auditorium and class rooms of the Kansas City Veterinary College.

Judging from a recent conference with the Local Committee of Arrangements at Kansas City an eventful meeting is assured.

Members desiring to present papers on special subjects should announce their intentions early as the work of planning the literary program is now well under way in each section. Drs. Ferguson and Blattenberg have some very original ideas of what a practitioner's program should cover and unless those desiring to present voluntary contributions apply early it might not be possible to find a place for them on the program. For a place on the program in the Section on General Practice members should address, Dr. J. H. Blattenberg, Lima, Ohio, and in the Section on Sanitary Science and Police, Dr. T. Edward Munce, State Livestock Sanitary Board, Harrisburg, Pa.

L. A. MERILLAT, Sec'y.

PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION

The 34th annual meeting of the Pennsylvania State Veterinary Medical Association was held at Harrisburg, Pa., January 23rd and 24th, 1917. About one hundred members and guests were present. The following subjects were presented which were thoroughly discussed:

The Veterinary Profession as a part of Agriculture,—H. H. Havner, State College.

State Milk Hygiene,—John P. Turner, Washington, D. C.

The Diagnosis of Infectious Abortion of Cattle with Special Reference to the Intradermal Abortin Test,—John Reichel, Glenolden.

Treatment of Sterility and Contagious Abortion of Cattle,—
C. J. Marshall, Philadelphia.

Therapeutics of some of the Digestive Disorders of Bovines,—
Louis A. Klein, Philadelphia.

The Caesarean Operation.—Harry W. Barnard, Lancaster.

Experience with Different Treatments for Shipping Fever at a
Sales Stable,—Wm. J. Lentz, Philadelphia.

The forenoon of the second day was devoted to business. One of the most interesting reports submitted was by the Committee on Medicine and Surgery. It included a description of vesicular stomatitis which was recently incorrectly diagnosed in the West as foot and mouth disease.

A motion was adopted recommending that the President of the American Veterinary Medical Association appoint a committee to cooperate with the U. S. Army officials in the organization of the Army Veterinary Service.

A joint meeting with the Allied Agricultural Interests was held on Wednesday evening when the following topics were discussed:

1. Should the State Pay Indemnity for Animals Destroyed to Prevent the Spread of Disease?
2. State Dairy Inspection.
3. Pennsylvania Dog Laws.

The following officers were elected for the ensuing year: President, F. H. McCarthy; Vice-Presidents, F. N. Sherrick, R. C. Gross, W. H. Fry; Treasurer, Thomas Kelly; Recording Secretary, E. H. Yunker; Corresponding Secretary, T. E. Munce; Trustees, John Reichel, C. B. Palmer, Fred Weitzel, F. U. Fernsler, E. Hogg.

E. H. YUNKER,
Recording Sec'y.

KANSAS VETERINARY MEDICAL ASSOCIATION

The meeting was held at Wichita Jan. 3rd and 4th. The meeting was to have been held at the Eaton Hotel but owing to the crowded condition it was held at the City Hall.

The address of welcome was given by the Hon. Mayor Bentley, Dr. R. R. Dykstra responded to the address.

A number of papers were given as published in the February number of the *Journal of the A. V. M. A.*

Several resolutions were adopted, among them was one approv-

ing the steps taken by the Federal and State authorities, enforcing the quarantine laws until it was decided beyond the shadow of a doubt that the recent outbreak of Vesicular Stomatitis was not Foot and Mouth Disease.

A resolution was also adopted endorsing the Lobeck Bill, which provides for the classification of salaries of veterinary inspectors and lay inspectors employed in the Bureau of Animal Industry, Department of Agriculture. The secretary was instructed to send a copy of the resolutions to the Kansas representative in Congress.

The local employees of the B. A. I. and the Southwestern Serum Company entertained the Association at dinner at the dining halls of Dold's and Cudahy's. A theater party was given by the Kansas Blackleg Serum Co. and the Wichita and Oklahoma Serum Co.

Eleven new members joined the association.

Dr. R. R. Dykstra, Manhattan, was elected president for the coming year. Dr. J. H. Burt was reelected secretary-treasurer.

The next meeting will be held at Manhattan, Jan. 1, 2, 3, 1918.

In addition to the papers on the program a paper was given by Dr. Imler, B. A. I. inspector in charge of serum production, Kansas City division, on "The Proper Method of Administering Anti-Hog Cholera Serum."

RESOLUTION

Whereas, an outbreak of vesicular stomatitis in cattle in the country tributary to the public stock yards of Kansas City and St. Joseph, during November, 1916, that so closely resembled foot and mouth disease, that to properly safeguard the live stock interest from that dreaded disease, it became necessary to quarantine such stock yards and stop the movement of live stock until proper laboratory and inoculation tests could be carried out to definitely determine the nature of said disease;

Therefore, be it Resolved, by the Kansas Veterinary Medical Association, in session assembled, that we fully endorse the action taken by the officials of the Bureau of Animal Industry, state officials and others interested in the transportation of live stock, in the action they took in promptly enforcing the quarantine laws to properly protect the great live stock interests of our country;

Be it Further Resolved, that we consider any less stringent action on the part of said officials in protecting our live stock interests would have been a gross neglect of duty;

Therefore, be it Further Resolved, that we pledge our hearty

support to such officials in the performance of their duty and all similar duties in the future.

Wichita, Kansas, January 4, 1917.

Signed, C. H. DOYLE, O. O. WOLF, E. B. HOLLECKER,
Committee on Resolutions.

J. H. BURT, Secretary.

CENTRAL CANADA VETERINARY ASSOCIATION

The fourteenth annual meeting of the Central Canada Veterinary Association was held in the Board of Trade rooms, Ottawa, Ont., on January 18th, the meeting being called to order at 8:30 p. m.

The date chosen coincided with that of the Ottawa Winter Fair and thus afforded out-of-town members a double attraction.

It was a representative gathering of Eastern Ontario practitioners, numbering in all about fifty. A slight departure in the ordinary conduct of the meeting was made, the customary reading of papers giving precedence to the introduction of subjects previously allotted to individual members and the practical and scientific discussion of the same gave evidence of the rapid advance in the standard of veterinary education.

Many important resolutions were adopted, one dealing with plans for a larger social gathering next year.

A motion was also passed appointing as Honorary President of the Association, Dr. F. Torrance, Veterinary Director General, the same being heartily endorsed by the members present.

Dr. E. A. Grange, Principal of the Ontario Veterinary College, was to have been the guest of the evening, but unfortunately found it impossible to be present, a letter from him expressing his regrets being read by the president.

As a testimony to the untiring efforts of the executive, a motion was unanimously adopted re-appointing the president, officers and council *en bloc* with the exception of the Secretary-Treasurer, Dr. H. D. Sparks, who voluntarily resigned to assume a position on the executive board.

The executives for the ensuing year are as follows: Honorary President, Dr. F. Torrance, Ottawa; President, Dr. Geo. Hilton, Ottawa; Vice-President, Dr. S. L. O'Hara, Shawville; Sec.-Treas., Dr. A. B. Wickware, Ottawa; Councillors, Drs. H. D. Sparks, Ottawa; A. E. James, Ottawa; C. H. Higgins, Ottawa; R. Barnes,

Ottawa: J. B. Hollingsworth, Ottawa; Lt. Col. A. W. Harris, Ottawa; R. T. O'Hara, Maxville; P. W. O'Hara, Manotick.

A. B. WICKWARE, Secretary.

SOUTHWESTERN MICHIGAN VETERINARIANS COMPLETE ORGANIZATION

Sixteen practicing veterinarians from Cass, Berrien and Van Buren Counties met at Benton Harbor, Mich., on January 25th and completed their organization which had its inception at a meeting held at Niles, Mich., in the early part of December. The association will be known as the Southwestern Michigan Veterinary Medical Association and is open for membership to any graduate practicing veterinarian registered under the State of Michigan.

The following interesting program was presented, with the calling of the meeting to order at 10 o'clock:

"Production and Use of Anti-hog-cholera Serum" (illustrated by stereopticon), Dr. C. H. Hays, B.A.I. Veterinarian.

"The Veterinarian's Interest in Legislation, 1917" (and always), Dr. G. W. Dumphy, State Veterinarian.

Business Session. Luncheon at 12 o'clock at Hotel Eastland.

1:30 o'clock. Clinical Demonstration (Technique of uterine and ovarian examination per rectum, and also uterine irrigation through use of special instruments), Dr. E. T. Hallman, State Pathologist.

A lively interest was taken in the meeting and the discussions were lengthy. All sixteen veterinarians in attendance became members of the association. The regular meetings will be held two each year, during January and August.

L. A. WINTER, Secy.-Treas.

IOWA VETERINARY ASSOCIATION

The Iowa Veterinary Association held its annual meeting at Ames on January 9th, 10th and 11th; about 200 veterinarians were in attendance.

The program was carried out to the letter, with the exception of the report of the chairmen of two committees who were unable to attend on account of sickness. The discussions of papers were lively and very interesting, which added much to the enjoyment of the meeting. Dr. G. P. Statter of Sioux City was elected president.

The "up-to-the-minute" assistance of the members of the veterinary faculty, together with the splendid equipment of the college, was greatly appreciated by the members of the association.

On Wednesday evening the entertainment at Sheldon-Munn Hotel was enjoyed by about 250 veterinarians and friends; a lunch and cigars proved to be physiologically compatible with a continuous line of side splitting stories.

In lieu of the clinic usually held on the last day, practically all the members remained to attend the Conference for Veterinarians, arranged by the veterinary faculty of the college, which was held January 11th and 12th. The program was carried out by the members of the faculty, assisted by L. S. Gillette, Asst. Prof. of Animal Husbandry at the College; Dr. Cassius Way, Chief Veterinarian for Borden's Condensed Milk Co.; Dr. C. E. Cotton, President of the A.V.M.A.; and Dr. V. A. Moore, Dean of the New York State Veterinary College.

The Conference was the first of the kind ever held in Iowa and was a complete success in every sense of the word. We hope it may continue year after year.

H. B. TREMAN, Secretary.

FIRST ANNUAL CONFERENCE FOR VETERINARIANS AMES, IOWA, JANUARY 11 AND 12, 1917.

For three years the Veterinary Division of the Iowa State College has offered a Practitioners' Short Course of one week during the summer, but this was the first of a series of conferences which it is hoped may be given annually. The State Association kindly gave over their day of clinic to the Conference so that the meeting would not be too long.

The Conference concentrated upon the more important diseases of dairy cattle, and we were very fortunate in securing the services of four men each of whom represents a different phase of the problem and is an expert in his particular phase. These men are:

Professor L. S. Gillette, who gave a lecture and demonstration on Judging and Types of Dairy Cattle.

Dr. Cassius Way, who gave an illustrated lecture on Dairy Farm Sanitation, and one on Production, Handling, and Distribution of Clean, Sanitary Milk.

