

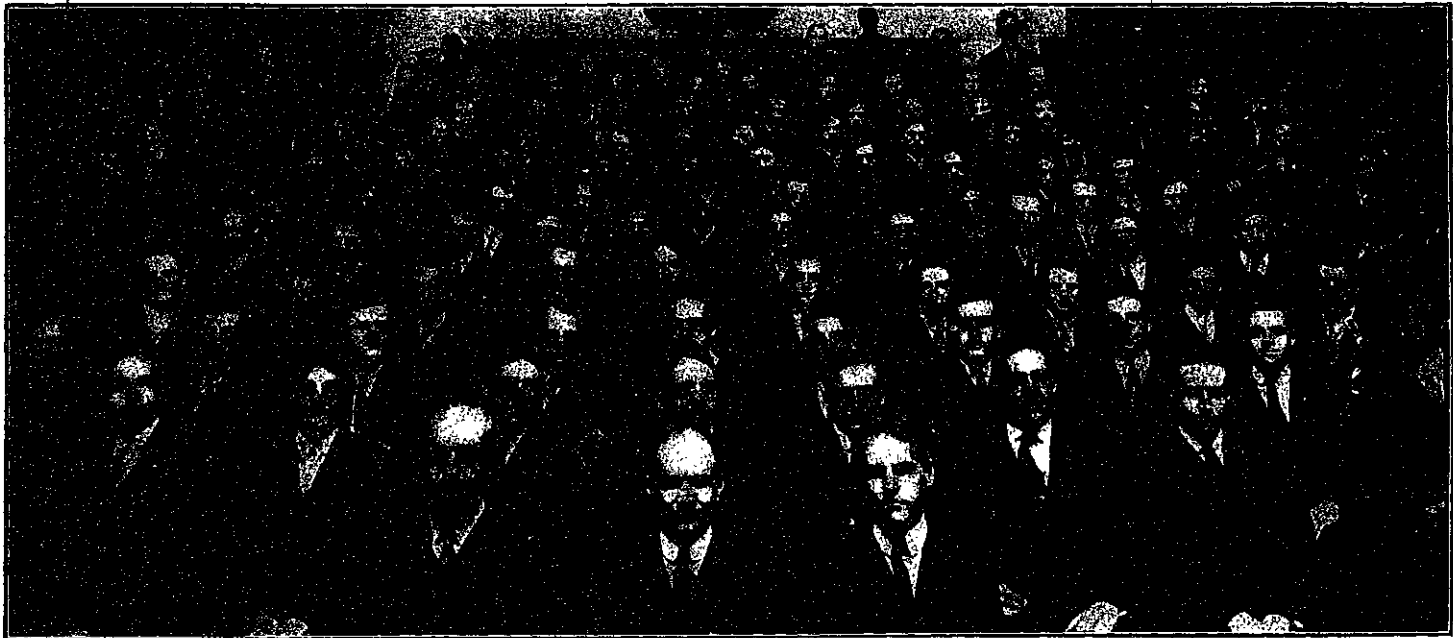
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STUDENTS AND INSTRUCTORS OF ELECTRICAL ENGINEERING.

GRADUATE WORK

BY PROF. HAROLD PENDER.

Engineering, in the broadest sense of the term, is the conception, performance and administration of any kind of work, guided in each instance by sound scientific and economic principles. To become a successful engineer in any chosen line of work one must therefore acquire not only a thorough knowledge of the scientific principles bearing on his profession, but in addition must acquire that general knowledge of men and affairs necessary to a sound judgment in all matters related to his profession, and in particular of the economic aspect of the problems upon which he may become engaged. In training young men for the profession of engineering, technical schools very properly lay particular emphasis upon the acquirement of exact scientific knowledge by the student, and upon the application of this knowledge to the solution of such technical problems as one is likely to meet in engineering practice. The time required for such purely technical training together with the equally important instruction in the general or "humanistic" studies, such as literature, history, etc., leaves but little opportunity for original investigations by the student.

Yet there is no more effective aid in the development of a keen and accurate method of thought than the discovering of a logical explanation of some doubtful or hitherto unexplained phenomenon. In addition to the increased power of imagination and analysis thus gained by the investigator, such investigations when carried to a successful conclusion, almost invariably lead to results of considerable value to the profession and to the world at large. It is therefore eminently desirable that a place be found in the curriculum of technical schools for work of such a character, first on account of the training acquired by the student, and secondly on account of the possible addition to the world's store of knowledge. Moreover, the mere fact that work of a constructive nature is being done in the laboratories of a school, even though the number of men engaged in such work are comparatively few in number, creates a spirit of research which, subconsciously, perhaps, stimulates to a greater or less extent every student; and, which is equally important, demands that the instructing staff keep in close touch with the development of

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HISTORY OF THE DEPARTMENT OF ELECTRICAL ENGINEERING

BY PROF. FRANK A. LAWS.

