Transactions of the A.S.M.E.

Memorial Biographies

SOCIETY RECORDS—Part II

Part I of Society Records for the year 1940, containing Council and Committee personnel and other general information, was issued as Section Two of the Transactions for February, 1940. Part II is published for inclusion with all bound copies of Volume 62 of the Transactions and distributed to members of the Society upon request.

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Memorial Biographies

THE purpose of Memorial Biographies is to place on permanent record the biographical and professional data relating to deceased members of The American Society of Mechanical Engineers. Hence every effort is expended to insure accuracy, and to make the memorials as inclusive as is reasonably possible.

The first source of information upon which these notices are based is the Society's file of membership applications and transfers. In the case of the more recent member, these application records are fairly complete. The applications of those who became members many years ago, however, contain less detailed data, and in many cases the sponsors are no longer alive, so that it is difficult to obtain assistance from this source. If the member has been retired for several years prior to his death, his business associates are frequently hard to locate, and, in some cases, members of his family cannot be found. While all these factors add to the difficulty of obtaining accurate and fairly complete data, every possible source of information is explored, with the result that publication of the notice is sometimes delayed. A number of the memorials in this issue have been prepared under these difficulties.

It is the practice of the Committee on Publications in the case of some deceased members to ask former friends and associates to prepare the obituary. The object is to secure a final record that will be more valuable for having been prepared by men who knew the deceased and are competent to evaluate his work. Memorials prepared in accordance with this policy are signed by those who wrote them or who collaborated in their preparation. To all persons who have thus cooperated, the Committee acknowledges its gratitude.

The Committee also appreciates and acknowledges the assistance that has been given by relatives, business associates, and friends in the preparation of all other memorials. It also acknowledges its debt to such sources as Who's Who in Engineering, Who's Who in America, and similar publications; the Encyclopedia of American Biography, and the National Cyclopedia of American Biography; the technical and daily press; colleges and universities and their alumni associations; and engineering and other societies which have supplied information from their records.

Relatives, business associates, and Local Section and Student Branch officers are urged to notify the Society promptly of the deaths of members. Newspaper clippings or obituaries in any other form should be sent whenever available and the names and addresses of those who can supply further information should be furnished. A special form for supplying complete details will be forwarded by the Office of the Society upon request.

THE COMMITTEE ON PUBLICATIONS

Memorial Biographies

GEORGE PENNELL ABORN (1863–1938)

George Pennell Aborn, in charge of the Industrial Department of the Harvard Trust Company, Cambridge, Mass., died on July 7, 1938, of coronary thrombosis, at Waban, Mass.

Mr. Aborn was born at Wakefield, Mass., on June 8, 1863, the son of George W. and Mary Frances (Pennell) Aborn. He prepared for college in the Wakefield High School, followed by one year at the Phillips Academy, Andover, Mass., and was graduated in mechanical engineering from the Massachusetts Institute of Technology in 1886, with the B.S. degree. During his college years he was employed in the vacation periods in the office of Percy M. Blake, waterworks consulting engineer of Boston, and there gained early practical experience which was a valuable asset in his later work.

In October of 1886, Mr. Aborn went to work as draftsman at the Knowles Steam Pump Works, Warren, Mass., advancing to assistant constructing engineer in 1890.

The following account of his work from then until the end of 1926, when his fortieth anniversary with the company was celebrated, is taken from "Simplexities," the Blake and Knowles house organ, December, 1926.

"It was at about this time that the compound duplex direct-acting pump was being looked upon with general favor as the most suitable type of engine for municipal water works pumping stations and for large mining service, and Mr. Aborn was responsible for the design and successful operation of the many units, some of them the largest ever made in the history of direct-acting pumping engine manufacture, for which the Knowles Works was justly well known in those days. He developed and patented a high-duty pumping engine at this period which showed much higher economy than the direct-acting pumps as regularly built, but the gradual introduction of flywheel pumping engines for large water pumping duty prevented further development along this line.

"Mr. Aborn also invented and patented many improvements in pumping machinery, air compressors, and power-plant auxiliaries which became adopted practice in the Knowles product. Of a generally inventive mind, his activities naturally overflowed to outside lines and several patents stand to his credit covering devices of a widely varied character.

"In 1896, Mr. Aborn was made chief engineer and assistant to the manager. When the Knowles Steam Pump Works was consolidated with the George F. Blake Manufacturing Company, at East Cambridge in 1897, the title of the company then becoming Blake and Knowles Steam Pump Works, Mr. Aborn was made assistant manager and chief engineer of the combined plants, and in 1905, he became manager of the Blake and Knowles Steam Pump Works (now the Blake and Knowles Works of the Worthington Pump and Machinery Corporation).

"During this East Cambridge period, Mr. Aborn's inventive genius has from time to time manifested itself in valuable improvements applied to the various lines of product built by the company, covering sinking pumps, air compressors, attachments and unloaders, exhaust relief valves, engine valves, a turbinated pump valve, novel arrangements of compound steam ends, etc. He was one of the first to investigate the possibilities of a combined wet and dry vacuum pump.

"Mr. Aborn has always been deeply interested in the matter of steam valve gearing, and has given much attention to the subject, particularly with reference to the operation of single pumps, and has devised many improvements in the means of accomplishing satisfactory valve movements, among them being the well-known simplex style 'A' gear which for twelve years has been adopted as the standard for all Blake-Knowles single pumps, and entirely supersedes both the original Knowles and the Blake types. All the thousands of simplex pumps built for the Naval program during the past war were equipped with this gear, and its great popularity with naval engineers and with pump operators generally is a sufficient testimonial of its excellence.

"Mr. Aborn has also developed a simplex cut-off valve gear, a radical departure in direct-acting pump operation which has shown an increase of efficiency and decrease in steam consumption amounting to from 15 to 20 per cent."

In February, 1928, after the East Cambridge plant closed, Mr. Aborn joined the staff of the Harvard Trust Company, Cambridge, Mass., in its Industrial Department, and subsequently was appointed manager, which position he was holding at the time of his death.

Mr. Aborn joined the A.S.M.E. as a junior in 1889, and was promoted to the member grade in 1892. He was also a member of the Society of Naval Architects and Marine Engineers and of the American Society of Naval Engineers. He was a past-president of the Boston Branch of the National Metal Trades Association, of the New England Foundrymen's Association, and of the American Association of Foundrymen. In 1931–1933 he was treasurer of the Cambridge Industrial Association and he served as its president in 1933–1934. He also belonged to the Masonic fraternity and to a number of Boston clubs, including the Engineers and University.

In 1890, Mr. Aborn married Maude Nutting Powers, of Warren, who survives him, together with their two children, Rachel (Aborn) Andersen and Pennell N. Aborn.

HARALD AHLQVIST (1876–1938)

Harald Ahlqvist, consulting engineer, New York, N.Y., died of coronary thrombosis, on September 6, 1938, at Kingston, Jamaica, while on a West Indian cruise. Mr. Ahlqvist was born on October 16, 1876, in Fredrikshamn, Finland, the son of Carl Henrik and Anna Luisa Ahlqvist. He attended the Real Lyceum, Fredrikshamn, and a school in Hamburg, Germany, and in 1901 was graduated in mechanical engineering from the Royal Polytechnicum, Dresden, Germany.

From March, 1896, to March, 1898, he served an apprenticeship at machine building in the works of Sulzer Brothers, Winterthur, Switzerland, and during 1899 was in military training in the Finnish Dragoons. For three months in 1900 he was employed in the drafting room of Berliner Maschinenbau, Berlin, Germany. In 1901, Mr. Ahlqvist came to the United States and was employed by the Southwark Foundry & Machine Co., Philadelphia, Pa., and by the Sharon Steel Co., Sharon, Pa., designing rod and wire machines, especially those used for producing barbed wire and wire netting. This was followed by a term as engineer for the Compania Industria de Turba in Mexico (November, 1903, to May, 1904), erecting a plant and installing machinery for peat briquetting. From then until August, 1905, he was engineer for Oficina Technica Pablo Bergner S. en C., Mexico, D.F., testing and designing mining and milling machinery, milling plants, and plants for the manufacture of rubber from guayule.

In 1906, he returned to the United States and joined the staff of Semet-Solvay Company, and the Solvay Process Company, Syracuse, N.Y., as designing engineer. He remained with this firm until 1922, becoming superintendent of operations in 1908 and assistant to the general manager in 1918. In 1919 he made a survey for the company in the Southwest which led to the establishment of three large alkali plants in Louisiana and Texas.

In 1922, Mr. Ahlqvist opened his own office as consulting engineer, specializing in the design, construction, and operation of soda ash, caustic soda, sodium bicarbonate, calcium chloride, and potassium chloride plants, lime kilns, and the manufacture of alkaline products in general. He designed and built plants in the United States and many other parts of the world, including Mexico, Venezuela, Germany, and Japan. He also remodelled and modernized the equipment of many plants, among which was the Mathieson Alkali Works, at Saltville, Va. He had taken out patents on an ammonia still, a sulphur recovery process, and a clarifier, designed primarily for ammonia soda liquors but usable for filtering other liquids.

Mr. Ahlqvist joined the A.S.M.E. as a member in 1909. He was also a member of the American Institute of Mining and Metallurgical Engineers, American Chemical Society, and American Institute of Chemical Engineers. His clubs included the Chemists' Club, New York, and the Apawamis, Manursing, and American Yacht clubs of Rye, N.Y., where he had for many years made his home. He was a fluent linguist, speaking not only his native tongue and English, but Swedish, French, and German as well. He became an American citizen in June, 1912, at Syracuse, N.Y.

He married, in 1903, Eleanor St. Barbe Pattee, of Brookline, Mass., now residing in San Diego, Calif.

SAMUEL AITKEN (1882–1938)

Samuel Aitken, vice-president of Moore & McCormack Co., Inc., (now Moore-McCormack Lines, Inc.), steamship agents, New York, N.Y., died on August 12, 1938.

Mr. Aitken was born on July 21, 1882, in Belfast, Ireland, the son of Robert and Annie (Kane) Aitken. He attended Belfast schools, including the Academical Institute, and then served as apprentice engineer in the famous shipyards of Harland & Wolff, Belfast, covering the years 1897–1902. At the completion of this training, Mr. Aitken went to sea as junior engineer, and continued in service with the White Star Line and the Pacific Mail Steamship Company until 1916, advancing to the position of chief engineer. In 1911, he was chief engineer of the S.S. *Asia* when it was wrecked on Finger Rocks in the

China Sea. Mr. Aitken, together with the captain and chief officer, spent the whole night fighting off Chinese pirates, during which they fired some five-hundred rounds of ammunition. The vessel had on board more than 200 passengers, all of whom were landed safely, and the cargo was kept intact.

In 1916–1917 Mr. Aitken was assistant superintendent of repairs for the Moore & Scott Iron Works, San Francisco, Calif. From then until 1919, he was employed by the U.S. Shipping Board, first as assistant to its representative in the Far East, stationed at Manila, where he was in charge of repairing interned German ships, and later as engineer-representative of the Board of Inspection and port engineer for the North Atlantic district. He organized the Engineering Department of the Board of Inspection and as its senior engineer had charge of the supervision of maintenance and personnel of U.S. Shipping Board vessels in the department. The Inspection Board, which investigated all accidents, strandings, etc., covered, during the latter part of 1918, New York, Philadelphia, Baltimore, Norfolk, and Newport News. Mr. Aitken's duties as post engineer were similar to those for the Board of Inspection.

In 1919, Mr. Aitken was appointed superintendent-engineer of Moore & McCormack Co., Inc., steamship agents, in charge of the Engine Department and of repairs and new construction in all departments of vessels controlled by the company. He was elected vice-president of the company in 1923. During the time he served the company in that office he made alterations to the Hog Island type of vessel to raise its speed from the 11 knots for which it was designed to maintain a sea speed of $13^1/_2$ knots. In this connection, Mr. Aitken took out several patents, foremost among which was the "drag eliminator," which was a form of streamlining around the stern post and rudder of the vessel.

Mr. Aitken joined the A.S.M.E. as an associate-member in 1921, and in 1924 was promoted to the member grade. Besides his membership in the A.S.M.E., he was also a civil member of the Society of Naval Engineers, and a member of the Society of American Military Engineers, the Society of Naval Architects and Marine Engineers, and the Institution of Marine Engineers of Great Britain. In 1936, he was appointed by the U.S. Secretary of Labor as the delegate to the International Maritime Labor Conference at Geneva, representing American steamship owners. He was also a member of the Board of Visitors of the New York State Merchant Marine Academy. He belonged to the Shackmaxon Country Club and Downtown Athletic Club. He held licenses as chief engineer from both the British and American governments. Though born in Ireland, he was a citizen of the United States.

In 1910, Mr. Aitken married Margaret Eugenia Scott, a native of Philadelphia, and is survived by her and by their son, George Robert Aitken.

WILLIAM ALEXANDER, II (1910–1938)

William Alexander, II, production foreman, Scott Paper Company, Chester, Pa., died on February 6, 1938, at Hackensack, N.J.

Mr. Alexander was born in Edinburgh, Scotland, on November 24, 1910, the son of William and Annisabel (Cox) Alexander. As a child, he emigrated with his parents to the United States, and he obtained his preparatory education in the Hasbrouck Heights, N.J., high school. He later attended the Rensselaer Polytechnic Institute for two years and the Massachusetts Institute of Technology, where he was graduated with the degree of B.S. in mechanical engineering, in 1932. He later did postgraduate work in accounting at the University of Pennsylvania.

Immediately after the completion of his technical education, Mr. Alexander went to work for the Scott Paper Company, Chester. From August, 1932, to December of that year he operated a paper converting machine; from then until July, 1934, he worked in the cost department; and in July, 1934, he was promoted to production foreman, the position he held at the time of his death.

Mr. Alexander joined the A.S.M.E. as a junior in 1932. He was an American citizen due to his father's being naturalized while he, the son, was a minor. He was unmarried.

GEORGE FRANCIS ANDERSON (1884–1938)

George Francis Anderson, chief engineer of England-Walton & Co., Hazelwood, N.C., died in Philadelphia, Pa., on June 23, 1938.

Mr. Anderson was born in Oakland, Calif., on October 20, 1884, the son of John Francis and Maria Agnes Anderson. His education was obtained in the public high school, followed by classes at the Humbolt Evening Technical School, and he served a four-years' apprenticeship as machinist, 1901–1904, with the Risdon Iron Works, San Francisco. He then spent about twelve years at sea, first as assistant engineer with the American-Hawaiian and Pacific Mail Steamship Line, 1905–1912, and during the next four years as chief engineer for the Eschen & Minor Steamship Co. During the year 1916–1917, Mr. Anderson was employed as lubrication and sales engineer by the Texas Oil Company, and Standard Oil Company of California. In 1918, he was a first lieutenant in the Air Service of the U.S. Army. From 1919 to 1925 he served at Philadelphia as senior inspector of hulls and machinery for the U.S. Shipping Board, Emergency Fleet Corporation.

When applying for membership in the A.S.M.E. in 1925, Mr. Anderson stated that although he had not taken out any patents he had done considerable design work for changes in vessels under his charge. He mentioned tie bolts for holding brickwork in Foster boilers; improvements in baffles; a time-saving tool for back-facing holes in headers for header plugs; oil burners; oil alarm devices to indicate low lubricating oil in turbine units; and engineroom appliances.

Following his service with the Shipping Board, Mr. Anderson joined the staff of the A. C. Lawrence Leather Co., being attached to its subsidiary, England-Walton & Co., of Hazelwood, N.C., as chief engineer, in charge of six separate plants, and he was holding this position at the time of his death.

Mr. Anderson joined the A.S.M.E. as a member in 1925. He was also a member of the Society of American Military Engineers. In 1921, he married Blanche Oliver, of Parkersburg, W.Va., who survives him.

JAMES DHU ANDREW (1874–1937)

James Dhu Andrew, manager of the American Boiler Manufacturers Association, New York, N.Y., died of pneumonia at his home in Englewood, N.J., on March 22, 1937. Mr. Andrew was born in Brooklyn, N.Y., on October 29, 1874, the son of James D. and Olive (Stevens) Andrew. He attended grammar and high school in Brooklyn, and subsequently spent two years in the School of Mines of Columbia University.

From 1896 to 1899, Mr. Andrew worked as erecting and testing engineer for the Edward P. Allis Company, Milwaukee, Wis. From 1899 to 1902, during the period of its electrification, he served as mechanical engineer for the Metropolitan Street Railway Company, New York, and for the next three years was chief engineer of the New York Edison Company.

In 1907, Mr. Andrew began a term of six years as superintendent of power for the Boston (Mass.) Elevated Railway system, and then spent four years as superintendent of station engineering for the Edison Electric Illuminating Company of Boston. From 1917 to 1920, he was general superintendent of plant construction and manager of hull construction of the American International Shipbuilding Corporation, Hog Island, Pa. During the next three years he was president, first of the American Balsa & Balsa Refrigerator Company, New York, and then of the Standard Tank Car Company, Sharon, Pa. From 1923 to 1926 he was vice-president of Stevens & Wood, Inc., engineers and constructors, New York, in charge of the design, construction, and operation of some power plants in Ohio and Pennsylvania, and also engaged in engineering surveys in South America.

Mr. Andrew acted as general consulting engineer for Armour & Co., of Chicago, Ill., from 1926 to 1929, and then became chief engineer of the Niagara & Hudson Power Corp. In 1933, he was appointed manager of the American Boiler Manufacturers Association and Affiliated Industries, and was thus employed at the time of his death.

In 1904, Mr. Andrew became a member of the A.S.M.E. He was also a member of the American Institute of Electrical Engineers, Society of Naval Architects and Marine Engineers, the Engineers Club, New York, the American Trade Association Executives, Winslow Lewis Lodge, F. & A. M., and Aleppo Shrine in Boston. He served as a member of the Board of Governors of the Englewood Hospital Association.

Mr. Andrew married Laura Ward, of Napanee, Ontario, in 1902, and is survived by her and by their son, James D., Jr., of Essex Fells, N.J.

JESSE OLIVER ARKEBAUER (1871–1937)

Jesse Oliver Arkebauer, marine surveyor and consulting engineer, New York, N.Y., died at the Marine Hospital, on Staten Island, on April 13, 1937, after nearly a year's illness. He is survived by his widow, Ada (Wheeler) Arkebauer, whom he married in 1900, and by a daughter, Gladys.

Mr. Arkebauer was well known in steamship and shipbuilding circles throughout the United States. He held an unlimited license as chief engineer on ocean steamships; had received a certificate of proficiency from the Brooklyn Polytechnic Institute for two years' special training in the design, construction, and operation of Diesel engines;

and was a graduate from the five-year course in general science of Cooper Union, receiving a mechanical engineering degree in 1919. He was commissioned an Engineer Officer in the 2nd Battalion of the New York State Naval Militia in May, 1915, and was retired in September, 1935, with the rank of Lieutenant-Commander in the U.S. Naval Reserve. He had been a member of the A.S.M.E. since 1921, and was also a member of the Society of Naval Architects and Marine Engineers, Propeller Club of the U.S. Port of New York, Marine Square Club of New York, and Port Tampa Lodge, F. & A. M.

Mr. Arkebauer was born at Nokomis, Ill., on September 1, 1871, son of Hye G. and Martha (Peyton) Arkebauer. He went to sea at the age of twelve, working his way up, rank by rank, to the berth of chief engineer, first serving in that capacity on the army transport S.S. *Torpon* in 1898. Later during the Spanish-American War he was assigned to the S.S. *Margarette* and S.S. *Florida*. Subsequent to the war he continued at sea until June, 1905, being first assistant engineer on the S.S. *Havana*, S.S. *Esperanza*, and S.S. *Morro Castle*. Then, after a few months' engineering work in New York, he was made chief engineer of the ferryboat, *Brooklyn*, in 1905. He remained in that service until 1907, when he was appointed assistant inspector of boilers for the United States Steamboat Inspection Service at the Port of New York. He was engaged continuously in this work until April, 1917, with the exception of a few weeks' active service in the New York State Naval Militia earlier that year. From then until November, 1919, he served in the United States Navy as machinery inspector at the New York Navy Yard, Brooklyn. During this period he supervised the fitting out of a large number of submarine chasers, overseas troop ships, and other classes of vessels. For the next nine years he was superintending engineer for Phelps Bros. & Co., New York, the American and Canadian agents for the Cosulich Steamship Line, of Trieste, Italy. Since 1928 he had been engaged in private practice as marine surveyor and consulting engineer.

CARL BENNETT AUEL (1870–1937)

Carl Bennett Auel, manager of the Employees Service Department of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., died on April 4, 1937, at his home in Irwin, Pa.

Mr. Auel was born in Brooklyn, N.Y., on March 21, 1870, son of Charles and Annie (Lambert) Auel. He attended the Polytechnic Institute of Brooklyn and the School of Engineering of Columbia University, then entered the School of Mechanical Engineering of Cornell University, from which he received the degree of mechanical engineer in 1892. He spent a part of the following year in graduate work, then entered the employ of the Westinghouse company, Pittsburgh, as assistant general foreman. He continued with the company until 1897, being in charge of the Production and Specification Departments during the latter part of the time.

For the next two years Mr. Auel was, first, general manager of the Clark Brake Company, Pittsburgh, then engineer of the Westinghouse Airbrake Company, Wilmerding, Pa. In 1901 he went to Manchester, England, as assistant to the general manager of the British Westinghouse Electric & Manufacturing Co., later becoming assistant general manager. He returned to the United States in 1905, resuming his association with the Westinghouse company here as assistant to the manager of works. Subsequently he became manager of the Railway and Control Departments, then assistant manager of works, director of standards, processes, and materials, and in 1920, manager of the Employees Service and Works Standards Departments. He established the company's building and loan association and tuberculosis sanatorium and developed a medical service for the employees. He was also in charge of the pension system, company restaurants, and Materials Disposition Department.

Mr. Auel had been a member of the A.S.M.E. since 1914. He was chairman of the Sectional Committee on a Safety Code for Mechanical Power Transmission Apparatus from the time of its organization in 1921 until his death, serving as one of the representatives of the A.S.M.E. He was appointed a member of Subcommittee No. 3 on Mechanical Power Control when it was formed in February, 1929, and was elected its chairman, in which capacity he served until the committee was discharged in December, 1935. He was also active in the work of the Management Division of the Society, and particularly in its Management Week campaigns and waste elimination activities; he had been chairman of the Subcommittee on the Elimination of Waste since the time of its organization in 1930, and was instrumental in the compilation and publication of the Waste Materials Dictionary. He was the author of many articles and addresses on industrial relations. Mr. Auel was also a past-president of the National Safety Council (1924–1925), and a member of the Western Pennsylvania Safety Council. He served as president of the Allegheny Public Health Association in 1925–1926 and belonged to the Pennsylvania State and the Pittsburgh Chambers of Commerce, Pennsylvania State Council for the Blind, Pennsylvania State Board of Health, and Philadelphia Board of Trade. He was a member of the Methodist church and Delta Upsilon fraternity, and was a Republican in politics. He enjoyed reading, especially historical works, gardening, camping, and historical and genealogical writing.

Surviving him are his widow, Louisa (Clark) Auel, whom he married in 1901, a son, Carl Clark Auel, and three sisters.

TOM BARKER (1884–1938)

Tom Barker, industrial engineer for the United Parcel Service, New York, N.Y., died on March 14, 1938.

Mr. Barker was born at Baraboo, Wis., on September 26, 1884, the son of John and Alice (Druse) Barker. He prepared for college in the Englewood (Ill.) High School, and then attended Dartmouth College, where he was graduated in 1906 with an A.B. degree.

His first employment, 1906–1908, was with the Western Electric Company in Chicago, Ill., where he took a general shop training course and did considerable clerical work. From 1908 to 1910, he worked for the Rex Tool & Manufacturing Co., Chicago, doing shop work in gasoline engine production, tools and dies. In 1910–1914, he was employed by the Rogers Addresser Company, Chicago, as manager of manufacturing addressing machines. In 1917–1919, Mr. Barker served as First Lieutenant of Infantry, 314th Machine Gun Battalion, 80th Division, A.E.F., in France.

On his return to civilian life, he worked in 1919–1920 in the Hawthorne Plant of the Western Electric Company in the establishment of piece rates, and followed this by a year's employment by Arison Goodwin & Associates, Chicago, consulting industrial engineers. Following this position, Mr. Barker became associated with the United Parcel Service and remained in their employ up to the time of his death.

He joined the A.S.M.E. as an associate-member in 1922, and in 1935 was automatically transferred to the member grade. Mr. Barker married Marie Therese Polet in 1937, and is survived by her and also by two brothers, Ralph and Hugh Barker, also engineers.

BERNARD CLEVELAND BECKER (1887–1938)

Bernard Cleveland Becker, development engineer with The Hoover Company, North Canton, Ohio, died suddenly of a heart attack on March 19, 1938.

Mr. Becker was born on November 16, 1887, in York, Pa., the son of Henry Franklin and Rebecca Jane (Zeigler) Becker. He was educated in public schools and afterwards took the complete course in mechanical engineering as given by the International Correspondence Schools. He began work in 1903 and had four years of practice in general machine shop work and toolmaking. In 1908 he entered the employ of the Heany Laboratories, Inc., New Haven, Conn., where he worked successively for ten years as machinist, draftsman, factory engineer, and chief engineer, occupying the last position for eight years.

For the year 1919, Mr. Becker was employed by the Tabulating Machine Company, Endicott, N.Y., as machine designer. In 1920 he began private practice as patent attorney at York, Pa., and carried on this work until 1926, though in 1924 he became associated with the York Manufacturing Company in the development and design of refrigerating machinery.

In 1927, Mr. Becker was engaged by The Hoover Company of North Canton, Ohio, "to create, improve, and develop mechanical and electrical devices." The company wrote that his ten years of service was marked by many successful achievements in the creative-inventive field and his work was outstanding. His attack on a problem was thorough and from many angles, which usually resulted in a number of designs from which a choice could be made. His layout work was clear, concise, and well planned, making it easy to interpret in the model construction department." Mr. Becker also invented a suction cleaner and several mechanical lead pencils.

Mr. Becker married Bernice E. Deardorff in 1926, and is survived by her and by two sons, Charles H., of Orange, Texas, and Ned G., of Lawton, Okla., as well as by his mother.

He became a member of the A.S.M.E. in 1932. He was also a member of Federal Lodge No. 1, F. & A. M., Capital Chapter, R.A.M. and Washington Commandery No. 1, Knights Templar, Washington, D.C., and of the Elks Club, of Flint, Mich.

HENRY LÉON BANCEL BINSSE (1852–1938)

Henry Léon Bancel Binsse, of Washington, D.C., died at his summer home at Pointe au Pic, County Charlevoix, Que., Can., on July 2, 1938. He was born in New York, N.Y., on November 14, 1852, son of Louis Bancel and Mary Delia (Carpenter) Binsse, and was de-

scended from the French families of Binsse de Saint Victor and Bancel, who came to New York at the time of the French Revolution. His early education included a period of engineering study at Düsseldorf, Germany.

When Mr. Binsse applied for membership in the A.S.M.E. in 1882 he submitted the following record: "Following my graduation with the degree of C.E. from Rensselaer Polytechnic Institute, Troy, N.Y., in 1875, I took a position at the North Chicago Rolling Mill, Chicago, Ill. I found that my taste led me to mechanical engineering and I, consequently, entered the works of C. H. Delamater & Co., New York, and familiarized myself with the trade. In 1879, I entered the firm of George A. Ohl & Co., engineers and machinists, of East Newark, N.J., of which firm I am still an active member." He made improvements in small turning lathes and horizontal boring machines while with this company.

In 1887 he established his own business, the Newark Machine Tool Works, in Newark, and he continued the manufacture of machine tools under that name until 1902 and as president of the Binsse Machine Company, Newark, from then until his retirement in 1914. He took out a patent on a screw-jack in 1883, one on a slotting machine in 1889, and one on gearing in 1899.

