

## History of Bacteriology at Indiana University\*

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The first course in bacteriology at Indiana University was offered by Professor Robert E. Lyons in the Department of Chemistry one year after his return from a three and one-half-year trip to Europe to study in certain laboratories. During his training in Chemistry (B.A. and M.A. degrees) at Indiana University with Professor Thomas Carleton van Nuyts, Professor Lyons had developed an interest in the branch of chemistry we now call biochemistry and in zymochemistry or the chemistry of fermentations. To further his education in these matters he went to Germany in the fall of 1892 and studied bacteriology at the University of Heidelberg and in the laboratory of Professor Fresenius at Biesbaden. Later he also studied at Jorgensen's laboratory in Copenhagen and with Metchinkoff at the Institute of Pasteur in Paris.

The first course which ran throughout the year, was given as an elective course in the evenings from six to nine on the Monday, Wednesday and Friday evenings. The students primarily were advanced and graduate students in chemistry. For the work in bacteriology there were available several rooms including a laboratory, an office and an adjoining media kitchen on the second floor in the north end of Wylie Hall. The laboratory was equipped with work tables facing the windows around three sides of the room, and general work and preparation tables were placed in the center of the laboratory. The work tables were covered with alternate squares of black and white enameled plate glass, and which, according to the catalogue, made possible absolute cleanliness and furnished a choice background in the observation of cultures! The professor's office occupied a small corner of the wing and opened directly into the laboratory. The kitchen adjoined the laboratory on the side of the central wing of the building.

The laboratory equipment was good for its time. Certain of the larger items had been purchased by Professor Lyons in Germany, as President Swain had made available certain funds for this purpose in order that the most modern equipment be viewed and purchased. The sterilizers consisted of a hot-air oven and, from Berlin, a Koch intermittent steam sterilizer (gas heated). Since Petri plates were then unknown, the plating was done on plain glass plates which had been sterilized in a tight metal container. Very little agar was used as a solidification agent, so gelatin was poured on the glass plates which were

\* The author is greatly indebted to Professor Robert E. Lyons for contributing much of the information upon which this report was based. In addition to this Professor L. F. Rettger, of Yale University, kindly prepared a short summary of the material relating to the years when he was a student, and likewise, Professor I. M. Lewis, of the University of Texas, supplied certain facts shortly before his death.

cooled on blocks of ice and placed on small glass benches under a bell jar. Thus plating was an arduous task especially if the gelatin had been overheated and failed to solidify but ran down the sides of the glass. Cultures which liquefied the gelatin gave rise to more trouble.

There were twelve Bausch and Lomb microscopes, each equipped with  $\frac{1}{3}$ ,  $\frac{1}{4}$  and  $\frac{1}{2}$  objectives, as well as a modern microtome. Anaerobic cultures were prepared by the hydrogen displacement method, involving the well-known expedient of testing the degree of oxygen displacement by the test tube Bunsen flame test. Considerable excitement was caused one evening when three or four students were using this procedure. The most daring in the lot insisted on standing over the gas-displacement jar when making the combustion test. He started to collect a second sample of gas from the bell jar, when suddenly there was a loud report and the upper part of the bell jar was hurled to the ceiling by the force of the explosion, the jar just grazing the nose of the daring experimenter. The hole in the ceiling made by the knob of the bell jar long remained as a grim reminder of what questionable judgment and technique might bring to future "experimenters." Thus we have the picture of the laboratory.

Two courses were offered in 1896-97—Chemistry 16 and 17. The former was the lecture course and was described officially as follows: "Lectures and demonstrations concerning the structure and composition of the bacterial cell; the life history and environment of bacteria; the germ theory of disease; the chemical nature of the products of bacterial activity; the technical application of bacteriology." Chemistry 17 was the parallel laboratory course and of it we have "Methods of culture; isolation and identification of the common non-pathogenic and pathogenic microorganisms; inoculation experiments; staining of sections; bacteriology of water, etc." In 1897-98, Chemistry 25 or "Special independent work" was added to the list. By 1901-02 the demand was such that additional laboratory sections introductory courses were arranged and the lecture course moved to the day time hours—Monday, Wednesday and Friday at 2:00. About this time course 25 became a series of lectures on selected topics including disinfection, immunity, serum therapy, filtration of water, etc. Course 26 was added. This was a laboratory course concerned with the following: Bacteriological examination of air, water, and foodstuffs, testing of disinfectants, antiseptics, and sanitary appliances. A reading knowledge of German was prerequisite in addition to the elementary bacteriology courses. The final course added, about 1902, was "Bacteriological Chemistry" and this was concerned with laboratory work in the preparation of metabolic products of micro-organisms and the testing of antitoxins. In addition to German and elementary bacteriology the prerequisites included organic chemistry and physics.

For some years, about 1900, instruction during the summer was offered, first at the Indiana University biological station at Turkey Lake and later at Winona Lake, and at the same time opportunity was afforded for the study of lake flora. Early assistants in bacteriology included Leo F. Rettger, Frederick N. Duncan, and George F. Bicknell.

In the fall of 1903, in recognition of the modern trends in medical education, Indiana University established as a separate division a medical school. Two years of collegiate work were required for entrance and only the first two years of the medical work were offered. All instruction was on the Bloomington campus. Included in the winter and spring terms of the curriculum of the second year were the introductory courses in bacteriology (Chemistry 16a and 16b), which were given by Professor Lyons, who gave, also, the courses in organic chemistry and physiological and pathological chemistry. In 1905 the Department of Pathology was established. The instructional work in bacteriology was transferred to the department with Wilfred H. Manwaring, Associate Professor, giving the lectures in the first years. The laboratories in Wylie Hall were continued and a small animal barn was available for the production and study of curative sera.

By 1907 he was aided by Lemuel W. Famulener as assistant professor. About this time the work of the second year was concentrated on the Indianapolis campus and thus the Bloomington campus was left without instruction in bacteriology. Professor Manwaring resigned and was succeeded by Henry R. Alburger, who was aided in the early years by T. V. Keen, Harry K. Langdon, Cameron Chamberlain, J. P. Christie, Alfred Henry, Walter F. Kelly, John D. Stewart and Ada Sweitzer.

Of considerable importance with reference to the training offered by Professor Lyons in the early days is a list of several students who were destined to become prominent in the field of bacteriology and related sciences. Leo F. Rettger, who served as a graduate assistant, was one of the first to take the M.A. degree in biochemistry and leave the school for additional study at Yale University. It was not long before he was well known as Professor of Bacteriology at Yale. James N. Currie, after working for the Bureau of Agriculture in Washington, became associated with the Charles Pfizer Company in Brooklyn. There he developed an outstanding commercial process for the production of citric acid by mold cultures. Willis D. Gatch is now Dean of Indiana University School of Medicine. The name of George Dick is known to all of you in connection with the Dick Test. Oscar Schultz later became Professor of Pathology and Bacteriology at Western Reserve University. Isaac M. Lewis, a student of Manwaring, became Professor in charge of Bacteriology at the University of Texas.

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The following notes relative to bacteriology at WABASH COLLEGE were received in a letter from Professor A. R. Bechtel, who was unable to be present. Bacteriology was first offered at Wabash College in 1893-94 by Professor Mason B. Thomas, who came from Cornell University. The course was offered primarily for science majors and pre-medical students. Essentially the same material is offered at the present as a four-credit course.