Dr. C. E. Cotton on Abortion from the Practitioners' Standpoint.

Dr. V. A. Moore on Our Present Knowledge Regarding Infectious Abortion in Cattle, and Tuberculosis: Its Prevalence, Lesions and Interpretation of Tests.

The other topics were handled by the members of the Veterinary Faculty who are doing special work along the lines indicated by the subjects of the lectures as given on the program.

Most of those present at the State Association Meeting remained for the Conference and others came in especially for the Conference. The program was fittingly closed Friday night by a banquet given by the Faculty, Alumni, and students of the Veterinary Division. Two hundred enthusiastic men were present. Dr. H. D. Bergman very ably acted as toastmaster and had the rare opportunity of introducing: Dr. Cassius Way—"The Veterinarian and the Dairy Industry"; Dr. C. E. Cotton—"The American Veterinary Medical Association"; Dr. V. A. Moore—"The Veterinary Profession"; Dr. W. W. Dimock—"Our Alumni"; S. H. McNutt—"Class of 1917"; Pres. R. A. Pearson—Impromptu.

During the evening Mr. Walter Greene, baritone, sang two groups of songs which were perfectly done and added greatly to the already rich program.

H. E. BEMIS.



NEW YORK CITY VETERINARY MEDICAL ASSOCIATION

*Address of the President, R. W. Gannett,
Brooklyn, N. Y.*

Fellow Members of the Veterinary Medical Association of
New York City:

I wish again to thank you for the honor you have given me. I feel that it is a real honor, and also realize the responsibility that goes with the presidency of an association such as ours. I believe though that my election was not so much a personal honor as an endorsement of the principles for which this society has stood for the past year in relation to the enforcement of our veterinary laws.

Dr. Goubeaud gave us a very lucid address on illegal practice about one year ago. The prosecuting committee has worked to correct the abuses of which Dr. Goubeaud spoke, and I am glad to say that thirty-eight veterinarians, most of them members of this society, have loyally supported this work by liberal contributions

of money. I believe that in electing a member of the prosecuting committee as your president, you, as a body, voiced emphatically your disapproval of illegal practice in every form.

This association offers to its members advantages surpassing those of any state or national organization for veterinarians. Nine meetings are held each year, including clinics, and social gatherings, and without interfering with the routine of practice, federal, state or municipal work.

I recommend that means be provided to send to every eligible veterinarian in the vicinity of New York City a circular letter stating the benefits to be derived from this association, and urging him to become a member. I also urge that every member make an earnest effort to bring in at least one applicant for membership.

In creating a program committee, I am sure we have taken a wise step. I recommend that this committee be made permanent by amending our constitution.

I also urge each member of this society to at least outline a paper upon some subject in which he may be especially interested. This is a day of specialists. There is not a member of this association who cannot do some operation, treat or diagnose some disease, better than his fellows. Don't be selfish, but come here and tell us how you do it, and then some one will tell you how to do it better. There is talent enough among the members of this association to provide an attractive program for each of our monthly meetings, and fortunately members have consented to serve upon our program committee who are acquainted with and able to secure outside veterinarians and speakers of reputation. I know they will not disappoint us, and I urge you not to disappoint them should they call upon you for a contribution to our program.

As to legislation, I feel that this association has in the past and can in the future, exert a powerful influence for good at Albany. We have a very good veterinary law, but there is room for much improvement. Let us not be too hasty. Good things come slowly. Our legislators must be made to understand the need of more stringent legislation governing the practice of veterinary medicine and surgery, but more than all else, earnest missionary work is needed among the registered practitioners themselves. We cannot consistently ask for a law more explicitly prohibiting the non-registered assistant veterinarians if a majority of our members do not demand it, nor can we consistently ask our courts to punish the non-

licensed veterinarian doing business under his own name if this association allows its members to employ non-registered assistants to do general practice. The plea that these assistants only do the work of a nurse and accept no pay is in itself an admission of guilty intent to violate the spirit, if not the letter, of the public health law.

The State Board of Veterinary Examiners and the Board of Regents are the authorities vested with power to determine the fitness of a person to practice veterinary medicine and surgery, and no veterinarian, no matter how honorable or charitable his intentions may be, should be allowed to usurp that power by authorizing the stable-man, the handy-man, the self-educated man and so on up to the non-registered graduate to go out, diagnose, and treat animal diseases, many of which are communicable to human beings.

The young licensed graduate veterinarian of to-day must be a high school graduate. His technical training now covers four years of hard work. Far more than was required of any of us. He deserves fair treatment, and in this state it is our duty as members of the state and local societies, to see that he receives fair treatment or our profession and the live stock interests of the state will suffer. From personal experience I can imagine the feelings of these young men when they learn the truth about conditions in our profession. Can you blame them for becoming bitter when members and officers of our state and local societies, state veterinarians, teachers in our colleges, and until recently members of the State Board of Examiners, employ illegal assistant veterinarians often of the most ignorant type with whom the legal four year graduates must compete in practice and be associated with in the mind of the indiscriminating public?

I recommend that this society, through its legislative committee, exert every possible effort to incorporate in our veterinary law a definition of the word "practice" so plain that there can be no mistake, as plain and explicit as is found in the new dental law, which I will quote:

"Practice of Dentistry." "A person practices dentistry within the meaning of this article who holds himself out as being able to diagnose, treat, operate or prescribe for any disease, pain or injury, deficiency, deformity or physical condition of the human teeth alveolar process, gums or jaws or who shall either offer or undertake by any means or method to diagnose, treat, operate or prescribe for

any disease, pain, injury, deficiency, deformity or physical condition of the same.”

Under penalties and their collection we again need language that is as plain as in the dental law. So plain that it will be possible to punish the practitioner who employs the illegal assistant veterinarian to practice veterinary medicine and surgery.

With your permission I will again quote from the dental law: “Any person who shall practice dentistry personally or by hiring or procuring another to practice, and shall fail to display or cause to be displayed the name, license and registration certificate of himself and any person practicing or employed to practice as a dentist or dental hygienist in his dental office or any dental office under his control shall be guilty of a misdemeanor and punishable upon a first conviction by a fine of not less than fifty dollars or more than five hundred dollars, or by imprisonment for not more than one year and upon every subsequent conviction by a fine of not less than one hundred dollars or by imprisonment for not less than sixty days, or by both fine and imprisonment. Any person who shall employ, hire, procure or induce one who is not duly licensed and registered as a dentist to practice dentistry or who shall aid or abet one not so licensed and registered in such practice, shall be guilty of a misdemeanor and punishable by a fine of not less than fifty dollars or more than five hundred dollars or by imprisonment for not more than a year, or by both such fine and imprisonment, providing that a person practiced upon by an unlicensed or unregistered dentist shall not be deemed an accomplice, employer, hirer, producer, inducer, aider or abettor within the meaning of this section.”

As in the dental law restrictions should be placed upon the use of the prefix “Doctor” or “Dr.” as well as the Degree of Veterinarian.

Of course, provision should be made for the bona fide veterinary student in a reputable veterinary college.

The Blamey trial which is set for the twenty-seventh of this month, may give us information as to the constitutionality of our method of appointing the members of the State Board of Examiners.

In my opinion, it should be optional with the court to impose a fine of any amount not less than fifty nor more than two hundred and fifty dollars for the first offense. With the present arbitrary fine of two hundred and fifty dollars, the Judges are too often inclined to suspend sentence,

As to prosecution, I believe that though our present law is inadequate and the work is unpleasant, still we must carry out the task, we must have the courage of our convictions if our profession is ever to attain the dignity and receive the recognition that it deserves.

I, for one, am willing to contribute to maintain a prosecuting fund. I recommend and shall insist that our meetings shall start promptly at 8:30.

Considering the decreased purchasing power of one dollar, it seems to me the members of this association should agree to a minimum charge of two dollars per visit.

I recommend that our constitution and by-laws be revised if we have sufficient funds at our command.

Also that the program committee be made permanent and the board of censors be elected.

I am heartily in favor of a smoker and believe that if we should get together oftener in a social way, we would become better acquainted, learn to make allowance for individual peculiarities, and much misunderstanding and resulting erroneous impressions of one another would be corrected.

If, in my maiden effort at writing a president's address I have hurt anyone's feelings, I am truly sorry, and beg to assure you that it is unintentional, but I consider it my duty to speak plainly and direct my every effort to elevate the standing of our profession.

In closing, let me urge harmony and good feeling in our association. We have difficult questions to meet. Our profession is passing through an important period in its evolution from the old time horse doctor of fifty years ago. Let us respect and honor, but not copy, him. Let us meet our present day problems face to face and honestly, and be too broad-minded and fair-minded to allow a transient difference of opinion to dampen our loyalty to our association and to our profession.

REPORT OF THE PRACTITIONERS' SHORT COURSE IN VETERINARY MEDICINE, UNIVERSITY FARM, DAVIS, CALIFORNIA, DECEMBER 27-30, 1916

The three days' course for veterinarians, arranged by the cooperation of the University of California and the California State Veterinary Medical Association, was attended by seventy-five vet-

erinarrians. Following are some condensed notes on a few of the lectures and demonstrations:

Lecture: The Specific and non-specific Treatment of Infectious Diseases, by K. F. Meyer, Associate Professor of Tropical Medicine, University of California.

A. *Diseases due to Filterable Viruses* yield the best examples of successful specific treatment. Dr. Meyer discussed in detail the procedure used in immunizing to rinderpest, contagious pleuro-pneumonia of cattle, hog cholera, sheep pox, rabies, and foot-and-mouth disease. To illustrate the possibility of improving the present methods of immunizing to hog cholera, the details of the preparation of *sensitized virus* were described. Nègre and Bridze's success in preventing sheep pox by the use of pulp virus of sheep pox sensitized by treating it with immune serum should be of interest to those working with hog cholera virus. (See *Ann. Inst. Pasteur*). Duval takes pulp of some organ (probably spleen) of a hog infected with cholera and treats it with anti-hog-cholera serum. A substance is obtained which in very small quantities will immunize hogs to hog cholera. From a livestock sanitary and police standpoint it is not a sound procedure to use the simultaneous method for hog cholera. In discussing the alleged relation of spirochetes to hog cholera the points were made that such infections usually produce few blood vessel wall lesions, but are accompanied by markedly enlarged spleens while acute cholera always causes marked bleeding from small vessels but not so often accompanied by spleen tumor. The fact that sodium taurocholate quickly destroys spirochetes but has no effect on the filterable virus of hog cholera is additional evidence that spirochetes are not the cause of hog cholera.

B. *Diseases due to bacteria* against which specific therapy has recently progressed are abortion, calf scours, calf diphtheria, strangles, purpura and glanders. Recent work has shown that anti-abortus serum will give splendid results in very young calves, but in older calves the serum must be made polyvalent. Professor Jensen of Copenhagen has demonstrated the high specificity of calf scour serum and the necessity of using antigens for its production which have been isolated from the outbreak to be treated.