Mr. Binsse married Elizabeth Hewlett Scudder on November 10, 1903, and is survived by her and a son, Harry Lorin Binsse, residents of Washington, D.C., and Glen Cove, L.I., N.Y., respectively; also by a sister, Alice (Mrs. Schuyler N. Warren), of New York, N.Y.

He resigned his membership in the A.S.M.E. in 1911 but was reinstated as of 1882 by action of the Council in 1917, with permanent remission of dues.

WOODROW W. BLACK (1912–1938)

Woodrow W. Black, an employee of the Reid Diesel Engine Company, of Oil City, Pa., died on August 2, 1938, of colitis, in the General Hospital, Buffalo, N.Y.

Mr. Black was born on January 21, 1912, at Cyril, Okla., the son of Warner and Annie Caroline (Williams) Black. He was graduated from the University of Oklahoma in June, 1937, with a B.S. degree, and had been in the employ of the Reid Diesel Engine Company since that time.

He became a junior member of the A.S.M.E. in 1938, and was unmarried.

EDMUND E. BLAKE (1870–1938)

Edmund E. Blake, chief engineer of Saco-Lowell Shops, Biddeford, Maine, died in Portland, Maine, on June 21, 1938, following a major operation.

Mr. Blake was born in Boston, Mass., on November 13, 1870, the son of James M. and Mary H. (Brown) Blake. He prepared for college in the Newton High School, Newton, Mass., and was graduated in 1893 from the Massachusetts Institute of Technology with an B.S. degree in mechanical engineering.

Mr. Blake's entire business career was devoted to Saco-Lowell Shops and its predecessors. Following his graduation, he served a year's apprenticeship in the shops of the Pettee Machine Works, Newton Upper Falls, Mass., and continued with that company until 1897, when he was in charge of machinery installations. He was associated with H. S. Chadwick, textile and mill engineer, in 1897–1899. He then took the position of salesman and engineer for the Saco and Pettee Machine Shops and in 1904 became manager of the Saco-Pettee Company at Biddeford. He was appointed chief engineer of Saco-Lowell Shops in 1923, and was responsible for many valuable improvements and inventions in cotton-mill machinery, the most notable being the commercial development of long-draft processing which has revolutionized the cotton-spinning industry in the last decade. He lived across the river in Saco, Maine, and was a valued member of the community, serving it in many capacities for 34 years.

Mr. Blake became a member of the A.S.M.E. in 1913. In 1896, he married Clara S. Sheppard, of Newton, Mass., and they had two sons, Malcolm S. and Edmund G., and a daughter, Mary, all married, and all of whom, together with six grandchildren, survive him.

HARVEY BOLTWOOD (1875–1938)

Harvey Boltwood, director of the Bureau of Service of the Interstate Commerce Commission, Washington, D.C., died suddenly of a coronary occlusion on September 2, 1938, while on the way to his office.

Mr. Boltwood was born at Albany, N.Y., on July 6, 1875, the son of Ransom Haight and Sarah Effie (Clarkson) Boltwood. He moved to Denver with his parents in 1888 and completed his preliminary education in the public schools there. He then worked for two years with the Union Pacific Railroad in Denver, after which he spent a year at Colorado College, Colorado Springs. His studies there were supplemented later by correspondence courses through the International Correspondence Schools.

In 1899, Mr. Boltwood began four years' service as machinist in railroad, mine, and mill work in Colorado, Idaho, and Washington. From 1903 to 1907, he was supervising locomotive construction and maintenance for the Denver & Rio Grande R.R. in New Mexico and Colorado. The next three years Mr. Boltwood spent in cyanide mill construction and operation in Colorado, as master mechanic. He gave this up in 1910 and was employed for the following year in charge of enginehouse and locomotive maintenance for the Union Pacific Railroad at Denver.

Mr. Boltwood's first service with the Interstate Commerce Commission began in Washington in 1911 when the Bureau of Locomotive Inspection was organized. He was one of the original fifty district inspectors. In 1918, he was transferred to the Division of Operation of the U.S. Railroad Administration as supervisor of equipment. In this connection he was sent to many points to make surveys of plant layouts and equipment with a view to initiating changes to increase output. He had some part in the design of standardized equipment at that time and later made a study of criticisms of it for the Department of Equipment, Division of Liquidation Claims. He was appointed mechanical engineer for this department in 1920, when the railroads were returned to private operation, his duties relating chiefly to handling engineering features in connection with the settlement of claims against the Railroad Administration. In 1922–1923 he was engaged in commercial education work in Colorado, and then he returned to the Interstate Commerce Commission, and was stationed at Shreveport, La., in the Bureau of Locomotive Inspection.

In April, 1925, Mr. Boltwood was appointed assistant director, Bureau of Service, for the Interstate Commerce Commission, in charge of the Section on Efficiency and Economy of Operation. He also was consultant in matters relating to the design of containers for shipping explosives and other dangerous items, particularly tank cars. In March, 1937, he was made director of the Bureau of Service, the position he was filling at the time of his death.

Mr. Boltwood joined the A.S.M.E. as an associate-member in 1921, and was promoted to member in 1930. He was also a member of the Mechanical Division of the American Railway Association, the International Association of Machinists, the Sons of the American Revolution, and the Masonic order. He was a member of the Galilee Baptist Church in Denver for many years and belonged to the National Baptist Memorial Church in Washington. In the A.S.M.E., Mr. Boltwood served on the Executive Committee of the Washington, D.C., Section from 1929 to 1932, as its chairman the last year. He was a member of the Section's Subcommittee on the Economic Status of the Engineer in 1928. He was also appointed a member of the General Committee (RR 2) of the Railroad Division in 1937, for the term 1937–1939. During 1937, he was also a member of a committee appointed by the District of Columbia Council of Engineering and Architectural Societies to study and report upon proposals looking toward the enactment of a law covering the practice of these professions in the District.

In 1917, Mr. Boltwood married Maude Margaret Morgan, who survived him, and they had two children, both living: Ransom Harvey and Charlotte Boltwood.

HENRY EDWARD BRETT (1858–1937)

Henry Edward Brett, consulting engineer, of Los Angeles, Calif., died at his home in that city on April 3, 1937. Mr. Brett was born in British Guiana, South America, on November 13, 1858, the son of Rev. William H. Brett and Caroline Brett. He was educated in the Grammar School of Loughborough, England, and by private tuition. He then spent some six years as apprentice in engineering works, covering patternmaking, machine shop, and millwright work, and as student draftsman with W. H. Thornbery, consulting engineer, of Birmingham, England.

He arrived in the United States in September, 1880, and spent four years as draftsman with E. D. Leavitt, Jr., Cambridgeport, Mass.; I. P. Morris Co., Philadelphia, Pa.; Robert Wetherill & Co., Chester, Pa.; and the Scott Foundry, Reading, Pa. He then went to the West Coast, where he served with the Pacific Rolling Mill Company of San Francisco, as draftsman, engineer in charge of the construction of cable railways in San Francisco and Oakland, and assistant to superintendent in charge of steel works. In 1887 he returned to the I. P. Morris Co., in Philadelphia, as draftsman, and subsequently was with Wm. Wharton Jr. & Co., Inc., of that city, as draftsman and designer of special machinery. Then, in 1890, he went back to the West Coast and joined the staff of the Pacific Rolling Mill Com-

pany, serving as constructing engineer for the Los Angeles Consolidated Electric Railway, of Los Angeles, where he was in full charge of track work, design and construction of powerhouse, and installation of steam and electric equipment and rolling stock. From 1892 to 1893, he held a similar position with the San Diego Electric Railway, of San Diego, Calif., and next served for one year with the Baker Iron Works, of Los Angeles, as mechanical engineer.

From 1894 up to his death, Mr. Brett practiced as consulting mechanical engineer in Los Angeles. His work covered general practice: machine design, development of inventions, structural work, and investigations and reports. Among other things he designed machinery for can making and canning equipment, machines for flax treatment, pressure filters, excavators, and shipyard machinery.

Mr. Brett obtained a number of patents, including oil burners, crematory furnaces, a continuous pressure cooker, and various machines for special purposes. In 1905 he served as a member of the Commission to Investigate the Construction of an outfall sewer for the City of Los Angeles. He was a registered civil engineer, State of California. He joined the A.S.M.E. as a member in 1902 and served on the Executive Committee of the Los Angeles Section in 1921–1922 and 1928. He was at one time a member of the Engineers' and Architects' Association for Southern California and had taught mechanical drawing in the Y.M.C.A. of Los Angeles.

On November 25, 1885, Mr. Brett married Miss Emilie T. Bridle, of Philadelphia, and they had three sons: H. Austin, born December 29, 1887; Edward C. N., born June 9, 1892; and Arthur T., born February 10, 1894. He became a citizen of the United States by naturalization in Los Angeles, 1896.

BENNETT MATTINGLY BRIGMAN (1881–1938)

Bennett Mattingly Brigman, best known as organizer and first dean of the Speed Scientific School of the University of Louisville—Ben to a host of personal friends—was a true Kentuckian. Born in Louisville, on February 25, 1881, the son of William Frederick and Margaret (Lehman) Brigman, he was long active in the professional and educational activities of state and city and died in Louisville, February 8, 1938. Mrs. Brigman, the former Alice Jessel, of Louisville, whom he married in 1904, survived him.

He attended the Universities of Kentucky and Louisville, receiving the degrees of B.S. and M.S. from the latter, in 1908 and 1912, respectively, and did special graduate work at the University of Wisconsin in the summer of 1915. He engaged in practical engineering for a number of years, principally in the shops, engineering offices, and test plants of the Louisville & Nashville Railroad. Long interested in boys, he left this work to organize and direct their pre-college and vocational training, first in the Manual Training Department of the University School, a one-time private preparatory school in Louisville, and then in the DuPont Manual Training High School of Louisville. From there he went to the University of Louisville as instructor in physics, later becoming professor of engineering and drawing.

Thus by broad training and by natural interest, he was well qualified to undertake the planning, building, and initial operation in 1924 of the Speed Scientific School, for which he served as inspiration as well as administrative head until his death. It was on the basis of his prospectus that gifts were made by William S. Speed and Mrs. Olive (Speed) Sackett to establish the James Breckenridge Speed Foundation. He served as guiding architect and dean of this, the first southern school to be accredited in all its branches of engineering, until his death.

He contributed much to his native city and to his native state. But it is as a nationally known engineer and personality, well acquainted throughout this country, that most of us knew him—as a leader in the Council of National Defense and in the Bureau of War Savings Stamps during the World War—as an authority on zoning and planning, municipal and community, and on smoke abatement—as a member and participant in many national projects of educational and professional nature—as a member and officer of national educational and engineering associations, particularly as vice-president of The American Society of Mechanical Engineers and of the Society for the Promotion of Engineering Education.

He became a member of the A.S.M.E. in 1923 and one of its Fellows in 1936. He served as chairman of its Louisville Local Section, 1925–1934; as a member of the Special Committee on Policies and Budget, 1933–1936; as a delegate to the American Engineering Council, 1933–1935; and as a manager of the Society, 1934–1937, and vice-president from then until his death.

These are the formal activities and accomplishments for which Dean Brigman will long be remembered—but those who knew him well personally, who sat on Council or Committee with him, in conversation with him in his home, or beside him during long train rides to conferences, or who joined his ever-present group of friends at conventions, will prefer to remember certain distinctive personal traits. There was his ever-impelling interest in his fellowmen, particularly his fellow students, whose ranks he never left—his never-failing infectious sense of humor, which made him take his job, but not himself, seriously—his unbounded enthusiasm and industry, despite a relatively weak physique—his sheer likableness as a man, as a teacher, and as an engineer.

These are the characteristics that made Ben Brigman stand well above his fellows.—[Memorial prepared by EUGENE W. O'BRIEN, Atlanta, Ga., Past Vice-President, A.S.M.E.]

MORTIMER COWPERTHWAITE BROWN (1887–1938)

Mortimer Cowperthwaite Brown, whose death occurred at his home in Mount Vernon, N.Y., on August 20, 1938, was born there on November 5, 1887, son of Edgar K. and Emily (Cowperthwaite) Brown. He prepared for college in the Mount Vernon schools and was graduated from Stevens Institute of Technology as a mechanical engineer in 1910. During the next eighteen months he was employed by the Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y., as assistant to the foreman of the machine shop, and by the Max Ams Machine Company, Bridgeport, Conn., in drafting work on automatic machinery. He then became draftsman for the Hodgman Rubber Company, Tuckahoe, N.Y., with which he remained until the fall of 1914, being promoted during that time to chief draftsman and then second assistant chief engineer.

Beginning in January, 1915, Mr. Brown was connected for about four years with the Aetna Explosives Company, serving at first as draftsman and inspector at New York, and later as chief engineer at the Fayville, Ill., plant of the company. He returned to New York in 1919 as mechanical engineer for the Pratt Engineering & Machine Co., with which he continued until April, 1921.

His next employment of note was with the Western Electric Company, New York, for three years beginning in May, 1925. During the following year he was an estimator for Coverdale & Colpitts, consulting engineers, New York, in connection with a project covering the cost and valuation of the Interborough Rapid Transit Company. Subsequently he was engaged in layout and drafting for the American Cyanamid Company, General Chemical Company, and John Johnson Sales Corporation, in New York. He was senior engineer and valuation checker for Maurice R. Scharff, consulting engineer, New York, September, 1934, through February, 1935, and from April to October of that year was engaged in making an inventory of gas plants and pumping stations for the Consolidated Gas Company, New York. He then was employed by the Law Department of the City of New York as valuation engineer on the appraisement for tax purposes of public utility power plant and substation machinery and equipment. He was transferred to the Tax Department at the beginning of 1936, and employed there until the end of the year and again from March, 1937, to February, 1938, when all engineers engaged on this work were released, later to be replaced by civil service engineers. During the spring of 1938 he was a provisional assistant electrical engineer for the New York Board of Transportation, in connection with listing and pricing equipment on elevated lines.

Mr. Brown became an associate-member of the A.S.M.E. in 1915 and was automatically transferred to full membership in 1925. His wife, Ethel (Stickney) Brown, whom he married in 1917, survives him.

ARTHUR BRUCKNER (1872–1937)

Arthur Bruckner, professor and head of the department of mechanical engineering in the School of Technology of the College of the City of New York, died of a heart attack on August 29, 1937, at his home in Hastings-on-Hudson, N.Y. He had been on leave of absence from the college since February because of ill health.

Professor Bruckner was born in New York on April 22, 1872, the son of Herman and Susan (Hoffman) Bruckner. His preparatory education was obtained in the New York public schools. He was graduated with a B.S. degree from the College of the City of New York in 1892, and in 1898 from the Sibley College of Cornell University, with an M.E. degree. He later took one year of graduate work in Cornell University, and three years of evening work in the New York Trade Schools.

From 1892 to 1897, Mr. Bruckner taught mechanic arts in the College of the City of New York. The next two years he spent at Cornell for his M.E. degree and graduate work. From 1899 to 1904, he was instructor in physics and the mechanic arts at the College of the City of New York, and organized the work of laboratory instruction in physics. In the years 1904–1907, he was busy in the planning, construction, and equipment of the Mechanic Arts Building of the College of the City of New York. He personally designed much of

the equipment for the laboratories and supervised its installation, and served as instructor in the mechanic arts and in the mechanical laboratory.

In 1907, Mr. Bruckner was made director of the Mechanic Arts Laboratories and instructor in various mechanical engineering subjects. In 1917 he was appointed assistant professor of mechanical engineering. He advanced to the rank of associate professor at the beginning of 1929, and was appointed full professor of mechanical engineering, in charge of the department, on January 1, 1936.

Professor Bruckner became a member of the A.S.M.E. in 1919. He was also a member of the Society for the Promotion of Engineering Education and the American Association of University Professors. He was much interested in education in general, and at the time of his death was serving his second term as trustee of the Union Free School District No. 4, Town of Greenburgh, Westchester County, N.Y. He had long made his home in Hastings-on-Hudson, N.Y., where he had served as a member of the Hastings Board of Education since 1935, and a member of the Hastings Taxpayers Association, and was both a member and secretary of the original Riverview Manor Association.

In September, 1898, Professor Bruckner married Mabel C. Earll, of Ithaca. He married a second time, in December, 1906, Ella May Ford, of Washington, D.C., who survives him. Surviving also are a son, Robert Earll, of Vineland, N.J., and three daughters, Mrs. Mabel Amelia Chomsland, of Ridgefield Park, N.J., and Mrs. Helen Sue Fagans and Mrs. Virginia Ford von Isecke, of Basking Ridge, N.J. He also left a sister, Mrs. Annie Hillenbrand, of New York.

EDWIN BURHORN (1866–1937)

Edwin Burhorn, president of the Edwin Burhorn Company, of Hoboken, N.J., died in Margaretville, N.Y., on September 26, 1937, after a brief illness. A sister, Miss Etta Burhorn, and a son, Alfred Burhorn, survived him. He had been a member of the A.S.M.E. since 1914.

Mr. Burhorn was graduated from the Stevens Institute of Technology in 1885, with a degree in mechanical engineering. The Morton Memorial volume published by the Institute in 1905 contains the following biography of Mr. Burhorn.

"Edwin Burhorn was born in New York, June 21, 1866, the son of August and Henrietta W. Bickel Burhorn. Both parents were born in Germany and came to the United States about 1849, their parents being revolutionary exiles. He was educated in the public schools of Hoboken, N.J., graduating from Hoboken High School and receiving the Stevens scholarship. He served as draughtsman with Henry Warden, Germantown Junction, Philadelphia, Pa., manufacturer of boilers and special wrought-iron work, etc., 1885; and as assistant to the general manager of the Franklin Sugar Refinery, Philadelphia, 1885. While in the latter position he took entire charge of testing boilers, engines, evaporating apparatus, etc., designed and installed a special system of draining bag filters by vacuum process, filling char filters by automatic spreading-machines, etc. He became interested with Mr. B. H. Coffey, '85 (Stevens Institute), in the Cycle Water Filter, having obtained a patent on a special controlling valve mechanism, and joined with Mr. Coffey at the shops of Henry Warden, improving the filter and placing it successfully on the market. He was with the Link-Belt Engineering Co., of Philadelphia and New York, 1890–1893, planning many systems of handling material by machinery of special design, and afterward took entire charge of the designing department of the New York office of the same company.

"In 1893 he started in business as an engineer and contractor under the firm name of Warren & Burhorn, changed the following year to Burhorn & Granger,* of New York, the firm acting as manufacturers' agents in addition to professional work. This partnership lasted for eight years, during which time it installed many complete plants for power, heat, and electric light; made several improvements in the Woodbury high-speed automatic engine, built by the Stearns Manufacturing Co., and placed the engine in successful operation in many places, notably in the *World* Building, New York. In 1901 the firm of Burhorn & Granger was dissolved, Mr. Burhorn opening an office for himself in New York, as engineer and contractor, which business he is now carrying on. Some of the installations made under Mr. Burhorn's supervision are as follows: Boiler plant at the rope-walks of the Boston Navy Yard (750 horsepower); electrical transmission plant for the factory of John Mehl & Co., Jersey City Heights; a motor-driven swing-bridge over the Passaic River, at Fourth Avenue, Newark, N.J.; char-drying equipment and incinerator for sugar-baskets at the Arbuckle sugar-refinery, Brooklyn, N.Y., and an Acme water-cooling tower at Baltimore, Md. . . . showing a class of work of which Mr. Burhorn is making a specialty,—namely, recooling water from condensers in steam plants, or, in ice plants, for recooling water from ammonia condensers. He is a member of The Franklin Institute of Philadelphia."

About the year 1905, cooling towers were designed with perforated pans for the cooling surface and with wire mesh placed on the outside of the tower to act as louvers to prevent the water from being blown away by the wind. Up to the time of his death in 1937, Mr. Burhorn had been granted more than fifty patents on cooling towers and auxiliary apparatus. Some of these developments include all-steel and all-wood construction, the narrow-type tower, indoor-type installation, forced-draft tower, louver fence, and many others for use with refrigerating machines, Diesel engines, air compressors, oil-refining equipment, and air-conditioning apparatus. Burhorn cooling towers are found in all parts of the world and in almost every state in this country, in use by manufacturers, food industries, breweries, meat packers, dairies, and ice plants.

In June, 1910, Mr. Burhorn incorporated his company and was president and chairman of the board until his death. Because of the individual requirements of each cooling-tower installation, the Edwin Burhorn Company, engineers, contractors, and manufacturers, carries through a design from the beginning to the final erection. Other equipment manufactured by the company includes spray-pond apparatus.

* For biography of Abbott D. Granger, see page RI-55.

JOHN ALLEN CAPP (1870–1938)

John Allen Capp died on January 6, 1938, at the age of 68 years. He was born in Philadelphia, Pa., on January 14, 1870, and received his education at the Central High School (where Prof. Elihu Thomson was, at that period, associated with the science courses), and at the University of Pennsylvania. In 1892 Capp was engaged by the Thomson Houston Electric Company in the mechanical testing laboratory at the company's West Lynn Works. That laboratory and two other laboratories, dedicated respectively to chemical and electrical testing and investigations, were located in a very large basement, below the office building. The equipment of the three laboratories was remarkably complete, considering the state of advancement in science and engineering at that early period.

Today such an assemblage of apparatus, machinery, and personnel would be termed a research laboratory. It is probable that, at that time, no finer testing facilities in the field of general engineering and scientific research had ever been provided by any manufacturing corporation in this country. E. W. Rice, Elihu Thomson, and A. L. Rohrer, who had collaborated in the design of this laboratory, were justly very proud of it and they brought down from the offices many visitors from all over the world. Everything was shown to the visitors without any reservation whatsoever. Incidentally it served as a fine inspiration to the personnel to meet so many distinguished pioneering scientists and engineers.

Capp's assignments related chiefly to materials, especially to metals and insulation. In those early days, relatively little was known concerning the properties and characteristics of materials used in the manufacture of electrical equipment and products. Much remained to be learned. In the course of his professional career of 45 years, Capp contributed a very noteworthy share of the knowledge of these materials, which have since been developed, and he aided greatly in improving them to their present high quality. In 1892, cast steel was just emerging as a rival to cast iron and wrought iron for generators, railway motors, and other electrical apparatus. (Outside of railway motors, there was at that time no quantity production of electric motors for other than extremely small powers.) The kind of sheet iron available for armature cores and for transformers not only had a high hysteresis loss, but this loss increased rapidly with time in service. However, in conformance with common experience, since we had no knowledge that core material several times better ever would be developed, most people concerned were fairly contented. Few of the faults in insulating materials had yet been overcome; indeed they scarcely were realized. The quality of the oil used in transformers left much to be desired, and the nature of its faults already was being vigorously investigated. The investigations are continuing today, almost half a century later.

In May, 1894, after the Thomson Houston Company and the Edison Machine Company had been consolidated as the General Electric Company, Capp was transferred to the Schenectady Works. In 1896 he was placed in charge of the Materials Testing Laboratory. In this capacity Capp had the responsibility for the preparation of specifications for all materials purchased by the company and for their inspection and testing. In parallel with these duties Capp was constantly carrying on special experimental work and researches on materials and apparatus. Along with other materials, coal was an important item in the list of Capp's responsibilities and early received his active attention. At first, the coal people resented the in-

trusion of specifications concerning their "natural" product, but soon they became impressed by Capp's fairness and they accepted the methods he proposed for sampling and for testing the ash and sulphur content and the calorific value. The major burden of these expanding activities was borne by Capp up to 1927, when his laboratory was merged in the new Schenectady Works Laboratory, in which Capp became engineer of materials and continued in that position for the remaining 11 years of his life.

Throughout his professional career, Capp was a very active member of several engineering societies, notably The American Society of Mechanical Engineers, of which he became a member in 1901, and the American Society for Testing Materials, which he served as president for the 1919–1920 term. Honorary membership in that society was conferred on him in 1937. Many technical papers were contributed by Capp in the course of his professional career, not only to these societies but also to the American Institute of Mining and Metallurgical Engineers, the British Iron and Steel Institute, and the Institute of Metals.

In 1919 Capp was appointed one of a group of three representatives of the A.S.T.M. to develop, in collaboration with representatives from other societies, the plans for organizing an American Engineering Standards Committee. Capp entered upon this task with high enthusiasm. The early steps were beset with tremendous difficulties and it was due in no small measure to Capp's sound judgment and organizing experience and ability that finally there emerged from those early efforts the highly successful American Standards Association of today. Dr. Agnew, who has been its secretary from almost the very beginning, has spoken in the highest terms of Capp's valuable contributions to its successful evolution at various critical stages.

Cloyd M. Chapman, who also had much to do with the ASA, writes: "My impressions of Capp concerned chiefly his clear, distinct, precise thinking and the exactness he displayed in expressing his ideas. He hewed to a line and was definite in his ideas. He decided quickly and was slow to change or modify a decision once made. He seldom needed to. I have enjoyed some lovely arguments with Capp even though I often came off second best."

While the ASA achievement probably is the one of greatest consequence in the committee field of Capp's activities, mention certainly should also be made of much other fine committee work contributed by him. Altogether, as a member of the A.S.T.M. since its founding in 1898, Capp served on 18 different committees. Beginning with the establishment of the Committee on Copper and Copper Alloy Wires in 1909, Capp was its chairman, and his expert knowledge of testing methods for determining the properties of nonferrous wire products contributed to the development of specifications and practices which were for years the standards of the copper industry. Also as an active member of the Committee on Steel, Capp headed up various subcommittees and served as chairman of the committee in 1918. From 1920 to 1927 he gave much effort to the reorganization of the Committee on Methods of Testing and served as its chairman until 1927. As a member of the A.S.M.E., he served on the Research Committee Subcommittee on Bearing Metals (later called the Special Research Committee on Bearing Metals), from the time of its appointment in August, 1916, for the study of microstructure and hardness of bearing crystals, until its discharge in December, 1927.

A. L. Rohrer calls attention to the high opinion of Capp's abilities held by Dr. Chas. B. Dudley in the early years of this century. Dr. Dudley was a great pioneer and authority in the field of materials specifications and testing, particularly as relating to steel rails and similar materials. He acted as Capp's mentor on many occasions and visits were frequently exchanged between himself and Capp at Altoona and Schenectady.

G. H. Wright (who was Capp's close associate for many years, including the period of the Schenectady activities) and A. L. Rohrer, recall that, around 1920, Capp did some early testing which led to the substitution of stainless steel for the monel metal buckets in the first stages of his company's steam turbines. With time and experience, this practice was extended through the entire stages. Since the last few stages require strength beyond the range of monel metal, stainless steel buckets replaced $3^1/_2$ per cent nickel steel. Capp is believed to have been the first to suggest this substitution and he worked very hard for its adoption.

In addition to his engineering interests, Capp took great delight in music. He was one of the founders of the Schenectady Civic Music Association and served as its president from 1932 to 1934. Dr. Felix Kleeberg (who was Capp's chief for some time, in the laboratory work in the 1894–1895 period) in reminiscencing about those early times, speaks of a trio which frequently met and played the classical Haydn trios, Capp playing the piano, a mutual friend (Frank Holden) the cello, and Kleeberg the violin.

There are but few now living who were associated professionally with Capp when he went to work at Lynn at 21 years of age. J. M. Darke, of the Lynn Works of the General Electric Company, referring to that early time, states that they all considered Capp as "a very efficient man, very methodical in his work, and very original in such work." A review of his accomplishments in later life more than justified these impressions of his early associates.

A fitting conclusion to this memorial has been furnished by F. M. Farmer, long associated with him in committee work, who writes: "John Allen Capp leaves with a wide circle of friends and acquaintances the memory of a man who could be depended upon to conscientiously carry out any assignment he accepted, a man whose integrity was never questioned and who would strenuously contend for what he believed to be the right decision, a man whose sound advice was widely sought and was always freely given."—[Memorial prepared by HENRY M. HOBART, Schenectady, N.Y., Mem. A.S.M.E.]

