gery, six. A total of eight students have taken their graduate degrees in the last six years. The total enrollment of the graduate college has increased rapidly since 1919, and much of this development is due to the efforts of Dean Buchanan, who is well known to many of our veterinarians on account of his book on veterinary bacteriology.

VIII.

STATE BIOLOGICAL LABORATORY

THE State Biological Laboratory was established at Iowa State College under a law which provided for "a laboratory for the manufacture and distribution of hog cholera serum, toxins, virus and biological products at the Iowa State College of Agriculture and Mechanic Arts, etc." This act was approved April 23, 1913, and became effective upon publication in the Register and Leader and the Des Moines Capital. The reaction to the losses from hog cholera came during 1913. The figures gathered by the assessors gave the exact number of hogs dead from hog cholera that year as 2,709,876. It is not strange that Iowa should be immediately interested in the question of hog cholera control since about one-sixth to one-seventh of the swine of the United States have been produced in Iowa every year. Thus it can be seen that we have had a very fertile soil in which to develop the disease. After Dr. Niles' resignation, the Bureau of Animal Industry established a field laboratory near Ames. This work was continued during 1907, and then the problem arose as to how this new method of vaccinating hogs had best be applied to the problem of hog cholera control. The first announcement to the public of the methods used was made at a conference of federal and state officers at Iowa State College on May 30, 1908. The following extract from the report of the State Biological Laboratory in 1915 gives one a general idea of this significant meeting.

"The purpose of this conference was to discuss the practical application of a vaccine recently developed by Doctors Dorset and Niles of the Bureau of Animal Industry and determine lines of investigational work in connection with the use of the vaccine in the control of hog cholera. The conference was held in Agricultural Hall, on the campus of the Iowa State College. Dr. A. D. Melvin acted as chairman of the conference.

"The following persons were present: Dr. A. D. Melvin, chief of the Bureau of Animal Industry; Dr. M. Dorset, chief of the biochemical division of the bureau, and Mr. H. J. Shore of the same bureau, all of Washington, D. C.; Dr. W. B. Niles, in charge of the bureau's field experiments in Iowa; Dr. R. R. Dinwiddie, pathologist and bacteriologist of the Arkansas Experiment Station, Fayetteville; Dr. F. S. Schoenleber, experiment station veterinarian, Manhattan, Kan.; Dr. A. T. Peters, animal pathologist of the Nebraska Experiment Station, Lin-

coln; Director C. F. Curtiss and Drs. John H. McNeil and C. H. Stange of the Iowa Experiment Station, Ames; Dr. J. W. Conaway, experiment station veterinarian, Columbia, Mo.; Dr. M. H. Reynolds, experiment station veterinarian, St. Anthony Park, St. Paul, Minn.; Dr. Paul Fischer, state veterinarian, Columbus, Ohio; Dr. C. E. Marshall, experiment station bacteriologist, Lansing, Mich.; Dr. R. A. Craig, experiment station veterinarian, Lafayette, Ind.

"Following the address by the chairman, stating the purpose of the conference, the state officials were called on to express their opinions regarding the use of the vaccine and means of production and distribution to the farmers in their respective states."

In the spring of 1909 the Legislature convened and prepared to establish a laboratory to manufacture hog cholera serum. There was some discussion as to whether it should be at Iowa State College or at Des Moines, but it was finally concluded to locate the laboratory at the capital city. A sum of $8,000 was appropriated for this purpose and two years later an additional $5,000 was appropriated for the same laboratory.

