



WILLIAM J. FOSTER (1442), WILLIAM J. FOSTER, JR. (14421) AND
WILLIAM J. FOSTER 3RD (144211), FEBRUARY 14, 1925

AUTOBIOGRAPHICAL

On my father's side I am descended from William Foster and Susannah Shannon of Newbliss (near the city of Monaghan), County Monaghan, Ireland, who with their family of six sons and one daughter, migrated for America about the year 1800. The ship they were on was delayed repeatedly, by calms at times, and by storms and contrary winds at other times; was once wrecked, the survivors cast up on an island, picked up later and finally landed on the shores of the State of Delaware in a starved condition; nineteen weeks after they had sailed from Ireland. But alas! the mother and son, Richard, had been buried at sea.

Andrew had kept a journal during the trip which he cared for carefully while he lived, keeping it in a small cupboard in his bedroom. After his death, during building operations, the cupboard was put temporarily in an outbuilding. When the contents of the cupboard were to be moved back into the house, it was found that rodents had gotten into the cupboard and destroyed grandfather's journal. It was a greatly regretted loss to the family.

The Children of William and Susannah Foster were Andrew, born in 1780; Richard; William, born in 1784; Mary; David; James, born in 1790; and Joseph. The father, daughter and five sons worked their way North from Delaware, evidently aiming at Salem, Washington Co., N. Y. Andrew and James stayed in Washington Co.: William and David went further North, marrying sisters by the name of Gray, and eventually owning farms near together in the Township of Lisbon, St. Lawrence County, N. Y.: Joseph settled in Erie Co., N. Y., a little west of the present City of Buffalo: Mary married a man by the name of Mills, and they settled in Auburn, N. Y., raising a large family, both sons and daughters, noted for their stature.

Andrew taught school for twenty years for one hundred dollars a year and board (around). In February, 1819, he bought the farm in the northeast of Argyle Township, now (1935) owned and occupied by his grandson, David A. Foster, my brother, while Andrew's brother James bought the adjacent farm where he resided until his death in 1871. This farm is now owned and occupied by my brother, Charles H. Foster.

Andrew Foster married on April 8, 1819, Mary Uteley, born July 19, 1797, in Manchester, Vt. She was a New Englander whose ancestors had moved Westward from Walpole, N. H., to Landsgrove, Vermont, at the top of the Green Mountains, and thence into the Manchester valley.

They spent the rest of their lives together on the farm he had just bought, until her death on Aug. 6th, 1856. They had nine Children.

James	born Feb. 18, 1820: died Feb. 17, 1911.
William	born Sept. 13, 1821: died Sept. 12, 1822.
Sarah	born April 22, 1823: died Jan. 3, 1907.
Susannah	born July 1, 1825: died Jan. 31, 1902.
Mary	born Sept. 29, 1826: died Jan. 30, 1911.
David	born July 25, 1828: died Mar. 5, 1888.
William	born July 20, 1830: died Mar. 22, 1900.
Andrew	born May 17, 1832: died Jan. 16, 1916.
Jane Elizabeth	born May 15, 1838: died May 21, 1924.

Four brothers and four sisters of this family grew up: married and had children with the exception that Susannah and Jane did not have children. All were farmers, seven of them having farms in the Township of Argyle and one in Hebron, all located within a radius of four miles.

The average length of their lives was seventy-nine and three-tenths years.

James, the oldest, my father, gradually assumed the management of the farm and did not marry until after his mother's death.

I, his second son, was born Sept. 17, 1860, seven months before the outbreak of the Civil War. My older brother David and I were constant playfellows and companions for years. Our parents found David so determined not to go to school until Willie went with him that a compromise resulted, and I began my school education one term before five years old. The school house was a full mile from our house. There were only three houses on the way, a hilly road, but there was a cross gander at one house and a big yellow dog at another that always came bounding out and barked at us as he escorted us past. In those days district schools had two terms a year, winter and summer.

My first winter term was at the age of six and John Martin, a gallant soldier of the 123rd N. Y. V., was teacher. He had lost a leg in the Chancellorsville engagement: had a wooden limb which probably did not fit very well, as he came at times without it. With his crutches he could beat any of the boys in a race. He had a brilliant mind and a little later was taken into the U. S. Customs Service where he remained the rest of his life and where he was given the title, Colonel.

One day while struggling with his class of beginners in Arithmetic, he lost his patience and exclaimed "little Willie Foster knows that," and put the question to me sitting in the back part of the room. The result was he put me in the class. Naturally, that put me on my mettle and I tried hard to maintain the reputation I had suddenly acquired. He must have told the incident to his father who lived in a little house about two hundred yards away; since, a year or two later, the old gentleman called to me to come into his house, I went in gingerly, as war had been declared by him upon the school children and maintained year after year. This new acquaintance proved valuable to me later on.