JAMES ADAMS CHARTER (1865–1937)

James Adams Charter, a member of the A.S.M.E. since 1899, died on April 21, 1937. He was born in Sterling, Ill., on July 24, 1865, the son of John and Rachel (Adams) Charter. His public school education was supplemented by studies under a private tutor and an apprenticeship in designing and mechanical work with the Williams & Orton Manufacturing Co., of Sterling. Following the completion of his apprenticeship in 1883 he worked as a draftsman for this company and for H. W. Caldwell & Co., of Chicago, for which he later became general superintendent. Other early connections were with the Sterling Gas Company and the Sterling Gas & Electric Light Co.

Mr. Charter was associated with his father in the design of gas engines, the first patents on which were taken out in 1882. He later described the invention as "the first internal-combustion engine to use liquid fuel (gasoline) injected directly into the suction intake of the engine (now called the carburetor)," and stated that their designs "made it possible to adopt gasoline for powering both automobiles and aeroplanes using internal-combustion engines." From 1894 to 1908 he was connected with Fairbanks, Morse & Co., Beloit, Wis., in charge of the manufacture of these engines, also representing this company in Europe for some time, and during the next four years he was with the Austin Manufacturing Company, Harvey, Ill., as designing engineer in connection with the manufacture of gasoline-driven road rollers.

In 1910 Mr. Charter became president of the Charter Single Sleeve Motor Company, Chicago, developing the rotary-sleeve type of engine for automobiles and aeroplanes. In 1923 he invented a new type engine starter drive, and incorporated a company for its manufacture, Charter Drive, Inc., Chicago, of which he served as president until his death.

Mr. Charter married Miss Julia Wheeler, of Chicago, in 1913, and is survived by her.

LAWRENCE RIPLEY CLAPP (1886–1937)

Lawrence Ripley Clapp, vice-president, The New Haven Copper Company, Seymour, Conn., died on July 9, 1937. He was born on February 25, 1886, in Brooklyn, N.Y., the son of William Gamwell and Sarah Louise (Ripley) Clapp. He prepared for college in the Morristown High School, Morristown, N.J., and was professionally educated at Columbia University, where he was graduated with an M.E. degree in 1910. As a student at Columbia he was awarded the Illig Medal for his outstanding work in metallurgy and was made a member of the honorary societies of Tau Beta Pi and Sigma Xi. Later, besides becoming a member of the A.S.M.E. in 1921, he also joined the American Institute of Mining and Metallurgical Engineers and the Canadian Institute of Mining and Metallurgy, and was a licensed and registered engineer in British Columbia.

From 1905 to 1907, prior to his graduation from Columbia, Mr. Clapp served as assayer, surveyor, miner, and millman at various mines in the United States and Mexico, for the Cananea Copper Company, Federal Lead Company, and Ms. Tecolotes y Anexas. From the time of his graduation in 1910 until the World War in 1917, he served as superintendent, Loreto Mill (silver), Cia de Real del Monte, Pachuca, Mexico; Silver Lake Mines (silver, lead, gold, copper), Silverton, Colo.; Sunnyside Mill (silver, lead, zinc), Eureka, Colo.

When the United States entered the World War, Mr. Clapp became associated with the U.S. Fuel Administration, Washington, D.C., as chief of States Conservation Section; U.S. Army, New York District Ordnance Claims Board, New York, N.Y., general assistant; and until 1922 he practiced as a consulting engineer in plant management and valuation in New York, N.Y.

Returning to the mining business in 1922 he served as assistant general manager, Granby Consolidated Mining, Smelting & Power Co., Anyox and Copper Mountain, B.C.; and in 1924 he returned to this country as vice-president and general manager, The New Haven

Copper Company, Seymour, Conn., the position he held at the time of his death.

Mr. Clapp stated that he had contributed "occasional papers in the technical press;" considered himself "best qualified for the mining and metallurgy of copper, including rolling-mill practice;" and had taken out "several patents on the rolling of copper and other ductile metals."

On April 17, 1915, Mr. Clapp married Miss Helen Tilge, of Philadelphia, Pa., and they had two children: Eleanor Lawrence and Marjorie Ripley.

ERIC HERBERT COSTER (1867–1937)

Several of the more important railroad power plants in this country, together with some private plants, bear testimony to the skill of Eric Herbert Coster, engineer of mechanical design for the Interborough Rapid Transit Company, New York, N.Y., from 1924 until his death in 1937.

Mr. Coster was born in London, England, on June 9, 1867, the son of Fredrick Leonard and Elizabeth (Bradley) Coster, but went to Sweden at an early age. He received his preparatory education at the grammar school in Uddevalla, Sweden, and the high school in Gothenburg, Sweden, and then attended the Chalmers College of Engineering, Gothenburg, receiving his diploma on his twenty-first birthday. Beginning in March, 1889, he worked for eighteen months as a fitter and erecting engineer on steam fire engines and pumping machinery for the Ludwigsberg Engineering Company, Stockholm. From then until May, 1896, when he came to this country, Mr. Coster was superintendent of his father's woodworking plant and planing and sawmills at Uddevalla.

His first employment after coming to the United States was with Sheaff & Jaastad, consulting engineers, Boston, Mass., as a draftsman on general plans and details for powerhouses and equipment. In April, 1897, he went with the Boston Elevated Railway Company, where he was engaged until December, 1898, in drafting and field work on powerhouse equipment, especially piping, and in the operation of two powerhouses. A brief engagement as a draftsman on piping with the New England Gas & Coke Co., Boston, followed, and, in March, 1899, Mr. Coster began an association with Westinghouse, Church, Kerr & Co., New York, N.Y., which lasted, with a single brief interruption, for fifteen years.

Drafting on building and equipment plans and details for the Kingsbridge powerhouse at New York and other powerhouses was Mr. Coster's first work with Westinghouse, Church, Kerr & Co. and was interrupted early in 1901, when he went to the London office of the British Westinghouse Electric & Manufacturing Co. to design a power plant for the Mersey Railway Company, at Birkenhead, and the Neasden power plant for the Metropolitan Railway, London. He returned to the United States late in 1902 and resumed work for Westinghouse, Church, Kerr & Co. as an assistant engineer, being subsequently promoted to the position of engineer-in-charge. Some of the more important work with which he was associated for the company included the design of five electrical substations for the Long Island Railroad and inspection of field work in this connection; general design of the power plant for the Congressional Office Buildings at Washington, D.C.; general design of the Cos Cob, Conn., power plant of the New York, New Haven & Hartford R.R., and arrangement of equipment; design and equipment of the Waterbury power plant for the Connecticut Company; design of producer-gas and gas-engine plants for the Harriman Estate at Harriman, N.Y., and purchase of all equipment, and supervision of field work in connection with this plant; similar work in connection with a mechanical-stoker and forced-draft installation at the Chicago plant of the N. K. Fairbank Company; and design and construction of an extension to the plant of the Fall River (Mass.) Electric Light Company. During these years Mr. Coster also did some appraisal work in connection with power plants.

From 1915 to 1917 he was engaged in the design and construction of new power plants and extensions to existing power plants for E. I. du Pont de Nemours & Co., Wilmington, Del. This employment was followed by work with Gibbs & Hill, consulting engineers, New York, in connection with the proposed improvement of the Pennsylvania Railroad Station at Pittsburgh, from June, 1917, to July, 1918. From then to February, 1920, he was engineer-in-charge for Henry R. Kent & Co., engineers and constructors, New York. The following April he took a position as assistant mechanical engineer with The Foundation Company, New York, with which he remained until May, 1921. About a year later he was appointed assistant appraisal engineer with the Board of Public Utility Commissioners, State of New Jersey, where he continued until May, 1923. He then went to Reading, Pa., where he was associated with the W. S. Barstow Management Association, until September, 1924, as mechanical engineer in charge of design and construction of a power plant at Middletown, Pa., for the Metropolitan Edison Company. From that time until his death, which occurred at New York on January 29, 1937, Mr. Coster was engineer of mechanical design for the Interborough Rapid Transit Company.

His widow, Mary (Seward) Coster, whom he married in 1903, a daughter, Elizabeth, of Holyoke, Mass., and a son, Herbert S. Coster, of Orange, N.J., survive him.

Mr. Coster became a naturalized citizen of the United States in 1906 and a member of the A.S.M.E. in 1910.

DUDLEY PEAK CRAIG (1890–1937)

Dudley Peak Craig, head of the Mechanical Engineering Department of the Colorado State College, Fort Collins, Colo., died on March 26, 1937, of pneumonia.

Mr. Craig was born in Ghent, Ky., on November 8, 1890, the son of Ulysses Peak and Mollie (Davis) Craig. His early education was obtained in the Manual Training High School of Indianapolis, Ind., and his engineering course was taken in Purdue University, where he was graduated with a B.S. degree in mechanical engineering in 1912, and in 1924 was granted an M.E. degree.

On graduating in 1912, Mr. Craig went to work with the Western Electric Company, Chicago, Ill., where he remained five years. His work was devoted particularly to manufacturing methods and time study, and the development of lead-covered cable. From 1917 to 1918, Mr. Craig was employed by Landers, Frary & Clark, New Britain, Conn., on time studies and factory costs. In 1918, he was in the U.S. Army in a field artillery officers training camp, but soon afterwards took a position with the Firestone Tire & Rubber Co., Akron, Ohio, where he stayed until 1921. He was attached to the Industrial Engineering Department in charge of the factory suggestion system.

In 1921, Mr. Craig returned to Purdue University as instructor and graduate student, obtaining his M.E. degree in 1924. He was appointed assistant professor in 1925, and associate professor in 1931. He remained in this position until September, 1936, when he went to Fort Collins, to take over the chair of mechanical engineering and head of the department at Colorado State College, following the retirement of Prof. L. D. Crain.

Professor Craig joined the A.S.M.E. as a member in 1925. He was honorary chairman of the A.S.M.E. Student Branch at Colorado State College at the time of his death. He was also a member of the Society for the Promotion of Engineering Education and corresponding secretary of its Rocky Mountain Section, belonged to the Tau Beta Pi and Pi Tau Sigma fraternities, and held the rank of major in the U.S.A. Field Artillery Reserves. In collaboration with Hubert J. Anderson, he was author of a book, "Steam Power and Internal Combustion Engines," which was brought out by the McGraw-Hill Book Company in 1931 (revised edition in 1937). Like many other young engineering students and instructors, Professor Craig engaged in occasional outside work; thus he worked as machinist apprentice for the Big Four Railroad, Beech Grove, Ind., during the summers from 1908 to 1911, and also put in another summer (1924) with the Cleveland Electric Illuminating Company, on acceptance tests of powdered coal boilers, and contributed papers to the *Purdue Engineering Review* and to *Power*.

In 1914, Professor Craig married Bessie Sheffer, of Chicago. He is survived by her and their four children, Gordon Davis, Mary Ruth, Elizabeth Ann, and Donald John, as well as by his mother and three brothers, all engineers.

CALVIN HENRY CROUCH (1870–1937)

Calvin Henry Crouch, a resident of Cliffside Park, N.J., died suddenly in Oswego, N.Y., on July 13, 1937, shortly after attending a reunion of his Class of 1892 at Cornell University.

Mr. Crouch was born on April 25, 1870, near Oswego, N.Y., the son of Henry Theodore and Ruth Lydia (Kenyon) Crouch. He prepared for college in the Oswego public schools and then attended Cornell University, where he was graduated with an M.E. degree.

Immediately after his graduation, Mr. Crouch spent a year as a student apprentice with the Ames Iron Works, Oswego. He then worked for a year with the Rome, Watertown & Ogdensburg R.R., Oswego, as a machinist, and followed this position by working for three years, from 1894 to 1897, as erecting engineer and in experimental and test work with the Deane Steam Pump Company of Holyoke, Mass. He next spent three years as instructor in machine shop practice at the Williamson Free School of Mechanical Trades, Delaware County, Pa. This was followed by one year erecting locomotives in Europe as traveling engineer for the Baldwin Locomotive Works, of Philadelphia, Pa.

In 1901, Mr. Crouch went to the University of North Dakota, Grand Forks, N.D., as dean of the College of Mechanical and Electrical Engineering and professor of mechanical engineering. He held this appointment until 1916, when all the engineering interests in the university were combined into the College of Technology. Under the reorganization, Mr. Crouch became professor of mechanical engineering and director of shops.

In 1919 Professor Crouch took the position of acting dean of the College of Technology and professor of mechanical engineering at the University of New Hampshire, Durham, N.H. He became dean the following year and remained at the college until 1925. From then until 1932, he was employed by E. L. Phillips & Co., New York, N.Y., as mechanical engineer.

In 1898, Mr. Crouch married Della L. Newman of Oswego, N.Y., who survives him.

He joined the A.S.M.E. as an associate in 1898, and became a member in 1908. He was also a member of the Society for the Promotion of Engineering Education. Mr. Crouch was a Knight Templar in the Masonic order, a Baptist in religion, and a Republican in politics. His paper, "Experiments With North Dakota Lignite in a Steam Power Plant and a Gas Producer," was published in the A.S.M.E. Transactions (vol. 34, 1912, page 795), and the University of North Dakota published a Bulletin by him, "Vocational Training." He also wrote several papers that were published in the Proceedings of the S.P.E.E.

ARCHER DAVIDSON (1881–1938)

Archer Davidson, sales engineer at Boston, Mass., for the Westinghouse Electric & Manufacturing Co., died on July 7, 1938. Mr. Davidson was born on February 18, 1881, at Farmville, Va., the son of William and Julia Flippen (Wiltsie) Davidson. His education consisted of six years at public schools, two years at Farmville High School, and three years at the Virginia Polytechnic Institute, Blacksburg, Va., where he received a B.S. degree in June, 1902.

During a portion of the time Mr. Davidson spent at the Virginia Polytechnic Institute, he worked at steam fitting in Lynchburg, Va., and also on the power plant and steam-heating system for the Virginia State Normal School for Women. Upon his graduation from college, he went to work as an apprentice machinist with the Westinghouse Machine Company, Pittsburgh, Pa., and was soon promoted to assistant foreman in the steam turbine Erecting and Testing Department.

In 1903, he was made an assistant in the Turbine Test Department and was employed as erecting engineer, under the direction of Westinghouse, Church, Kerr & Co., in connection with installations at two plants in Maine. In 1904 he returned to the Westinghouse Machine Company as erecting engineer, and during the following year he was connected with the installation of some twenty turbine units for plants furnishing power for cotton mills, electric railway and lighting service, and general industrial purposes.

Mr. Davidson was appointed district engineer for the Atlanta District of the company in 1905, and remained there until 1915, when he was transferred to the Boston Office as sales engineer, in which work he continued until his death. He was highly regarded in engineering circles for his ability and experience in the design, operation, and application of steam equipment, and he was responsible for many of the large turbine installations throughout New England.

During his long service with the Westinghouse organization, Mr. Davidson took out a number of patents. Probably the most outstanding was one covering the combination impulse and reaction turbine exploited by the Westinghouse Machine Company, which materially shortened the length of the turbine as compared with one of equal power having all reaction blading. This patent was sufficiently broad in scope to cover any combination type turbine.

A second patent of importance covered a power plant arrangement wherein with an existing non-extraction type turbine, an extraction type is installed with feedwater heaters supplied from the extraction type unit, serving to progressively increase the temperature of condensate passing from the condensers of both turbines to separate boilers, the boiler supplying steam to the extraction turbine operating at higher pressure and temperature with the object of improving the overall performance.

Mr. Davidson married Florence Meadows in 1922 and is survived by her and by two sisters. He joined the A.S.M.E. in 1907 as an associate.

HENRY S. DEMAREST (1867–1937)

Henry S. Demarest died on July 11, 1937, at his home in Hempstead, L.I., N.Y., after a long illness. Mr. Demarest was president and treasurer of Greene, Tweed & Co., New York, N.Y., manufacturers of mill supplies. He was the son of Albert Alonso and Constance Marie (Eakin) Demarest and was born on February 1, 1867, in Brooklyn, N.Y., in the public schools of which city he obtained his education.

Mr. Demarest began his business career with the Worthington Pump & Machinery Co., then known as Henry R. Worthington. While with that firm his attention was drawn to a little-known brand of asbestos packing. The qualities of this packing so impressed him that he gave up the lucrative position he held and persuaded Greene, Tweed & Co., the manufacturers of the packing, to permit him to attempt to place their product on the market. His untiring efforts, judgment, and faith in the product were eventually rewarded, the packing becoming well and favorably known throughout the world. Later Mr. Demarest acquired the controlling interest in the company.

Besides his own business, Mr. Demarest was a director of the Union Ferry Company of New York and Brooklyn. He was a vice-president of the American-Polish Chamber of Commerce and was decorated by the Polish government with the medal of the Order of Polonia Restituta. During the first World War, he was a member of the Executive Committee of the Hardware Metals and Allied Trades Committee.

Mr. Demarest became an associate of the A.S.M.E. in 1914. He was also a member of the Union League Club, the Merchants Club, the Export Managers Club, the British Chamber of Commerce, the Huguenot Society, and the Holland Society of New York.

Mr. Demarest's chief hobby was his business; but he was also keenly interested in his library and garden.

He is survived by his widow, Mrs. Frieda J. (Nicholas) Demarest, whom he married in 1931, in London, England.

HERMAN DIEDERICHS (1874–1937)

Herman Diederichs was elected a junior member of the A.S.M.E. in 1904 and promoted to full membership in 1913. In 1930 the Melville Medal of the Society was awarded jointly to him and to William D. Pomeroy for their paper entitled "The Occurrence and Elimination of Surge or Oscillating Pressure in Discharge Lines From Reciprocating Pumps."

He was appointed a member of the Committee on Awards of the Society in 1933 to fill an unexpired term and served as chairman of the committee during 1936. He was also a member of the Nominating Committee for 1936. He served as a member of the Power Test Codes Committee on Reciprocating Steam Engines from 1918 until his death, and as a member of the Special Research Committee on Bearing Metals from its appointment in 1916 until its discharge in 1927. He was a representative of the Society on the Division of Engineering and Industrial Research of the National Research Council from 1930 to 1933.

Dean Diederichs had been on the faculty of the College of Engineering of Cornell University since his graduation there in 1897. The following memorial is adapted from an obituary by Dexter S. Kimball (whom he succeeded as dean of the College of Engineering) which was published in *The Cornell Engineer*, October, 1937. The same issue contained tributes by others who had been associated with him, including Livingston Farrand, S. C. Hollister, P. M. Lincoln, W. N. Barnard, and Albert W. Smith.

Dean Herman Diederichs passed away on August 31, 1937, at Clifton Springs (N.Y.) Sanitarium of an obscure anemic disease and after several months of illness. His death removes another of the outstanding figures that have not only made famous the College of Engineering of Cornell University, but who, by reason of their personal characteristics, gave luster to the entire institution.

Dean Diederichs was born in Muenchen-Gladbach, Germany, August 12, 1874, and received his elementary education there. He was the son of Johann Peter and Anna Marie (Kamps) Diederichs, and was the oldest of a family of six, all of the remainder of whom survive him. These are Mrs. Katherine Shafer, of Brooklyn, N.Y.; Mrs. Louise Weber, of Waterbury, Conn.; P. Paul, of Dolgeville, N.Y.; Hugo N., of Owens, W.Va.; and William J., of Upper Darby, Pa.

In 1888 his parents migrated to this country and settled in Dolgeville, N.Y. The family was one of modest circumstances, yet means were found to send him and others of the family to high school at Dolgeville, where he won a state scholarship. He walked to Herkimer, more than twenty miles distant, to take the competitive examinations. With this and a promise of financial assistance from friends (which did not materialize), he entered Cornell University in 1893. Here, largely through his own exertions, he not only completed his course in engineering in the prescribed four years, with such a good record as to be elected to the honorary society of Sigma Xi, but he also found time to engage in student activities and was

prominent as a shot-putter. He graduated with the degree of M.E. in 1897, which, for a person who had to learn English at fourteen years of age, must be considered as an accomplishment.

He won the first Sibley prize in his senior year and the Sibley Fellowship for graduate study. After a year on this fellowship he was appointed an instructor in experimental engineering under Professor Rolla C. Carpenter. In 1902 he was promoted to an assistant professorship, to a professorship in 1907, and succeeded Professor Carpenter as head of the Department of Experimental Engineering in 1920. In 1928 he was appointed the first incumbent of the John Edson Sweet Professorship, founded in honor of the distinguished engineer who at one time was a professor at Cornell. In 1921 he became director of the Sibley School of Mechanical Engineering and in 1936 he was appointed to the deanship of the College of Engineering—a well-deserved honor, which he was fated to enjoy only for a little over one year.

His entire manhood was, therefore, devoted to the service of his alma mater, not only in his chosen field, but in many of the broader aspects of university life. No man of the faculty was called upon more frequently to serve on important committees, and the confidence of his colleagues in his sound judgment and honesty is attested by his election by the university faculty in 1929 to serve as one of the faculty representatives on the Board of Trustees, which office he filled for three years. Space does not permit even an enumeration of the many services of this sort that he rendered to the university community. His service to the College of Engineering was even greater. For many years no important question whether of academic or administrative character has been decided without seeking his advice and judgment. The curriculum of mechanical engineering, in particular, has been shaped under his guiding hand. He was indeed a wise adviser.

He was no less active and interested in the problem of student life. Interested naturally in athletics, he was for many years a member of the Athletic Association and for some years served as president of that body. Here, again, his sterling character impressed itself upon the difficult problems of athletics, and that this was amply appreciated by the student body is shown by the following dedication of *The Cornellian* of 1935:

"To Herman Diederichs, who for forty-two years has served his alma mater as student, teacher, and administrator, and, who, through his intense interest and untiring efforts, has succeeded in inaugurating a new era in Cornell athletics. For his active participation in campus affairs, he will long be remembered, and as a stern teacher and a sympathetic, honest friend, the Class of 1935 will revere him—Cornell's Man of the Year."

Surely student praise can attain no higher level of appreciation.

He was vice-president of the second district of the National Collegiate Athletic Association and chairman of the Board of Athletic Control of Cornell University.

Dean Diederichs was essentially a man of scholarly mind and his outlook on life was naturally colored by this fine quality. He was an authority in the field of experimental engineering. In 1905 he and Professor Carpenter collaborated in writing a treatise entitled "Internal Combustion Engines" and in 1911 they produced "Experimental Engineering," which is a standard work in that field. In 1930 he and Professor W. C. Andrae collaborated in a monumental treatise entitled "Experimental Mechanical Engineering" (Volume I, Engineering Instruments) and Volume II, on testing of power plant apparatus, was in preparation. He also translated Güldner's "Internal Combustion Engines" from the German. He contributed a number of articles to the *Sibley Journal* and other publications, beginning as early as 1900. Among these were "Analysis of Coals," "Comparative Tests of Plain and Para-Pneumatic Pulleys," and several reports on gas-engine tests. He was the co-author of three bulletins of the Engineering Experiment Station at Cornell, dealing with "The Purification of Salt Made From Central New York Brines," "The Heat Transfer From Steam to Heavy Fuel Oil," and "Flame Propagation in Closed Cylinders." He also made many tests and investigations as a consultant, among which may be mentioned a power test on the steamer *Morro Castle*, of the Ward Line, a report on a plant for the production of oxygen, for the American Oxygen Company, and, particularly, a voluminous report on the power plant of the Hall of Records in New York, N.Y. This test consumed a year and the report constitutes a book of 673 pages.

Dean Diederichs was also a member of the following honorary and scientific societies: Quill and Dagger, senior honorary society; Phi Sigma Kappa fraternity; Sigma Xi; Tau Beta Pi; Phi Kappa Phi; Society of Automotive Engineers; American Society for Metals; Verein deutscher Ingenieur; and Society for the Promotion of Engineering Education.

His teaching naturally reflected his scholarly habits and Germanic thoroughness. He had little sympathy with lazy or indifferent students, but he would go to any length to make a point clear and no student went to him for help and came away empty-handed. Perhaps his best teaching work was his lectures on materials of engineering given to many generations of electrical and mechanical engineers and which, in the opinion of the writer, were classics. He was an excellent lecturer and could interest the student in this highly technical subject. Of lasting value also is his work in helping to develop the present course in experimental engineering than which there is none better, if as good, in this country. It should be remembered that the engineering experimental laboratory was conceived by Dr. Robert H. Thurston at Stevens Institute and brought by him to Cornell in 1885. The background of the present course was developed under his guidance by Professor Rolla C. Carpenter and has been widely copied elsewhere. Professor Diederichs, therefore, drank from the original source and carried with him to his death the inspiration of these two great pioneers. It has been his labor to modify and adapt the course to an ever changing industrial world and this he has done in a masterly manner, keeping the course in advance of the times, though almost always handicapped for lack of money and equipment. It was this same inspiration that enabled him to keep the spirit of research alive in mechanical engineering, for, in spite of many handicaps, too many to enumerate, the long list of scientific publications issued under his guidance has continued to grow. His influence and knowledge in this important side of the work of the college will be one of its heaviest losses, and one that will be impossible to compensate for. Men of his thorough scholarly and scientific background and long experience in experimental work are rare indeed, and difficult to replace. One of the reasons for his wide and deep knowledge lay in his omnivorous reading, not only of scientific and engineering literature, but also of a broad general character, and this wide reading habit embraced German literature as well as American and English. He was a very well-informed man.

I have always held him in high regard as an administrator. He was my close friend for nearly forty years, and my most valued adviser during my deanship. Not that we have always agreed on all matters, but because of his openmindedness it was always possible to come to a conclusion that seemed best and which was mutually satisfactory. He never allowed his personal feelings or opinions to affect in any way the welfare of any member of the faculty, and his interest in the life of the college was deep and fair-minded. He had certain definite policies for the future of the college, which I had hoped he would have an opportunity to develop, but fate ordained otherwise. That these good qualities were fully appreciated by his colleagues, was attested by the almost unanimous vote by which his nomination was approved.

His relations to his students were quite unique. Despite the fact that he was a bachelor, he had a real fondness for young people and sympathy with their problems. He was far from being a demonstrative person, and his rather severe countenance and somewhat brusque manner were often forbidding to the new student. It usually took some experience with him to discover that this rough exterior hid a warm and understanding heart. Dr. C. F. Hirshfeld, in an appraisal of him on the occasion of his appointment to the deanship, has very aptly expressed this quality thus—"In some respects the poorer scholars and breakers of rules and regulations among the older classes were more fortunate than those who traveled the straight and narrow path of scholarship and good conduct. Many of the weak, the lame, and mischievous who appeared before Professor Diederichs and his associates, by special though not sought after invitation, discovered that back of the severe manner of the strict disciplinarian there dwelt a kindly, understanding, and human living soul." He had a fine sense of humor through which he could always view student manners, and he was fond of relating humorous situations that arose in his contacts with underclassmen. Only a short time ago he related to me with glee, two absolutely new and equally spurious reasons advanced by freshmen, why it was imperative for them to get away several days before the beginning of the spring recess. He said that because the reasons were at least new and ingenious, though of doubtful validity, he granted the requests and laughed heartily.

No student ever went to him for advice or help on any matter without receiving assistance, and as freshmen grew into seniors, they acquired respect, admiration, and often real affection for this rugged and unique personality. To hundreds of returning alumni, the campus will not be quite the same, because "Died" will not be there.

One of Dean Diederichs' most outstanding virtues was his essential honesty, not only in matters pertaining to his professional work and his teaching, but in all his personal contacts with people. I have never known a man on whose word I could more thoroughly rely, or one of greater integrity, in all the many transactions that transpired between us. He was modest to an extreme degree, which accounted, no doubt, for some of his apparent great reserve. He was a sociable man, fond of company, and a first-class companion. His wide range of reading enabled him to converse intelligently on almost any topic. Frailties he no doubt had, as have all of us, but they were over-

shadowed by his rugged, upstanding personality, and by the many helpful services he rendered to all around him. Like Joseph of Arimathæa, "he was a good man, and a just," and Cornell University and this entire community are the better because he lived and worked among us.