Strangles vaccines and serums are flooding the market. Serum made from human strains of streptococci are valueless for strangles. Sensitized serum and auto-vaccination of Müller and Pfeifer is promising.

Purpura or morbus maculosus is a disease of hypersensitive-ness, the etiology is a mystery. C. O. Jensen has had good results with anti-streptococcic serum—33 out of 35 cases recovered.

Glanders is not necessarily a fatal disease. In Johannesburg, S. A. Dr. Meyer observed complete recovery of horses having glanders lesions in the lungs. Discussed the use of Farasis.

Practitioners in the use of bacterial vaccines have drifted away from the original system of Wright, who carefully controlled the administration of such products by bacteriological diagnosis and by determining the opsonic index of each case treated.

C. *Chemo therapy* is destined to play an important role in veterinary practice. Salvarsan is now used with good results in the treatment of shipping fever.

D. *Non-specific treatment.* The encouraging results obtained in Argentina in the treatment of typhoid fever by the use of intravenous injections of typhoid vaccine have led to extensive experiments. After the injection of the vaccine a sharp reaction occurs immediately. Colon vaccine has now been found to produce the same curative results. One cannot immunize to paratyphoid with typhoid vaccine but paratyphoid after it has developed may be cured by the typhoid vaccine. Intravenous medication is by far the best in therapeutic treatment of infectious diseases.

The *non-specific* treatment of hogs sick with cholera by intravenous injections of bacterial cultures or proteins would be worth trying.

Lecture: Recent Developments in the Prophylaxis of Anthrax, Blackleg and Septicemia Hemorrhagica. By K. F. Meyer.

Anthrax requires for its diagnosis the use of up-to-date bacteriologic technic. Every veterinarian should qualify to do this. In the case of carcasses which have begun to decompose the use of the *Ascoli Precipitation Outfit* is desirable and it would be a good thing if such outfits could be put on the market in the United States. The ability of anthrax bacilli to produce capsules is an indication of virulence. The body fluids cannot destroy the capsule protected organisms. Dr. Meyer then described in detail the a-gressin theory of Bail as related to anthrax. The comparative value of the Pasteur vaccine, Sobernheim simultaneous methods, and Rickman and Joseph spore vaccine combined with serum method of immunization were discussed. The simultaneous serum spore vaccine immunization was introduced in the United States by Eichhorn.

Blackleg infections are frequently confused with diseases caused by organisms of the malignant edema species and immunization should, therefore, be on a broad polyvalent basis. The prophylaxis and treatment of blackleg with serum as well as the immunization with vaccine was described.

Hemorrhagica Septicemia has not been definitely proved to exist in California. A disease which simulates clinically and on post-mortem the classical *wild-* and *rinderstuche* causes great losses in both this state and Nevada, but the bacteriological findings have not as yet proved its identity with typical septicemia hemorrhagica of cattle caused by *B. bovis septicus*. Cooperating with the state veterinarians of California Dr. Meyer has vaccinated large numbers of range cattle but the results do not throw any light on the identity of the disease. Of 1264 animals vaccinated 27 died and of 1700 unvaccinated 11 died. Laboratory experiments on rabbits and sheep are of little value in determining the efficiency of vaccine for cattle.

Lecture: Pathology of Infectious Abortion. By K. F. Meyer.

Dr. Meyer discussed the pathology of bovine and equine infectious abortion.

Bovine. Dr. Meyer emphasized (1) the latency and sexotropism of the organism; (2) carriers and their detection by allergic test rather than by agglutination or complement fixation tests; (3) pathogenicity for guinea pigs. Out of 15 samples of high grade milk purchased in open market 14 produced lesions in guinea pigs. (4) histopathologic studies of guinea pig lesions by use of Trypan blue, these are of interest in comparison with studies on tuberculosis lesions. (5) immunity—a—resulting in slight lesions, b—immunity of equilibrium as in syphilis or tuberculosis, c—assertion of superinfection require further study, d—resistance due to herd immunity so-called "Durchseuchungs Resistenz" expressed not in form of abortion disease, but as granular vaginitis. (6) artificial immunity very doubtful—living cultures produce carriers.

Equine Abortion. Due to *Bacillus paratyphoid A.*

CASE REPORTS AND NOTES ON LECTURES AND DEMONSTRATIONS GIVEN
BY DR. W. L. WILLIAMS AT PRACTITIONERS' SHORT COURSE
IN VETERINARY MEDICINE, UNIVERSITY FARM, DAVIS,
CALIFORNIA, DECEMBER 27-30, 1916.

Case No. 1, December 28, 1916.

A three year old Holstein cow aborted September 29, 1916, in the sixth month of pregnancy and had not been in heat since.

Examination. Condition poor, lactation 18 pounds per day, external genitals normal. The lips of the os externum were grasped by means of Knowles' twenty-inch uterine forceps and the uterus drawn back sufficiently to enable the hand, when introduced per rectum, to easily reach the ovaries. All internal genitals normal except the left ovary which was $1\frac{1}{2}$ inches in size, including a large corpus luteum.

Diagnosis. Inhibition of estrum from persistent corpus luteum.

Prognosis. Good.

Treatment applied. Attempts to dislodge the corpus luteum by mild pressure of the hand per rectum failed. By introducing the other hand into the vagina the ovary was compressed by the thumb and finger pressure through the vaginal wall, the organ being held from slipping by the hand in the rectum.

Treatment advised. Give uterine douches of 2% Lugol's solution once a week for three weeks. As a result of the expulsion of the corpus luteum the animal will probably come in heat in two or three days, but she should not be bred until she comes in heat the second time. As an additional aid to conception advise when in heat to douche uterus immediately with 2% Lugol's solution, and after an interval of one-half hour, breed. If not pregnant in six weeks renew the course of uterine douching. Examine for a retained corpus luteum which, if present, should be expelled.

Case No. 2—December 28, 1916.

A four year old Holstein cow in her second pregnancy aborted a seven months' fetus on September 26, 1916. Character of estrum irregular. Agglutination negative; a 1 to 10 dilution failed.

Examination. General condition poor, lactation 23 pounds per day. Vagina contained two ounces of pus. Uterus enlarged, horns being four inches in diameter. Ovaries and oviducts normal.

Diagnosis. Pyometra.

Prognosis. Fair.

Treatment applied. An effort was made by means of Albrechtsen's extra-small uterine catheter to irrigate the uterus. This gave imperfect results. A pure gum horse catheter was then introduced into the uterine cavity and advanced to the apex of the cornu. One per cent salt solution was introduced through the catheter, the uterine contents broken up and thinned and three gallons of thick fetid pus slipped out. Uterus was then douched with 2% Lugol's solution, care being taken not to allow the iodine to come in contact with the mucous membrane of the vagina.

Treatment advised. Repeat above treatment once a week until the pyometra is controlled, rest for three weeks, douche at time of heat as in case 1, and breed.

Case No. 3, December 28, 1916.

A 32 months old Holstein heifer, had never conceived although served six times during the year. Character of estrum irregular.

Examination. General condition good, external genitals normal. After fixing the uterus by grasping the lips of the os externum with Knowles' twenty-inch uterine forceps the pelvic organs were palpated per rectum and found to be normal with the exception of the uterus which was enlarged, the horns being $1\frac{1}{2}$ inches in diameter. The os externum was drawn back into view by means of both pairs of the Knowles' forceps and Albrechtsen's small uterine catheter slowly and gently inserted into the uterus. On irrigation with physiological salt solution flakes of pus were seen in the return flow.

Diagnosis. Sterility and mild chronic metritis.

Prognosis. Good.

Treatment applied. Uterine irrigation with 2% Lugol's solution, followed by physiological salt solution, care being taken not to allow the Lugol's solution to come in contact with the vaginal mucous membrane.

Treatment advised. Repeat above treatment once a week continuously for three or four weeks after suppuration in the uterus has apparently ceased.

Case No. 4, December 28, 1916.

A nine year old Holstein cow calved normally September 1, 1915, and has not been in heat since. Serum agglutinates *B. abortus* in dilution of 1 to 200.

Examination. General condition fair. Lactation 20 pounds per day. Buttocks and tail soiled with muco-pus. Vagina contained muco-pus having no odor. Mucosa of os uteri and cervix severely inflamed, uterus enlarged, walls thickened and contains about a pint of pus. Left ovary $1\frac{1}{2}$ inches in size and contains a large deep-seated corpus luteum. Oviducts normal.

Diagnosis. Pyometra, cervicitis and retained corpus luteum.

Prognosis. Fair.

Treatment applied. Attempts to dislodge the corpus luteum failed so the ovary was punctured by passing a scalpel through the superior vaginal wall. (Williams' modification of Celin's guarded scalpel was used for this operation.) After the puncture the corpus luteum was expelled by compressing the ovary as in Case No. 1. The uterus was irrigated with 2% Lugol's solution followed with physiological salt solution. The os externum, cervical canal and cervical end of the uterine cavity was swabbed with Lugol's solution full strength by means of a piece of cotton grasped in Bozeman's double curved uterine dressing forceps. Great care was used to prevent the iodine coming in contact with the vaginal mucous membrane, the os externum being drawn well back by means of two pair of Knowles' special uterine forceps and a layer of cotton being laid on the floor of the vulva to catch any excess of iodine oozing from the cervical canal.

Treatment advised. Repeat once a week the application of both the above douches and the local application of full strength Lugol's solution, and after apparently normal condition continue the douching once a week for three or four weeks and breed.

Following is a facsimile of the record sheet used by Dr. Williams and a record of one of the cases which he treated:

STERILITY—ABORTION

ORIGINAL EXAMINATION

Owner—*University of California.* Address—*Davis, Calif.* Date—*Dec. 29, 1916*

Year of Birth—*1911* Name of Animal—..... Number—*101*

BREEDING HISTORY OF LAST PREGNANCY

Record the service or services in each month by inserting the day of the month served. If in estrum (heat) but not served, insert the date in (). In recording "Result," indicate a heifer not known to have conceived by H, a normal live calf by C, premature birth by X, abortion or dead calf by A, and retained after-birth by R.

