

The Knowledge Bank at The Ohio State University
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Electrical Department

By PROFESSOR F. C. CALDWELL

IF THE curious investigator seeks to ascertain from the records of the university when the department of electrical engineering was created, he is likely to conclude that it never was created, but like Topsy, it "just grewed." The author was called to the university in the fall of 1893 as assistant professor in the department of Physics, but for the purpose of teaching classes in Electrical engineering. In 1896 his title was changed to that of Assistant Professor of Electrical Engineering, and he was given entire charge of classes in Electrical Engineering, but the munificent appropriation of \$500 was made for Physics and Electrical Engineering, jointly. In May, 1897, the budget for "The Department of Electrical Engineering" was considered by the trustees and in 1898 Electrical Engineering was definitely listed as a separate department in the appropriations. Consequently for want of a better date, 1897 may well be chosen as the year of the beginning of this department. Electrical Engineering as a study, however, had preceded this date by a considerable period. A curriculum was established in 1889 but, as in many other institutions, the teaching of this subject was begun in the department on Physics. A \$10,000 appropriation by the legislature led to the construction of the first Electrical Engineering laboratory in 1889, and the first degrees in Electrical Engineering were given in 1891 to Norman W. Storer and George N. Cole. For this beginning in the organized teaching of Electrical Engineering, credit is due to Professor Benjamin F. Thomas, at that time professor of Physics. It is, however, necessary to go far back of this date to find the beginning of interest in applied electricity at Ohio State. Numbered among the first faculty was that famous professor of physics, later a trustee of the university, Thomas Corwin Mendenhall. The following, closely quoted from a memorandum by an electrical pioneer of Columbus, Dudley T. Fisher, tells of an early event in which Dr. Mendenhall and his students of applied electricity participated.

The electric lighting history of Columbus began at midnight on the third of July, 1876. As a feature of the centennial anniversary of the signing of the Declaration of Independence, Professor Mendenhall of the Ohio Agricultural and Mechanical College, afterwards

known as the Ohio State University, borrowed the arc light regulator from the projection lantern in his Physical Laboratory and, with several of his student assistants, toiled all day on the third of July, carrying this lamp, together with fifty cells of grove battery, fifty quarts of dilute sulphuric acid, and the necessary wires and material for their support, up the winding stairs leading to the top of the dome of the State House. Just as the bell on the Third Street Fire Engine House struck to announce the arrival of the 'Glorious Fourth' the circuit was closed, and those citizens who had stayed up for the occasion, of whom I was one, saw a tiny spark of bluish

light. Not very much by present day standards, but it was a wonderful exhibition at that time. That was the first electric light that most people had seen. As I recollect that apparatus the carbon electrodes of the lamp were sawed out of the carbon crust, deposited on the inside of the retorts of the illuminating gas plant, which supplied light to the college building.

Dr. Mendenhall also took an active interest in the beginnings of the telephone, and it is said that the first telephone line in Central Ohio was erected by him on the university campus. Some of the

graduates who have done most to establish the reputation of Ohio State University in the electrical industry had their training under Dr. Mendenhall or Professor Thomas. Among these were Charles F. Scott, B. G. Lamme, and C. E. Skinner, to name only a few.

The first Electrical Engineering Laboratory, to which I have previously referred, was a two story building with a floor area 45 by 75 feet, immediately back of the west end of University Hall, the west basement of which, was at that time occupied by the physics laboratory. In addition to the dynamo laboratory and associated rooms it included a department library and a room for photometric and illumination testing and in 1895 special quarters were set aside for telephone testing. This first laboratory housed the new department until the beginning of January, 1908, when it was moved to the north end of the newly erected Robinson Laboratory, a \$75,000 building, which it shared with the Department of Mechanical Engineering, and which it still occupies.

When the Department was organized in 1897, the staff consisted of, in addition to the writer, one half-time

THIS is one of a series of articles on the histories of the different departments of the College of Engineering. Professor Caldwell has been connected with the Department of Electrical Engineering from its beginning in 1893 to the present time. From 1897 to 1930 he was head of the Department. Without doubt, he is exceedingly well qualified to write upon this subject and we are very glad to be able to present this article to our readers.—The Editor.

(Continued on Page 12)

Electrical Department

(Continued from Page 6)

man, John Rudolph Spurrier. This modest beginning developed to the present staff of two full professors, three associate professors and three assistant professors, in addition to graduate assistants, may be traced in the accompanying table of department personnel. If space permitted, it would be interesting to follow the careers of those who have left the department staff to the important positions which most of them are now occupying in the industry.