AMELIA EARHART (1898–1937)

Amelia Earhart was born in Atchison, Kan., on July 24, 1898, the daughter of Edwin S. and Amy Otis Earhart. She was educated in the Hyde Park High School of Chicago, at Columbia University, and at various other colleges. From 1926 to 1928, she was in charge of the girls' work at Denison House in Boston, and also taught an extension course for the Commonwealth of Massachusetts. On June 17, 1928, she was the first woman to cross the Atlantic Ocean in an airplane, going from Trespassey Bay, Newfoundland, to Burryport, Wales. From 1928 to 1930, she was aviation editor of the *Cosmopolitan Magazine*, and began her career as a pioneer. She has been described as the first woman to fly the Atlantic alone, the first person to fly the Atlantic alone twice, the first woman to fly an autogiro, the first person to cross the United States in an autogiro, the first woman to receive the Distinguished Flying Cross, the first woman to fly nonstop across the United States, and the first woman to fly from Hawaii to the United States.

In 1931, she married George Palmer Putnam, who cooperated in every way to make her flying possible and to encourage her in her pioneer work. The best account of her achievements and her interests is contained in her two books, "20 Hours, 40 Minutes," published in 1928, and "The Fun of It," published in 1931. They show her two chief interests to have been flying and furthering the progress of aviation, and increasing opportunities for women to select and go forward into careers and at the same time, enjoy home and family life.

Purdue University is proud that Amelia Earhart became a member of its faculty and made outstanding contributions, both in the field of aeronautics and in that of careers for women. Her "Flying Laboratory" in which she made her last flight was financed by men affiliated with Purdue, and the tragic ending in July, 1937, of her exploratory trip around the world, which shocked and saddened the entire world, took from Purdue not only a valued and inspiring leader, but a beloved friend. Her portrait hangs in one of the residence halls for women and each of the three residence halls has a memorial library maintained by the students in affectionate recognition of her contributions. President Edward C. Elliott has characterized her perfectly in a speech made on the Purdue campus at a Conference on Women's Work and Opportunities, October 31, 1937, when he said, "Her primary interest in life was not in this career of adventure upon which she had embarked, but rather in an effort to find and make some addition to the solution of the problem of careers for women."

Miss Earhart had many honors and medals. She was a member of many technical groups, including the A.S.M.E., which she joined as an associate in 1931, and of many nontechnical groups and clubs. Her contributions can be measured by her achievements, but also include stimulating and encouraging youth everywhere to adventure and to achievement.—[Memorial prepared by LILLIAN M. GILBRETH, Montclair, N.J., Mem. A.S.M.E.]

RALPH EARLE (1874–1939)

Ralph Earle, Rear-Admiral, U.S. Navy, Retired, president of Worcester Polytechnic Institute, died at Worcester, Mass., on February 13, 1939. He had been president of the Institute since 1925 and was made a member of the A.S.M.E. in 1926.

President Earle was descended from the early settlers of Leicester, Mass. He was born in Worcester, May 3, 1874, son of Stephen Carpenter and Mary Eaton (Brown) Earle, and after his early education in the public schools of Worcester, was admitted to the Worcester Polytechnic Institute in January, 1892. A few months later, he took the competitive examination for entrance to the United States Naval Academy at Annapolis, won the appointment, and was graduated there in 1896.

He was promoted through the various commissioned grades of the Navy, serving in the war with Spain, the World War, and in the Philippine and Mexican Campaigns. He soon became conspicuous in matters pertaining to naval ordnance, and in 1916, shortly after attaining the rank of captain, he was made the Chief of the Bureau of Ordnance, with the rank of Rear-Admiral during the exacting World War period. He was responsible for the conception of two of the outstanding activities in which the American Navy was engaged during the World War. The first had much to do with the defeat of the enemy's submarine warfare and consisted of the design and construction of a mine barrage across the North Sea. This barrage consisted of a submerged mine field 230 miles in length and 25 miles wide and was the culminating step in combatting the submarine.

The second accomplishment was that of the design and the construction of the 14-inch railway batteries which saw active service in France. These naval guns were the largest at the front and resulted in cutting the enemy's main line of communication and unquestionably paved the way for the Armistice.

In 1925, he retired from the Navy to accept the call to become the president of the Worcester Polytechnic Institute in his native city. His record there was one of marked progress for the school, both professionally and materially, and, at the time of his sudden death in 1939, his comprehensive plan to keep that well-established school abreast the field of engineering was well under way and is now being pushed to completion. As sixth president of the Institute, his administration will be long remembered for the success which he achieved in training youth for leadership in the world of science and engineering.

Admiral Earle was a Bachelor of Science, United States Naval Academy, and received the following honorary degrees: D.Sc., Worcester Polytechnic Institute, 1925; D.Eng., Rensselaer Polytechnic Institute, 1926; LL.D., Amherst College, 1929; and LL.D., Clark University, 1930. During his naval career, he was honored with many decorations both by his own and foreign countries. He was a member of the Society of Naval Architects and Marine Engineers and of the Society for the Promotion of Engineering Education, as well as of a number of other societies and clubs, and was the author of several books.

President Earle is survived by his widow, Janet Turner (Schenck) Earle, whom he married in 1898 and who is the daughter of a naval officer; a son, Ralph, Jr., who is a naval officer; and a daughter, Mary Janet Hines, who is the wife of a naval officer.

President Earle's whole career was stamped with the loyalty engendered in his early naval life and he had to an unusual degree the gift of winning the loyalty of his subordinates. Added to this gift were his human qualities which made him beloved by all with whom he came in contact.—[Memorial prepared by ADMIRAL WAT TYLER CLUVERIUS, President, Worcester Polytechnic Institute.]

CHARLES ISAAC EARLL (1863–1938)

Charles Isaac Earll, of York, Pa., died in New York, N.Y., on June 14, 1938, while on a business trip. He was severely injured in an automobile accident near Norwalk, Ohio, on October 28, 1937; and although he apparently recovered from the effects of the accident, he was never well for long afterward, and his death, eight months later, was probably an indirect result of the injuries sustained at that time.

Mr. Earll was born at Van Buren, N.Y., on April 11, 1863, the son of Myron H. and Asenath (Styles) Earll. He obtained his preparatory education at the State Normal School, Whitewater, Wis., and was graduated with a B.S. degree in mechanical engineering from the University of Wisconsin in 1885. He later took one and one-half years' work in the New York Law School.

Immediately on his graduation from the University of Wisconsin, Mr. Earll went to work for the Filer & Stowell Co., Milwaukee, Wis., as machinist and draftsman in the building of steam engines and sawmill machinery. From 1886 through 1890, he worked as draftsman and designer on the Paige typesetter, an enterprise conducted by James W. Paige, Hartford, Conn., and financed by Samuel L. Clemens (Mark Twain). In January, 1891, Mr. Earll went to New York and was employed as assistant engineer on the several cable-operated street railways then in use on Broadway, Columbus, Seventh, Ninth, and Lexington Avenues, and Twenty-Third Street.

From 1894 to 1898, Mr. Earll was superintendent of shops for the De Laval Separator Company, Poughkeepsie, N.Y., and from 1898 to 1915, he practiced in New York as patent solicitor and consulting engineer. In 1915, he established his own business in York, Pa., manufacturing trolley catchers and trolley retrievers, and continued in that work until his death.

During his long professional career, Mr. Earll took out a number of patents relating to cable railways and grips for these railways; also on a geared hoist and on a reel for clotheslines, and several on springs, working mechanisms, and other details for trolley catchers and retrievers.

Mr. Earll became a member of the A.S.M.E. in 1892. He served on the Publications Committee of the Society from 1911 to 1917, being chairman in 1914 and 1915; and on the Executive Committee of the Susquehanna Section in 1928–1930. He was also a member of the Engineering Society of York, and of the Manufacturers' Association, the Chamber of Commerce, the Lafayette Club, the Country Club, and the Rotary Club, all of York, and of the Engineers' Club, of New York.

In 1905, Mr. Earll married Mary H. Flynn, of New York, who survives him.

SAMUEL SUMNER EDMANDS (1877–1938)

Samuel Sumner Edmands was born in Kalamazoo, Mich., on April 30, 1877, his father being John Edmands, and his mother Maria (Goodwin) Edmands. His formal technical education was received at Worcester Polytechnic Institute, Worcester, Mass., where he was graduated in 1899. During the following year he was employed by the American Telephone & Telegraph Co., Providence, R.I. In 1900 he returned to the Middle West, serving as instructor in electrical engineering at Ohio State University for one year. In 1901 he began his service at Pratt Institute, Brooklyn, N.Y., where he was destined to continue for thirty-seven years, and to leave his imprint on the development of technical education of the technical institute type in this country.

He served Pratt the first year as instructor, and became head of the electrical department the following year. In 1910 Arthur L. Williston retired from his position as director of the School of Science and Technology at Pratt to become principal of Wentworth Institute, at Boston, and the young head of the electrical department was elevated to fill his position.

The period which followed 1910 was an important one for technical institutes. They were to be called upon, with other educational institutions, to give preliminary trade training to United States soldiers in 1918, and later, from 1919 to 1925, to train many demobilized soldiers who had been wounded in service, or whose physical weaknesses had been aggravated by service. For this work the technical institute type of institution proved very useful, for it was accustomed to devise courses to meet specific needs, and was free of the inertia of large educational systems. Those interested in such courses found much to learn at Pratt Institute, because of the prominent position of this institute in its field. During all this period Director Edmands was quietly effective. During more recent years he expanded the Institute's two-year course to three years, with an optional fourth year for a degree.

Director Edmands joined the A.S.M.E. in 1923 and was a member of the Committee on Education and Training for the Industries from 1924 to 1933. He declined the chairmanship of this committee because of the pressure of other duties. His service on the committee was wholehearted. He helped select many of the papers that were presented at the meetings, and his acquaintance with educators and industrial leaders in the East brought the committee into contact with effective speakers in the field of education for industry. He was also a member of the Brooklyn Engineers' Club, and of the Society for the Promotion of Engineering Education.

In 1930 Director Edmands received the honorary degree of Doctor of Engineering from Worcester Polytechnic Institute. Efforts to attract him to positions of greater apparent prominence in education failed to move him from Pratt Institute. He was primarily interested in the development of the technical institute type of course with which Pratt Institute had long been identified, and in which his own influence had been great.

Dr. Edmands' death on May 24, 1938, was the result of injuries suffered in the crash of an automobile in which he was a passenger. He was at the height of his powers and would have made a considerable additional contribution to the field in which he had already done much, had he been spared. He was married in 1905 to Althea Florence Miller, of Brooklyn, N.Y., and is survived by his widow and a daughter, Miss Patricia Edmands.—[Memorial prepared by JOHN T. FAIG, Cincinnati, Ohio, Mem. A.S.M.E.]

LOUIS G. ENGEL (1859–1938)

Louis G. Engel, who retired from active professional work about 1905, died on April 19, 1938, at his summer home, New Canaan, Conn. Mr. Engel was born on November 29, 1859, in Brooklyn, N.Y. He was the son of Frederick Eberhard and Caroline Leonora (Gunzenhauser) Engel. He attended Brooklyn public schools, and then entered the School of Mines of Columbia University, where he was graduated with the Class of 1880 with the degree of Mining Engineer (E.M.). He then served a partial apprenticeship in shop work, and became familiar with ordinary machine tools.

This was followed by three years' service as mining engineer for the Tilly Foster Iron Mines, Tilly Foster, N.Y., where he had direct charge of all underground work. He was then employed for about three years as draftsman by the Brooklyn Sugar Refining Company and for over a year further as superintendent of construction, with full responsibility for all new work. About 1890, Mr. Engel associated himself with the New York Sugar Refining Company, under the presidency of Claus Doscher. This company later became the National Sugar Refining Company, and Mr. Engel remained with it until his retirement in 1905.

Mr. Engel married Miss Gesine Doscher, who survives him. He became a member of the A.S.M.E. in 1887.

ROBERT HEYWOOD FERNALD (1871–1937)

Robert Heywood Fernald, director of the Mechanical Engineering Department and dean of the Towne Scientific School of the University of Pennsylvania, died on April 24, 1937, in the University of Pennsylvania Hospital, Philadelphia, Pa., of a heart ailment, following a long illness.

Dean Fernald was the son of Dr. Merritt Caldwell Fernald, a former president of the Maine State College of Agriculture and the Mechanic Arts (now the University of Maine), and Mary Lovejoy (Heywood) Fernald. He was born in Orono, Maine, on December 19, 1871, prepared for college in the Orono High School, and was graduated from Maine State College with a B.S. degree in mechanical engineering in 1892. He did graduate work at the Massachusetts Institute of Technology, 1892–1893, and in 1898 was granted an M.E. degree by the Case School of Applied Science. He was a Fellow in Columbia University in 1900–1902, obtaining the A.M. degree there in 1901, and the Ph.D. in 1902.

It was not at all Dr. Fernald's ambition as a young man to take up educational work—he had architecture in mind; but following his graduate work at M.I.T., he ran into the depression of 1893, and being offered an instructorship in mathematics and mechanical engineering at the Case School of Applied Science, he accepted it, and decided to teach until economic conditions improved. He liked his work so well that he never subsequently dropped it, although he found time to engage in a wide variety of consulting and professional work.

In 1900, Dr. Fernald left the Case School, where he had been assistant professor of mechanical engineering since 1896, to take a fellowship at Columbia University. Upon the completion of his work there in 1902 he became professor of mechanical engineering at Washington University, St. Louis, Mo., and remained there until 1907, when he returned to the Case School to head its Mechanical Engineering Department. In 1912, he was called to the University of Pennsylvania as Whitney professor of dynamical engineering and director of the Mechanical Engineering Department. In February of 1930, Dr. Fernald was made dean of the Towne Scientific School, which appointment was terminated only by his death.

In addition to his several earned degrees, the University of Pennsylvania in 1924 conferred upon Dr. Fernald the honorary degree of Doctor of Science. He was also a member of the honorary fraternities of Sigma Xi, Phi Kappa Phi, Tau Beta Pi, and Phi Beta Kappa. He became an associate of the A.S.M.E. in 1900, member in 1903, and Fellow in 1936. He was an active member of the Society for the Promotion of Engineering Education. He was a member of the Joint Committee of the National Industrial Conference Board and Society for the Promotion of Engineering Education on relations between technical education and the industries, 1922–1928; and served as official representative of the Towne Scientific School in the Society for the Promotion of Engineering Education. He belonged to The Franklin Institute, and served as president of the Cleveland Engineering Society in 1912. He was a secretary of the Engineers' Club of Philadelphia in 1916, its president in 1922–1924, and a member of its Board of Directors, 1924–1927. His club memberships included the Engineers, University, Manufacturers, and Lenape clubs, of Philadelphia.

Dr. Fernald directed and conducted extensive investigations in the United States and Europe for the U.S. Geological Survey and Bureau of Mines and prepared exhaustive reports for these bureaus. He was engineer-in-charge of the Technologic Branch, U.S. Geological Survey, from September 1, 1904, to July 1, 1910, and consulting engineer, Fuel Division, Bureau of Mines, July 1, 1910–1920. As consulting engineer for the Public Service Commission of Pennsylvania, 1913–1915, he formulated rules and regulations for gas, heating, and water utilities of Pennsylvania. He was a member of the Conservation State Board, Pennsylvania, U.S. Fuel Administration, 1918–1919, engineer-member, Giant Power Survey Board of Pennsylvania, 1923–1926; member, Executive Committee, Third World Power Conference, 1935–1936; member, Science Advisory Committee, Mechanical Engineering Division, Chicago Century of Progress Exposition, held in 1933; member, Board of Directors, Philadelphia Sesquicentennial Exposition, held in 1926; member, Executive Committee, Traffic Commission, City of Philadelphia, 1930–1933; member, Greater Pennsylvania Council, 1931; chairman, Committee on Development of Pymatuning Area, Mercer County, Pa.; honorary vice-chairman, Engineers' National Hoover Committee, Pennsylvania Section, 1932; engineer-member, Advisory Committee, Philadelphia Agency of the Reconstruction Finance Corporation, 1932–1933; and chairman, Executive Committee, Technical Advisory Council affiliated with Philadelphia Chamber of Commerce, 1936–1937. He also carried on a general consulting practice in mechanical engineering, especially in fuels and power,

and made commercial investigations for numerous firms and individuals.

An easy and prolific writer, Dean Fernald contributed many papers, not only to purely technical journals, but to many nontechnical periodicals. He was also the co-author, with G. A. Orrok, of a 600-page university textbook, "Engineering of Power Plants," which passed through three editions, 1916, 1921, and 1927.

As a member of the A.S.M.E., Dr. Fernald served with competence and loyalty. He was a manager of the Society, 1916–1919, and vice-president, 1920–1921. He was one of the Society's delegates to the American Engineering Council in 1921. His committee service began in 1911, when he became chairman of the Gas Power Section. He was chairman of the Executive Committee of the Philadelphia Section in 1915–1916, and a member of the Meetings and Program Committee, 1913–1917, serving as chairman the last year. He was a member of the Power Test Codes Committee from 1918 until his death, and was appointed its acting chairman in 1933 and permanent chairman in 1936. He was temporary chairman of Power Test Codes Committee No. 16 on Gas Producers during its first year, 1918–1919, and continued as a member of the committee until his death.

In June, 1905, Dr. Fernald married Catherine Mason Coupland, of Boone, Iowa. They had three children: Merritt Caldwell, Frances Mason, and Mason. His widow and two sons survive him. He also had three brothers, Merritt Lyndon Fernald, Fisher Professor of Natural History, Harvard University, George Bancroft Fernald, Master of English at St. Marks School, Southborough, Mass., and Reginald Lovejoy Fernald, proprietor of the Pratt Teachers Agency, New York, N.Y.; and a sister, Harriet Converse (Fernald) Pierce.

WESLEY MONTEITH GRAFF (1890–1937)

Wesley Monteith Graff, director of the Safety Engineering Division of the National Bureau of Casualty and Surety Underwriters, New York, N.Y., died on June 5, 1937. Mr. Graff was born on May 11, 1890, in Brooklyn, N.Y., the son of Charles Edward and Margaret (Barclay) Graff. He was educated in the Polytechnic Preparatory School, Brooklyn, and in the Sheffield Scientific School of Yale University, where he obtained a Ph.B. degree in 1911 and M.E. degree in 1913.

Mr. Graff's first practical experience was secured during his college vacations: In 1910, with the Pennsylvania Tunnel & Terminal R.R. Co., as draftsman in connection with tunnels and terminals in New York, and as assistant engineer on acceptance tests of electric locomotives; in 1911, with the Hartford Electric Light Company, in charge of an investigation and cost-comparisons of steam and water power for central-station use; in 1912 and 1913, with the Edison Electrical Illuminating Company of Brooklyn as assistant power engineer on sales of industrial electric power, and laying out and supervising the installation of industrial power, heating, and lighting equipment.

After his graduation, from September, 1913, to April, 1918, Mr. Graff was employed by the Graves Engineering Co., Inc., New York, consulting engineers, first as chief mechanical engineer, and, from October, 1917, as vice-president. His work chiefly concerned the design, construction, and operation of electric public utilities; design, specifications, investigations, and reports pertaining to industrial power, heat, and illumination; studies of special mechanical manufacturing processes; and the design of special machinery.

Mr. Graff served from April, 1928, to December of the same year with the Engineering Division of the Ordnance Department, Washington, D.C., as director of the preparation of specifications for the Motor Equipment Section, covering trucks, tractors, tanks, mobile machine and repair shops, and allied matters. In December, 1918, he became vice-president of the Graves, Graff & Dresser Co., New York, and in August of the following year, he formed his own company, the Graff Engineering Corporation, New York, consulting engineers, specializing in design, investigations, and reports pertaining to industrial power, heat and illumination, and to the elimination of industrial waste by the improvement of manufacturing processes and equipment. He was president of the company until it was discontinued in 1931 when he became director of the Safety Engineering Division of the National Bureau of Casualty and Surety Underwriters.

Mr. Graff was elected a member of the A.S.M.E. in 1923. He served on the Society's Safety Committee from 1931 until his death, being a member the first three years, chairman two years, and advisory member the remainder of the time. He was the Society's representative on the Sectional Committee on a Safety Code for Walkway Surfaces from October, 1932, until his death. He had served since 1931 for the National Bureau of Casualty and Surety Underwriters on several other safety code committees. He was also a member of the Illuminating Engineering Society, Alpha Chi Rho fraternity, and the honorary society of Sigma Xi, and the Union Club of New Jersey. He had served as chairman of the Republican Committee in Westfield, N.J., where he made his home.

In 1913, Mr. Graff married Marjorie Higgins, and three children were born to them: Marian Barclay, Wesley Monteith, Jr., and Barbara Preston Graff.

ABBOTT DEAN GRANGER (1870–1938)

Abbott Dean Granger, president of the Granger Machinery Corporation, New York, N.Y., died at his home in Oakland, N.J., on September 27, 1938. Surviving him are Mrs. James S. (Peters) Granger, whom he married in 1895, and three daughters, Althea (Granger) Ross and Barbara S. Granger, of Ridgewood, N.J., and Olive (Granger) Oliver, of White Plains, N.Y.

Mr. Granger was born in New York on December 3, 1870, son of John Calvin and Althea (Dean) Granger. He attended high school in Brooklyn and secured a C.E. degree at the School of Mines, Columbia University, in 1892. For about eight years thereafter he was associated with Edwin Burhorn* in the firm of Burhorn & Granger, engaged in the installation and equipment of plants for power, heat, and electric light, and other contracting and engineering work. He then established the A. D. Granger Co., New York, and served as president of it and of its successor, in 1935, the Granger Machinery Corporation, until his death. The company designed, sold, and installed power plant machinery and other equipment.

Mr. Granger was elected a member of the A.S.M.E. in 1915 but accepted a loss in seniority in 1936 and is recorded as a member of that year. He belonged to the Columbia University Club and was at one time a member of the Brooklyn Engineers Club.

JOHN WILSON WISHART HALLOCK (1888–1937)

John Wilson Wishart Hallock, secretary of the General Alumni Association of the University of Pittsburgh, died on July 17, 1937, in the West Penn Hospital, Pittsburgh, Pa., after a long illness.

He was born at Pittsburgh on December 27, 1888, the son of Harvey T. and Ellen (Wishart) Hallock. He secured his preliminary education in the public schools of his native city, and then entered the University of Pittsburgh, where he was graduated with the B.S. degree in mechanical engineering in 1912, and in 1915 was granted the M.E. degree. In 1936 the degree of doctor of philosophy in economics was conferred upon him by the university.

From July, 1912, to October, 1913, he worked as assistant engineer for the Harris Pump & Supply Co., Pittsburgh, on the design, construction, and erection of hydraulic machinery. He was then employed for seven months as draftsman and junior engineer by the War Department, in the Engineer Depot, Washington, D.C. In June, 1914, he returned to the Harris firm in Pittsburgh, as assistant to the vice-president in executive and sales work. A year later he was engaged as instructor in cooperative work, by the School of Engineering, University of Pittsburgh, and subsequently became director of this work. An article by him entitled, "The Cooperative Plan of Engineering Education," published in the Bulletin of the Society for the Promotion of Engineering Education (vol. VIII, no. 1, September, 1917, pp. 12–24), describes the plan in some detail. In May, 1917, he began a term of active service with the U.S. Army, Corps of Engineers, entering as second lieutenant and being discharged, February 10, 1919, with the rank of captain in that corps. During the greater part of the time he was in charge of production districts for the General Engineer Depot. At the time of his death, he was colonel in the Corps of Engineer Reserves, and chief of the Pittsburgh Procurement District.

After leaving active service in 1919, Dr. Hallock resumed his former occupation as director of cooperative work in the University of Pittsburgh, but in October, 1919, he returned to the Harris Pump & Supply Co., as sales manager. However, about a year later he went back to the University of Pittsburgh as professor and head of the newly established Department of Industrial Engineering, in addition to resuming the directorship of the cooperative work; he also continued to act for the Harris Company in a consulting and sales organizing capacity. After eighteen years of active faculty service, Dr. Hallock was asked to take charge of the reorganization of the University's General Alumni Association. He became its secretary on August 1, 1933, and soon had it functioning. He took over this task when interest was at a low ebb, and built up its files of names and addresses from about 7,000 to more than 25,000.

He joined the A.S.M.E. as an associate-member in 1919 and was promoted to member in 1922. He was also a member of the Society for the Promotion of Engineering Education and the American Economics Association, of the national fraternity of Phi Gamma Delta, the Rotary and University clubs of Pittsburgh, the honorary

* For biography of Edwin Burhorn, see page RI-48.

fraternities, Sigma Tau and Omicron Delta Kappa, and of Scabbard and Blade, honorary military fraternity. He was a ruling elder in the Shadyside Presbyterian Church of Pittsburgh and general superintendent of the church school.

Dr. Hallock is survived by his widow, Mrs. Eva (White) Hallock, whom he married in 1914, and by two daughters, Janet Thomson and Eleanor Wishart Hallock.

He was the author of a number of published articles, principally on industrial safety, and of a widely known text, "Production Planning, Its Engineering Elements," published by the Ronald Press in 1929. In 1931 the outline of his work in industrial safety engineering was published by the National Safety Council and adopted as a standard text.

RUDOLPH K. F. HARTIG (1892–1937)

Rudolph K. F. Hartig, an engineer in the service of the Brooklyn Edison Company, Inc., died on June 9, 1937. Mr. Hartig was born at Waukesha, Wis., on March 24, 1892, the son of William and Fredrika (Dittman) Hartig, and obtained his preparatory education in the Waukesha public schools. He served in the U.S. Navy as a fireman, 1917–1919, and after the close of the World War entered Montana State College, from which he was graduated in 1925 with a B.S. degree in mechanical engineering.

From October, 1925, to July, 1927, Mr. Hartig was employed by the Brooklyn Edison Co., Inc., as junior engineer in power plant work, supervising the installation and maintenance of central station instruments. He also assisted in testing various equipment units, such as turbogenerators, condensers, boilers, stokers, and auxiliaries. In July, 1927, he was transferred to the main office of the Brooklyn Edison Co., where he was given charge of the preparation of reports and articles for A.S.M.E. and N.E.L.A. publications. He cooperated in obtaining and preparing data for a number of progress reports of the A.S.M.E. Special Research Committee on Condenser Tubes, 1927–1933, and prepared the N.E.L.A. Prime Movers Committee Serial Reports on Stoker Equipment and Furnaces, 1927–1928, and the Foreign Developments Report, 1929–1930. He also made plant betterment studies for the company.

Mr. Hartig joined the A.S.M.E. as an associate-member in 1930, and was automatically transferred to the grade of member in 1935. He served on the Annual Meeting Excursions Committee in 1929, 1930, and 1931, as chairman the last year.

In 1926, Mr. Hartig married Anna O'Hare of Brooklyn, N.Y., who, together with their two children, William J. and John G. Hartig, survives him.

PHILIP MOULTON HATHEWAY (1885–1937)

Philip Moulton Hatheway, of Brooklyn, N.Y., died at "Mowglis, School of the Open," East Hebron, N.H., on July 21, 1937. Mr. Hatheway was born in Boston, Mass., on October 19, 1885, the son of Amos L. and Cora L. (Moulton) Hatheway. He prepared for college at the Phillips Exeter Academy, from which he entered the Sheffield Scientific School of Yale University, being graduated from there in 1907 with a Ph.B. degree.

Following his graduation, Mr. Hatheway entered the employ of the Stanley Works, New Britain, Conn., where he worked in the office and cold rolled steel mill for about two years. He then served successively as field clerk, draftsman, and assistant engineer with Westinghouse, Church, Kerr & Co. He engaged in both inside and outside work in connection with various construction jobs and was connected with organization work at the main office of the company in New York, N.Y. In 1913, he went with the American Felt Company, Boston, Mass., as plant manager, remaining there until 1915, when he took a position with the Associated Factory Mutual Fire Insurance Company, Boston, making fire insurance surveys, inspections, and reports. In 1916–1917 he was connected with the International Steel & Ordnance Corp., Lowell, Mass., putting a detonator plant into production. The following year he was employed by the International Register Company, of Chicago, on war work. He acted as assistant to the president, directly connected with the manufacture and inspection of navy, ordnance, and signal corps matériel.

