divisions, and that the broad base of the curriculum should include mathematics, physics, English, drawing, mechanics, mechanics of materials, heat power engineering, hydraulics, economics, shop practise, and business law. The majority opinion is that economics should be emphasized but should be taught in engineering courses rather than separately. Only a small minority favored distinct curricula in certain divisions of electrical engineering. A larger influence in engineering education by the national societies was favored by many.

Copies of Bulletin No. 13 may be obtained from the Lancaster Press, Lancaster, Pennsylvania, at a nominal price of thirty cents each. Titles and prices of previous bulletins and reports published by the Board of Investigation and Coordination may be found in the JOURNAL for January 1927, page 83, and September 1927, page 858.

Some Leaders of the A. I. E. E.

William LeRoy Emmet, vice-president of the Institute 1900-1902, was born at Pelham, New York, July 10, 1859. In 1881 he was graduated from the U. S. Naval Academy and remained in the Navy for two years thereafter. For thirty years he worked earnestly and enthusiastically toward one goal—the mastery of obstacles that appeared to lie between engineering theory and its practical application. In this endeavor, he showed tenacity and fearlessness, his practical knowledge of operating conditions enabling him to weather discouragement. Apparent failure in principle only led Mr. Emmet to study details, for in the fullness of this knowledge he felt confident that he could perfect the fundamentals. In the analysis of a situation, either mechanical or human, Mr. Emmet was a master worker.

His was untiring energy and diligence of application. To offers of high salaries and positions of executive importance he turned a deaf ear, preferring to remain among the yet unsounded engineering problems rather than assume the direction of the better explored endeavors. In 1887 he joined the Sprague Electric Company, then coping with electric railroad developments in Richmond, Va., Harrisburg, and other cities throughout the country. In 1889 he was sent to Pittsburgh to superintend the Sprague Electric Company's installation, one of the largest electric railroad operations of the time. Mr. Emmet, with his characteristic determination, tackled the work, rewound motors, reinsulated coils, devised new methods of attaching the brushes—methods which afterward became historic in electrical development—and invented a new system of insulating armature coils.

In 1890 Mr. Emmet went with the Westinghouse Electric & Mfg. Co., but only for a short time. During his work with the Sprague Co., the R. D. Nuttall did much work from his designs on trolleys and electric railway devices used either in the Sprague Co. work or sold by Emmet to the Westinghouse Co. and to Electric Railways. This led to the Nuttall Co's. later activity in this field. About this time he was granted several patents on trolley devices and other supplies which later proved their worth in this field of application. Next he went to Buffalo to become electrical engineer for the Buffalo Railway Company, but went on almost immediately to Chicago as district engineer for the Edison General Electric Company, just formed. In 1892, this company transferred him to their New York Office and started him in as engineer in charge of the Foreign Department, later, again transfering him to the Lighting Department, where his most important professional work was begun. It was in 1900 that Mr. Emmet started his work in the development on the Curtis steam turbine, and in 1902 the first 500-kw. machine was installed in Newport, R. I. with great success. Three months later this was followed by a four-stage 3000-kw. machine which gave much greater economy and really put the turbine operations upon a firm basis, and by the end of the year, the first and famous 5000-kw. machine was installed in Chicago. It soon became of worldwide fame. Mr. Emmet was the first to point out the great importance of high vacuum in the operation of the turbine; he also initiated the use of the turbine for ship propulsion (1907) first, in two fireboats in Chicago, and in 1909 the first proposition was made to the United States Government for the operation of battleships. Of his work in the early development of a-c. generators, Mr. Emmet once stated that his greatest difficulty was the hunting of alternators operated in parallel by reciprocating engines. This apparent defect in the electrical apparatus he traced to the engine governors, but with a few changes which he suggested in the design, the trouble was speedily overcome. The first successful operation of a-c. generators was in Omaha, where 48-pole, 300-kw. machines were installed. In his turbine work, Mr. Curtis was of great assistance and support to Mr. Emmet. For the year 1919, he was the recipient of the Edison Medal for his "invention and development of electrical apparatus and prime movers."

Mr. Emmet has over a hundred patents on electrical and kindred apparatus to his credit. He is a member of the American Philosophical Society, the Society of Naval Architects and Marine Engineers, the National Academy of Sciences and has contributed much to technical literature, both by way of papers and longer works.

Order by Number

In ordering pamphlet copies of papers abridged in the JOURNAL, please use order form on page 249 of this issue. Check copies desired, fill in Name and Address, tear out form and mail as directed.