DATES OF ESTRUM AND SERVICE

RESULT OF BREEDING

YEAR	JAN.	FEB.	MRT.	APT.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	Date of termination of pregnancy	Result
													Nov., 1915	Calved

DATES OF ESTRUM AND SERVICE SINCE LAST TREATMENT

<i>Constantly in heat, served frequently with no result since last pregnancy.</i>

Character of estrum, regular or irregular—*Constantly in heat.*

General Condition—*Fair*

State of lactation—*Dry*

Right broad ligament—*Sunken*

Left broad ligament—*Sunken*

Vulva—*Normal*

Vagina—*Normal*

Os uteri—*Inflamed slightly*

Uterus—*Normal*

Right ovary—*1½ inch cystic*

Right Oviduct—*Normal*

Left ovary—*¾ inch normal*

Left oviduct—*Normal*

Diagnosis—*Nymphomania*

Prognosis—*Fair*

Treatment applied—*Ruptured cysts in ovary, douched uterus, swabbed cervix.*

Treatment advised—*Repeat above treatment until genitals are normal, and breed.*

Remarks:—*The pelvic articulations and ligaments are loose and the bones crepitate when lateral pressure is placed on the sacrum.*

In addition to the special operations taught by Dr. Williams he recommends a system of preventive hygiene which should be carried out by every owner of valuable cattle. Following is a synopsis of Dr. Williams' recommendations in this condition:

He stated that abortion is a disease so widely disseminated that few dairy or pure bred herds are free from the infection. The infection may even be present in cattle without the occurrence of abortions. When the virulence or disease-producing power of the germs is high losses occur in the herd from abortion, sterility, retained afterbirth, or diseased ovaries and they also cause diseases of new-born calves such as calf scours, pneumonia, joint disease and similar complications. In infected herds not only the aborting cows but the non-aborting cows, bulls and calves may harbor the infection, and calves and young heifers should be protected from infection. Heifers carrying the first calf are more liable to abort than older ones. The two periods when the germs of abortion infection are most liable to gain entrance to the offspring is at the time the heifer calf is born and at the time she is first served by the bull. The entrance of the germs at these times is especially liable to cause damage. In order to obviate as far as possible the infection, Professor Williams recommends the following procedure to all cattle owners having animals valuable enough to warrant the expense:

Before and after service, irrigate the sheath of the bull with one-fourth per cent. Lugol's solution. It is advisable to administer a vaginal douche of this solution an hour or two before service to cows which do not conceive at the first service. Dr. Williams has discovered that the use of this solution does not interfere in any way with conception. If the cow still fails to breed, enlist the services of a qualified veterinarian who by manipulating the ovaries and catheterizing the uterus may be able to get the cow into breeding condition.

When the cow has reached her 270th day of pregnancy, or earlier, if calving seems probable, give her a thorough bath with warm water and soap, lathering the skin repeatedly until thoroughly clean. Rinse off the soap and water with a 1% solution of compound solution of cresol. Place the cow in a clean, disinfected stall. After the bathing wash the tail, vulva, thighs and udder daily with warm compound cresol solution, one and a half to two per cent., and douche the vagina daily with one-fourth per cent. Lugol's solution.

When the calf is born rub it dry and disinfect the stump of the navel cord. Do not tie it. Do not touch the navel stump with the hands. Fill a goblet or glass to the brim with 1-1000 corrosive sublimate solution and, having the calf held on its feet, push the goblet against the navel region so as to submerge the navel stump completely and keep it submerged for fifteen minutes. (Corrosive sublimate tablets can be purchased of a size that one to one pint equals 1 1000.) Then dust the navel stump over heavily with a powder composed of equal parts of powdered alum and boric acid. Place the calf in a clean, dry, comfortable stall and keep it alone until two or three months old. Do not permit the calf to suck.

According to Dr. Williams, it is best in most cases to feed calves on boiled milk. Some very young calves do not thrive on boiled milk and when it does not appear practicable to boil the milk the following special precautions should be taken to protect the milk for the calf from infection:

Before drawing milk from the cow to feed the calf wash her vulva, tail, thighs and udder and douche the vagina according to the plan recommended prior to birth. The milker must first disinfect his hands and use a sterile pail. The first milk from each teat should be discarded. Repeat the washing of the vulva, tail, thighs and udder immediately before each milking. Repeat the vaginal douches daily until all discharges from the vulva have ceased. At eight or ten days of age nearly all calves may be safely placed on boiled milk. The milk which is boiled may be drawn from any economic source. In order to prevent scorching a large double boiler or water bath should be used to heat the milk.

When all discharges after calving have ceased vaginal douching of cows may be stopped, though it would be well to continue the external washing of the vulva, tail and udder daily in the interest of clean milk as well as of the general health of the herd. When abortion or retained afterbirth occurs each case should be handled individually by a skilled veterinarian and by the special treatment restored to health as promptly as possible. Much needless loss might be saved by owners of valuable pure bred cattle if the services of veterinarians skilled in the special work perfected by Dr. Williams were available. By a monthly or quarterly veterinary examination of all the animals in a herd cases of sterility will be discovered before it is too late to cure them and incurable or

dangerous cases can be eliminated before they have done irreparable damage to the bull or to other cows.

This does not mean, however, that all animals infected with abortion should be disposed of. As a matter of fact in herds in which abortions are occurring a cow that has aborted once or twice may be just as valuable for breeding as one that has not. Cows seldom abort more than two or three times. Cows that are not made sterile by abortion will in all probability resume normal reproduction. On the other hand, if they are removed to make way for fresh animals there is a possibility that the newcomers already or soon will be infected and are more liable to abort than the old cases. The elimination of infected but recoverable animals is, therefore, not to be recommended as a means of controlling the disease unless their value is not great enough to warrant the expense of treatment.

By keeping pregnant animals the disease will be brought to a standstill more quickly than if new susceptible material is continually added in their place. Some cows apparently become immune without aborting. It is the history of the disease in the great majority of herds that after reaching its height, it gradually subsides of its own accord until only a few slips occur each year or it may disappear entirely. In herds where abortions have not occurred for several years, or at least only rarely, the owner should take particular pains to prevent its introduction. Every case of abortion should be regarded as infectious until proved otherwise.

For outbreaks of pneumonia and scours in calves Dr. Williams recommends the frequent use of enemas of physiological salt solution and the daily injection of liberal amounts of calf scour serum in addition to the special precautions to be taken at time of calving mentioned above.

Lecture: *Parasites Affecting Domesticated Animals.*

Prof. W. B. Herms, Associate Professor of Parasitology,
University of California.

Insects and insect-like forms (ticks and mites) and worms (Helminths) were dwelt upon. (1) Repellents—available repellent only effective for two days at best. Control of fly breeding urged. (2) Lice—poultry lice are best handled by means of the dust to which tobacco dust and sulphur are added. For swine, fuel oil emulsion of one to two per cent is useful. (3) Wool maggot problem is an important one in California. The maggots are

traceable to flesh flies. Controlled by burning carcasses of dead animals, systematic trimming of the wool from between the hind legs and around the vent. Treatment of infected sores with chloroform to which a little oil of tar is added. (4) Roundworms in Poultry—referred to Circular 150 of University of California Experiment Station. (5) Pulmonary Strongylosis or lungworms is a disease of sheep, goats, calves, pigs, and certain other animals; treatment by nasal injection of chloroform as described in Circular 148 University of California Experiment Station. (6) Trichinosis is rather more common than is ordinarily believed. As far as animal husbandry is concerned its control depends on the control of wastes, slaughter-house refuse, etc. as fed to swine, and rat control. (7) Distomiasis or liver fluke disease is rather widespread in California both in sheep and cattle. Since the parasite depends on a snail as its intermediary host, much depends upon drainage to eliminate snails and no doubt much might be accomplished by the application of lime to infected pastures, about 400 pounds per acre. (8) Hepatic taeniasis or liver tapeworm occurs commonly in sheep. By many the fringed liver tapeworm is looked upon as an important parasite. Until something more is known about the life history of the tapeworm little or nothing can be done to control it. (9) Cysticercosis in its several forms is very common in cattle, sheep and hogs. The bladder worms are the larvae of tapeworms in man, dogs and certain other animals. The control of cysticercosis as relating to human tapeworms depends on the disposal of human feces in a way so that food of cattle and hogs may not become contaminated. The several species of dog tapeworms are responsible for other bladder worms in cattle, as well as in sheep (causing gid) and in humans (hydatids) hence it is highly important that dogs be kept under proper control and treated from time to time for tapeworms. Stray dogs may be placed in the same category with coyotes and treated accordingly.

Lecture and Demonstration in Judging Livestock—Professor Gordon H. True and Assistants, College of Agriculture, University of California.

Two periods of two or three hours on the first and second days of the short course were given over to demonstrations of stock judging by members of the Animal Husbandry Division of the University. On the first day the points of heavy and light horses were

discussed by Professor C. W. Rubel and Mr. R. P. Royce. With specimens of the leading breeds of hogs in the ring Professor J. I. Thompson discussed their points while Professor R. F. Miller gave the sheep demonstration, using Rambouillet and Romney rams and middle woolled wethers of the Hampshire herd that had won for the University at the recent International Livestock Show at Chicago. With the herd bulls of the Aberdeen, Shorthorn, Hereford and Angus breeds for illustration, Professor Gordon H. True brought out the characteristic points of the beef breeds.

On the following day specimens of Ayrshire, Holstein, Jersey and Guernsey were first discussed, and later the veterinarians placed classes of Jersey and Guernsey cows.

Demonstration of Thorough Post-mortem on Large Animals.

K. F. Meyer.

Post-mortems were made upon a horse, cow and pig. Those in attendance were greatly impressed by the thorough, systematic, attractive and skillful method of autopsying these animals.

Lecture on the Importance of Proper Technic in the Use of Anti-Hog-Cholera Serum and Virus, with Demonstration on Live Animals.—B. J. Cady, Veterinary Inspector, U. S. Bureau of Animal Industry, General Educational Hog Cholera Work for California.

Dr. Cady placed special emphasis on (1) the importance of correct diagnosis, The lesions of acute and chronic hog cholera were discussed. Emphasis was also placed on (2) the necessity of keeping a separate vaccinating outfit in good working condition and sterilized; (3) on proper handling of hogs in preparing them for treatment, more especially in the hot summer months, the method of penning hogs and places selected for the work, time of day, etc.; (4) method of restraining, with the trough for small animals and the use of ropes around the nose of larger animals; (5) seat of injection suggested: arm-pit and flank for serum, inside of ham intramuscularly for virus, on small animals; for large animals, back of the ear for serum, posterior ham intramuscularly for virus. Not more than 15 c.c. of serum should be injected in one place in small animals and not more than 20 c.c. in large ones. Proper size and length of needles—No. 16 gauge, best average size, 1 to 1½ inches in length. 30 c.c. Champion and 45 c.c. Viking Syringe best for use of serum and small syringe not more than 12 c.c. to be

used for virus. A demonstration was given showing complete vaccinating outfit and method of handling, disinfecting and injecting both serum and virus on one small ninety pound shoat and on a large animal.

Anti-Hog-Cholera Serum Production—P. T. Petersen, Assistant in Veterinary Science, in charge of Serum manufacture, Department of Agriculture, University of California.

Dr. Petersen gave (1) a résumé of the papers and discussions on hog cholera presented at the meeting of the National Live Stock Sanitary Association held at Chicago in December, 1916. Of particular interest were the transmission experiments. (2) His observation on the methods in the many commercial and state serum plants in the middle west visited by him. He was of the opinion that the future anti-hog-cholera serum will be a clear and sterile product.