From 1918 to 1932, Mr. Hatheway was employed by the National Lead Company, of New York, N.Y. He was chief engineer at the Atlantic Works, Brooklyn, during the early part of the time, later becoming assistant superintendent of the plant, which position he held until he resigned in 1932.

Mr. Hatheway married Clitheroe James, of Brookline, Mass., in 1918, and is survived by her and their son Dean Moulton, and daughter, Clitheroe Dean Hatheway. Mr. Hatheway listed his recreations as canoeing and camping, and his hobby as photography; his religion as Congregational and his politics as Republican. He was a member of the Yale Club of New York, Appalachian Mountain Club of Boston, and the Masonic fraternity. He joined the A.S.M.E. as a junior in 1913, and was promoted to the member grade in 1921.

CHARLES GILBERT HAWLEY (1868–1939)

Charles Gilbert Hawley, lawyer, scientist, and internationally known inventor, son of the inventor, Benjamin Ruggles Hawley, and Rosamond (Hall) Hawley, was born in Normal, Ill., on June 20, 1868. His parents were early Illinois pioneers.

Mr. Hawley's early schooling was in Chicago, Ill. He attended Cornell University for his academic work and took his graduate work at Northwestern University, from whose Law School he received the Bachelor of Laws degree on June 11, 1890. He immediately entered the active practice of the law, specializing in all branches of patent law. Because of his keen inventive analytical mind he rose rapidly and was in great demand by prominent corporations who recognized his great ability as both technical adviser and trial expert. In the beginning of the century he moved his offices from Minneapolis, Minn., where he started his practice, to Chicago, where he had his headquarters, but divided his time between his offices there and in New York and Washington. He kept his legal residence in Chicago until January, 1938, when he changed it to Cleveland, Ohio.

One of Mr. Hawley's early associations was as counsel and large shareholder of the Universal Rim Company, who owned the patents on the Baker demountable rim, the first demountable rim on the market. He was also one of the first inventors to conceive the idea of the front-wheel drive for automobiles, but did not push it because of his belief that it was too far in advance of the industry to be at that time profitably marketable.

Mr. Hawley was an officer and large stockholder of the Locomotive Fire Box Company, who manufactured and marketed, under patents assigned to it by Mr. Hawley, the Nicholson thermic syphon, used by more than one hundred railroad companies in this and foreign countries. He severed his connections with this company a few years ago, after which he took out domestic and foreign patents on an improved downflow thermic syphon, which patents he assigned to the Downflow Syphon Company, of which he became an officer, large stockholder, and technical adviser. This new syphon is now being marketed by this company.

In 1924 Mr. Hawley organized and became president of Centrifix Corporation, with headquarters in Cleveland. This company manufactures and markets outstanding high-efficiency centrifugal separators and purifiers for the removal of solids and other objectionable entrainment from steam, gas, air, and vapor. Through Mr. Hawley's ingenious inventions this company also developed high-speed tar extractors, fractionating units, and gas scrubbers of a standard of efficiency equal to that of his purifiers. During the time Mr. Hawley was directing head of Centrifix Corporation, a position he held until his death on April 16, 1939, he invented, perfected, and assigned to this company eighty-six United States patents and a great number of foreign patents under which the company now operates. The basis and most remarkable part of these inventions is that none of the equipment has any moving parts, which makes them of lifelong duration.

During the last fifteen years of his life Mr. Hawley spent much of his time in the development of a new type of sewage treatment plant. His main aim in this was to be able to give to the public at a very low cost a complete sewage treatment apparatus that required little space, is easily installed, operates at a minimum operating cost, and is easily added to if necessary. These plants were designed especially for small communities which in the past have been denied the benefits of sewage treatment because of the costs involved. The Hawley Engineering Company has taken up where Mr. Hawley left off and is carrying forward his ideas for the further development and marketing of these sewage disposal plants. The future development of these plants is based upon patents granted or applied for by Mr. Hawley during his life.

Mr. Hawley had been a member of the A.S.M.E. since 1926. He also belonged to the Masonic fraternity.

Mr. Hawley was an individualist of the old school. He was a man of force and indomitable will, but endowed with a big heart and a loyalty to his friends which was unshakable. His friends and those who knew him loved and respected him and have deeply mourned their loss. His work and his family occupied all of a full, successful, and praiseworthy life. His death brought to him a well deserved rest—a rest he did not have time to take during his life.

Mr. Hawley is survived by his wife, Virginia (Taylor) Hawley, and three children, Hope (Hawley) Degenhardt, John Stuart Hawley, and Charlotte (Hawley) Laier.—[Memorial prepared by RANDALL T. ELLIOTT and HUBERT H. RICHARDSON, Cleveland, Ohio, nephews of Mr. Hawley.]

ROBERT THOMPSON HAZELTON (1883–1937)

Robert Thompson Hazelton, secretary-treasurer of The Cincinnati Shaper Company, died suddenly of thrombosis on March 3, 1937, in Cincinnati, Ohio. Mr. Hazelton was born in Petoskey, Mich., on July 17, 1883, the son of Wilbur and Margaret (Patterson) Hazelton. He obtained his early education in the public schools of Petoskey, and Medina and Rochester, N.Y. He also attended the Rochester Business Institute for one year; took a four-years' course in the Mechanics' Institute of Rochester, covering such subjects as are usual in a course in mechanical engineering; and served an apprenticeship as a machinist at the A. L. Sweet Iron Works, Medina, working on general manufacturing, tools, and jigs. During the summer of 1901 he worked in the drafting room of the A. L. Sweet Electric Light & Power Co., manufacturers of motors and other electrical apparatus.

In October, 1901, Mr. Hazelton entered the employ of Charles Bridgeford, Rochester, N.Y., manufacturer of machine tools and special machinery, and spent about six months there on shop work. Later he designed and patented the line of machine tools built by the Bridgeford Machine Tool Works, of Rochester, which company was successor to Charles Bridgeford. Here he had charge of drafting and design, and specialized in designs for jigs and fixtures used with the machine tools manufactured by the company.

Mr. Hazelton did special work at the University of Rochester in 1909, and then returned to the Bridgeford Machine Tool Works as superintendent. In March, 1911, he was engaged by the Cincinnati Milling Machine Company, on supervision of tools; in 1914, he was made head of the Engineering Department; in 1915, works manager and chief engineer. In June, 1920, Mr. Hazelton became works manager of The Cincinnati Shaper Company and was made treasurer in 1927. While at The Cincinnati Shaper Company he developed a line of machine tools and sheet metal working equipment; these machines today are recognized leaders in their particular fields.

He joined the A.S.M.E. as a junior in 1909, and was promoted to member in 1916. He served from September, 1929, to October, 1936, on Subgroup No. 7 on Gear Cutting and Hobbing Machines of Technical Committee No. 4 on the Standardization of Spindle Noses and Collets for Machine Tools of the Sectional Committee on the Standardization of Small Tools and Machine Tool Elements. He was also a member of Technical Committee No. 1 on T-Slots of the Sectional Committee on the Standardization of Small Tools and Machine Tool Elements from September, 1924, to the date of his death, representing the National Machine Tool Builders' Association. Mr. Hazelton was an active member of the committee appointed in 1931 by the Industrial Commission of Ohio to study and to develop better means for the safeguarding of metal-working machinery.

Mr. Hazelton was director of the Engineers' Club of Cincinnati for several years. He also belonged to the Cincinnati Club, the Hyde Park Country Club, and the Masonic order. He was twice married; his first wife, Miss Rose Westcott, predeceased him. His second wife was Mrs. Lydia Jenkins, by whom he is survived, as well as by three children: Mrs. Rupert Benson of Camp Hill, Pa.; Burton Hazelton, of St. Louis, Mo.; and Merrill Hazelton, of Cincinnati, Ohio.

NATHANAEL GREENE HERRESHOFF (1848–1938)

Nathanael Greene Herreshoff, retired president of the Herreshoff Manufacturing Company, died at his home in Bristol, R.I., on June 2, 1938, after a year's illness. At the time of his death Mr. Herreshoff was ninety years of age.

While famous primarily for his achievements in the field of yacht design, which gained for him among yachtsmen the name "Wizard of Bristol," Mr. Herreshoff had to his credit many noteworthy accomplishments in mechanical engineering, which led to his election to honorary membership in the A.S.M.E. in 1921.

Mr. Herreshoff was born in Bristol, R.I., on March 18, 1848, the son of Charles Frederic and Julia Ann (Lewis) Herreshoff. He received his early education in the public schools of Bristol and his advanced technical training at Massachusetts Institute of Technology, which he attended from October, 1866, to May, 1869. He was awarded the honorary degree of Master of Science in 1896 by Brown University, a recognition peculiarly fitting, in consideration of the fact that his great-grandfather, John Brown, was the founder of that institution.

Upon completion of his education, Mr. Herreshoff joined the Corliss Steam Engine Company of Providence, spending nine years with that organization, first as draftsman, later engaged in engine adjusting, and finally in charge of steam and hydraulic engineering, particularly in connection with the development of large pumping engines. While with the Corliss company one of his most important responsibilities was the conduct of experiments and the testing of material for the construction of the famous engine which furnished the motive power for the Centennial Exposition in Philadelphia in 1876. Mr. Herreshoff was also in charge of the installation of this engine, starting it, and conducting power tests. During this period in his career as one of the pioneers in the design of compound steam engines, he was awarded two patents on steam engine governors.

The Herreshoff Manufacturing Company of Bristol was founded in 1863 by Mr. Herreshoff's older brother, John Brown Herreshoff, who remained at the head of the concern until his death in 1915. Nathanael Herreshoff's interest in boats dated from the early years of his youth on the shores of Narragansett Bay, for it is reported that at the age of ten he designed and built a twenty-foot catboat, the forerunner of the series of fast sailing yachts which made his name known throughout the yachting world. While still connected with the Corliss company he did a certain amount of designing for his brother John, hence it is not surprising that in 1878 he joined the Herreshoff company as designing engineer and superintendent of construction. After the death of his brother, Mr. Herreshoff became president of the company, serving in this capacity until 1925 when the concern was reorganized and he retired.

During its early years the Herreshoff Company was engaged in the construction of sailing vessels, but in the 1870's its interest turned to the production of fast steam-driven craft, Nathanael Herreshoff's knowledge of steam power playing a large part in its success. In 1876 he designed the first torpedo boat for the United States Navy, the boiler being designed by his brother James. The success of this craft led to the receipt of orders for many similar vessels from several foreign governments. During this period Mr. Herreshoff was awarded several patents on details of construction of steam engines, and perfected the design of coil boilers for use on steam yachts and other fast steam-powered vessels. His ingenuity in the reduction of unnecessary weight in power plants became evident at this time, and his engineer's craving for efficiency in design carried over into his later work with fast sailing yachts. The fundamental soundness and advanced character of his designs may be appreciated when it is realized that many winches and other devices designed by him were still in use on *Ranger*, the last America's Cup Defender, sailed in 1937.

In the late 1870's Mr. Herreshoff began his experimenting in the field of fast sailing yachts, the field in which he was preeminent until his retirement. Probably the first of his creations to cause excitement in yachting circles was *Amaryllis*, a double-hulled sailing catamaran built in 1877, which showed remarkable speed and led to arguments among racing committees of that day. This craft was followed in 1891 by *Gloriana*, a boat which may be said to have truly revolutionized the design of racing yachts, since she was the first to embody such features as the spoon bow and long overhangs which gave the yacht a greatly increased sailing length when heeled. *Gloriana's* phenomenal speed and racing success, together with that of *Wasp*, built in the following year, brought the designer to the attention of the yachtsmen of this country and led to the production of a long line of yachts which were to make international yacht-racing history.

In 1893, when another challenge for the America's Cup was received from England, Nathanael Herreshoff was in the front rank of American yacht designers, and it was inevitable that he should be called upon to design a defender. He produced *Vigilant*, which defeated Lord Dunraven's *Valkyrie II* in three straight races. This success was followed by *Defender*, which defeated *Valkyrie III* in 1895 and by *Columbia* which defeated the first of Sir Thomas Lipton's *Shamrocks* in 1899 and repeated against *Shamrock II* in 1901. The long series of Herreshoff defenders was completed by *Reliance* in 1903 and *Resolute* in 1920, these two defeating Lipton's *Shamrocks III* and *IV*.

In 1925 the Herreshoff Manufacturing Company was reorganized and Nathanael Herreshoff retired from active participation in the business. The company, however, continued its connection with the defense of the America's Cup, for *Enterprise* and *Rainbow*, the successful defenders of 1930 and 1934, were built at its Bristol plant from designs by W. Starling Burgess. Mr. Herreshoff continued his active interest in yachting and yacht designing as long as his health would permit, his last design being the yawl *Belisarius*, which he designed for Commodore Carl B. Rockwell of Bristol in 1935.

On March 18, 1938, the Town Council of Bristol took note of Mr. Herreshoff's ninetieth birthday by the passage of a testimonial resolution which evidenced the high esteem in which he was held by his fellow citizens. This resolution testified in part that "by his extraordinary talents and genius for marine architecture—by his sterling character and integrity, by his interest in Bristol both as a just and fair employer and as a worthy citizen, extending over an unusual period of years, he has endeared himself to our people and brought renown upon his native town, placing our citizens under lasting obligations to him."

While Mr. Herreshoff's fame depended chiefly upon his achieve-

ments as a designer of racing yachts, his accomplishments as an engineer in steam power plant development would in themselves have made his career of importance. His genius lay in the combination of accurate science with the less definite characteristics of art which has marked the great designers in all fields.

In addition to his honorary membership in the A.S.M.E., Mr. Herreshoff was also a member of The Society of Naval Architects and Marine Engineers, The Franklin Institute, and the Institution of Naval Architects of London.

Mr. Herreshoff was married in 1883 to Clara A. DeWolf, who died in 1905. In 1915 he married Ann R. Roebuck, who survives him. Surviving him also are four sons: A. Sidney of Bristol, A. Griswold of Grosse Pointe, Mich., L. Francis of Marblehead, Mass., and Clarence DeWolf of Bristol; also one daughter, Miss Agnes M. Herreshoff of Bristol. Of the sons, A. Sidney and L. Francis are following their father's career of naval architecture.—[Memorial prepared by Z. R. Bliss, Providence, R.I., Mem. A.S.M.E.]

ED HILL (1876–1937)

Ed Hill, superintendent of the City Water and Light Plant, Jonesboro, Ark., died on July 17, 1937.

Mr. Hill was born at Olney, Ill., on May 4, 1876, the son of Kizziah and Edward F. Hill. He attended the Olney schools and in 1890 entered the service of the Olney Edison Electric Light Company, as apprentice operating engineer. He remained in Olney until 1895, when he went to Flora, Ill., as assistant foreman on the construction of a power plant, of which he subsequently became operating engineer.

He was employed from 1900 to 1904 by the St. Louis-San Francisco Railway Company, at Springfield, Mo., on field construction work. He then became lineman for the City Water and Light Plant of Jonesboro, for which he later served as chief engineer, and subsequently superintendent in charge of construction, operation, and maintenance of plants, which position he was holding at the time of his death. Mr. Hill was largely responsible for the design, construction, and equipment of the present Jonesboro power plant.

Mr. Hill became a member of the A.S.M.E. in 1932. He married Miss Kate Galbraith, of Flora, Ill., in 1899, and is survived by her and one daughter, Helen (Hill) Roth.

GEORGE N. HINCHMAN (1866–1937)

George N. Hinchman, of Webster Groves, Mo., died on May 25, 1937. At the time of his death, Mr. Hinchman was engineer in charge of development and design for Otto Eick, Inc., of St. Louis, Mo.

He was born on March 17, 1866, at St. Louis, the son of George Nichol and Elizabeth (McFarland) Hinchman. He obtained his elementary education in the grade schools of St. Louis, and was graduated in 1884 from Washington University, in mechanical engineering. He served as an apprentice from 1884 to 1886 in the Standard Foundry Company of St. Louis, and from 1886 to 1890, under Charles K. Pickles, of St. Louis, learning drafting and machine design.

From 1890 to 1899, Mr. Hinchman was in charge of drafting and design for the Falls Rivet & Machinery Co., Cuyahoga Falls, Ohio, and as their engineer was responsible for all plant layouts and designs made by that firm. In 1899, he went to the Pittsburgh Meter Company, East Pittsburgh, Pa., and was in charge of design, special inspection, and erections. He returned to St. Louis in 1902, as designer and experimental engineer for the Standard Adding Machine Company. He was superintendent of the Compressed Air & Vacuum Machinery Co., St. Louis, in 1910–1911, and then until 1918 was employed by Otto Eick, a brewery engineer, designing and erecting bottling machinery. Subsequently he was connected with the Alvey Manufacturing Company, St. Louis, designing elevators and conveying machinery, and with the Wagner Electric Company, St. Louis, designing airplane motors for the United States government.

From 1922 to 1928, Mr. Hinchman was in charge of the Maintenance Department of the Commonwealth Steel Company, Granite City, Ill., where he was responsible for all construction designs. From 1928 to 1932, he was employed to handle all special design work for the W. W. Sly Manufacturing Co., Cleveland, Ohio, and in 1932, he returned to Otto Eick, Inc., as engineer in charge of all development and design, which position he held up to the time of his death.

Mr. Hinchman became a member of the A.S.M.E. in 1919, and was also active in the Masonic order in Webster Groves and Cleveland. He married Elizabeth Scown in 1890 and they had one daughter, Laura, now Mrs. R. R. Johnson, of Dallas, Texas.

CLARENCE FLOYD HIRSHFELD (1881–1939)

Clarence Floyd Hirshfeld was born in San Francisco, Calif., on January 30, 1881, and received his elementary education in the public schools of that city. It was his early ambition to be a mining engineer but he grew away from this and in 1898 entered the University of California to study electrical engineering. Graduating in 1902 with the degree of bachelor of science in electrical engineering, he entered Cornell University in 1903 as a graduate student in mechanical engineering and received the degree of M.E. in 1905.

During his first year at Cornell, Dr. Hirshfeld became an instructor in experimental engineering and advanced in the following years to the positions of assistant professor and finally professor of mechanical engineering, teaching successively experimental engineering, heat power engineering, gas engine design, gas manufacture, and gas distribution. He remained a member of the faculty until 1914 and was author and co-author of several textbooks, including:

Engineering Thermodynamics, 1913
Farm Gas Engines (with T. C. Ulbricht), 1913
Steam Power (with T. C. Ulbricht), 1913
Elements of Heat Power Engineering (with W. N. Barnard), 1915
Economic Operation of Steam-Turbo-Electric Stations (with C. L. Karr), 1918
Elements of Heat Power Engineering (with W. N. Barnard and F. O. Ellenwood), Latest Edition, 1933.

Early in his teaching career, Dr. Hirshfeld undertook a private consulting practice which grew to wide proportions and broad scope. In 1913 he was engaged by Alex Dow, president of The Detroit Edison Company, for consulting services in connection with that company's power system. He became active in many phases of the company's business, notably in the field of industrial electric heating, and in 1914 resigned from Cornell to become chief of research for The Detroit Edison Company under an arrangement which provided for the continuation of his private consulting work.

In addition to his duties as research adviser to the management, Dr. Hirshfeld organized and headed the company's Research Department, credited as being one of the first of its kind in an electricity supply company, and one now widely known in this country and abroad for its pioneering in many fields, the high quality of its work, and its many contributions to the art. As an essential part of the department, Dr. Hirshfeld organized and developed the company's library, which is outstanding of its kind and which has served as a model for many other organizations. Continuing with the company until his death, Dr. Hirshfeld has left many marks of his work, his influence, and his inspiration. He had an active part in the design of power plants, the development of scientific purchasing methods, the institution of an inspection division, the development of standardization practices, the establishment of patent policies, and the general development of the research attitude throughout the organization.

He was called into the service of the War Department late in 1917, and was first commissioned as major in the U.S. Army Ordnance Department and later as lieutenant-colonel. His previous engineering training made him immediately available for the task in hand, that of general supervision of the inspection of artillery and artillery ammunition purchased for the army. He forthwith devoted himself with characteristic energy to the effective administration of inspection forces quickly organized for the war effort and drawn largely from civilian life. Shortly after his entrance upon this work, the inspection section of this departmental division was decentralized by the establishment of district ordnance offices and it became Dr. Hirshfeld's duty to act as liaison officer between the several districts and the headquarters in Washington. He served in this capacity with marked intelligence and undoubted distinction until he was honorably discharged in May of 1919. He returned then to his place in the Detroit Edison organization, from which he had been given temporary leave, and resumed the activities interrupted by the war service.

As in many other cases where men had similar experience in war materials procurement, Dr. Hirshfeld continued his interest in ordnance work through membership in the Army Ordnance Association. During the last four years of his life he was assistant chief of the Detroit Ordnance District, his knowledge of the subject, based upon experience in time of actual war, making his counsel invaluable.

In various associations of the electrical operating industry Dr. Hirshfeld was a prominent figure. He served as member, and more often as chairman, of many committees of the National Electric Light Association and in 1926 he was made chairman of the National Technical Section, one of the four major divisions of the organization. Likewise he was active on many committees of the Association of Edison Illuminating Companies, notably the Committee on Power Generation and the Committee on Electric Switching and Switchgear, which he headed in 1928 at the time of its organization. He was representative for several years of the electric light and power group on the American Engineering Standards Committee and its successor, the American Standards Association, and he served as a member of the United States National Committee of the International Electrotechnical Commission.

Under the auspices of the Association of Edison Illuminating Companies, a conference of electric utility executives and research men was held in 1933 to discuss the feasibility of a joint research organization of electric operating companies. The result of the conference was the formation of the Edison Research Coordinating Council, of which Dr. Hirshfeld was made vice-chairman and later chairman. He served also as chairman of the council's research committee on metallurgical applications of electricity. When the council was later incorporated under the name, Utilities Coordinated Research, Inc., he was elected president.

Although an active member of many technical and professional organizations, Dr. Hirshfeld was most prominent in The American Society of Mechanical Engineers, of which he became a junior member in 1905, member in 1919, and Fellow in 1936; to which he contributed many outstanding technical papers; and of which he was an officer and member of the Council as a manager from 1929 to 1932 and as vice-president from 1932 to 1934.

His early work in the Society dealt largely with standardization, test codes, and special research projects. For many years he served as a member of the main Power Test Codes Committee, counseling it on the broad aspects of acceptance tests, and as chairman of the individual committee dealing with instruments and apparatus he rendered both the committee and the Society extremely valuable and efficient service.

More recently he was actively concerned with the professional training and development of the engineer. In 1928 he became a member of the Committee on the Economic Status of the Engineer, which sponsored the study on earnings of engineers for the year 1930 and later recommended the steps which led to the formation of the Engineers' Council for Professional Development. Dr. Hirshfeld served as chairman of the preliminary organization committee of E.C.P.D. and for two years as first chairman of that body. He exerted a valuable influence in its formative years by his clear concept of the ideals of the new organization and by the selection of men of vision and understanding to carry on its work. After his retirement as chairman he remained an active member of the E.C.P.D. until his death.

Dr. Hirshfeld's full appreciation of the need for providing orderly access to technical literature led to his active support of The Engineering Index, on the Advisory Board of which he represented The American Society of Mechanical Engineers, and to his devoted service as a director when it became a separate undertaking as Engineering Index, Incorporated.

Other organizations of which Dr. Hirshfeld was a member included the American Institute of Electrical Engineers, American Association for the Advancement of Science, American Chemical Society, American Institute of Mining and Metallurgical Engineers, American Society for Testing Materials, Econometric Society, The Newcomen Society, Sigma Xi, and the Princeton Engineering Society.

An able lecturer and finished public speaker, Dr. Hirshfeld gave generously of his time in filling demands for his appearance on programs of technical, professional, and industrial organizations. He addressed sales conferences, educators, purchasing agents, operating men, and executives with the same skill that made him a great teacher, for he possessed an outstanding ability to convey new and complex subject matter in such unique and interesting fashion that his listeners absorbed it without conscious effort. In 1932 he delivered the commencement address at Rensselaer Polytechnic Institute which at that time honored him with the degree of Doctor of Engineering; in 1935, under the auspices of Science Service, he gave a radio broadcast on the subject of Science in Transportation, and in 1936, the Brackett Lecture on Industrial Research at Princeton University. A prophet not without honor in his own country, he received the degree of Doctor of Engineering from the University of Detroit in June of 1938.

Dr. Hirshfeld was well known in America and Europe as the author of scientific and engineering papers and articles. He wrote extensively on the many phases of electricity supply business and his writings on engineering education, professional training, and the place of the engineer in society won nation-wide comment and praise. In 1934 his paper, "Engineers of the Next Generation," won the American Institute of Electrical Engineers' national prize for the best paper on public relations and education, and he was the recipient of the Worcester Reed Warner Medal at the Annual Meeting of The American Society of Mechanical Engineers in December, 1937. He was also author of the paper, "Preparation and Combustion of Fuel," read before the First World Power Conference in London, 1924, and "Research Relating to Power Development," before the Second World Power Conference in Berlin. In 1926 his paper, "What Is the Demand for Overload in the U.S.A.?" was presented before the International Electrotechnical Congress. He was author of the chapter, "The Spirit of Power," in the composite book, "Toward Civilization," edited by Dr. Charles A. Beard and published in 1930.

Gaining recognition first as an educator, Dr. Hirshfeld later became known as one of the world's leading figures in the field of industrial research. Early in life he adopted what he termed "the research method of thought," and his naturally inquisitive mind, his remarkable powers of observation, and an enviable memory, contributed to the ultimate development of that type of mental approach to a high degree of perfection. He applied it not only to consideration of phenomena in the physical world but to the behavior of human beings as well. He cautioned against living in the present without knowledge of the past and appreciation of the possibility of the future, and he taught the intelligent use of known and procurable facts in the solution of problems of all types, whether scientific, industrial, civic, economic, or social.

One of his greatest achievements was the ability to assemble, rationalize, and coordinate facts and knowledge of all kinds into a single pattern which he referred to as "the whole scheme of things." Even the obscure and apparently unimportant observations found their place in that pattern. To him, that which divides knowledge into different classes was merely a matter of terminology; in all he saw the same elements, the same forces, and the same behavior under comparable influences, so that he interpreted all experiences by a single set of laws.

He often referred to research as merely a fact-finding process, but those who knew him realize it was his ability to interpret the significance of new and often apparently unimportant facts in terms of already existing knowledge that made him outstanding as a research engineer. He possessed a fertile imagination and the necessary courage to venture on new lines of thought even though they might lead along untraditional paths and run contrary to conventional belief and practice. It was probably this attitude of mind, together with his connections with many research undertakings, that led to his service on the Advisory Board of the Purdue Research Foundation; the National Board of Councillors of the United States Bureau of Mines; the Ohio State University Research Foundation; the National Research Council; and the American Institute of Physics' Advisory Council on Applied Physics.

In 1930 a committee of street railway executives, known as the Electric Railway Presidents' Conference Committee, was organized to deal with an acute situation which had arisen in their industry. Increasing competition of the rubber-tired, automotive type of vehicle had reached such proportions that fear was expressed for the future existence of the electric street car, and the huge investment in street railway properties throughout the nation appeared seriously jeopardized. Despite certain advantages of the rail-type vehicle in mass transportation and despite miscellaneous efforts to modernize it, the street car lacked the public appeal offered by its competitors. Recognizing that the electric car had developed largely along traditional lines by rule-of-thumb methods, whereas its competitors had grown out of the great mass of scientific research that forms the background of the automotive industry, the committee was aware that a street car capable of recapturing public favor must be more than simply the old mechanism in a new dress; it must be a new product of scientific effort under the most able direction available. The choice of Dr. Hirshfeld for the task stands as a great tribute and a fine expression of the confidence in this man who had had no experience in the field of transportation and had not been identified with this branch of engineering.

