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THE SCIENCE OF BACTERIOLOGY IN THE STATE OF WASHINGTON*

Doubtless it is generally known that bacteriology as a science is scarcely a half century old. True, the bacteria were discovered some two and a half centuries ago, to be exact in 1675, when Anton Leenvenhoek first saw them through a microscope which he had constructed; however, facts accumulated very slowly before 1850. In 1820, Ozanum, an English writer of a leading textbook on medicine, could say: "Many authors have written concerning the animal nature of infectious diseases; many have indeed assumed it to be developed from animal substances, and that it is itself animal and possesses the property of life. I shall not waste time in efforts to refute such absurd hypotheses." Yet, another fifty years sufficed to establish firmly these "absurd hypotheses," while 100 years sufficed to make bacteriology fruitful in its contributions to agriculture, industry, sanitation and medicine, until now we enjoy a new, better, safer and richer world than that in which Ozanum lived.

The new bacteriology was not long in establishing itself in the young State of Washington. Before the State's Enabling Act was 20 years old, bacteriological laboratories were established for instruction, for the diagnosis and control of infectious diseases, and for improving public sanitation.

Bubonic Plague Averted

In 1907 there occurred in the State of Washington an event the importance of which is not generally realized; bubonic plague broke out in Seattle on October 1, resulting swiftly in the death of five persons before the cause was discovered. An unchecked epidemic of plague would have meant the paralysis of industry and commerce, and the loss of money and precious lives. The leaders in control of public health, Dr. E. E. Heg, State Commissioner of Health, and Dr. J. E. Crichton, Commissioner of Health for Seattle,

* The series of articles on the History of Science in the State of Washington is continued in this issue, including this article by Professor John Weinzirl on "The Science of Bacteriology in the State of Washington," and followed by Dean C. W. Johnson's article on "History of Pharmacy in the State of Washington" and by Professor Effie I. Raitt's article on "Home Economics in the State of Washington." Other articles are in course of preparation.—EDITOR.

lost no time in placing control of the epidemic in the hands of the experienced workers of the Federal Government. Dr. B. J. Lloyd and Dr. C. W. Chapin, Bacteriologist, of the United States Public Health Service, took charge of the control work, and not another single human death from plague occurred, although infected rats were occasionally found in the following seven years.

The year 1907 found in Seattle: (1) the Plague Laboratory of the United States Public Health Service; (2) the State Board of Health Laboratory with Dr. Rose A. Bebb as Bacteriologist; (3) the Seattle City Laboratory with Dr. W. R. M. Kellogg as Bacteriologist; and (4) the University of Washington Bacteriological Laboratory. The first three had received their impetus from the threatened epidemic, the last had come in response to a general demand for instruction in the new and rapidly growing science of bacteriology. Professor John Weinzirl was placed in charge of the University Laboratory, and while the equipment was meagre, still the first class of students numbered sixteen, and of this first class three became bacteriologists. The University Bacteriological Laboratory was fathered by the Botany Department for seven years when it became an independent department in 1914.

During the ten years 1907 to 1917, bacteriological work was firmly established in our State. As a result of a severe typhoid epidemic, Yakima City and County established a laboratory about 1910, with Miss Alice Montgomery (now Mrs. E. L. Range), as Bacteriologist. The State Food Control Division frequently made use of the University Laboratory for the testing of questionable food products. Private laboratories also had made their appearance. Among the latter were the Physicians' Clinical Laboratory of Seattle with Dr. O. G. West as director, and the Peterkin Memorial Laboratory of Seattle with Miss Maude W. Fos as Bacteriologist and Serologist. Miss Fos and Miss Montgomery were both University of Washington graduates.