The "Electrician," in its issue of June 10, 1882, begins an account of the Crystal Palace exhibition with these words: "Although we have heard much of the Edison light, few of us had seen it until the present year." This statement is not surprising when it is remembered that the first Edison central station for the supply of electric light by incandescent lamps was established at Brockton, Mass., in 1883. This station was at first patronized by a few venturesome shopkeepers who had to choose between novelty of illumination and the certainty of being able to do business after sunset.

The Boston Edison Company was organized in 1885, the generator capacity at that time being 40 K. W. The telephone had been invented in 1876, and was coming into general use; in 1883 there were about 16,000 subscribers in the territory covered by the New England Telephone and Telegraph Company. Commercial arc lighting may be said to date from 1878, when the Brush system was introduced. The first commercial electric railway was put in operation in 1881, but no road operating under ordinary traffic conditions was established until 1887.

As for professional societies, the title of the British Society of Telegraph Engineers, indicates sufficiently along what lines electrical work had chiefly developed up to the period of which we are speaking. It was not until 1889 that this name was changed to The Institution of Electrical Engineers. The American Institute of Electrical Engineers was organized in 1884.

The whole domain of alternating current work was as yet unexplored and the commercial transformer had not yet been brought out by Goulard and Gibbs. It was an era of invention and promotion rather than close analysis, and one finds many references in the press to large sums of money paid for worthless inventions. Such transactions did not inspire public confidence either in things electrical or in electricians. Not that some of the best minds were not studying the problems presented, for instance, such men as Rowland, Hopkinson, Siemens, J. C. Maxwell and Sir William Thomson, and it was the results of the researches of such men that finally placed electrical matters on a sound sci-

entific basis and rendered possible the tremendous developments of the succeeding years.

Naturally enough there was a great and growing interest in electrical matters accompanied by a demand for men who were conversant with the applications of electricity as they then existed. To supply, in a measure, this demand for persons with accurate information, Professor Cross gave an optional course of lectures on "Recent Applications of Electricity." These were given after Institute hours, and were taken by large classes. The great interest shown by the students in these lectures was most encouraging, and very likely helped to direct Professor Cross' attention to the development of more systematic instruction along these lines. Another and probably the determining factor, was that at that time he was engaged in expert work in telephony and arc lighting work of the very first importance where exact scientific knowledge was an absolute essential. These things had led him to study the possibility of giving at the Institute a course which should fit men for the practice of Electrical Engineering as a profession. The immediate demand as it then existed in the industries would have been satisfied by men of a rather inventive turn of mind whose education had been along the so-called "practical" lines. But a careful study of the problem, and especially of the possibilities involved in the future development of this branch of engineering, convinced Professor Cross that the class of men who would be needed in the future, and who would best contribute to the advancement of the profession must have a wider training. His conclusions were embodied in a circular dated August 31, 1882. This circular contains a statement of the course of study, together with an introductory note, which is here quoted.

"In view of the rapidly increasing development of the various branches of electrical engineering, and the consequent demands for persons conversant with the theory and application of electricity, the Corporation of the Institute of Technology has established a course of instruction bearing more directly upon this subject than any of those

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FUTURE OF COURSE VI

BY PROF. DUGALD C. JACKSON.

Electrical Engineering has come to a scope that is only limited by the breadth of the world's industrial interests. A fully developed electrical engineer is one who can conceive, organize and direct extended industrial enterprises which depend upon applications of the electric current for their commercial success. Men of this kind are becoming leaders in the most important industrial affairs. Defined in this way, electrical engineering is an exacting pursuit, but it is also a comprehensive and influential profession of which the opportunities cannot be exhausted in decades of effective endeavor. This makes it a most absorbing pursuit for any man who possesses the firmness of character and the effectiveness of training required to enable him to reach an influential figure in its practice; but it also makes breadth of training, established on a deeply laid foundation, an absolute essential to real success. If we are to stop for the purpose of analyzing what is meant by real success in its best sense to an engineer, it may be expressed in these words—A power to advance the civilization of the world, a means to improve the conditions and relations of men. These things particularly fall to the lot of engineers who fully honor their calling. With them go the respect and friendship of fellow citizens, influence in affairs of interest and sufficient pecuniary earnings to afford ease of mind to the recipient and happiness to those in dear relationships.

It is appropriate at this point to say that the man who follows the profession of an electrical engineer with fullest success must be a man of science, a man of the world, a man of business, and a man who knows something of the trend of human civilization and human aspirations. No one is likely to satisfy the best ambitions of electrical engineers unless he puts forth his best efforts to make himself master of the fundamental principles of science, and particularly of physical science, and at the same time does his part in cultivating the social relations of man to man. Said in another way, this means that any student in Course VI who wishes to come to the many prizes that electrical engineering offers to its followers, must try to become reasonably learned in science, persuasive in manner, trained in right thinking, analytical of mind, and exceptional in reliability. The curriculum of the Course is administered with the constant purpose of reaching these ends,

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