The Occurrence and Importance of Abortion and Sterility in California Cattle.—C. M. Haring, Professor of Veterinary Science, University of California.

Statistics were given showing the occurrence of abortion in dairy and beef herds and in range cattle. In response to the statements that the exclusive feeding of alfalfa causes sterility in cattle and the request by cattle owners that this be investigated by the California Agricultural Experiment Station the following statistics have been gathered in Stanislaus County, where alfalfa is the exclusive feed used by many owners, and in Humboldt County, where no alfalfa is raised or fed:

Table Concerning the Possible Effect of Alfalfa Feeding on Sterility and Abortion in Dairy Cows in Humboldt and Stanislaus Counties.

	Number of Cows	Number of Cows Sterile	Percent Sterile	Number of Abortions	Percent Abortions	Ratio of Sterility to Abortions
Stanislaus County Cattle:						
A. Fed on Alfalfa Exclusively	3399	377	11.09	279	8.21	1:0.74
Stanislaus County Cattle:						
B. Fed chiefly on alfalfa with a little other feed	930	110	11.83	105	11.29	1:0.95
Humboldt County Cattle:						
C. Fed partly on alfalfa and chiefly on other feed	1374	276	20.09	136	9.90	1:0.49
Humboldt County Cattle:						
D. Fed no alfalfa at all	2760	510	18.47	405	14.67	1:0.79

It will be noted that the proportion of sterile cows is higher among those which received little or no alfalfa than in those fed exclusively on this excellent forage plant. The above figures do not indicate that the exclusive feeding of alfalfa reduces in any way the fertility of cattle.

Dr. Haring gave figures regarding agglutination tests for abortion in both dairy and range cattle and endorsed the view that practically all high bred dairy herds contain animals harboring the infection. Reports of serious losses from abortion in range cattle are occasionally received. Blood from range cattle collected at the stock yards sometimes agglutinates *B. abortus* in dilutions greater than .1 c.c. of serum to 1 c.c. of agglutinating fluid.

In examining the blood of 65 range steers and bulls collected at the Oakland and San Francisco stockyards,

46	failed to agglutinate at	1:10
11	agglutinated at	1:10
3	“ “	1:25
3	“ “	1:50
2	“ “	1:100

Lecture and Demonstration of Biological Phenomena as Related to Immunity with Special Reference to their Use in Clinical Diagnosis.—By J. Traum, Assistant Professor of Veterinary Science, University of California.

The purpose of this lecture and demonstration was to make the veterinarians more familiar with the terminology of immunity and to demonstrate step by step the various serologic tests so that the current literature would be more intelligible to them.

Beginning with (1) the invasion of microorganisms and the parenteral introduction of proteins into the body, the discussion included (2) the defensive action on the part of the body by the production of *antitoxins*, *opsonins*, *agglutinins*, *precipitins* and *lysins*; (3) the demonstration in test tubes of the last three named anti-substances in the sera of animals; (4) the use of antigens suspected of exciting the production of the anti-substances (in infectious diseases, cultures or extracts of the microorganisms); thereby determining the causative agent and in that manner making a diagnosis possible.

The agglutination, precipitation and complement fixation tests were performed, the reason for the use of each ingredient and meth-

od of procuring these being discussed. Tests were also performed prior to this period so that complete positive and negative tests were also available for demonstration. The practical application and limitation of these tests in all diseases, but especially in connection with abortion, were discussed.

Demonstration of Laboratory Tests of Interest to Veterinarians.

The large attendance made it necessary to form two sections for these demonstrations:

- (1) *Demonstration and Practice in the Bacterial and Chemical Examinations of Milk.*—C. L. Roadhouse and Mr. Bisbee, University of California.

This included the approved procedure and dilutions made in preparing bacteria plates from certified, pasteurized raw market milk. Examinations of milk for butterfat and solids were made and the use of the lactometer in detecting adulterated milk was demonstrated.

The plates were examined after incubation for 48 hours and several veterinarians practiced the plating of milk at the close of the course.

- (2) *Clinical Examination of Blood.*—K. F. Meyer and J. Traum.

Blood was drawn from a horse, hemoglobin estimated by Gower's method; color index discussed; red and white cells were counted; smears were made, stained and examined. The cellular elements of the blood in health and disease were demonstrated and discussed. Microscopes and material were available for all those who desired to take advantage of this opportunity.

COLORADO VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Colorado Veterinary Medical Association was called to order in the rooms of the Gentlemen's Riding and Driving Club, Denver, Colorado, at 10:45 A. M., January 25, 1917. In the absence of the president and the first vice-president, Dr. R. H. Bird was elected as chairman *pro tem*. In the absence of the secretary, Dr. George H. Glover was elected to fill the office during the meeting.

The minutes of the previous meeting were adopted as published in the Proceedings of the Association. The report of the

secretary showed that there were fifty-three members in good standing.

The following names were presented and on approval by the executive committee these men were elected to membership: Floyd Cross, Fort Collins; H. S. Eakins, Fort Collins; John H. Copenhaver, Omaha; A. Philip Immenschuh, Monte Vista; Carrel L. Jones, Delta; and Garrey E. Clark, Fowler.

Dr. Charles G. Lamb, a member of the legislative committee, reported on a bill which he contemplated introducing into the legislature. After a discussion of the matter the following legislative committee was appointed to further our interests; Charles G. Lamb, George H. Glover and W. W. Yard.

The following resolution was presented by Dr. John Bryant and adopted by unanimous vote:

Whereas, Some of the State Colleges have been giving short courses for veterinary practitioners and these have been found to be very successful.

Therefore, Be it resolved that the Colorado Veterinary Medical Association respectfully petitions the authorities at the State Agricultural College to arrange for such a course.

The matter was left to Dr. George H. Glover to present to the college authorities.

The resolution of condolence regarding the death of Dr. T. H. Quinn passed and a copy ordered sent to the widow.

The following officers were elected: President, R. H. Bird; First Vice-President, George H. Glover; Second Vice-President, John Bryant; Secretary-Treasurer, I. E. Newsom.

Executive Board: A. J. Savage, J. F. Meinzer, F. W. Culver.

The program presented was as follows:

Coitus Interruptus—F. W. Culver.

Suggestions for the Betterment of the Association—A. G. Fisk.

The Ethics of the Profession of Veterinary Medicine—C. F. Davis.

The Vesicular Stomatitis—J. F. Meinzer.

The Whorled Milkweed as a Poisonous Plant—Geo. H. Glover.

Contagious Abortion—G. M. Potter.

Dr. Fisk had recently visited the meeting of the Nebraska association which so impressed him that he offered many suggestions for the betterment of our own state association.

Vesicular stomatitis had recently been prevalent in horses in the San Luis Valley. The outbreak was discussed by Dr. Meinzer who had seen many of these cases.

Dr. Glover brought to the attention of the association a considerable number of instances in which large numbers of sheep and cattle had died following the consumption of considerable quantities of the whorled milkweed (*Asclepias verticillata*). He did not look upon the weed as containing a direct poison, but believed that because of its extremely woody nature deaths resulted rather than from any poisonous principle.

Dr. Potter, who has charge of the contagious abortion work in the Bureau of Animal Industry, gave an excellent talk on the methods recommended by the Bureau for eradicating this disease.

At the noon hour, the association was banqueted by the Denver Hog Ranch Company, immediately following which the members paid a visit to the plant of the above named company, an entirely new and modern plant.

In point of numbers and interest shown this was the best meeting ever held by this organization.

I. E. NEWSOM.

VIRGINIA STATE VETERINARY MEDICAL ASSOCIATION

The regular annual meeting of the Virginia State Veterinary Medical Association, convened in the parlor of Murphy's hotel, Richmond Va., on the evening of January 11. As is the usual custom, all matters of business were brought forward. The election of members, the reports of all committees, all matters of new business, and the election of officers.

The election of officers resulted as follows: Pres., Dr. B. B. Glover, of Lexington; First Vice-Pres., Dr. H. T. Farmer, South Boston; Second Vice-Pres., Dr. H. R. Clemmer, Staunton, Va.; Secretary and Treasurer, W. G. Chrisman, Blacksburg, Va.

At ten o'clock the following morning, the association reconvened, and took up the regular program. First, an address, H. H. Adair, Bristol, Virginia. Second, an address by Dr. Roy K. Flanagan, Assistant Secretary of the State Board of Health, subject: "Cooperation Between State Board of Health and the Veterinary Association." Dr. Marsh, B. A. I., "Contagious Abortion in Cows." Dr. C. J. Marshall, State Veterinarian, Pa., "The Handling of Horses in the European War Zone." Jesse M. Jones, Director of

Extension Work at Virginia Polytechnic Institute. "Cooperation Between the Extension Department, and the Practicing Veterinarian." Prof. W. D. Saunders, Prof. of Dairy and Animal Husbandry of Virginia Polytechnic Institute. "Practical Solution of Problems on the Dairy Farm." Hon. J. D. Eggleston, Pres. Virginia Polytechnic Institute. "The Needs of a Veterinary Department at V. P. I."

Dr. J. E. Noonan, formerly of Winchester, and now in the U. S. Army, stationed on the border, forwarded a very interesting paper which was read by the secretary, entitled "The Handling of Horses in Camp."

At one o'clock the association adjourned to the dining room, and Col. Murphy served a banquet in regular Virginia style. There were laid seventy-five covers. The guests of the occasion were: Ex-Governor Mann, Attorney General, John Garland Pollard, Lieut. Governor J. Taylor Ellyson, and the Hon. Westmoreland Davis (all three candidates for Governor); Hon. George W. Koiner, Commissioner of Agriculture; Hon. S. M. Page, a member of the House, from Albermarle Co.; Hon. Harry Smith, Richmond, Va., "Virginia's most noted Lawyer"; Mr. J. Thompson Brown, of Eveington, member of the V. P. I. Board of Visitors; Hon. J. D. Eggleston, Pres. of the Virginia Polytechnic Institute; C. B. Garnett, Chairman of the State Corporation Commission; Mr. T. O. Sandy, State Demonstration Agent; Dr. Roy K. Flanagan, State Board of Health; Dr. C. J. Marshall, State Veterinarian, of Pa.; Dr. H. Marshall, Inspector in charge, Richmond, Va.

This was a very enjoyable occasion, at which was exhibited great wit and humor, with Dr. Fernyhough as toastmaster, Ex-Gov. Mann, Messrs. Ellyson, Pollard and Davis, "Candidates for Governor". Mr. Koiner, Commissioner of Agriculture, and Mr. Sam Page, his opponent for that office. Messrs. Harry Smith, Thompson Brown, and Pres. Eggleston.

At four o'clock we adjourned, to meet in Norfolk, July 12.