In the interim between the legislative meetings of 1911 and 1913, hog cholera had increased considerably in the state. The feeling was growing that laboratory methods and practices had better be combined with a technical institution where the members of the staff were familiar with the technique in producing biological products. As a result the act already referred to was adopted by the legislature. The demand for serum can readily be imagined when we realize that the farmers of Iowa were losing on the average of $76,548 per day. As a result of this demand, it was necessary to purchase serum wherever it might be procured and send it out, while our own plant was under construction. Temporary pens were built and an alley was constructed leading into the Anatomy Laboratory, which was used during the summer months. Before our own serum could be produced and tested, we distributed 901,750 cc. of serum which we had purchased from Kansas, Kentucky and the commercial plant at Sioux City, Iowa. It was provided that each person, firm, company or corporation desiring to sell serum in the state must give a bond to the director of the laboratory and such other evidence as he might require to secure a permit to sell within the state. The director was required to set a standard of potency which all serum must meet in order to come under the requirements of the law. During 1913, 25 such permits were granted and by the end of 1914, 62 companies had been given permits to sell serum in the state. The original act required that each shipment of serum and virulent blood must be made with the permission of the director of the laboratory. The most difficult provision in the law to administer was the provision to grant permits to use virus, and in order to reach a reasonable conclusion a conference was called to which the state veterinarian, the president of the State Veterinary Association, Dr. W. B. Niles; the president and secretary of the Iowa Swine Breeders' Association, the dean of agriculture, head of the Animal Husbandry Department, and the director of the State Biological Laboratory were

invited. One of the conclusions reached by this committee was the following:

"The law does not clearly state whether or not the use of virus shall be limited to practicing veterinarians, but it does clearly indicate that much information which veterinarians have is essential to the use of virus; therefore the director should use special care to satisfy himself in connection with application of any person other than a competent veterinarian, that this person is sufficiently trained along the lines of sanitation, immunization and bacteriology to have a fundamental knowledge to enable him to receive the brief instruction that is offered at the college for persons wishing to secure permits."

Of the $35,000 appropriated, approximately $18,000 was put into buildings of semi-permanent character. This left a working fund which, however, was not sufficient to enable us to store serum in any considerable quantity. This became known to a number of swine owners and others, and as a result $12,100.34 was advanced on orders during the winter season. The sale price of our serum was 2 cents per cc. until June 1, 1914. The price was then reduced to 1½ cents per cc.

It must be remembered that the supervision of all commercial plants, the testing of samples of serum, the supervision of the use of virus and all overhead was charged to the cost of serum produced here.

We have already referred to the beginning of the operation of the laboratory and the kind assistance of Dr. Murphey, Dr. Murray and other members of the staff. On September 1, 1913, Dr. C. G. Cole was put in charge of serum production and testing, and Dr. D. W. McAhern, who was pathologist for the state serum plant at Des Moines before it was transferred to the college, was secured as an assistant. He soon, however, received an offer from a commercial serum plant and resigned. Dr. J. D. Cecil of Philadelphia was secured for the vacancy, but in a few months he also accepted a position with a commercial firm. Dr. N. E. Koenig of Cornell University was then secured to fill the position, which he held until 1916.

The work which had been begun in 1913 had developed to such an extent that additional help was necessary and Dr. Lew McElyea was appointed on the serum inspection work May 8, 1916. Dr. McElyea is now in commercial work in the city of Ames. Dr. Cole is with the Bureau of Animal Industry in the field laboratory in which the hog cholera vaccination methods were worked out in the beginning. Dr. F. W. Cairy was added to the staff soon after the laboratory was established. He is now identified with the commercial serum work at Sioux City, Iowa.

During 1914 an outbreak of foot and mouth disease appeared in the United States and spread to several parts of the state of Illinois thru hog cholera serum which had been manufactured in a plant located at the Union Stockyards, Chicago. This led to a more rigid supervision and the necessity of testing all serum produced on calves for foot and mouth disease before it was distributed.

During 1913 and 1914, four extension veterinarians were employed for an additional program on the use of hog cholera serum. Five

hundred and thirty-five lectures and demonstrations were given and 20,379 people from every county in the state were reached.

It was not our desire to become permanently established in serum production work, and the public generally preferred to deal with people in commercial work. The percentage of serum supplied by the State Biological Laboratory as compared with the total amount used, showed an annual decrease.