In 1897-98 the curriculum of the department included, for electrical engineers, three courses, each extending through the year and all dealing with dynamo-electric machines. This has expanded until it now includes, in addition much more extended treatment of such machinery, a series of courses in the fields of communication, electric transmission, and illumination. Electronics and electric railways are also treated.

In spite of the increasing opportunities for specialization and growing technical demands of the industry, the tendency has been toward the broadening of educational opportunity. A minimum of nine quarter-hours (term-hours) of electives was first introduced in 1899-1900, and the development of the curriculum along technical lines was begun in the same year. As now planned for the future, there will be about thirty-five hours of electives, besides six hours of required work in history. The half-summer quarter of shop work heretofore required, is now changed to a full summer quarter with five hours of required electrical engineering.

Under Professor Everitt and his predecessor, the late Charles Allen Wright, the department has become especially strong in the field of communication. It is probable that it stands second to no institution in the world in this field.

In this connection, the subject of radio engineering, which was started in 1910 by Walter L. Upson, now of Washington University at St. Louis, calls for special comment. Ohio State was one of the first universities to go into this field and to establish regular contacts with other institutions, notably the University of Michigan. For a short time during the great flood of 1913, this radio connection with the University of Michigan was the only means of communication between Columbus and the rest of the world, and messages were sent to Ann Arbor, and from there by telegraph to other points. This early work in radio led, naturally, to the establishment of the University Broadcasting Station, WEAO, in June, 1922. This station used a 100-watt set made at the laboratory but before the end of the year a 500-watt set was constructed. In 1925 it seemed best to all concerned to separate the station from the department and establish and operate it as an independent, but cordially cooperating organization. Professor Wright was then made the first Director of the Station.

An outstanding fact in the history of the Department of Electrical Engineering has been the cordial coopera-

tion of the Department of Physics. From the beginning, this department has furnished the students with their basic training in electric and magnetic circuit theory, and in doing so, it has given most considerate attention to the wishes of the staff of our own department. For several years it has offered four courses, three in the sophomore year, and one in the senior year, especially for electrical students.

In the early days, the electrical end of the supply of power and light to the university buildings formed a part of the duties of the department of electrical engineering, and the superintendence of the installation of electric lighting in Orton and Hayes Halls, the first buildings to be so lighted, awaited the author upon his first arrival at the University. This work, as well as the wiring of Townsend Hall, and later, of the older buildings, was largely done by electrical engineering students at the then prevailing rate for student labor of ten cents an hour. The first power plant, composed of a 500-volt direct-current generator, and a 1000-volt single-phase alternator, was located in what was at that time the mechanical laboratory, and is now the machine shop of the Service Department. As the Electrical Engineering work was separating from the Physics Department in 1896 and '97 a new power system was being adopted and installed and a sixty kilowatt, two-phase, Westinghouse generator, the first polyphase system in central Ohio, was taking the place of the former single-phase and direct current combination. During this period, John P. Covan joined the staff, dividing his efforts equally between the power and light system and the pioneer department shop. Later, his time was entirely absorbed by the former and he is still connected with the Service Department of the University. About the year 1900 the power and lighting system was entirely separated from this department.

The graduates in electrical engineering gradually rose from two in 1891, to sixteen in 1895 but fell to four in 1901, then went up to twenty-five in 1907. Then, except for 1910, when there were only sixteen graduates, it ranged between twenty and thirty until 1917. The war year of 1918 dropped it to fourteen. It then rose to fifty-two in 1923, and has remained in the neighborhood of fifty since that time. At present there is a tendency to fall off somewhat on account of present industrial conditions. This has also greatly decreased the demand for graduates, which in normal years has been far in excess of the supply. All but a few of the electrical engineering graduates have become associated in some way with the electrical industry. The communication, electrical manufacturing, and central station industries, have absorbed the majority of the men. Among the graduates of the department is a vice-president of the American Telephone and Telegraph Company and also one of the General Motors Company, as well as many others in important managerial positions. Four Ohio State men, including Charles F. Skinner, whose term has just expired, have been presidents of the American Institute of Electrical Engineers. The two Sullivant Medals so far granted were both given to electrical engineers, the late

(Continued on Page 20)

Electrical Department

(Continued from Page 12)

Benjamin G. Lamme, and Charles F. Kettering. Mr. Kettering also received one of the six honorary degrees which the University has awarded in recent years. In 1902, an Ohio State man, Charles F. Scott, was made President of the American Institute of Electrical Engineers, and in his mind was born the idea of associating the student technical societies and the universities with the national engineering organizations by establishing student branches. Thus appropriately, one of the first two branches of that society, was established here on December 20, 1902. The first convention of Ohio College Branches of the A.I.E.E. was held here in December, 1928.