W. G. CHRISMAN, Secretary.

GENESEE VALLEY VETERINARY MEDICAL ASSOCIATION

The twentieth annual meeting of the Genesee Valley Veterinary Medical Association was held at the Hotel Hayward, Rochester, N. Y., on Thursday, January 25th, 1917. After the routine busi-

ness of the association was transacted the following officers were elected for the ensuing year:

President, Orrin B. Webber, Rochester; Vice-President, F. E. Cleaver, Avon; Sec. and Treas., J. H. Taylor, Henrietta; Censors, J. E. Smith, W. J. Payne, J. W. Turner, H. S. Beebe, Warren E. Stocking, A. George Tegg, W. G. Dodd.

At this time the program was taken up and Dr. H. S. Beebe read a very bright and instructive paper on "Mammitis", in which he gave a report of some of the cases treated by Dr. Frost. Dr. W. H. Salisbury's paper on "Contagious Pleuropneumonia" brought out a good discussion.

Dr. F. E. Cleaver's paper on "Retained Placenta" revealed the fact that there is no disease in the treatment of which good men differ more widely than in this condition, yet in spite of this fact, we are approaching nearer to one point of view and I believe within the next three years there will be a very great improvement in the treatment of this condition.

At the conclusion of the discussions the association gave a dinner to all present, which was enjoyed very much, but most of all was the social time and feeling of good fellowship, which is really the best part of our meetings. Those who were not present missed one of the best meetings we ever had.

J. H. TAYLOR, Secretary.

FLORIDA VETERINARY MEDICAL ASSOCIATION

The third annual meeting of the Florida Veterinary Medical Association was held at Gainesville, Fla., on January 18th, 1917. It was much the best meeting we have so far had and active work will again be done this spring, in trying to put a veterinary practice law on our statute books.

FRED W. PORTER, Secretary.

THE VERMONT VETERINARY MEDICAL ASSOCIATION

The Vermont Veterinary Medical Association held the winter meeting at White River Junction, January 24th and 25th.

The following officers were elected for the year 1917: Dr. John Thomas, President, Wells River; Dr. John Canty, 1st Vice-President, Morrisville; Dr. H. C. Stetson, 2nd Vice-President, St. Johnsbury; Dr. George Stephens, Sec. and Treas, White River Junction.

An interesting paper was written by Charles T. Fake on "Forage Poisoning". Dr. Fake was unable to attend the meeting, so the paper was read by Dr. F. A. Rich. The paper was ably discussed by Drs. Parker, Barr and Thomas.

A paper was read by Dr. Canty on "Lumbar Abscess," and a very interesting train of symptoms was given until the horse died some twelve months after its first appearance, and on autopsy showed that one kidney and the pancreas were involved in an enormous abscess formation.

A clinic was held the morning of the 25th and some very interesting cases were on exhibit. The meeting adjourned the afternoon of the 25th and it was voted to hold the summer meeting at St. Johnsbury, July 18th and 19th, 1917.

GEORGE STEPHENS, Sec. and Treas.

MICHIGAN STATE VETERINARY MEDICAL ASSOCIATION

The following program was prepared for the thirty-fifth annual meeting held at Lansing, February 6 and 7:

Address of Welcome	Mayor Reutter
Response	H. M. Gohn
President's Address	
Reports of Standing and Special Committees.	
Banquet:	
Michigan Interest in Live Stock	Governor A. E. Sleeper
.....	State Treasurer Samuel O'Dell
Veterinary Prospects in Cleveland	Senator A. T. Roberts
State Veterinary Board	Judson Black
M. A. C.	President F. S. Kedzie
Veterinary Status in the Army	W. Horace Hoskins
What I Know About the Boys	George W. Dunphy
Civic Affairs	Mayor Reutter
Other Speakers: J. H. Blattenberg, H. H. Halladay, Reuben Hilty.	
Subject to be Announced	W. Horace Hoskins
Parasites of the Dog in Michigan	Maurice C. Hall
Our Veterinary Law	Judson Black and C. C. Mix
Contagious Abortion	E. T. Hallmann
Discussion	J. F. DeVine
The Control of Hog Cholera	Newton and Hays

NORTHWESTERN OHIO VETERINARY MEDICAL ASSOCIATION

The following program was prepared for the annual meeting at Toledo, Ohio, February 21:

President's Address	E. V. Hoover
Colic and Its Complications	A. C. Shaftstall
Ensilage Poisoning	Charles E. Frost
Case Report	
Poisoning by Castor Oil Bean	F. A. Young
Some New Therapeutic Suggestions	N. S. Mayo, Chicago
Milk Supply in Small Towns	F. F. Sheets
Selected	J. W. Adams, Philadelphia
Ovariotomy of the Sow	C. L. Jones
The Hydro Method of Removing Retained Secundines in the Mare and Cow	Ralph Shaw
After Dinner:	
Toastmaster	F. E. Anderson
Competition	W. G. Cook
" The Arab's Farewell to His Horse "	C. A. Fast

AMERICAN VETERINARY MEDICAL ASSOCIATION SPECIAL COMMITTEES OF 1917

Local Committee of Arrangements:—A. T. Kinsley, Chairman, 1336 E. 15th Street, Kansas City, Mo., and all of the members of the association residing in Kansas City and vicinity.

Committee on Anatomical Nomenclature:—

S. Sisson, Chairman, Ohio State University, Columbus, Ohio.
H. S. Murphey, Iowa State College, Ames, Iowa.
I. Ernest Newsom, Colorado State College, Ft. Collins, Colo.
S. L. Stewart, Kansas City Veterinary College, Kansas City, Mo.
E. S. Brashier, Chicago Veterinary College, Chicago, Ill.

Committee on Army Organization:—

C. J. Marshall, Chairman, University of Pennsylvania, Phila., Pa.
V. A. Moore, New York State Veterinary College, Ithaca, N. Y.
J. P. Turner, 916 O Street, N. W., Washington, D. C.
F. A. Bolser, 1200 Race Street, Newcastle, Ind.
L. A. Merillat, 1827 South Wabash Ave., Chicago, Ill.

Salmon Memorial Committee:—

J. F. Winchester, Chairman, Lawrence, Mass.
A. D. Melvin, Bureau of Animal Industry, Washington, D. C.
J. S. Anderson, Seward, Neb.
David F. Fox, Sacramento, Calif.
J. G. Rutherford, Calgary, Alta.
S. Brenton, Detroit, Mich.

International Commission on Bovine Tuberculosis:—

J. G. Rutherford, Chairman, Canadian Pacific Railway Co. Calgary, Alta.

J. J. Ferguson, Swift & Co., Chicago, Ill.

John R. Mohler, Bureau of Animal Industry, Washington, D. C.

S. F. Tolmie, Victoria, B. C.

F. Torrance, Bureau of Agriculture, Ottawa, Ont.

*J. H. Grisdale.

V. A. Moore, Ithaca, N. Y.

E. C. Schroeder, B.A.I. Experiment Station, Bethesda, Md.

*T. W. Tomlinson

*J. R. Valentine.

*Not members of the association.

A NEW METHOD OF REMOVING RETAINED FOETAL MEMBRANES.

At the annual meeting of the Northeastern Veterinary Medical Association at Toledo, Dr. Ralph Shaw of Anna, Ohio, presented a new and unique method for removing the placental membrane, particularly from cows and mares.

Dr. Shaw called this the hydro-method. Dr. Shaw has tested this method out and reports were given at the meeting from several other veterinarians who tried this method at Dr. Shaw's suggestion. All of them reported excellent results in cases where it was practical to use this method. In some cases the membranes were so torn that the hydro-method could not be employed.

Dr. Shaw's method consists in inserting a cannula about ten inches long into the umbilical vein. The cannula is ligated in place, the umbilical artery is ligated and any ruptured portions of the membranes that are protruded, are also ligated. Dr. Shaw then injects into the placenta, through the umbilical vein, at least a half gallon of normal salt solution. It is forced in with an injection pump, care being taken not to exert pressure enough to rupture the membrane. An injection of saline solution into the placental membrane causes its distention quite similar to an erectile tissue. The distention seems to separate the villi and the uterine connection without difficulty, in from six to twelve hours. Dr. Shaw and others have used larger quantities of normal salt solution and also antiseptic solutions, but they are of the opinion that a half gallon of the normal salt solution is the most satisfactory.

We hope that veterinarians who have an opportunity to try out this new method will do so. It seems to be very promising. Great credit is due Dr. Shaw in presenting this new and ingenious method of overcoming this very common difficulty. N. S. M.

COMMUNICATIONS

BRUSTSEUCHE

*Editor Journal of the American Veterinary Medical Association:
Ithaca, N. Y.*

On page 787 of the February *Journal*, Dr. Udall calls attention to the fact that in an abstract previously published, I have translated "Brustseuche" into "Influenza", thereby misquoting the authors of the paper abstracted. His point is well taken. But at the time I wrote the abstract, July 1916, the distinction between the two diseases was not so widely known as it is at present. The old English edition of Hutyra and Marek, which I used at the time, translates Brustseuche into influenza: the new edition separates them. I left the word Brustseuche in the title of the abstract probably because I realized at that time that there was some confusion as to its correct translation. The title of Dr. Macek's paper is "Zur Epidemiologie der Brustseuche der Pferde" and in so far as influenza and pleuro-pneumonia have lately become separate diseases—I stand corrected.

W. N. BERG.

ALUMNI NOTICE N. Y. C. V. C.

*Editor Journal of the American Veterinary Medical Association:
Ithaca, N. Y.*

Dear Sir:—Kindly print the following notice in your *Journal*:
To the Members of the Alumni Association of N. Y. C. V. C.:

In order that your secretary may get a correct list of its members, please send your name and address to him.

JOS. A. DEGROODT, Sec'y and Treas.
Mendham, N. J.

OPEN CASES OF TUBERCULOSIS

*Editor Journal of the American Veterinary Medical Association:
Ithaca, N. Y.*

I read with much interest the article in the January number of the *Cornell Veterinarian* by Drs. Udall and Birch under the caption, "A Further Report of Diagnosis of Open Cases of Tuberculosis." The entire report is, in my judgment, a valuable addition to our knowledge on this subject. The findings, however, are of particular interest to me since they coincide so closely with the deductions I have made from observations carried on in practice rather than under special experiment.

Some fifteen years ago I had rather unusual opportunities, with the aid of interested owners, to attempt to eradicate tuberculosis from several herds by frequent physical examination, not recognizing at that time the *great danger* of the milk as a source of infection and the almost unbelievable susceptibility of young bo-

vines to this disease, both of which I became thoroughly convinced after making more extended observations.

I seemed to make rather indefinite and slow progress in freeing these herds from tuberculosis which I attributed largely to my lack of ability as a diagnostician. Later, when I supplemented my work with tuberculin and had opportunities in State work for many post-mortems and could see positive proof of my errors in diagnosis by physical examination, I regained courage and decided that only a superhuman man could clean up a tuberculous herd by physical examination alone, under our present methods of cattle traffic, and allowing the young stock to habitate with the herd and be fed upon the raw milk from any animal in such a herd irrespective of its physical appearance.