There were no policies or precedents, and the following quotation from the last, but unpublished, report from the director of the State Biological Laboratory is interesting in this connection:

"At that time (1913) there was much contention among persons in charge of hog cholera work in the various states as to whether the use of virus should be permitted and, if so, under what conditions. After careful consideration of the advantages as well as dangers associated with the use of virus the following conclusion was reached:

"Immunity produced by injecting serum lasting for but a few weeks can be made permanent by the use of a small quantity of virus at a very slight additional expense. The expense of applying serum alone treatment for obtaining protection for but a few weeks under Iowa conditions is not justified and would be a disappointment to stockmen. The interests of the state would be served best by adopting, except in a limited number of cases, the simultaneous (serum and virus) treatment. All possible precautions that would not interfere with efficiency should surround the distribution and use of virus, which should be kept in the hands of those trained to use it.

"There is every evidence that our policy has not been wrong for Iowa conditions. Our records indicate that in 1918 approximately 96 percent of the hogs treated were treated by the simultaneous method, while in the beginning the virus was used in about 88 percent of the herds treated. With the increased use of serum and virus in Iowa there has been a constant decrease in hog cholera. From our experience one is forced to the conclusion that, based on our present knowledge of the disease, the future control of hog cholera depends on the careful application of the simultaneous treatment by properly trained men before the disease appears in the herd. This should be accompanied by education as to proper sanitary measures. In other words, we must keep ahead of the disease and not follow it."

As the demand for serum decreased, we finally discontinued production and bought serum from a reliable commercial concern and distributed it for a couple of years. In the meantime the legislature had authorized us to use the buildings and grounds for research and other work of the Veterinary Division. During the entire period the records show we produced 25,793,357 cc. of serum; of this 24,770,467 were sold, 209,910 were used in the laboratory, 282,540 were used for revaccination purposes for which no charge was made, and 503,995 cc. were destroyed.

During this period we bought and used 26,568 head of hogs. The total number of permits issued to all companies for sale of serum and virus in the state was 84. During the period from 1913 to 1920, altho it required much time and effort on the part of the administration of

the Veterinary Division and was distracting from an educational and research standpoint, the value of the work should not be underestimated. On January 1, 1913, there was no regulation, whatsoever, for the production of hog cholera serum and virus; there was no plan or policy in regard to the control of hog cholera where the production of immunity was involved; the practical application of the serum and the best methods to be employed were not yet known. It was necessary for someone to organize the work, marshall all the facts known and figure out a plan how they could be best utilized to control the enormous losses the livestock industry of the state was suffering. We believe that it is fair to say that these problems were worked out in a quite satisfactory manner during that period of time.

IX.

VETERINARY MEDICAL SOCIETY

THE Veterinary Medical Society of the Iowa Agricultural College was organized in the spring term of 1884. As the senior students of the veterinary course realized the necessity of a society, the object of which should be the discussion of matters relating to veterinary science for the improvement of its members, a meeting of the veterinary students was called and the organization of the society determined upon.

Many difficulties attended its organization. The rules of the college were such that the permission of the college faculty had first to be obtained. It was given upon certain conditions. Notwithstanding the many difficulties, the society was organized with the following charter members:

W. E. D. Morrison — G. M. Osborn
W. B. Niles — E. E. Sayers
M. E. Johnson — D. E. Collins
W. R. Whiteman.

Most of the spring term was utilized in perfecting the organization, much interest being taken by the members, and at the close of the fall term two senior students were graduated from the society.

In the spring term of 1885, the original constitution and by-laws, being somewhat defective, were revised, but no marked changes made. Several new members joined at the opening of this term, and increased interest was taken in the society. At the close of the fall term, four senior students were graduated.

Near the close of the spring term of 1886, the constitution was altered and the dean of the veterinary faculty was made permanent president and the house surgeon first vice-president. During this year the society numbered more members than at any previous time in its history. Near the close of the fall term, arrangements were made and perfected for incorporating the society under the laws of the state of Iowa. These arrangements were to be carried out and the society