He was appointed chief engineer of the committee in the fall of 1930 and immediately started an analysis of the problem. In this he conferred not only with street railway executives, engineers, and operators, but in characteristic fashion with factory hands, office workers, and housewives who made use of public means of transportation. He diagnosed the shortcomings and found the need for many improvements, but there was available little information as to the specifications to be met, or the inherent possibilities and limitations of a rail vehicle.

Accordingly Dr. Hirshfeld set up a program of research and experimentation, established a laboratory, and employed a group of engineers and technicians to work under his direction in a fundamental study of the whole problem of street car design and performance. After four years of intensive activity, an initial car was produced containing many revolutionary developments in truck design, wheel construction, control equipment, lighting, ventilation, and body. Steel springs had given way to rubber springs, the wheels contained rubber disks insulating the steel rim from the rest of the structure, and other novel features had been successfully developed and applied. A rail vehicle had been created which could equal or outperform the modern automobile in accelerating or braking rates. The smoothness of ride by actual test excelled that of any other street vehicle, and the noise level had been reduced to a point where the "sing" of the trolley wire became the distinguishing evidence of the car's approach. A new type of welded body with modern lines and appearance, heated, lighted, and ventilated by improved methods,

constituted the new dress in which this revolutionary street car made its appearance.

Exhibited at the Cleveland Convention of the American Transit Association in September, 1934, the new car met with enthusiastic approval of the street railway industry. It was called the Presidents' Conference Committee Street Car and is now commonly known as the P.C.C. car. When commercial production was undertaken, the committee's interests were transferred to the newly incorporated Transit Research Corporation. Dr. Hirshfeld continued as chief engineer of the new organization until the time of his death.

That the P.C.C. car has met with public favor is evidenced by the fact that at the end of 1939 there were approximately 1130 cars of this type in operation or under construction for thirteen cities in the United States and Canada.

Teacher, scientist, engineer, lecturer, and always a scholar; it would seem that such achievements and accomplishments must have completely filled a comparatively brief life span of 58 years. Yet, Dr. Hirshfeld took time to listen to those who brought their individual problems to him; to encourage them in the development of worthwhile ideas; and to divert their misdirected efforts to more logical ends. His instant recognition of the best in those with whom he came in contact, his deep understanding and broad tolerance of humanity's shortcomings, and his desire, without a trace of the overzeal of the reformer, to make the world a better place for his having lived in it, won respect, admiration, and genuine affection from his great circle of friends.

His casual observation and his more considered advice were sought by his neighbors and friends who valued the honesty and integrity of his opinion, while those privileged to know him more intimately not only appreciated his good humor and innate modesty but found in him the love, devotion, sincerity, and hospitality which added so much to the realization of an unusually happy home life.

In addition to the recognition which was his, living, it is fitting that this final honor, the award of the John Fritz Medal, should have come to him. There could be no finer memorial than the words of the citation, "for notable leadership through research and development in power generation and electric traction and for being a great teacher and friend of man, young and old."

Dr. Hirshfeld's death occurred on April 19, 1939, at the Grace Hospital in Detroit, after an illness of several months. Surviving him are his widow, the former Elizabeth Bishop Winslow, of Ithaca, N.Y., and two sons, John W. and James F. Hirshfeld.—[Biography, slightly expanded, prepared by F. Douglas Campbell, personal assistant to Dr. Hirshfeld at The Detroit Edison Company, for the John Fritz Medal Board of Award.]

JAMES DAVID HOFFMAN (1868–1938)

James David Hoffman, affectionately known as "Jimmie" by his many friends, a member of the engineering staff of Purdue University from 1890 to 1911 and from 1917 to 1938, died at midnight on Saturday, August 13, 1938, at his home in West Lafayette, Ind. He was born in Auburn, Ind., on January 23, 1868, son of Daniel Zinn and Rachael C. (Goetschius) Hoffman. He is survived by his widow, Zoelah M. (Burroughs) Hoffman, whom he married in 1913, and by one son, James David Hoffman. His first wife, Kate B. (Peterson) Hoffman, whom he married in 1890, died in 1902.

Professor Hoffman served as apprentice machinist with the Auburn Foundry and Machine Works between the time he was graduated from the Auburn High School in 1883 and his entrance to Purdue University in 1886. He was graduated from Purdue University with the degree of B.M.E. in 1890, and the degree of M.E. was conferred upon him in 1893. During the summer of 1890 he was draftsman and designer for the Buckeye Engine Company at Salem, Ohio, but was recalled the same fall to Purdue University to the post of assistant in practical mechanics, working under the direction of the late Dean W. F. M. Goss. He was promoted to the rank of instructor in 1891 and to assistant professor in the same department in 1901. In 1902 he was appointed assistant professor of machine design at Purdue University and was promoted to associate professor in 1903 and to professor in 1908. His connection with Purdue University was interrupted from 1911 to 1917, when he held the position of professor of mechanical engineering and practical mechanics at the University of Nebraska. He was recalled to Purdue University in 1917 to the position of professor and head of the department of practical mechanics, as successor to Michael Joseph Golden. Since 1929 he had also been in charge of the curriculum of industrial education. Professor Hoffman was retired from active service at Purdue University with the rank of professor-emeritus, effective September 1, 1938.

He was author or co-author of a number of books on engine and boiler design, machine design, and heating and ventilating; also of five pamphlets on house construction and heating of homes. His contributions to the technical press included numerous articles and papers, published in technical magazines and in the transactions of engineering societies.

In addition to the courses which he taught at Purdue University and at the University of Nebraska, Professor Hoffman delivered frequent nontechnical lectures and radio talks on residence construction, heating and ventilating, and shop practice.

His society affiliations included the following: The American Society of Mechanical Engineers (junior 1894, member 1903), American Society of Heating and Ventilating Engineers (life member and past-president), National District Heating Association (honorary member), National Warm Air Heating and Air Conditioning Association (honorary member), Warm Air Furnace Code Committee (first and only chairman from its organization in 1921 until his death), Society for the Promotion of Engineering Education (life member), Executive Committee, Central Indiana Section, A.S.M.E., Indiana Engineering Society, Advisory Committee for the Indiana Federal Housing Administration, Tau Beta Pi, Sigma Xi, Sigma Tau, Kappa Delta Rho, Rotary International (past-president, Lafayette Rotary Club). He was also an active member of the Presbyterian Church at Lafayette, Ind., and at Lincoln, Neb., having served on all of its official boards. He was a public-spirited citizen and as such devoted himself unselfishly to his community and state.

An editorial appearing in the Lafayette *Journal Courier* of August 14, 1938, reviewed his life and work in the following manner:

"With the passing of Professor James D. Hoffman, another of the sturdy, mature dependables who helped make Old Purdue a power in education, disappears from the campus he graced for so long. Professor Hoffman had been retired at seventy but he was to continue to have an office on campus, and had been awarded emeritus honors.

"Activity, hard work and constant association with youth had kept Professor Hoffman young in heart and spirit. He was a jolly companion, a good and cheery neighbor, a splendid citizen, a successful and greatly beloved teacher. Perhaps he was best described as 'a Christian gentleman.'

"His practical helpfulness in his relations with the young, over and above the functions of a teacher, have been attested many times. He knew how to be helpful when help was really needed, and there was no ostentation in his well-doing. His influence on behalf of clean living and integrity was far beyond that of a mere professor. His simplicity and sincerity, his friendliness and unassuming guidance by example rather than preachment, made him a real power in college, community, club and church, among young and old alike. 'Jimmie' Hoffman leaves a vacancy in the ranks of sound civic life and better education which it will be hard to fill."—[Memorial prepared by L. V. Ludy, Lafayette, Ind., Mem. A.S.M.E.]

JOHN A. HUNTER (1868–1939)

John A. Hunter entered this world at Stormstown, Pa., on May 15, 1868, son of John A. and Elizabeth (Elder) Hunter. By way of contrast, the word "storm" had no place in the tranquil life which he was destined to live. His bland sense of humor, his ability to appreciate the other fellow's point of view, and the basic spirit of fair play which dominated his life, left him unusually free of enemies and from the normal strife of life. He did not avoid making adverse criticisms, but such criticisms were usually accompanied by helpful suggestions and with a crack of humor which defied resentment. He seemed to anticipate friction between human beings and his efforts to maintain peace and goodwill were successful to an amazing degree.

After graduating from Pennsylvania State College in 1890 with the degree of B.S. in mechanical engineering he spent three years teaching manual arts in Georgia. He then took graduate work at Cornell University and Pennsylvania State College, where he gained an M.E. degree in 1896. He was an instructor and assistant professor of mechanical engineering there from 1894 to 1904 and then went to the University of Colorado as an assistant professor. Two years later he was made a full professor and placed at the head of the department of mechanical and chemical engineering, a position he continued to hold until reaching the retirement age.

Professor Hunter's humor and friendly smile were appreciated as fully by the women students in the university as by the men. One day Professor Hunter entered a dining room during a rather furious "boarding house" debate when one of the girls flew to his side in an appeal for support and called him "Uncle John." This girl is now the wife of Alvin Forbess, chief engineer for the Amalgamated Sugar Company of Utah. There was a significance to this little episode which became a characteristic part of the remaining twenty-five years of Professor Hunter's life. Not only did he become "Uncle John" from then on to every acquaintance from the governor of the state down to the boy in the streets, but through the use of that simple and affectionate salutation, "Uncle John," all barriers were

down and future hundreds were destined to do as Mrs. Forbess had done—fly to his side for advice, comfort, and protection.

John Hunter had a keen political mind and this ability was soon recognized by the president of the university. For many years the president sought his advice on political affairs affecting the university. Professor Hunter also persuaded many of the best regents ever to serve on the board that it was their duty to make the necessary sacrifice and seek election to this non-salaried position. Professor Hunter also contributed his own efforts to the cause of public government and civic interests. He was a member of Boulder City Council from 1912 to 1916. He served the Chamber of Commerce as president during 1923, 1924, and 1925. He was president of the Boulder Club over a long period of years. He headed many campaigns, such as community chest, etc., and he was rightfully considered one of the leading citizens of Boulder.

From 1896 until 1918 Professor Hunter spent his vacations in the employ of such firms as Westinghouse Machine Company, Pittsburgh Locomotive Works, Baldwin Locomotive Works, and the Pennsylvania Railroad, and his practical knowledge was one of his greatest assets.

He searched continuously for employment opportunities for his graduated students and many outstanding engineers today are grateful to "Uncle John" for his assistance in getting a good start. *The Colorado Engineer*, published by the student engineering body, nominated him for the "Hall of Fame." In May, 1936, the engineering faculty held a banquet in his honor and used the occasion to present him with a gold watch. When he retired he was presented with a bronze plaque on which was cast the actual signature of every member of the faculty of the university from the president to the youngest instructor.

For a period of twenty years he served as weather observer for the City of Boulder, but probably the extra-curricular activity which gave him the greatest pleasure was his position as a deputy state oil inspector. During this period every dollar he received from the oil inspector's salary was used to help needy and worthy boys through college by employing them to do extra testing work in the oil laboratory.

Professor Hunter was a member of the Colorado State Board of Examiners for Engineers and Surveyors from 1921 until his death. He rewrote the first Colorado registration law and personally steered the revised law through the Colorado legislature. Because of the intense study which he gave to this work, this new Colorado law is almost a verbatim duplicate of the present "Model Registration Law" of the American Society of Civil Engineers, although it appeared several years in advance of the "Model Law."

Professor Hunter helped develop and helped finance the first mechanically operated vertical automobile storage elevator. The rights to this elevator were purchased by Westinghouse and one operates today in the heart of downtown Chicago. He was also interested in the development of a road "file" and a rotary type engine.

In 1919 romance entered the life of "Uncle John" when he married a member of the faculty, Miss Alice Downing. His marital happiness ran strong but ended abruptly when his bride was suddenly stricken and died in January, 1920. The grief attending this tragedy caused "Uncle John" to be absent from the only Colorado Section meeting he missed from the time he personally organized the Section in 1918 until his own health failed nineteen years later.

Professor Hunter became a member of A.S.M.E. in 1914 and he was one of the first chairmen of the Colorado Section. From 1932 through 1935, Professor Hunter served the Society as manager and during the next two years he was a vice-president. He was elected to the Fellow grade in 1936. From the time he joined the Society until his death he served its interests with an ardor analogous to religious zeal.

Following the death of his wife, a sister, Miss Anna Hunter, presided over his home. The courteous and thoughtful consideration with which he unfailingly treated this sister prompted many appreciative comments. At his death, which occurred on December 17, 1939, Anna Hunter went to live with the other remaining sister, Mrs. A. Woodward Smith of Blairsville, Pa.

Professor Hunter was an active Mason, and a member of Acacia, Tau Beta Pi, and Alpha Chi Sigma. From 1905 until his retirement he was a member of the Society for the Promotion of Engineering Education.

His physical stamina astounded physicians when he recovered from a condition where he seemed completely paralyzed, with death but a matter of hours. His recovery was so sufficient that he again attended A.S.M.E. meetings, but within the year he succumbed to a combination of uremic poisoning and heart trouble.

On December 19, 1939, he was laid to rest beside his bride of a few months, in Fairmont Cemetery in Denver.—[Memorial prepared by FRANK H. PROUTY, Denver, Colo., Mem. A.S.M.E.]

MELVILLE WILLIAM KANTROW (1880–1937)

Melville William Kantrow, mechanical engineer in charge of inspection for the American Safety Razor Corporation, Brooklyn, N.Y., died on October 15, 1937.

Mr. Kantrow, who simplified his name from Kantrovitz in 1923, was born in Virginia City, Nev., on December 8, 1880, the son of Charles Marks and Henrietta (Mayer) Kantrovitz. His early education was obtained in public schools in New York, N.Y., and at Cooper Union in that city, from whose Art Department he was graduated in 1898.

Following his graduation, Mr. Kantrow worked at various jobs such as assistant draftsman in both mechanical and architectural drafting rooms, and mechanic's helper in machine shops. Then, from 1903 to 1908, he was with the Yale & Towne Manufacturing Co., in Stamford, Conn., first as apprentice and later as assistant in their toolroom, in charge of die work in connection with Keller automatic die sinking machines. From 1909 to 1915, he was employed by Joseph Mayer & Bros., Seattle, Wash., in charge of the manufacture and installation of tower and street clocks and electric time-clock systems. From 1915 to 1919, he worked for the Remington Arms & Ammunition Co., Bridgeport, Conn., first as a foreman in the die room, later being made general foreman in charge of the sub-assembly of the Browning machine gun. He also installed and put into operation a battery of Keller automatic die-cutting machines, and served as assistant in the Drop Forge Department. He designed many jigs, fixtures, and machines to speed up production during the World War.

In 1919, Mr. Kantrow went with the Keller Mechanical Engraving Company, Brooklyn, N.Y., as superintendent of their Automatic Die-Sinking Machine Department, and also directed the setting up and putting into production of these machines for purchasers.

Mr. Kantrow had been employed by the American Safety Razor Corporation since 1926. At first he was engaged in checking production control in the Frame Department. Later he organized an inspection system for the entire plant, also organized and started production in their Double-Edged Blade Department, was in charge of the Pile Wire and Plating Departments, and acted as general "trouble-shooter" in locating and eliminating "choke points" throughout the entire plant.

In 1921, Mr. Kantrow joined the A.S.M.E. as an associate-member and he was automatically transferred to the member grade in 1935. He married Rose Klipper, of New York, in 1928, and is survived by her and by a son, Harry E., of New York, and twins, Lillian and Leon, of Seattle, Wash., as well as by his mother.

MOSES BATES KAVEN (1864–1937)

Moses Bates Kaven, vice-president and consulting engineer of the United Shoe Machinery Corporation, Boston, Mass., died on July 1, 1937.

Mr. Kaven was born on September 28, 1864, at Plymouth, Mass., the son of James M. and Harriet (Barnfield) Kaven. His early education was obtained in the public schools of East Bridgewater; his professional schooling at the Worcester Polytechnic Institute, Worcester, Mass., from which he was graduated in 1885 with the degree of B.S. in mechanical engineering. He was awarded the D. Eng. degree by his alma mater in 1928.

In February, 1886, Mr. Kaven was employed at the Atlantic Works, East Boston, as draftsman on marine engines. In November of that same year, he transferred to the Simonds Rolling Machine Company, Fitchburg, Mass., where he was engaged in drafting work for dies and special machinery for rolled forgings. In October, 1887, he was sent to England and was there employed as works manager of the Simonds Steel & Iron Forging Co., Ltd., of London and Birmingham, until June of 1890.

Mr. Kaven returned to this country in 1890, and became assistant mechanical engineer on marine engines and general machinery with the Lockwood Manufacturing Company, East Boston, Mass. He left there in 1892, and until 1898 acted as assistant to the manager of the Portland Company, Portland, Maine, building marine engines and general machinery and boilers.

In 1898, Mr. Kaven became associated with predecessors of the United Shoe Machinery Corporation, serving successively as superintendent, general superintendent, vice-president in charge of manufacturing, and vice-president and consulting engineer; also as director in sixteen affiliated and subsidiary companies. Mr. Kaven continued in this work until his death.

He became a member of the A.S.M.E. in 1891. He was also a member of the University Club and the Engineers Club, both of Boston; of the Worcester Club of Worcester, Mass., in which city he had resided since 1925; and of the Tedesco Country Club, of Swampscott, Mass. He was a trustee of the Worcester Polytechnic Institute. He was a Republican in politics and a Unitarian in religion.

In 1890, Mr. Kaven married Helen M. Kidder, of West Boylston, Mass., who died on November 30, 1935.

ROBERT RUSSELL KEITH (1879–1937)

Robert Russell Keith, works manager of the Tractor Works of the J. I. Case Co., Racine, Wis., died suddenly on June 12, 1937, while attending the 35th reunion of his class at Iowa State College.

Mr. Keith was born on February 13, 1879, at West Liberty, Iowa, the son of Albert F. and Rachel E. Keith. He obtained his preparatory education in the public high school of West Des Moines, Iowa, where he was later instructor in manual training for a year, and his professional education at the Iowa State College, where he was graduated with a bachelor degree in mechanical engineering in 1902. He then worked as an apprentice machinist in the roundhouse of the Chicago Great Western R.R. Co., South Des Moines, from July to October, 1902. This was followed by service as draftsman in Des Moines with the Eagle Iron Works; one year in the foundry of the Keith Furnace Company, West Liberty; and two years, 1903–1905, with the Louisiana Purchase Exposition at St. Louis. He had charge of the foundation work for all power units for the exposition, some 22,000 hp; was assistant to the superintendent of maintenance and operation; and then directed dismantling and shipping.

Next, Mr. Keith spent five years with the Sight Feed Oil Pump Company, Milwaukee, whose name was later changed to Richardson-Phoenix Company. He acted as shop superintendent and designed the entire line of product. This was followed by six months as assistant superintendent at the A. O. Smith Co., Milwaukee, and eighteen months as general manager, Sterling Machine Company, Norwich, Conn.

From 1912 to 1917, Mr. Keith served as superintendent of the Sheffield Car Company, Three Rivers, Mich., a plant of Fairbanks, Morse & Co.; 1917 to 1919, plant manager of the Holt Caterpillar Company, Peoria, Ill.; 1919 to 1928, as superintendent of the Tractor Works of the Moline Plow Company, Rock Island, Ill., for a short period, and then with International Harvester Company, first as superintendent of Tractor Works at Chicago, and later chief engineer of the Motor Trucks and Bus Division for that company. He took out several automotive patents which he assigned to the company. In January, 1928, he became works manager of the Tractor Works for J. I. Case Co., Racine, Wis., where he was employed at the time of his death.

Mr. Keith joined the A.S.M.E. as a junior in 1904, was promoted to associate in 1911, and to member in 1914. He was also a member of the Society of Automotive Engineers, and at the time of his death was vice-president of that society, representing the Production Engineering Activity. He had also served on the society's National Meetings Committee and the Production, Truck, and Engine Divisions of the Standards Committee.

Mr. Keith married Helen Marks, of Davenport, Iowa, in 1920 and is survived by her and by four children: Dorothy, Herbert, Gordon, and Mary.

JOHN ALFRED ALEXANDER LINDSTROM (1866–1937)

John A. A. Lindstrom, research engineer, National Lead Company, Brooklyn, N.Y., died at the Post Graduate Hospital, New York, N.Y., on September 28, 1937, of uremic poisoning.

Mr. Lindstrom was born on August 20, 1866, in Abo, Finland, the son of Alfred Emanuel and Sophia Gustava (Lindquist) Lindstrom. He obtained both his elementary and professional education in Finland, where he was graduated from the Institute of Technology of Abo in 1884. His first professional employment was as assistant engineer in the office of the city engineer and architect of Abo, from 1884 to 1893. He then emigrated to the United States, and was employed from 1895 to 1899 on the design and construction of new works for Howard & Bullough, American Machine Company, Pawtucket, R.I. In 1903–1904, he worked on the design of the Kingsbridge Power Station, New York, N.Y., and then was employed until 1906 by the Atlas Portland Cement Company at Northampton, Pa., on the design and construction of their plants Nos. 4, 5, 6, and 7. In 1908–1909, he was superintendent of erection and inspector under W. T. Donnelly, chief engineer, for an 8000-ton floating drydock, Erie Basin, Brooklyn.

From 1909 until his resignation in 1929 Mr. Lindstrom was employed by the General Chemical Company, New York, as engineer, estimator, and designer of chemical plants. These were situated in Bay Point, Calif.; Calumet and East St. Louis, Ill.; Newell, Pa.; Pulaski, Va.; Marcus Hook, Pa.; and elsewhere. This work included also wharves and tramways for the Marcus Hook and the Hudson River plants.

In 1934–1936, he was chief engineer, U.S.A., at Fort Hamilton; and in 1937, began his service with the National Lead Company, Brooklyn, and was there employed up to his death.

Mr. Lindstrom joined the A.S.M.E. as a member in 1911. He was also for thirty years a member of the Bergen Beach Yacht Club. He became a naturalized citizen of the United States in 1900, and supplemented his early education in Finland by taking correspondence courses in this country.

He is survived by his widow, Fanny (Spencer) Lindstrom, whom he married in 1920.

ALAN NELSON LUKENS (1867–1937)

Alan Nelson Lukens, chief engineer for the Railway Steel-Spring Division of the American Locomotive Company, New York, N.Y., died at his home in Elizabeth, N.J., on October 20, 1937.

Mr. Lukens was born on March 29, 1867, at McKeesport, Pa. He prepared for college at the Pingry School, and then entered the Stevens Institute of Technology, Hoboken, N.J., where he was a student in mechanical engineering for two years. He left in 1886 to work with Cyrus Currier and Sons, Newark, N.J., as a special apprentice. After two years of this training, he was employed as superintendent by the Conshohocken (Pa.) Tube Company, in charge of their wrought iron pipe mill.

In 1892, Mr. Lukens left this company and took a position as designing engineer for the Artificial Gas Producer Company, Pittsburgh, Pa. He remained there until 1896, when he was engaged as superintendent by the Charles Scott Spring Company, Philadelphia, Pa. Here he had entire charge of the factory, and supervised the erection of new buildings and the reinstallation of all machinery after a destructive fire. In 1902 this company became one of the properties of the newly incorporated Railway Steel Spring Company, and Mr. Lukens was given entire charge of all engineering of five plants, later reduced to three and greatly enlarged. He was responsible for much research and development work on modern steel springs, and numerous inventions and patents on springs, miscellaneous car parts, and special machinery used in their manufacture. After the company became the Railway Steel-Spring Division of the American Locomotive Company in 1926 Mr. Lukens continued active in its affairs up to the time of the short illness which ended his life.

Mr. Lukens became a member of the A.S.M.E. in 1931, and was greatly interested in its work. He was a member of the Special Research Committee on Mechanical Springs from its organization in 1924 up to his death. He also served on the Subcommittees of Heavy Helical Springs and Elliptical Springs. He was a member of the American Society for Testing Materials, and served as Clerk of Sessions for the Westminster Presbyterian Church of Elizabeth.

Surviving are two brothers, the Rev. Victor H. Lukens, rector emeritus of the First Presbyterian and Trinity Church of South Orange, and the Rev. Frank Lukens, rector of the Burlington, N.J., Presbyterian Church; and two daughters, Mrs. Samuel R. MacPhee, of Williamsburg, Pa., and Miss Dorothy Lukens, of Elizabeth.

WILLIS McKEE (1873–1937)

Willis McKee, consulting engineer and contractor, of Cleveland, Ohio, died of pneumonia on December 4, 1937. Mr. McKee was born at State College, Pa., on June 24, 1873, the son of Professor James Y. McKee, then vice-president of The Pennsylvania State College, and Margaret G. McKee.

Mr. McKee spent his entire childhood on the campus of The Pennsylvania State College, and obtained his preliminary education in the A and B preparatory departments there. In 1888 he entered the college in the course in civil engineering, and was graduated with honors with a B.S. degree in 1892. In 1902, he received the degree of M.E. from the college. He was appointed vice-president of the Alumni Association of the college in 1935 and continued in that office until his death. He was also a member of several committees of the association.

After his graduation in 1892, he entered the employ of the Union Switch & Signal Co. and was engaged in erecting block signals along the lines of the N.Y. Central & Hudson River R.R. From 1895 to 1897, he taught in the high school at Mt. Carmel, Pa., and in 1897, he went to work with the Carnegie Steel Company, at Duquesne, Pa., as draftsman. He transferred to the Engineering Department of the National Steel Company, Youngstown, Ohio, in 1899, and after a few months was put in charge of the engineering of their Mill Department. In the early part of 1901, when the National Steel Company became the Ohio Works of the Carnegie Steel Company, he was made chief engineer there. He resigned this position to take the same title with the Republic Iron & Steel Co., in 1902, and in 1904 left that company to become general superintendent of the Elyria Iron & Steel

Co. He remained with this company and its successor, Steel & Tubes, Inc., for about thirteen years, serving as treasurer during the last year.

In 1918 Mr. McKee joined the organization of Arthur G. McKee & Co., which had previously been established by his brother, Arthur G. McKee. For several years he served this company as general superintendent of construction and later as manager of the Mill Department. In 1923 he opened offices as a consulting engineer in Cleveland and was engaged in this business and in marketing rolling mill equipment, on which he had about twenty patents, until the time of his death.

In 1900, Mr. McKee married Sara Pascoe of Carnegie, Pa., and they had two daughters, Margaret R. (McKee) McFarlane, and Helen P. (McKee) Hunzicker, who survive him. He is also survived by two brothers, George C., of Greenville, Mich., and Arthur G., and one sister, Mary (Mrs. H. E. Stitt), both of Cleveland.

Mr. McKee became a member of the A.S.M.E. in 1920. He was also a member of the Cleveland Engineering Society. In the A.S.M.E., he served on the Executive Committee of the Iron and Steel Division as associate in 1933 and 1934, and as member from then until his death.

ALBERT CLEMENT MIDDLETON (1870–1939)

Albert Clement Middleton, son of Frank Barclay and Sally (Albertson) Middleton, was born in Camden, N.J., on November 4, 1870. After attending Friends, a private school in Camden, he entered the Friends' Central High School, Philadelphia, Pa. When he had completed his studies there, he served an apprenticeship under his uncle, Howard W. Middleton, of the firm of C. W. and H. W. Middleton, of Philadelphia, learning the iron and steel trade, and continued in that work until his uncle's death, in 1893, terminated the business.

During the next two years Mr. Middleton engaged in the iron and steel business with H. McCalla, of Philadelphia, with whom his brother, E. M. Middleton, and Walter Ivins were also associated, and from 1895 to 1897 he was connected with the Cole Machine Company, Camden, manufacturers of engines for steam launches and small boats.

In 1897 Mr. Middleton joined Eldridge R. Johnson, Camden, who had a machine shop there and contracted for the making of all motors for the Berliner Gramophone Company, of Philadelphia. Mr. Middleton served as secretary of the business until 1901, when it was incorporated as the Victor Talking Machine Company, and from then until he retired in 1913 he was this company's secretary and assistant treasurer.