In 1912 I read a paper at Philadelphia, at a meeting of the A.V.M.A., discussing this problem and I ask your patience to here quote a paragraph of that paper as the striking similarity may be of interest to the authors, Drs. Udall and Birch.

After discussing the value of physical examination in reducing tuberculosis by taking out the plainly open cases I stated:—

“This method of detecting tuberculosis is at present receiving much attention, and it is fortunate that it is, because the more accurate and the more expert our knowledge becomes on this question, the more valuable can we make our profession in suppressing this scourge. The opinion seems to be gaining ground, particularly on foreign shores and also among a few in this country, that by frequent physical examinations a veterinarian skilled in physical diagnosis can detect a certain percentage of tuberculous animals and practically all of those that are distributing virus. The experience of some of us makes it hard to accept this doctrine. The *extreme susceptibility of bovine animals to tuberculosis and the uncertainty as to when an infected animal may give off virus, either in its milk or through any of the eliminating channels of the body, the danger of closed lesions breaking down at any time, would seem to undo the possibility of so freeing an infected herd from tuberculosis or raising healthy calves on the unheated milk of such a herd.*”

We have been told by some veterinarians of whose ability and integrity there can be no possible question, that they have eliminated tuberculosis from infected herds without the aid of tuberculin. Personally I feel that unless they have posted every animal of such a herd or submitted them to a carefully repeated tuberculin test, that they cannot be certain that they *did eliminate* tuberculosis from such a herd.”

I quote here paragraphs 7 and 8 of the report of Drs. Udall and Birch:

“It is evident that reliance upon a physical examination alone for the suppression of tuberculosis in our experimental herd kept under usual conditions of feeding and watering, is a failure. The extent to which some individuals have developed lesions before

they were recognized is enough to weaken one's confidence in his own judgment and powers of observation. While the development of symptoms resembling those of tuberculosis but due to other causes, leaves one in a state of confusion. This is especially true if the final opinion is to be checked by autopsy. Without attempting to pass judgment on the value of a general examination of dairy cattle, or the value of this method in the suppression of tuberculosis in general, we have convincing evidence that in our hands it reveals only a small percentage of the open pulmonary cases. There are many reasons why a physical examination of dairy cows should be practiced and why it should be extended, but in company with all diagnostic methods its limitations must be recognized as determined by experimental and practical tests, and not by a confession of faith, or public opinion. Employed alone it reduces the number of spreaders in all badly infected herds, but it cannot be made to remove all, or nearly all. It is of great value in detecting the occasional non-spreader, and as a means of eliminating udder lesions from a herd that produces market milk. The physical examination of large animals is hard work. In a sense the meaning of the term is entirely relative, depending on the experience, judgment and application of the examiner. For general use in dairy inspection, a uniform standardized system should be established in order to define the minimum requirements of an examination and to indicate how often it should be repeated.

In infected herds, control depends on a knowledge of the cows that are not tubercular fully as much as a knowledge of those that may be found to be tubercular. In large herds where the infection is well distributed and in herds where exchange is frequent, it may be assumed that a knowledge of all the cases of open tuberculosis that occur in a herd is practically impossible. So long as tubercular animals continue to be found in a herd it is a safe assumption that unrecognized cases remain there. In estimating the value of different methods of diagnosis too much emphasis has been placed on their achievements, and not enough on their failures. This has resulted in placing too much reliance on the value of diagnosis in suppressive schemes."

Their report also deals with the advantages and limitations of the sputum cup as a means of diagnosis.

I commend the reading of the entire article to those who are interested since at this time there is a tendency for some to be overzealous in advocating one particular method of diagnosis as being superior and self-sufficient.

The diagnosis of tuberculosis is the weakest link in our chain at present and we are sorely in need of more accuracy in detecting a larger percentage of actually diseased animals.

Yours truly, J. F. DEVINE.

REVIEW

PRINCIPLES AND PRACTICE OF VETERINARY MEDICINE

DAVID S. WHITE, D.V.M.

Dean of the College and Professor of Veterinary Medicine
Ohio State University, Columbus, Ohio.

This is a new work of about 500 pages printed by Lea & Febiger of Philadelphia at \$3.25.

It is designed for students and others who have need of knowledge of the fundamental principles of the practice of veterinary medicine. In the preface Dr. White has a brief and very interesting discussion on the subject of text-books in veterinary medicine. At best the theory and practice of veterinary medicine is a formidable subject. To teach students its facts and theories, and to train them in their application—in the art of practice—is still more formidable. So that any compendium, text-book, or work of reference from a teacher of the experience and prominence of Dr. White is a contribution of great value. Teachers of the principles and practice of veterinary medicine in America have not distinguished themselves in recent years by contributions to veterinary literature. It has been suggested that they are too prone to let some other person do the teaching, get the experience, and write their books. It is a good omen that an American teacher should write a text-book on the subject. No subject in the entire curriculum is weaker in good text-books, clinical material, or the general organization for thorough teaching. Dr. White's statement in the preface that some of our best works are translations often made by those who are neither veterinarians or teachers of veterinary medicine, and too few of them linguists, is unfortunately true. There is no good reason why American professors of internal veterinary medicine should shirk the responsibility of contributing to the literature of their own subject.

Under the following eleven parts are concise and comprehensive descriptions of all the diseases ordinarily included in works on the subject of medicine:

Part I. Diseases of the Respiratory Organs, pages 17-66.

Part II. Diseases of the Circulatory Organs, pages 69-81.

Part III. Diseases of the Digestive Organs, pages 83-157.

Part IV. Diseases of the Reproductive Organs, pages 159-167.

Part V. Diseases of the Blood and Blood-producing Organs, pages 169-179.

Part VI. Diseases of Metabolism, pages 185-190.

Part VII. Diseases of the Organs of Locomotion, pages 193-198.

Part VIII. Diseases of the Kidneys, pages 199-208.

Part IX. Diseases of the Nervous System, pages 209-247.

Part X. Diseases of the Skin, pages 249-275.

Part XI. Infectious Diseases, pages 279-459.

The author is to be complimented on bringing the essentials of so large a subject within the covers of a 500-page book. As an outline for the teacher and student it will serve a highly useful purpose, since the amount of reading required to cover the subject of an hour's discussion is not more than one can reasonably demand from the student.

The usual classification is followed for the non-contagious diseases, and the highly practical classification according to symptoms for the infectious diseases in part XI. In the latter group the use of the term "Influenza" as a collective term for influenza and infectious pneumonia in the horse seems superfluous if not confusing.

As a compact work on the subject of veterinary medicine it occupies a field by itself in American literature. The text conforms to our most recent clinical experience and knowledge, and its construction is up to the usual high standard of the publishers.

D. H. U.

—E. A. Cockefair, farm adviser for Greene county, Missouri, has been co-operating with farmers of that county in gaining control of contagious abortion in dairy cows. The plan followed by Mr. Cockefair is to treat the herd of any farmer requesting it. This work is done confidentially, which results in more ready co-operation on the part of the farmers. * * * * —*Wallace's Farmer*.

All that seems lacking is the veterinary degree and the special training that goes with it.

—The veterinary hospital of Doctors O. M. and E. S. Norton and the work they are doing have received very favorable notice in a recent issue of the *Daily Democrat*, Greenville, Miss.

NECROLOGY

HOSEA B. CRANDALL

Doctor Hosea B. Crandall died at his home on Burnet Ave., Syracuse, February 2. He was afflicted with heart disease, asthma and Bright's disease for the past two or three years and of late had not been active in practice. Doctor Crandall was one of the pioneer veterinarians of Syracuse, having begun his work there some twenty-five years ago, and was prominently known throughout Central New York. He had a large following of friends and was an indefatigable worker. He was a member of the New York State Veterinary Medical Society and of the Central New York Veterinary Medical Association.

D. O. KNISELY

Dr. D. O. Knisely of Topeka, Kansas, died suddenly a few days ago. After completing his work at a call some distance from Topeka, he was observed to sink to the ground while walking toward his automobile, dying immediately. Dr. Knisely was one of the prominent practitioners of Kansas and the originator of the stomach tube that bears his name. He was a graduate of the Chicago Veterinary College in 1892; a very able practitioner and well known in the Southwest.

MISCELLANEOUS

—Dr. S. A. Alexander, a recent graduate of the Ohio State University has accepted the position of Assistant Professor of Physiology and Pathology at the A. and M. College, Raleigh, N. C., lately vacated by Dr. J. I. Handley, who has gone to East Lansing, Mich.

—The next meeting of the Missouri Veterinary Medical Association will be held in Sedalia, Mo., next July.

—Veterinarians McKim of Watertown, N. Y. and Zabriskie of New Jersey were among the sixty or more Americans held as prisoners by Germany. Their release has been demanded, granted, refused and at this writing it is again reported they will be released.

—The Edgar County Graduate Veterinary Medical Association was organized at Paris, Ill., January 25. Dr. W. B. Van Cleve of Chrisman was elected president and Dr. Franklin Adams of Paris was elected secretary-treasurer.

—A meeting of the Hudson Valley Veterinary Medical Society was held at the new County Court House at Albany, N. Y., February 7th. The subject for discussion was "Fractures."

—Dr. H. Nunn has removed from McMinnville, to Corvallis, Ore.

—Dr. G. A. Roberts of Raleigh, N. C. has suffered an irremediable loss in the death of his wife, Mrs. Emily Steinmetz Roberts. Her death followed that of an infant daughter, which occurred two days previously. The news of Mrs. Roberts' death will cause deep regret in a large circle of friends.

—At a recent meeting of the Kiwanis Club at Utica, Dr. W. G. Hollingworth spoke in favor of more efficient meat and dairy inspection for the city.

—Dr. Charles M. Walton has returned from Army detail on the Mexican Border to his former station at National Stock Yards, East St. Louis, Ill.

—Dr. Ross C. Roueche has resigned from the Bureau of Animal Industry and accepted the position as Chief of the Bureau of Food and Dairy Inspection of the Division of Health in the City of Cleveland, Ohio.

—Dr. D. E. Collins has been placed in charge of the federal meat inspection station at Faribault, Minn.

—Dr. Harry F. Kern has resigned from the Bureau of Animal Industry and returned to Manila where he will reenter the veterinary service in the Philippine Islands.

—Dr. O. J. Lanigan has been transferred to New Richmond, Wisconsin, and designated as inspector in charge of the federal meat inspection service which has opened up a new station at that place.

—Dr. O. E. Lindburg has removed from Sioux City, Ia. to 2573 St. Mary's Ave., Omaha, Nebr.

—Dr. A. E. Tillisch has removed from Tracy, Minn. to Westbrook, Minn.