So far as Ohio State is concerned, the Electrical Engineering Department has always been interested in originating education devices. This department was probably the first to offer engineering inspection trips to its students to point as distant as Pittsburgh and Cleveland. This was prior to 1906 when such trips were first required in their curricula. It was the first engineering curriculum to offer electives to its students, and the first to require the study of economics. It was the first to establish a regular system of character grading of its seniors, which for a number of years had been done by the seniors themselves. It was also the first to publish lists of honor students, and shared with the Department

of Mechanical Engineering the first requirement of summer practical experience work. The Robinson Fellowship founded by Stillman W. Robinson and open to graduates in Civil, Mechanical and Electrical Engineering, has been held in this department by six students, in two cases for two years each, since its establishment in 1902. By the will of Benjamin G. Lamme, who died on July 8, 1924, two scholarships of \$450 each, are awarded yearly, one to an electrical and one to a mechanical student. These students are chosen as being the most outstanding in their scholastic accomplishments during their sophomore and junior years. Three such scholarships have been awarded in this department.

While graduate work has been given in the department for a number of years, up until 1927, it was usually limited to one or two members of the teaching staff. In 1928, however, there were eight graduate students, in '29 there were six and in '30 there were four. Special emphasis is now being placed on the opportunities offered for graduate study and a bulletin describing such opportunities has recently been published.

Since the retirement of the author as Chairman, in January, 1930, and the taking over of the management of the department by Professor Dreese, many changes and improvements have been made, both in the equipment of the department and in the curriculum. In his efforts to advance the interests of the department, Professor Dreese has received exceptionally cordial support from the authorities of the University, and the prospects for the future development of the department are very bright.

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DEPARTMENT OF ELECTRICAL ENGINEERING PERSONNEL 1893 TO 1932

- 1893-date. Caldwell, Frank Cary, Asst. Prof. 1893-1897; Assoc. 1897-1901; Prof. 1901-date; (Dept. Head 1897-Jan., 1930).
- 1898-1905. Fish, Fred Alan, Fellow and Laboratory Asst. 1898-1899; Asst. 1899-1900; Asst. Prof. 1901-1905; (Fellow at Univ. of Wisconsin 1900-1901).
- 1905-1908. Anderegg, Gustavus Adolphus, Assoc. Prof. 1905-1908.
- 1905-1907. Coggeshall, Allan, Asst. Prof. 1905-1907.
- 1907-1912. Hunt, John Herman, Asst. Prof. 1907-1908; Assoc. 1908-1911; Prof. 1911-1912.
- 1908-1910. Upson, Walter Lyman, Asst. Prof. 1908-1910.
- 1909-date. Shepardson, John Ernest, Asst. 1909-1912; Instr. 1912-1922; Asst. Prof. 1922-date.
- 1910-1911. McOmber, Loren Wallace, Asst. Prof. 1910-1911.
- 1911-1912. Heitman, Albert H., Asst. 1909-1911; Instr. 1911-1912.
- 1912-1918. Flowers, Alan Estis, Prof. 1912-1919; (Absent on leave 1918-1919).
- 1912-1925. Brown, Roy Atkinson, Instr. 1912-1919; Asst. Prof. 1919-1925.

- 1916-1917. Kellogg, Edward Washburn, Asst. Prof. 1916-1917.
- 1916-1931. Puchstein, Albert Frederick, Asst. 1916-1918; Instr. 1918-1919; Asst. Prof. 1919-1928; Assoc. Prof. 1928-1931; (Absent on leave 1930-1931).
- 1918-1927. *Wright, Charles Allan, Prof. 1918-1827; (Absent on leave 1926-1927, Director of Broadcasting Station 1925-1926).
- 1922-1923. Ganshaw, L. W., Instr. 1922-1923.
- 1923-1924. Wise, Arthur Glen, Instr. 1923-1924.
- 1924-date. Kimberly, Emerson Edward, Instr. 1924-1925; Asst. Prof. 1925-1932; Assoc. Prof. 1932-date.
- 1924-1925. Terwilliger, Charles VanOrden, Instr. 1924-1925.
- 1925-date. Tang, Kwan Yao, Instr. 1925-1932; Asst. Prof. 1932-date.
- 1926-date. Everitt, William Littell, Asst. Prof. 1926-1931; Assoc. Prof. 1931-date.
- 1925-1928. Lloyd, Tom Cox, Instr. 1925-1928.
- 1930-date. Byrne, John Francis, Instr. 1930-1932; Asst. Prof. 1932-date.
- 1930-date. Dreese, Erwin Ernest, Prof. January, 1930-date; (Chairman 1930-date).
- 1930-1931. Campbell, Ivor St. Clair, Assoc. Prof. 1930-1931.
- 1932-date. Bibber, Harold Whitney, Assoc. Prof. Jan., 1932-date.
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