Mr. Middleton took an active part in civic and political affairs in the State of New Jersey. He was elected treasurer of the state on January 31, 1928, and served until April 1, 1934. He had been chairman of the South Jersey Port Commission since its organization in April, 1926. This commission constructed port facilities at Camden, where it operates the Camden Marine Terminals, and has aided greatly in developing transportation to serve the industrial and commercial interests of South Jersey.

Mr. Middleton had also served as a director of the West Jersey & Seashore R.R. Co., and of the First Camden National Bank & Trust Co., the Camden Safe Deposit & Trust Co., and the Camden Fire Insurance Association. He became an associate of the A.S.M.E. in 1911, and was a member of The Franklin Institute, the Camden County Historical Society, and several clubs in New York and Philadelphia. Gunning, yachting, and fishing were his chief recreations.

Mr. Middleton's death occurred on March 4, 1939. He is survived by Mrs. Middleton, the former Rena E. Lord, of Haddonfield, N.J., whom he married in 1898, and by a daughter, Rena.

ALBERT ELIPHALET MITCHELL (1855–1937)

Albert Eliphalet Mitchell, president and treasurer of the Wyckoff Pipe & Creosoting Co., Inc., New York, N.Y., died on December 26, 1937. He was born in Madison, Maine, on February 3, 1855, son of Thomas Gilmore and Laura Ann (Packard) Mitchell.

Mr. Mitchell's preliminary education was obtained in the common schools, and he later attended the University of Maine, which in his student days was known as the Maine State College of Agriculture and the Mechanic Arts. He was graduated as a mechanical engineer in 1875, of which class he is believed to have been the last surviving member.

Mr. Mitchell served as apprentice machinist with the Baldwin Locomotive Works in 1876–1877 and then entered the employ of the Pennsylvania Railroad at Altoona, Pa., where he worked successively in the machine shop, the Test Department, and the Signal Department. He then spent a year, 1881–1882, in the Yale & Towne Manufacturing Co., Stamford, Conn., as a designer of hoisting machinery, followed by two years as chief draftsman with the old New York & New England R.R., now a part of the New York, New Haven & Hartford R.R. He next spent about two years in Cleveland, Ohio, where he was employed as mechanical engineer and plant superintendent by the French Furnace Company and the Arctic Ice Machine Manufacturing Company. In 1886 and 1887, he was employed by the New York, Lake Erie & Western R.R. Co. (now the Erie Railroad) on special work in the Motive Power Department; from 1887 to 1889, he was engineer of signals; in 1889 and 1890, engineer of tests; from 1890 to 1892, mechanical engineer; and from 1890 to 1902, superintendent of motive power.

In 1901–1902, he was assistant superintendent of motive power for the Chicago, Milwaukee & St. Paul R.R., and in 1902–1904, superintendent of motive power for the Northern Pacific Railroad. In 1904–1906, he held a similar position with the Lehigh Valley Railroad, and in 1906–1908, was employed by the N.Y., N.H. & H. Railroad, on appraisal of rolling stock and as manager of purchases and supplies, fuel agent, etc. In 1908, Mr. Mitchell became vice-president of the Wyckoff Pipe & Creosoting Co., later becoming its president and treasurer, and continuing in this position to the time of his death. He held several patents, chiefly in the railway field.

Mr. Mitchell became a member of the A.S.M.E. in 1891. He was also a member of the N.Y. Railroad Club and served as its president from 1896 to 1898. He belonged to the Cleveland Engineering Society, the Mayflower Society, and the Phi Gamma Delta fraternity.

He was twice married. His first wife was Nellie Vernon Knapp, whom he married in Stamford, Conn., in 1884; his second wife was Mrs. Eliza Anna Wyckoff, nee Corel, whom he married in 1908, and who died in 1933. He had one daughter, Hazel Vernon, who also predeceased him.

Mr. Mitchell was a member of the Jury of Awards of the Paris, France, Exposition of 1892. He was for many years a member of both the Master Car Builders' and the Master Mechanics' Associations, and during that time, wrote various reports for these associations.

GEORGE LUTON MORTON (1858–1937)

George Luton Morton, former primary examiner in the U.S. Patent Office, who retired on June 30, 1932, after forty-six years of service in the Patent Office, died on May 13, 1937, in Washington, D.C., of pneumonia. He was born on August 19, 1858, at Parkman, Ohio, the son of Perry and Laura (Chapman) Morton.

Mr. Morton took a six-years' course in mechanical engineering in the Ohio State University, graduating in 1884, during which time he worked at intervals in various shop processes outside the university. He later took a three-years' course in law at the National Law School, Washington, D.C., and was admitted to the bar in the spring of 1889. He was also admitted to practice before the Supreme Court of the United States.

After his graduation in 1884, he was variously engaged: for one year as teacher of mechanical drawing in the School of Design, Cleveland, Ohio; as draftsman for Professor Robinson at Columbus, Ohio; and as a student of patent law in the office of Ex-Commissioner Gen. M. D. Leggett at Cleveland; also on the mathematical work connected with an article, "Cushioning in Engines," published in Van Nostrand's *Engineering Magazine*, June, 1885. Following these activities, Mr. Morton worked for nine months as machinist and draftsman for the Cleveland Rubber Company, and then went into the office of the superintendent of motive power, New York, Lake Erie & Western Railway Company, as draftsman. He remained here until 1886, when as the result of a successful competitive examination he was appointed an assistant examiner in the U.S. Patent Office, and assigned to Division 13.

Mr. Morton rose to be chief clerk in the Patent Office, in 1895, and three years later was appointed primary examiner of Division 36, which was organized under his supervision. He held this position until his retirement in 1932. He became a member of the A.S.M.E. in 1890; he was also a member of the Masonic order and of the University Club in Washington.

He married, in 1905, Alice M. B. Simmons, of Washington, D.C., who survives him.

ANDREW HENRY NEUREUTHER (1877–1937)

Andrew Henry Neureuther, consulting engineer and patent attorney for the Westclox Division of the General Time Instruments Corporation, of La Salle and Peru, Ill., was killed in an automobile accident on October 16, 1937, near Princeton, Ill.

Mr. Neureuther was born on April 3, 1877, at Peru, the son of Charles F. and Louise (Oesterle) Neureuther. He attended the Peru schools and entered the University of Illinois in the Mechanical Engi-

neering Department with the Class of 1898. After being granted his B.S. degree in mechanical engineering he spent a year in postgraduate work at the University, securing his M.E. in 1899. He then joined the staff of the Western Clock Company, La Salle, a small local plant, as engineer. Mr. Neureuther grew up with the company, soon becoming its chief engineer, a position he held until 1932, when he was made consulting engineer and patent attorney. As chief engineer, he supervised every addition to the plant from 1899 on, one of his first jobs being to change the illuminating system over from gas to electricity. The modernization of the heating and power plants, the establishment of physical and chemical testing departments and an experimental machine shop, the conduct of research, and the design and manufacture of special machinery all came under his supervision. He held some twenty patents in the United States and Great Britain relating to clocks and clock parts, and particularly to automatic casting machines and other special machinery used in the manufacture of clocks.

In addition to his engineering course, Mr. Neureuther took up the study of law in his spare time, specializing in patent law, and secured his LL.B. degree from the Chicago Correspondence School of Law in 1903 and shortly thereafter was admitted to the Illinois Bar Association. In 1930 the Western Clock Company was acquired by the General Time Instruments Corporation, of which it became the Westclox Division, and since 1932 Mr. Neureuther had devoted practically all of his time to the patent work of the corporation. He attained a wide reputation in patent work and had served as an expert witness in important cases.

Mr. Neureuther was a contributor to technical publications including the *Street Railway Review* and *Machinery*. He was serving as president of the National Sheet Metal Company and of the Citizens' Hotel Company, both of Peru, at the time of his death and had served as director of The Illinois Zinc Company and The Central Life Insurance Company of Illinois, Chicago, and of two banks in Peru.

Mr. Neureuther became a junior in the A.S.M.E. in 1899, and was promoted to the member grade in 1928. He was a member of Tau Beta Pi, honorary engineering fraternity, and of the Masonic order and was active in many organizations for community betterment. He had served as a trustee of the Peru Congregational Church, president of the public library board, vice-president of the Business Men's Association, and member of the school board and hospital association, and was actively interested in Boy Scout work. He was also secretary of the executive board of the Civic Federation of La Salle, Peru, and vicinity, and president and director of the Ottawa (Ill.) Chautauqua Association.

In 1902 he married Nettie Jane Robinson, of La Salle, who died in 1922. Three children, Anita Nettie Connellee, Andrew Wesley Neureuther, and Mabel Elaine Small, survive him. In 1926 Mr. Neureuther married Ada M. Baysoar, who also survives him.

CARL VICTOR NORDBERG (1872–1937)

Carl Victor Nordberg, of the Nordberg-Rowe Engineering Company, Butte, Mont., died on June 3, 1937, of angina pectoris.

Mr. Nordberg was born in Björneborg, Finland, on July 10, 1872, the son of Carl Victor and Dores (Heinze) Nordberg. His education and early engineering experience were acquired in Finland, where he was graduated with an M.E. degree from the Polytechnic Institute of Finland in 1900. Prior to this, he was employed from June to September, 1896, with Abo J.M.A.B., manufacturers of steam engines; from September, 1896, to June, 1897, with Nobel Bros., St. Petersburg, builders of mining machinery and steam engines; from June to September, 1897, and in 1898, with Björneborg Mek. Verkstad, Finland, builders of steamships and marine machinery; from June, 1899, to August, 1900, with A. G. Electricitäts Werke Vorm. Kummer & Co., Dresden, Germany, as assistant to the chief engineer, building an electric railway and power plant for the city of Helsingfors, Finland.

Following his graduation from the Polytechnic Institute Mr. Nordberg came to the United States and entered the employ of the Nordberg Manufacturing Company, Milwaukee, Wis., which had been founded by his older brother, Bruno V. Nordberg (Mem. A.S.M.E.; for obituary see Trans. A.S.M.E., vol. 46, 1924, page 1318). For about five years he worked on designs for air compressors, blowing engines, hoisting, pumping and stationary steam engines and stamps.

From September, 1905, to August, 1916, Mr. Nordberg served as representative of the Nordberg Manufacturing Company in the western states, selling machinery and supervising the installation of power plants. In August, 1916, he formed the corporation known as C. V. Nordberg Machinery Company, at Butte, Mont. On November 1, 1919, he assumed charge of the Missoula Iron Works, which he managed in addition to the C. V. Nordberg Machinery Company until October, 1924. In November, 1926, he became associated with the Nordberg-Rowe Engineering Company as consultant in research and engineering. He terminated this connection in 1932 to devote his time to designing and building portable compressors, which line he followed up to the time of his death. He supervised the installation of compressor valve systems for a number of mining companies, and a central compressor plant for the Anaconda Copper Mining Company, Butte, Mont., one of the largest of such plants in the world. He took out several patents, including one on cooling towers, and one on clutches.

Mr. Nordberg became a member of the A.S.M.E. in 1908. He was a member of the Navy Consulting Board of the United States, appointed by Secretary Josephus Daniels, in September, 1916. He became a naturalized citizen of the United States in 1912.

In 1902, Mr. Nordberg married Ida Viola Stenstrom in New York, N.Y. She died on February 27, 1924. He is survived by a daughter, Greta (Nordberg) Quayle, and a son, Carl Victor Nordberg, Jr., both of Butte, Montana; also by two grandchildren, Dolores Ann Quayle and Carl Victor Nordberg.

JULIAN DAY PAGE (1873–1936)

Julian Day Page was born at La Salle, Ill., on April 6, 1873, son of Thomas Mason and Kata (Brown) Page. He was graduated from Purdue University in 1894 with a bachelor's degree in mechanical engineering and took his master's degree three years later. During that period he worked on crane design for the Whiting Foundry Equipment Company, Harvey, Ill. From 1897 to 1901 he worked in Cleveland, Ohio, first for the Brown Hoisting Machinery Company, then for the McMyler Manufacturing Company, on crane design. He went to Youngstown, Ohio, in 1901, and for about three years was chief engineer for the Youngstown Engineering Company, also in connection with crane manufacture.

In 1904 he turned to plate work as chief engineer of the Enterprise Boiler Company, of Youngstown. He continued in this field for some years, working for the Wm. B. Pollock Co., Youngstown, from 1905 to 1907 and again, as assistant engineer, in 1910–1911; at the Ohio Works of the Carnegie-Illinois Steel Corporation, Youngstown, in a similar capacity, from 1907 to 1910; and for the Struthers Furnace Company, at Struthers, Ohio, as chief engineer, from 1911 to 1915. He received a safety medal in connection with his work in this position.

Subsequently Mr. Page spent about a year each with the Wm. Tod Co., Youngstown, and Mark Manufacturing Company, Chicago, Ill., and then went to New York, where he was chief draftsman with Perin & Marshall for several years. From May, 1918, until March, 1920, and again from July, 1923, to June, 1932, he was connected with the Wilputte Coke Oven Corporation, New York, as chief draftsman during the most of the time. He was with the International Coal Products Corporation in Newark, N.J., in 1920–1922.

Since 1934 he had been designing engineer for the Lummus Company, New York. He died in Plainfield, N.J., on February 3, 1936, after an illness of almost a year.

Mr. Page became a member of the A.S.M.E. in 1918. He was a Knight Templar and 32nd degree Mason. He was much interested in horticulture and in the promotion of welfare for crippled children.

Surviving Mr. Page are his widow, Helen Grinnell (Sill) Page, whom he married in 1903, and two children, Julian Day Page, Jr., and Helen Jane Page, who reside with their mother in Westfield, N.J.

EDMUND J. MASON PARRY (1876–1937)

Edmund J. Mason Parry, for more than thirty years associated with the Hartford Steam Boiler Inspection & Insurance Co., died suddenly at his desk in the home office of that company in Hartford, Conn., on October 4, 1937.

Mr. Parry was born on October 10, 1876, at Menai Bridge, Isle of Anglesey, North Wales. He was educated in Menai Bridge and Beaumarais schools and then served apprenticeships with De Winton, Carnarvon, Wales, and with Harland and Wolff, shipbuilders and engineers, Belfast, Ireland. At the completion of this course of training in 1896, Mr. Parry went to sea as assistant engineer in the Dominion Line Steamship Company, Liverpool, England, and in December, 1900, he was granted the certificate of the British Board of Trade as first-class marine chief engineer. He continued at sea, after transferring to the White Star Line in 1900, until April, 1906, with the rank of Engineer Officer, assistant to the chief engineer.

In June, 1906, having emigrated to the United States, Mr. Parry joined the Hartford Steam Boiler Inspection & Insurance Co. as inspector of steam boilers and flywheels, in its Boston office. He occupied this position until March, 1913, when he was transferred to Hartford as directing inspector for the company, in charge of the inspection of details relative to the design, construction, and installa-

tion of boilers and other pressure vessels, with authority over the work of other inspectors.

Following the death of Frank S. Allen in 1918, Mr. Parry succeeded to the position of chief inspector. For the next five years he served as head of the home department's inspection staff and in 1923 was transferred to the New York department as chief inspector. In the spring of 1933 he was granted leave of absence for rest and recuperation from a long illness and spent the next several months in his native England. On his return Mr. Parry went to Hartford as a member of the engineering staff of the boiler division and served in this capacity until the time of his death.

Mr. Parry became a member of the A.S.M.E. in 1918. He belonged to the Masonic fraternity and was a Shriner and a member of the Order of de Molay. For many years he was associated with the Hartford Hospital as a member of the board of directors and at the time of his death was its secretary. He was also a member of the Municipal Incinerator Commission, and of the Trinity Episcopal Church of Hartford. His clubs included the St. David Society of the State of New York, and the Professional Engineers Club of Connecticut.

He is survived by his wife, Elizabeth (Olson) Parry; three sisters in England; and a brother, Osmond Parry, in South America.

JOHANN FRIEDRICH MAX PATITZ (1866–1937)

Johann Friedrich Max Patitz—generally known as Max Patitz—chief consulting engineer for the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., died suddenly of a heart attack on January 3, 1937.

Mr. Patitz was born on May 21, 1866, in Muegeln, near Leipzig, in Saxony. The following account of his life is based largely upon an obituary in *Milwaukee Engineering*, Vol. XVII, No. 4, of January, 1937.

He was educated in the Citizens' School and Royal High School or Gymnasium, of Dresden. With his parents, he emigrated to the United States, and found his first employment in Pittsburgh, Pa., where he spent four years working in various factories and machine shops. Then, in June, 1885, he entered the employ of the Edward P. Allis Company at the Reliance Works in Milwaukee, where he held a number of successive minor positions during the first years. His ability, however, soon found recognition, both by Mr. Allis and the late Edwin Reynolds, and he was transferred to the engineering department. He became one of the company's designing engineers; and in 1901, when the Edward P. Allis Company became part of the Allis-Chalmers Company, he was put in charge of the building of steam engines and compressors. As early as 1899, Mr. Patitz saw the possibilities of the steam turbine, and in 1902 he was sent abroad to investigate the subject, and on his return did much to further the building of steam turbines by the company. He later made other trips to Europe for the company, investigating the various designs of gas engines, diesel engines, compressors, tillers, and tractors, and was intimately connected with the early development of Allis-Chalmers tractors and farm machinery.

Mr. Patitz was granted many patents. His studies of the parallel operation of alternating-current generators began as early as 1900. He became an outstanding authority on critical speeds and vibrations in high-speed machinery, and on the intricate mathematical calculations of modern machine design.

Mr. Patitz became a junior member of the A.S.M.E. in 1891 and a member in 1900. He was appointed a member of the Power Test Codes Committee No. 5 on Reciprocating Steam Engines in January, 1918; and of the P.T.C. Committee No. 20, on Speed Responsive Governors, in April, 1922, and was still serving on these committees at the time of his death. He was also a member of the Subcommittee on Steam of the Research Committee from the time of its appointment in 1911 until the completion of its work in 1915. In addition, Mr. Patitz was a member of the Society of Automotive Engineers, Verein deutscher Ingenieure, Engineers' Society of Milwaukee, American Society of Agricultural Engineers, American Association for the Advancement of Science, and Deutsche Landwirtschafts Gesellschaft.

FRANCIS GLADHEIM PEASE (1881–1938)

Francis Gladheim Pease was born at Cambridge, Mass., on January 14, 1881, and received his early education at Highland Park, Ill. He studied science and engineering at Armour Institute of Technology, Chicago, and received his B.S. degree in 1901. His alma mater conferred the degree of M.S. in 1924 and Sc.D. in 1927. While attending Armour, Pease worked evenings and weekends in the optical shop of Petitdidier, where he mastered many practical details of instrument making.

After graduating from Armour, Pease was recommended by Petitdidier to Professor G. W. Ritchie of the Yerkes Observatory. Here he first took part in the routine work of grinding lenses and mirrors and later began work in instrument design under Professor Ritchie and also took part in the astronomical work as an observer under Dr. George Ellery Hale. This was a splendid apprenticeship for a man who combined great mechanical talent with good training in engineering theory. To these Pease also brought imagination and great enthusiasm.

When the work at Mt. Wilson Observatory was inaugurated in 1904 under a grant from Carnegie Institution, Pease and others accompanied Dr. Hale to Pasadena, Calif. Much of the development of this fine observatory must be credited to Dr. Pease. He designed in large part the Snow telescope, the 60- and the 150-ft tower sun telescopes, the 60- and 100-in. reflecting telescopes, the 50-ft interferometer, besides a great host of auxiliary instruments. He also supervised much of the work of grinding and testing the 60- and 100-in. reflectors. After the erection of the 60-in. telescope, Dr. Pease carried on the regular work of an astronomer. His astronomical observations cover a wide range, including fine photographs of star clusters and faint nebulae which are used for comparison with previous and later observations. He made many observations of the spectra of faint nebulae. His moon photographs are said to be the finest in existence.

In 1919 Dr. Pease assisted Dr. A. A. Michaelson in designing and constructing a giant interferometer and in measuring the diameter of Betelgeuse. Later, Pease made other measurements of the diameters of many of the nearer stars. He also assisted Dr. Michaelson in two determinations of the velocity of light, the last of which was completed by him after Dr. Michaelson's death. In this later experiment he designed and built a pipe line a mile long which was evacuated to one one-thousandth of an atmosphere. In 1929 he repeated the famous Michaelson-Morley experiment on ether drift, using an 85-ft interferometer, and confirmed the previously found negative results.

Following the design of the 100-in. telescope, Pease became greatly interested in the design of still larger telescopes. In 1926 he made a careful study of the problems involved in the design of a 300-in. reflector. He advocated the fork type mounting and proposed the use of pyrex glass for the mirror.

When the work on the 200-in. reflector was inaugurated in 1930 at the California Institute of Technology, Dr. Pease devoted half of his time to assisting in the design. He was engaged in this work at the time of his very sudden illness and death, on February 7, 1938.

Dr. Pease had been a member of the A.S.M.E. since 1915 and served the Society as chairman of the Los Angeles Section and in many other capacities. He is survived by his widow whom, as Miss Caroline T. Furness, he met at Yerkes Observatory and married in 1905. Dr. Pease was a large man, a viking physically, and he radiated health and friendliness. He will be sorely missed.—[Memorial prepared by Wm. Howard Clapp, Pasadena, Calif., Mem. A.S.M.E.]

HARRY ADAM PICKEL (1874–1937)

Harry Adam Pickel, superintendent of generation for the Pennsylvania Power & Light Co., at Hazleton, Pa., died on January 18, 1937, in the Good Samaritan Hospital at Lebanon, Pa., the result of an automobile accident two days previously.

Mr. Pickel was born at Montclair, Pa., on August 11, 1874, the son of Uriah Leonard Pickel and Elizabeth (Van Artsdalen) Pickel. He had no formal education beyond grammar school and home study work. From 1893 to 1896, he served an apprenticeship at woodworking with Samuel Gourley of Philadelphia, from which he entered the employ of M. R. Mucklé, Jr., & Co., electrical and mechanical engineers and contractors. Here he served as electrical mechanic and foreman on several important jobs, the largest being the United States Gas Improvement Building at Broad and Arch Streets, Philadelphia, when he was in charge of all electrical work. In 1899, Mr. Pickel went to the Philadelphia Bourse Building as electrician, and had become assistant chief engineer when he left, in 1902, to serve as superintendent and chief engineer of the Colonial Trust Building, Reading, Pa., a new building, ten stories high, and the first modern office building in that city.

In 1906, Mr. Pickel joined the staff of the Engineer Company of New York, specialists in boiler efficiency and owners of the balanced draft system. After serving for some time in New York as salesman and superintendent of construction, he was sent to Philadelphia as district manager, and while there he designed and built the first device to operate the damper of a steam boiler by the variation of the furnace gases.

From 1908 to 1913, Mr. Pickel was building superintendent and chief engineer of the Central Branch Y.M.C.A. in Philadelphia, one of the largest Y.M.C.A. buildings in the country, and he was also its house manager. He was also consulting engineer for the General

Board of the Y.M.C.A. in Philadelphia and in that capacity designed the plumbing, heating, and electrical work for the Elkins Memorial addition to the Central Branch, and also power plants for other branches in the city.

In 1913, he went into business with two partners as the Quaker City Engineering Company, of Philadelphia. This business was terminated in 1916, because of lack of capital, and Mr. Pickel became superintendent of power for the Hercules Powder Company, Kenvil, N.J. Here he remained until August, 1919, when he took the position of superintendent of the Hauto Steam Electric Station of the Pennsylvania Power & Light Co. He became superintendent of generation for the company on April 1, 1925.

Mr. Pickel joined the A.S.M.E. as an associate-member in 1917, and was automatically transferred to the grade of member in 1935. He was active in the establishment of the Lehigh Valley Section in 1920, and was one of the promoters in the expansion of the territory to include the anthracite area, which occurred in 1928. He was chairman of the Executive Committee of the Anthracite-Lehigh Valley Section in 1935–1936, and vice-chairman in 1928–1929, 1931–1934, and 1936–1937.

In 1901, Mr. Pickel married Bertha May Hubbs, who survived him though injured in the same accident that was the cause of her husband's death. He was also survived by two sons, Harry A., Jr., living in Ringtown, Pa., and Robert, who was a student at Gettysburg College at the time of his father's death.

In addition to his membership in the A.S.M.E., Mr. Pickel had been a member of the Engineers Club of the Lehigh Valley since its organization in 1921, and served on important committees at various times. He was active in the work of the Boy Scouts of America, and of the Rotary Club. He was a Royal Arch Mason and Knight Templar and a member of the First Presbyterian Church of Hazleton, Pa., in which he served as president of the Men's League.

EDWARD RIVETT (1851–1937)

Edward Rivett, of Allerton, Mass., died on December 16, 1937, of thrombosis of the brain, after a nine weeks' illness.

Mr. Rivett was born on January 5, 1851, in L'Assomption, Que., Can., the son of Antoine and Elise (Marsolais) Rivett. He had only a common school education, and went to work in 1865 in a cotton mill, at Manville, R.I. In the following year he also worked in a cotton mill, in Holyoke, Mass. He then put in two years in shoe shops in Worcester and Lynn, Mass.; then two years as night overseer in a textile factory in Baton Rouge, La. In 1871, he was employed by the N.Y. Watch Co. in its factory in Springfield, Mass., and this started him on what he made his lifework. He went to Boston in 1872, and got work with C. A. W. Crosby, watchmaker and jeweler. He invented a number of watchmakers' tools, and in 1884 started manufacturing tools and lathes with Mr. Crosby as silent partner, under the firm name of the Faneuil Watch Tool Company, at Faneuil, Mass. The first "factory" was a wooden extension of his own home. After Mr. Crosby's death, Mr. Rivett bought out his interest and incorporated the business as the Rivett Lathe Manufacturing Company, Brighton, Mass.

In 1912, Mr. Rivett sold out this business on account of failing health. From then on up to his death, he considered himself as "retired," but he continued to experiment and improve watchmaking tools and machinery, often remarking to friends that he was "too busy to take a vacation."

During his early days with Mr. Crosby, he had his first experience in the buying of diamonds, in which he became an expert.

Concerning his work the *American Machinist*, in its issue of December 29, 1937, said, in part:

"Mr. Rivett believed himself to be the originator of precision in bench lathes and small internal grinders. Unusual mechanical skill, an inquiring mind, and initiative were qualities that aided Mr. Rivett in building precision into his machines. His designs were worked out at the bench and his men built early models from sample pieces. In the search for greater precision he visited many shops in this country and abroad to pick up ideas or materials. From Switzerland he obtained gages, in Turkey he bought a lifetime supply of lapping powder. If he wanted special gib stock, he went directly to the mill and showed them what he needed. In his opinion many modern shops have an impersonal attitude toward their products, and it was his delight to find one where no amount of time or trouble was too much to give in the search for perfection."

Mr. Rivett became a member of the A.S.M.E. in 1904. He was a Knight Templar and a Shriner. He was a skilful fisherman, good shot, and excellent woodsman, and was very fond of such recreation. His wife, Alma (Pinceloup) Rivett, whom he married in 1882, died in 1895. A daughter, Ida F. (Rivett) Lockwood, of Newton, Mass., survives him.

MARTIN LUTHER SIBERT (1908–1937)

Martin Luther Sibert, a junior member of the A.S.M.E., died on March 31, 1937. He was born on December 1, 1908, in Gadsden, Ala., the son of Samuel Houston and Emma Lula (Penny) Sibert, and was a nephew of Major-General William L. Sibert, Retired, of the U.S. Army Corps of Engineers.

He prepared for college in the Gadsden High School and was graduated, with a B.S. degree in mechanical engineering, from the Georgia School of Technology in 1931, later studying electro-acoustical engineering through correspondence courses. During part of 1932–1933 he was engaged in business for himself as a merchant and subsequently was employed by the U.S. Geological Survey as an engineering draftsman and computer, assigned, since August 15, 1934, to the Tennessee Valley Authority, in Chattanooga, Tenn.

Mr. Sibert became a member of the Student Branch of the A.S.M.E. at the Georgia School of Technology in 1928, and transferred to junior membership in the Society in 1932. He was commissioned as second lieutenant in the 345th Infantry Reserve in 1930. He was unmarried.