—Dr. R. W. Steigely, formerly of La Porte, Ind., has removed to New Carlisle, Ind.

—Dr. F. T. Kocher has removed from Marietta, Pa. to College Park, Md.

—Dr. R. E. Cropper, formerly of Bullittsville, Ky., has removed to 129 East 55th St., Chicago, Ill.

—The next meeting of the Illinois State Veterinary Medical Association will be held at East St. Louis, July 18 and 19.

—Dr. D. Mattrocee, formerly of Los Banos, Cal., has been reappointed County Live Stock Inspector and will be located in the future at 51 18th St., Merced, Cal.

—Dr. J. D. Dunkel, of New York, has taken up the duties of chief inspector of the Manhattan Sanitary Inspection Association, vice Dr. John J. Hayes. Dr. Hayes has accepted a lucrative position as Assistant Superintendent of the New York City branch of Armour & Co.

—Dr. Preston B. Scott has been transferred to San Antonio, Texas, to take charge of export and import inspection of animals along the Mexican Border.

—D. James C. Murphey, of Kansas City, Missouri, has removed to Imperial, California, where he will supervise the manufacture of anti-hog-cholera serum at the plant of the Imperial Valley Serum Company.

—Dr. Guy T. Cole has been transferred to Moultrie, Georgia, where he will have charge of federal meat inspection at the plant of the Moultrie Packing Company.

—Dr. Carrol P. Hart has removed from National Stock Yards, East St. Louis, Illinois, to Morristown, Tennessee. He will have charge of the meat inspection work of the Bureau of Animal Industry at the latter place.

—Dr. William T. Conway has been designated as inspector in charge of the Bureau of Animal Industry station at New Haven, Connecticut.

—Dr. Frank P. Engel, Fort Worth, Texas, who was graduated from the San Francisco Veterinary College in 1913, and has been in the Bureau of Animal Industry for over two years, died on February 12, 1917, of acute appendicitis.

ASSISTANT STATE VETERINARIAN—ILLINOIS. On March 3, 1917, the Illinois State Civil Service Commission will hold assembled examinations at Anna, Carbondale, Charleston, Chicago, Danville, DeKalb, East Moline, East St. Louis, Elgin, Jacksonville, Kankakee, Lincoln, Macomb, Mt. Vernon, Normal, Peoria, Pontiac, Quincy, Rockford, Springfield, and Urbana for the position of Assistant State Veterinarian. Salary \$8 per day, when working. Open to male citizens of Illinois over 21 years old. The duties of the position involve sanitary control of live stock and making differential diagnosis under direction of the Live Stock Commissioners; requiring graduation from a Veterinary College of recognized standing, with a license to practice the veterinary science in Illinois, and experience as a veterinarian.

In general, the examination will consist of the following parts weighted as indicated:

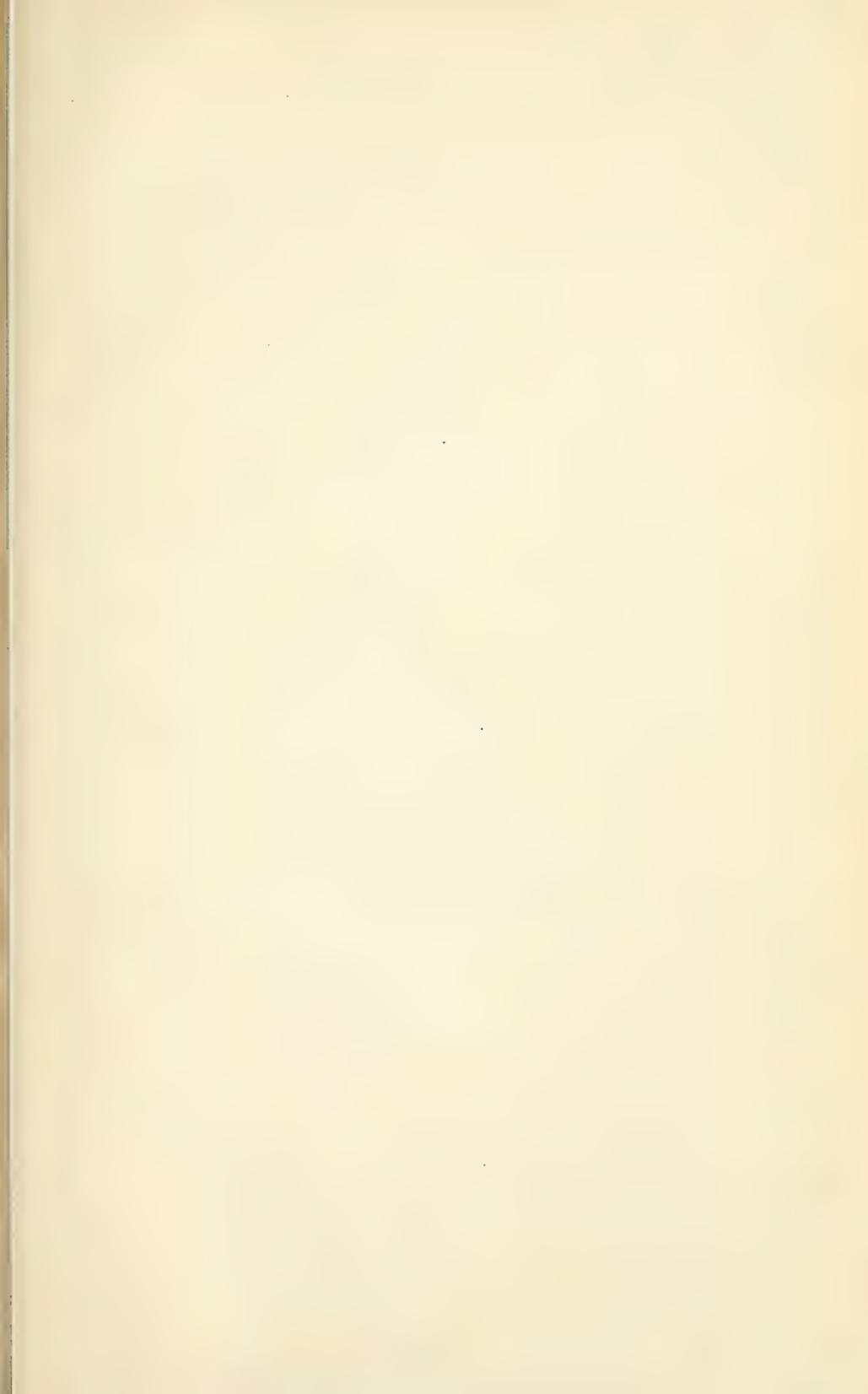
Training and Experience	3
Special subjects, including questions on sanitary control of live stock and differential diagnosis	7

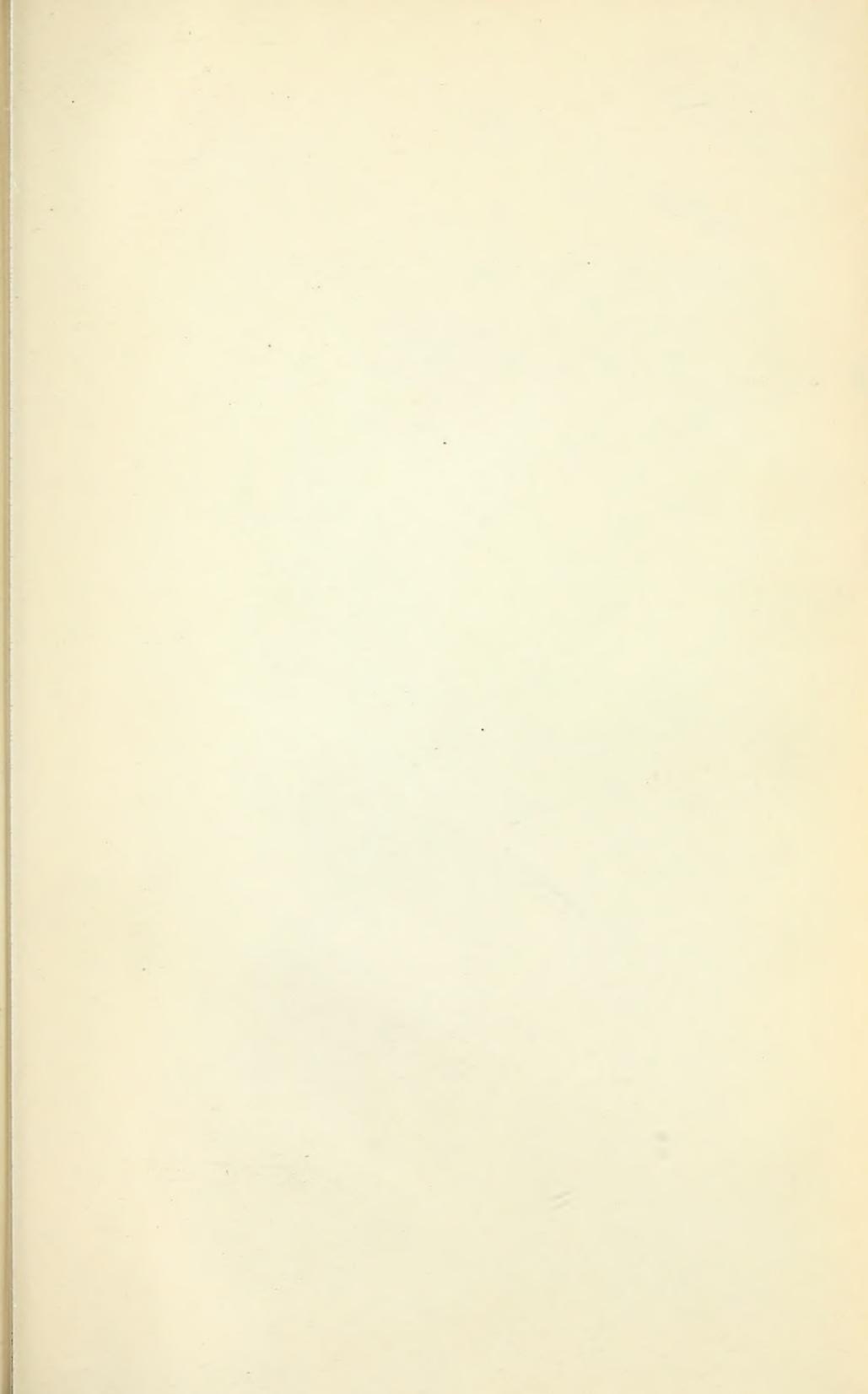
A minimum grade of 65 is required on special subjects.

Application must be on file in Springfield before 5 P. M., Saturday, February 24, 1917. Application blanks may be secured by addressing the State Civil Service Commission at Springfield, Illinois, or at Room 602, No. 15 South Market St., Chicago.

Persons receiving copies of this notice are requested to call the examination to the attention of qualified persons.

The Commission has no further information to give out than is contained in this circular.





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