Influence of the World War

Regrettable as it must appear, only catastrophes seem able to shake humanity from the lethargy of daily routine. In 1917, ten years after the threatened epidemic of Black Death in Seattle, a real catastrophe occurred when the United States was forced to enter a world war in which thousands of lives and billions in treasure were sacrificed. We emerged victorious, but it was necessary to draft not only men and money, but science as well. The science of bacteriology saved the life of many a soldier. The

Spanish War with 100,000 drafted men developed approximately 15,000 cases of typhoid fever with many deaths; during the World War with 4,000,000 men drafted, we had approximately 500 cases of this disease. Tetanus and septicaemia which commonly follow gun-shot wounds were also largely avoided. These and many other similar victories of bacteriology emphasized its importance to humanity. At once the hospitals called for laboratories which were established with great rapidity, and ten years after the close of the war, no standardized hospital approved by the American College of Surgeons is without one. In addition, private or so-called clinical laboratories have come into existence to reinforce the work of the many practitioners. One type of clinic, a group of medical specialists working together, commonly establishes a laboratory to aid diagnostic and therapeutic practice. The number of such hospital and private laboratories in the State of Washington is now about thirty, and no city is without one or more.

The increased demand for bacteriological service occasioned by the war was reflected also in the Public Health Laboratories. Whereas the Seattle City Laboratory started with Dr. H. E. Coe as a part time worker, it now employs five bacteriologists including the Director, Dr. P. C. West; the State Laboratory with a similar start now employs five including the Director, Dr. A. U. Simpson.

In Educational Institutions

At the educational institutions the effect of the war was likewise felt. The number of students in the Bacteriology Department of the University of Washington doubled immediately. Lack of space and equipment now compels the placing of limitations upon the number of students that may enroll in many of the courses. The number of courses offered has also been greatly increased until now it includes General Bacteriology, Sanitary Bacteriology, Public Hygiene, Infectious Diseases, Clinical Diagnosis, Serology, Pathology and Applied Bacteriology in the undergraduate years, and Seminar, Advanced, Research and Journal Survey in the post graduate years. The Bacteriology Department also furnishes service courses to medicine, nursing, pharmacy, fisheries, engineering, education and science. It enrolls about fifty majors of which a considerable number are graduate students. Those planning to do clinical laboratory work are provided with a Set Course which prescribes the supporting subjects. A unique feature of this course is the Applied Bacteriology in which students are required to apply their knowledge in actual practice in co-operating laboratories. In

this way the student is prepared to enter any laboratory and to carry on the work with full confidence.

At the State College of Washington, bacteriology has also been raised to an independent department with Professor Victor Burke as head. The enrollment at the College is very large because their courses are extensively elected by students in the applied sciences, such as veterinary medicine, dairying, soil science, and home economics. Their courses include most of those offered at the University and in addition those bearing more directly upon agriculture, such as Dairy Bacteriology and Soil Bacteriology. The State College also houses the Agricultural Experiment Station manned by full-time research workers, including of necessity a bacteriologist.

The State Normal Schools do not offer bacteriology as such, but include more or less instruction in it under their biology courses. At Whitman College, Walla Walla, however, General Bacteriology has been given for a number of years by Professor H. S. Brode. It is interesting to note that a considerable number of Professor Brode's students have continued to study bacteriology at the University of Washington and elsewhere, and they are now engaged in bacteriological work. The College of Puget Sound at Tacoma has also given General Bacteriology for a decade at least, and its history closely parallels that of Whitman College.

Public Health Laboratories

Before closing this phase of our subject it may be interesting to many to know of the work done in the Public Health and in the Clinical Laboratories. The work of the former commonly covers two phases, namely, the analytical and the diagnostic determinations. Under the former, water, milk and other foods are examined to determine their fitness for consumption by the public; under the latter various pathologic specimens, such as blood, urine, sputum and others are examined for disease bacteria or for immune bodies. Diphtheria, Typhoid, Tuberculosis, Syphilis and other diseases are diagnosed in part by means of such examinations, and these diagnoses furnish a sound basis for the control of infectious diseases. It may be a surprise to know that in the State Department of Health Laboratory, the number of such examinations annually reaches well above 50,000.

In the Hospital and Diagnostic Laboratories, the work always bears upon the diagnosis of diseases, but it is quite different from the Public Health Laboratory in that pathology, chemistry and bacteriology are combined in furnishing the basis for conclusions.