EDMUND RAY STEVENSON (1859–1935)

Edmund Ray Stevenson was born at Burgettstown, Pa., on April 14, 1859, and received his early education at the public school there, which was in session only for a six months' winter term. Nevertheless, at the age of eighteen he passed an examination qualifying him to teach in the public schools of his native county of Washington. Because of his youthful appearance, however, the superintendent of schools thought it best not to make the certificate valid.

Mr. Stevenson therefore entered upon an apprenticeship in the steamboat shop of James Rees in Pittsburgh, upon the completion of which he secured employment with the Yale & Towne Manufacturing Co., Stamford, Conn. Here he studied steam engineering under James McBride (Mem. A.S.M.E.) and Thomas Shaw, who later founded the Shaw Crane Company. He continued his studies under H. P. Morgan, chief engineer of the Norwalk Iron Works Company, South Norwalk, Conn., where he spent 15 years as machinist, toolmaker, toolroom foreman, supervisor of machine repairs, and designer of jigs, tools, and fixtures. He was also one of the early pupils of the International Correspondence Schools, enrolling in the mechanical course in January, 1901. This course enabled him to teach evening classes in mechanical drawing and mathematics.

He left the Norwalk Iron Works Company to work as tool designer under Joseph E. Aue (Mem. A.S.M.E.) for the De La Vergne Machine Company, New York. During a year there he helped to design, among other things, an attachment for use on planers to plane cylindrical valve stems, a cam grinder, a cylinder boring mill, and a large floor milling machine. For the next five years he was in charge of power and transmission at the plant of the Union Hardware Company, Torrington, Conn., and performed all the millright work. He supervised the installation of considerable new equipment and the construction of a new grinding room.

The remainder of Mr. Stevenson's work was in Detroit, Mich. He was employed by The Timken-Detroit Axle Company in 1915 as tool trouble man and four years later was transferred to the Tool Design Department. He taught in the vestibule or shop training school throughout the World War, and improved the company's practice in the welding of tools by substituting a butt-welding machine for the spot-welding machine that was formerly used to join the high-speed steel and Stellite tips to cold-rolled stock, thereby effecting savings in time and current.

He next went to the Kelsey Wheel Company to design tools for the manufacture of Ford front tractor wheels. This led to his connection, in 1924, with the Ford Motor Company, to design and build fixtures for body assembly; he also installed safety attachments on cranes, and improved the tools used in the plant and the fixtures for repairing them. He was appointed an instructor at the Henry Ford Trade School in 1928 and remained there until 1933.

Mr. Stevenson was especially interested in increasing production by the standardization of parts, and the use of conveying systems instead of men and trucks to move material from one part of the plant to another. In addition to the work already mentioned, he invented an attachment for use in connection with universal cutter and tool grinders, and developed a multiple stamp mill for the Stamford Bronze Company, and a line of machinery for the Boas Thread Company which would print labels, stamp and label spools, and wind thread.

He joined the A.S.M.E. in 1921 as an associate-member but resigned in 1927. He was reinstated as an associate-member in 1933. His death occurred on June 29, 1935. Mrs. Ethel R. Stevenson, of Detroit, survives him.

GEORGE GODFREY STEWART (1888–1937)

George Godfrey Stewart, engineer at the Donora Steel Works of the American Steel & Wire Co., Donora, Pa., died on January 14, 1937, of an embolism following an operation for appendicitis.

Mr. Stewart was born at Merchantville, N.J., on December 23, 1888, the son of Wickliff Baldwin and Justina (Godfrey) Stewart. He was graduated from Temple University in 1907, and from Drexel Institute in 1916. He served a special apprenticeship from 1904 to 1907 as a machinist with the Pennsylvania Railroad ferries at Camden, N.J., and two further years, 1908–1910, in the P.R.R. shops at Hoboken, N.J. During the latter period, he secured considerable engineroom experience on P.R.R. ferry- and tugboats in New York harbor, and before and during his course at Drexel Institute he piloted ferryboats of the P.R.R. between Camden and Philadelphia.

In 1916–1918, Mr. Stewart was inspector of tests in the Test Department of the P.R.R., with headquarters at Altoona, Pa. In 1918–1919, he served as assistant superintendent of shop and field machinery at the Gloucester, N.J., and Bristol, Pa., plants of the U.S. Shipping Board, Emergency Fleet Corporation. He began work for the American Steel & Wire Co. in 1921 as machine operator in the shops at Donora, and in 1922 was made foreman of the Engines and Pumps Department. Retrenchments by the company necessitated his transfer to work as engine repairman in May, 1932, but the following year he was placed in charge of the boiler house, with the title of head engineer, and continued in that position until his death. He held patents on a safety valve and on a key ring.

Mr. Stewart joined the A.S.M.E. as an associate-member in 1928, and was automatically transferred to the member grade in 1935. He was a member of the Engineers Club of Philadelphia from 1914 to 1938. He was also a member of the Masonic order and a Shriner.

In 1920, Mr. Stewart married Margaret M. Pipes of Donora, Pa., who survives him.

WILLIAM FRASER STEWART, JR. (1897–1937)

William Fraser Stewart, Jr., chief engineer in connection with fire prevention and safety engineering work with W. H. Markham & Co., St. Louis, Mo., died at the Central Hospital, in that city, on September 9, 1937, of a duodenal ulcer.

Mr. Stewart was born in St. Louis on January 1, 1897, the son of William Fraser and Daisy Beatrice (Lamb) Stewart. His formal education ended with the completion of three years in the Central High School, St. Louis, after which he served an apprenticeship with David Ranken, St. Louis, and with Hispano Suiza, Paris, France.

In July, 1917, he enrolled in the U.S. Naval Reserve Force at St. Louis, as chief machinist's mate, and was sent to France, where he was assigned to aviation, in charge of bomb sight design and machine shops at St. Trojone. On his return to the United States in 1919 he became superintendent of the American Heater Corporation, St. Louis, designers and builders of automatic water heaters. He held this position until 1922, and then served until 1925 with the Western Electric Company as division inspector, in charge of inspection and tests of automatic telephone exchange apparatus. In 1925, Mr. Stewart was appointed engineer for the Ocean Accident & Guarantee Corp., his duties relating to safety engineering, general consulting work, and the inspection of powerhouse equipment. His association with W. H. Markham & Co., began in 1930. In addition to his responsibilities as chief engineer he served the company in connection with building and equipment values, on which he was well informed.

Mr. Stewart joined the A.S.M.E. as an associate-member in 1929, and was automatically transferred to the member grade in 1935. He was also a member of the Safety Council, St. Louis, Army Ordnance Association, and American Legion, and a former member (1924) of the Flying Club of St. Louis, and belonged to the Masonic Lodge in Clayton, Mo. He founded and was chief of the West Overland (Mo.) Fire Department (volunteer) from 1929 to 1934, when it was disbanded. He continued in the Naval Reserve Force for a number of years after the War, finally accepting his discharge in 1925. He was an excellent shot and made a hobby of collecting old firearms.

He married Marion Clare Williams in 1927, and is survived by her and their three children, William Robert, John Fraser, and Beverley Ann.

ARCHIE MILTON STILES (1878–1937)

Archie Milton Stiles, who had been connected with the Water Division of the Department of Public Utilities of the City of St. Louis, Mo., since 1901, died in that city on March 5, 1937. Mr. Stiles was born in St. Louis on June 9, 1878, the son of Andrew and Catherine (Cathbert) Stiles, and secured his preliminary education in the public schools there; his professional education he obtained through the International Correspondence Schools.

From 1892 to 1896 he worked as machinist-apprentice with the Rankin-Fritsch Foundry & Machine Co. of St. Louis and during the next five years he was machinist with several different companies, making dies, castings, and tools. In 1901, he began his long service with the Water Division of the City of St. Louis. He served until 1905 as machinist and from then to 1912 as foreman of machine, blacksmith, tin, and pattern shops. In 1912, he became inspector for steam boiler and pumping machinery, and held this position until 1920, being resident inspector at various plants throughout the United States, during the manufacture of pumps, boilers, compressors, valves, piping, and general supplies and machinery for the City of St. Louis. In 1930, Mr. Stiles was appointed superintendent of construction of mechanical equipment by the City Water Division, and was so employed up to his death.

He joined the A.S.M.E. as a member in 1930, and was also a life member of the Masonic fraternity and of the Low Twelve Club of Chief Engineers, of St. Louis. He contributed occasional papers to *Power* and *American Machinist*. He was especially fond of opera and vocal music and enjoyed water sports and fishing.

Mr. Stiles is survived by his widow, Marcelina F. (Ryan) Stiles, whom he married in 1930.

GEORGE EDWIN TAYLOR (1886–1936)

George Edwin Taylor, district manager at San Francisco, Calif., for the Chain Belt Company of Milwaukee, died on July 23, 1936. He had been associated with the company since 1923.

Mr. Taylor was born in Chicago, Ill., on January 22, 1886, son of Edwin and Lilla (Knight) Taylor. He took a three-year technical course at the Crane Technical High School and Junior College in Chicago (1901–1903) and an evening course in mechanical drawing at the Chicago Technical College in 1905–1906. After leaving high school he was employed successively in the shops of the Western Electric Company and by the Arthur Frantzen Company, electrical contractors, Chicago, for several years, then became a junior draftsman with the H. W. Caldwell & Son Co., Chicago, where he remained until April, 1912. He then took the position of chief draftsman for the Meese & Gottfried Co., of San Francisco. Subsequently he was put in charge of all work in the engineering department. He helped to develop a full line of power transmitting machinery, embodying friction clutch design, chain, gear, and belt drives. In a letter written in 1921 he mentioned several examples of his work, as follows:

"I have had the pleasure of seeing the successful operation of truck conveyors installed at the Bay piers for unloading ships for the California Navigation and Improvement Company, also large conveying systems for handling sugar for the California and Hawaiian Sugar Refining Company at Crockett, Calif. I have made complete layouts of timber structure and large rock screens for gravel plants such as were installed for the Grant Rock and Gravel Company at Fresno and the Grant Gravel Company at Pleasanton, Calif. We have just completed and shipped five self-propelled automatic trippers for belt conveyors to be used at the Shasta Zinc and Copper Company's plant."

During his years with this company Mr. Taylor also gave evening instruction in mathematics at the Healds Engineering School in San Francisco. In 1921 he joined the R. & J. Dick Co., Inc., of Passaic, N.J., as sales engineer, and he continued in that work until he entered the employ of the Chain Belt Company in 1923.

Mr. Taylor married Anita Leith, of San Francisco, and is survived by her. He enjoyed music, was a baseball, basketball, and football fan, and liked to fish and hunt. He was a charter member of the Cleveland Lodge No. 211, F. & A.M., Chicago, Ill., held the 32d degree in the Scottish Rite, San Francisco Consistory, and was a member of Islam Temple, A.A.O.N.M.S., San Francisco. He became a junior member of the A.S.M.E. in 1919, was advanced to the grade of associate-member in 1921, and automatically transferred to full membership in 1935.

ROGER TAYLOR (1881–1937)

Roger Taylor, superintendent of the plant of the Susquehanna Electric Company at Conowingo, Md., died on April 27, 1937. Mr. Taylor was born on October 7, 1881, at Ashton-under-Lyne, England, the son of Jesse and Mary Schofield Taylor. He received his professional education at the technical school in Ashton-under-Lyne, and later took two years' work in the Drexel Institute of Philadelphia, Pa.

Mr. Taylor's first employment after coming to the United States began in October, 1898, in the Motive Power Department of the Philadelphia (Pa.) Rapid Transit Company, where he worked on boiler and turbine tests and indicating steam engines until August, 1906, when he was appointed engineer-in-charge and assistant for several of the company's reciprocating and turbine plants.

In October, 1912, he joined the Philadelphia Suburban Gas & Electric Co. as superintendent of plants in Pottstown and Phoenixville, Pa. This assignment covered the parallel operation of turbine, hydroelectric, and reciprocating engine plants, considerable new construction, and work on gas plant operation.

In October, 1916, Mr. Taylor joined the Operating Department of the Philadelphia Electric Company. He assisted in the design and construction of the company's Delaware station and served as its superintendent. He also was closely connected with the engineering design and development of the Conowingo hydroelectric project. He remained with this company for nearly ten years, when he became associated with the Susquehanna Electric Company, a subsidiary of the Philadelphia Electric Company, as plant superintendent, which position he held for the remainder of his life.

Mr. Taylor became an associate-member of the A.S.M.E. in 1917 and was promoted to member in 1927. He also belonged to the American Institute of Electrical Engineers. He served on the National Hydraulic Committee of the National Electric Light Association and on the Prime Movers and Hydraulic Committees of the Pennsylvania Electric Association, which represented the eastern geographic division of the N.E.L.A. prior to 1933.

Although born in England, he came a citizen of the United States by his father's naturalization. He married Sarah McIlhenny, of Philadelphia, in 1906, and is survived by her and by their two children, Roger S., an electrical engineer, and S. Eleanor Taylor. Mr. Taylor's brother, Jesse Taylor, Jr., is a member of the A.S.M.E.

CARL CLAPP THOMAS (1872–1938)

Dr. Carl Clapp Thomas died at his residence at Pasadena, Calif., on June 5, 1938. He was born in Detroit, Mich., on July 14, 1872, the son of George Roscoe and Caroline Melissa (Clapp) Thomas. His preparatory education was obtained in the public schools of Detroit and later in those of Pasadena, where his father became an early resident. Carl Thomas entered in 1891 the first class at Leland Stanford University, along with the Hon. Herbert Hoover and others who have since been outstanding personalities in American life. In 1894 he transferred to Cornell University, from which he received the degree of Mechanical Engineer in 1895. In 1937, The Johns Hopkins University honored him by conferring the degree of Doctor of Engineering.

Dr. Thomas was employed for four years after graduation with the Globe Iron Works Company, shipbuilders, Cleveland, Ohio, in the shops, as draftsman, as chief draftsman, and finally as chief engineer. From 1899 to 1901 he served as chief draftsman in the marine department of the Maryland Steel Company, Sparrows Point, Md. He was next professor of marine engineering and naval architecture at New York University from 1901 to 1903, and at the same time maintained a consulting practice as a marine engineer. He was assistant professor of mechanical engineering at the University of California, Berkeley, Calif., during the college year 1903–1904, at which time he served as consultant on the design and building of the U.S.S. *Nebraska*, of dredges for the North American Dredging Company, and of other ships of various types.

In the spring of 1904, the late George Westinghouse engaged Dr. Thomas to carry out some special work for him. Later in the summer Dr. Thomas became interested in the Steam Turbine Department and spent some time on the test floor before going to Cornell University that fall as professor of marine engineering. This interest in steam turbines resulted in the offering by Professor Thomas during the following year of a course of lectures on steam turbines at Cornell University, probably one of the first courses on steam turbines in America, and, later, in the writing of a textbook on steam turbines (John Wiley & Sons, Inc.) which first appeared in 1906 and which ran through four editions. At the time it was written this book formed an outstanding contribution to engineering literature.

The summer of 1905 was spent on experimental work at the General Electric Company's laboratories at Schenectady on the specific heat of superheated steam. This was followed by extensive research on this subject at Cornell which resulted in the contribution of a paper to the A.S.M.E. on "The Specific Heat of Superheated Steam" (Trans. A.S.M.E., vol. 29, 1907, p. 1021). A by-product of this research was the invention and development of the Thomas electric calorimeter for the exact measurement of the quality of wet steam. Professor Thomas spent the summer of 1906 in the steam turbine department of the Fore River Shipbuilding Company, Quincy, Mass. During 1907–1908 he served as president and manager of Thomas and Grant, engineers and boat builders, Ithaca, N.Y.

Following the death of Prof. Storm Bull, Dr. Thomas was called to the University of Wisconsin as professor of mechanical engineering in 1908 and remained until 1913, with the exception of one year spent in research in Europe. At Wisconsin he directed much research, from some of which resulted the invention of the Thomas electric gas meter that has since been used widely throughout the world. Another invention less widely known was a method of supercharging internal-combustion engines. A third contribution during this period was the design of a form of bent tube boiler that has since been widely used. Other investigations covered steam flow, steam nozzles, air measurement, properties of bearings, boiler circulation, and properties of heat insulation materials. Many technical papers were written during this period, two of which appeared in the A.S.M.E. Transactions.

In 1913 he was called to The Johns Hopkins University, Baltimore, Md., to assist in organizing the new School of Engineering and to become its first professor of mechanical engineering, which position he filled until 1920, with the exception of the war years, 1917–1919, when he was on leave of absence to serve as manager of machinery design and fabrication, American International Shipbuilding Corporation, at Hog Island, Pa. This was the largest shipyard ever constructed, and it was here that freighters and transports were built in great numbers to aid America and her Allies in World War I.

While at The Johns Hopkins University he carried on extensive experimental work, and developed devices for the cooling of water in spray ponds, for the recovery of used oil, for the low-temperature carbonization of coal, flotation methods for minerals, etc. He also invented the electric recording gas calorimeter.

In 1920, Professor Thomas moved to Pasadena and became western representative and vice-president of Dwight P. Robinson & Co., Inc., which positions he held until his death. He had a large part in the design and construction of the Seal Beach Station of the former Los Angeles Gas & Electric Co. and of the expansion of the American Potash & Chemical Co.'s plant at Trona, Calif.

Professor Thomas became associate in engineering research at the California Institute of Technology in 1925, and continued in this position until his death. One of the results of his research work at the Institute was the development of a new apparatus to separate liquids from mixtures with vapors.

The contributions of Dr. Thomas to the civic affairs of Pasadena were of no small order. He was one of the Board of City Directors of Pasadena from 1921 to 1924. He was a director and vice-president of the Pasadena Hospital. He was a director of the Pasadena Art Institute and also of the Pasadena Civic Orchestra Association.

Dr. Thomas was a member of the American Society of Naval Architects and Marine Engineers, of The Franklin Institute (from which he received the Edward Longstreth Medal in 1912 for his paper on "The Measurement of Gases," published in the November, 1911, issue of the *Journal* of The Franklin Institute), the American Gas Institute, the American Association for the Advancement of Science, and the Inventors Guild.

He joined the A.S.M.E. in 1908 and served on its Nominating Committee in 1913. From 1913 to 1917 he was a member of the Society's Special Committee on Changes in Patent Laws of the United States. He was chairman of the Committee on Air Machinery from 1916 to 1920; a member of the Main Committee on Research, 1916–1920; and a member of the Power Test Codes Committee on Steam Turbines since 1920. He was a manager of the Society from 1920 to 1923, and a delegate to the American Engineering Council during 1924–1926.

Dr. Thomas was married on July 14, 1899, to Katherine L. Nash. Mrs. Thomas and two sons, Alfred Randall and Roscoe Carl, all of Pasadena, survive him.

Dr. Thomas possessed a keen analytical mind as evidenced by his prolific research and many inventions. He was a capable engineer and an able administrator. In university work, he was an inspiring teacher and was loved by students and associates. He was devoted to good music and throughout his life played the violin with skill and great enjoyment.

Only great dynamic energy and boundless enthusiasm could have enabled Dr. Thomas, in his relatively short life, to accomplish so much in so many diverse fields. Yet, while he was highly respected as an engineer, a scientist, a teacher, and an inventor, it is Carl Thomas the man who is remembered by his friends. He had a genius for friendship. His warm interest in people, his eagerness to help without thought of self, his uncompromising devotion to the highest ideals, combined with tender sympathy and an understanding of life's problems—these are characteristics that will make all who knew him remember Carl C. Thomas as a beloved friend.—[Memorial prepared by A. G. CHRISTIE, Baltimore, Md., Fellow and Past-President, A.S.M.E.]

WILLIAM FYFE TURNBULL (1881–1937)

William Fyfe Turnbull, engineering examiner of the New York City Municipal Civil Service Commission, died on May 14, 1937.

Mr. Turnbull was born in Belleville, Ont., Can., on August 9, 1881, the son of Alexander and Mary Esther Turnbull. He prepared for college at the high school in Orange, N.J., and then attended Columbia University, where he was graduated with the A.B. degree in 1903, and took a year of graduate work, 1903–1904. He also took two years' work in mechanical engineering at the Massachusetts Institute of Technology, 1904–1905 and 1906–1907. During his college years, he had some shop experience with the H. K. Porter Co., builders of locomotives, Pittsburgh, Pa. In 1905–1906, he worked as draftsman for the Erie Railroad, and in the same capacity for the N.Y. Central R.R. in 1907.

In 1908 and 1909, Mr. Turnbull served as assistant to the treasurer of the Hampton Institute, Virginia, his work there covering also inspection of the steam and electric light plant and the sewer system. From 1909 to 1915, he was estimator and technical correspondent with the American Locomotive Company, New York, also lecturer in strength of materials for evening classes at Teachers College, Columbia University. From 1915 to 1918, he served as instructor in machine design at the University of Pennsylvania, and in 1918–1919 was attached to the U.S. Department of Labor on war service. Following this assignment, Mr. Turnbull resumed teaching, serving on the faculty of Yale University, 1919–1921, and New York University from then until September, 1927, when he was employed by the Third Avenue Railway System of the City of New York. Here he worked on shop drawings, road tests, mechanical improvements, traffic surveys, cost of operation of buses, and proposed trolley buses. In 1934 he was appointed to the New York City Municipal Civil Service Commission as engineering examiner.

Like many engineers who divided their professional labors between teaching and commercial lines, Mr. Turnbull did considerable independent and consulting work. He was licensed as a professional engineer in the State of New York in 1924. This work included surveys for the West Shore Railroad, Erie Railroad, and Central Railroad of New Jersey, for which he also checked all steel-work drawings for the Newark Bay Viaduct.

In 1916, he married Clara Kramer, of Tuckahoe, N.Y., who survives him. They had no children. Mr. Turnbull was an American citizen, having been naturalized in 1902, at Newark, N.J. He became an associate of the A.S.M.E. in 1913, but resigned in 1917. However, he was reinstated in 1923 with the grade of member. Several brief contributions by him, dealing with engineering economics, were published in *Mechanical Engineering* and he served on the Subcommittee on Economics of the Management Division of the Society in 1933–1935. He was also a member of the Society for the Promotion of Engineering Education and the New York Railroad Club.

ARTHUR WILLIAMS (1868–1937)

Arthur Williams, former vice-president of the New York Edison Company, died on April 14, 1937. Mr. Williams was born on August 14, 1868, at Norfolk, Va., the son of Rev. Christopher Stephen and Hannah Sanford (Rogers) Williams, and was educated in public and private schools in Hartford, Conn., and in New York, N.Y.

He began work in August, 1884, with the firm of Rennie & Smith, electrical contractors, New York. In February, 1885, he entered the service of the Edison Electric Illuminating Company of New York as assistant in the Chemical Meter Department, becoming superintendent of interior construction in 1887; electrician of the company later in 1887; superintendent of the third district, 1888, and of the Underground Department, 1889; general inspector, 1890, and general agent, 1893. From then on, until 1915, he exercised the function of these two positions in this company and in the New York Edison Company, into which it was merged in 1901. He was then appointed general commercial manager, and in 1924 he was made vice-president in charge of commercial relations, from which position he retired in 1928.

Besides his lifework in the electrical industry, Mr. Williams was active in many other fields. In 1917, he was appointed to the post of Federal food administrator for New York, N.Y., and served in that capacity until his resignation in 1920. During the Spanish-American War, he served as commanding officer of the New York Volunteer Defense Forces, mining New York Harbor. In 1912, he was decorated by the King of Spain, receiving the rank of Knight in the Royal Order of Isabel the Catholic, in recognition of his work in the interests of safety; and in 1926 he was made a Chevalier of the French Legion of Honor.

Mr. Williams joined the A.S.M.E. as an associate in 1915, and was a Fellow of the American Institute of Electrical Engineers. He was a past-president of the American Association for the Advancement of Science, Association of Edison Illuminating Companies, National Electric Light Association, New York Electrical Society, and American Museum of Safety, and was chairman of the Greater New York Safety Council, 1936–1937. He had served as president of the Electrical Board of Trade and of the Electrical and Industrial Exhibition, held annually at Grand Central Palace, New York, for a number of years. He was also a member of the American Academy of Political and Social Sciences, American Electrochemical Society, American Association for Labor Legislation, International Industrial Relations Association, Society of American Military Engineers, and other technical and civic organizations, as well as of many clubs. He was the author of numerous papers on municipal ownership, electrical subjects, relations with employees, and allied topics.

Mr. Williams was deeply interested in social and civic welfare. He was unmarried, and made his home in Roslyn, Long Island, of which village he was a trustee.

RUDOLF WINTZER (1873–1937)

Rudolf Wintzer was born on May 14, 1873, at Iserlohn, Westphalia, Germany. He was one of four children of Marie Koenig and Wilhelm Wintzer. During his early life, his father acquired a factory at Guetersloh, Germany, at which wagon wheels were made. Upon the death of his father, the family established a home in Berlin. Mr. Wintzer completed his education at the Technische Hochschule, Charlottenburg, and for several years worked in various machine shops and foundries in Germany. From 1896 to 1900 he worked under Professor Riedler, consulting engineer, Charlottenburg, and later became his assistant. This work related particularly to the design of pumping and blowing engines, compressions, and all kinds of machinery for mines and iron and steel works. He was also assistant at the technical high school. In 1901–1902 he had full charge of the drafting room and shop of the Stahl und Eisen Aktiengesellschaft at Hörde, Germany, manufacturing steam engines and boilers.

His work with Professor Riedler prepared him for his next position, which was with the Westinghouse Works, at Manchester, England, where he went in 1903. From there he was called to the United States by the Guggenheim interests for consultation, and after completion of his work with them, again returned to Manchester, where he was active for several years, designing and testing large gas engines. He was finally again called to the United States by the Guggenheim organization and engaged by them for carrying on work then being done at the Snow Steam Pump Works of the International Steam Pump Company, at Buffalo. In 1906 or 1907 he became chief engineer of the Power & Mining Machinery Co., at Cudahy, Wis., which in 1906 had become part of the International Steam Pump Company. During the next few years he was kept busy traveling for the company and in work at the Buffalo and the Cudahy works.

In 1911 or 1912, while seeking other employment, he contacted the Nordberg Manufacturing Company, Milwaukee, and was engaged by the Peck Concentrator Company to design a special separator, which work he carried on in the shops of the Nordberg Manufacturing Company. He was finally employed by the Nordberg Manufacturing Company, toward the end of 1912, and remained with it until his death. Between 1922 and 1924 he acted as assistant to Dr. Bruno V. Nordberg, at that time chief engineer, and upon the latter's death in 1924, Mr. Wintzer became chief engineer of the company. Having led a very active life, he was finally appointed as consulting engineer in 1935 and his assistant, Emil Grieshaber, thereupon took over his duties as chief engineer.

During his years with the Nordberg Manufacturing Company, Mr. Wintzer developed a number of interesting units. While associated with Dr. Nordberg, he detailed and carried out special designs on a very successful hydrogen compressor. With Dr. Nordberg, he also developed large rolling mill engines, and later on, when he assumed the position of chief engineer, this experience stood him in good stead. He thereafter developed the largest hydrogen compressors so far built, as well as some very heavy rolling mill engines, river boat engines, compressors, pumps, and the like. During his lifetime, he invented a number of things and held twelve patents, either in his own name or in combination with others. He was continually striving to improve any device which came to his notice and his intense interest in all mechanical means kept him active along these lines until the last.

Mr. Wintzer was of a very retiring nature, but traveled a great deal and formed many acquaintances and friends. He often spoke of the particularly happy years spent in association with Dr. Nordberg. It seems both men recognized in each other those engineering attributes which sometimes lead to lasting friendships. His death, from heart failure, occurred on December 16, 1937. He is survived by his widow, Emmy Wintzer, whom he married in 1910, and by two boys, Herman and Fred, both of whom are engineers in the employ of chemical industries in this country, and a sister living in Hamburg, Germany. He had been a member of the A.S.M.E. since 1908.