Blood may be examined bacteriologically, serialogically or chemically to furnish the necessary data. Tissues are commonly examined pathologically for the diagnosis of tumors and other conditions. Probably the best way of gaining a realization of the value of these laboratories is to note their number. To this end a list with their present directors is here included:

<i>Seattle:</i>	<i>Chief of Laboratory</i>
State Department of Health Laboratory	Dr. A. U. Simpson
City Department of Health Laboratory	Dr. P. C. West
<i>Spokane:</i>	
City Department of Health Laboratory
<i>Yakima:</i>	
County-City Dept. of Health Laboratory	Miss Katherine Stewart
<i>Tacoma:</i>	
City Department of Health Laboratory	Miss Peterson

Clinical and Bacteriological Laboratories

<i>Aberdeen:</i>	
Biological Laboratory	Mr. G. J. Scott
<i>Bellingham:</i>	
Heinemann Diagnostic Laboratory	Dr. Heinemann
<i>Everett:</i>	
Western Laboratories	Mr. H. A. Felder
<i>Olympia:</i>	
Olympia Biological Laboratory	Mr. L. T. Swenson
<i>Seattle:</i>	
Peterkin Memorial Laboratory	Miss Maude W. Fos
Crescent Biological Laboratory	Miss Lodie Biggs
Garhart Diagnostic Laboratory	Dr. M. N. Garhart
Hoff Wassermann Laboratory	Mr. H. A. Hoff
Pacific Wassermann Laboratory	Dr. Robt. Freeman
Physicians Clinical Laboratory	Dr. G. A. Magnussen
Polyclinic Laboratory	Miss Hattie Fitzgerald
<i>Spokane:</i>	
Hollister and Stier Laboratory	Mr. Guy Hollister
Drs. Patton and Patton Laboratory
<i>Tacoma:</i>	
Porro Laboratory	Mr. Thomas Porro
<i>Wenatchee:</i>	
Wenatchee Diagnostic Laboratory	Mr. Dirks
<i>Yakima:</i>	
Western Laboratories	Miss Prior
<i>Walla Walla:</i>	
Western Laboratories

*Hospital Laboratories**Seattle:*

Swedish Hospital Laboratory	Dr. D. H. Nixon
Providence Hospital Laboratory	Dr. V. Cefalus
Virginia Mason Hospital Laboratory	Mr. W. E. Gibb
Seattle General Hospital Laboratory	Miss Minnie L. Parker
Orthopedic Hospital Laboratory	Miss Cornelia Drake

Everett:

Everett General Hospital Laboratory	Miss Cramer
Providence Hospital Laboratory	Mrs. Dorothy Ness Hopper

Tacoma:

Tacoma General Hospital Laboratory
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The McDermott Bequest

Still a third event, sad and unfortunate, enters into our local history. Death claimed Mrs. Josephine Patricia McDermott, on February 7, 1920, and earlier had claimed her daughter, Alice. In her will Mrs. McDermott bequeathed \$100,000 to the University of Washington, as a memorial to her daughter, to be used in the study of two dreadful diseases, tuberculosis and cancer. The money became available in 1925 when The Alice McDermott Foundation was created with Dr. John Weinzirl as director. Thus far the income from this fund, supplemented by annual gifts from the Washington State Tuberculosis Association, has been devoted to research on tuberculosis. This field seems to afford the greatest promise of progress. A considerable body of data has been secured and is being compiled for publication. Both scientific information and practical results are sought in this field of endeavor.

By these noble and generous gifts, the State of Washington is able to contribute its share toward the knowledge which it is hoped will result in the discovery of a more efficient treatment for one of the remaining scourges of the world.

In Conclusion

Twenty years is a brief period, but in that time bacteriology in the State of Washington has assumed an important role. It has halted epidemics of bubonic plague, typhoid, diphtheria and other diseases; it has helped to save many lives in and out of hospitals; it has made water and food both safer and cleaner; it has enriched the soil so that two blades of grass may now grow where but one would grow before; and by these services it has made our beautiful State a better place in which to live.

JOHN WEINZIRL