Meantime I advanced rapidly in arithmetic: when ten years old, the teacher, a young woman much superior to the average of the district school teachers of the day, offered to bet ten dollars there was not a problem in the old Adams Arithmetic that I could not do. I hoped no one would take her up, as there was one in the back of the book that I felt shaky about. It involved three men walking at different speeds, starting off together, and going around an island of certain diameter: when would the three be abreast again. This problem belongs to algebra, and none of our teachers knew algebra. Somewhat later, Mr. Martin loaned me an algebra and after a time a text-book on Surveying and Navigation.

When about thirteen I quit going to school in summer time and worked hard on the farm as did David who began ploughing at thirteen. We attended school in winter: when I was sixteen we began going to the Argyle Academy, winters only. During the first two winters we drove from home, morning, and back at night, six miles of hilly road, rain or shine. The third winter, our sister, a girl cousin, and a boy cousin joined us in a party taking rooms and boarding ourselves. We took practically all our provisions with us from our homes every Monday morning.

The Principal of the Academy was George A. Hoadley, a graduate of Union College, an excellent teacher who later was Professor of Physics at Swarthmore College for many years, Author of Text Books, etc. He put me in the advanced class in Algebra at the start and followed up with Geometry and Trigonometry. During the third winter, he told me I ought to go to college. So I took the matter up with the folks at home and found them agreeable. I suspected Mother and Grandmother Dobbin were pleased, as they hoped I would some day be a Minister. It was arranged that I should attend the Academy the spring term. This I did, concentrating on Latin and brushing up on other subjects, so as to be ready to take College entrance examinations. The last week in June, 1879, I went to Schenectady, met the interested Professors of Union College and was allowed to register for the A.B. Degree four years later in the Scientific Course, and at the same time was assured there would be no trouble in arranging to carry Greek as an extra. This was to provide for the contingency of entering a Theological Seminary.

During the summer following, I changed my plans; instead of entering college I went to a College Preparatory School, The Island Grove School, Fort Edward, N. Y., and spent a year of intensive work on Greek and Latin. My roommate and chum was William H. Williams of North Argyle. He and I entered Williams College in September, 1880, and roomed together there four years with scarcely a word of disagreement. My preparatory work had been so sketchy and irregular that I rather ex-

pected at least one condition. Upon returning home at end of first term to spend the Holidays, I found Grandmother Dobbin on her death bed. She passed away that first night. On returning from the burial in South Argyle graveyard I was taken with a chill. The Doctor was called the next morning and pronounced the trouble measles. The outcome was the introduction into the community of an epidemic and the loss of about two weeks of the second term. Upon returning to College I was surprised to find my name among the three or four that were being discussed as the leader of our class. At the end of Sophomore year the First in Mathematics was to me and Prizes in other subjects that year and the following years came my way. My Classmates made me President of the Class Junior Year. At the end of that year, I was one of the four men elected to the honorary Phi Beta Kappa Society. Williams College for many years gave the Phi Beta Honor to a much smaller percentage of the graduates than did the average college. Honorary Scholarships awarded to me and private tutoring which I did helped materially to pay expenses.

Soon after graduating in 1884, President Carter wrote me the Trustees of the College had voted to establish a Temporary Fellowship that would be sufficient to pay all my expenses for a year of postgraduate work in Mathematics under Prof. Safford, provided I would accept. It was to be understood that I was to give certain instructions to undergraduates when called upon. I accepted. Henry Lefavour, the honor man in Mathematics and Science in the Class of 1883, was my companion during the year. We did some work in making astronomical observations. But, the most of our time was spent in calculating the orbits of newly discovered planetoids; Prof. Safford working in conjunction with German Astronomers; and in getting an inkling into the mysteries of certain Higher Mathematics. Lefavour did more postgraduate work in German Universities: earned his Ph.D.: and has spent his life as an educator, first, as Professor of Physics at Williams and second as Organizer and first President of Simmons College, Boston; recently retired.

For my year's work and my record as a teacher in secondary schools, Williams gave me the A.M. degree in 1887.

Uncertain as to whether I would be successful in teaching, I became Assistant Principal of the Burr and Burton Seminary, Manchester, Vt., in the fall of 1885: spent one year there, enjoying my school work and the social life of the village: not only did I play the roll of father to the boys, but was their barber: was President of the Shakespeare Club in the Village: Teacher in Sunday School of the Congregational Church, etc. It was the first time in my life that I had an opportunity of getting acquainted with and having social relations with a goodly number of the other sex.

During the Easter Recess, spent at home, Argyle, N. Y., a telegram from Dr. John Meigs of Hill School, Pottstown, Penna., invited me to meet him in Williamstown, Mass., with reference to an engagement. I met him and engaged for one year, still having in mind more postgraduate work and eventually a professorship in some University. I found the Hill School an ideal institution in most respects; one where the boys learned how to study, acquired good habits of living, and learned to properly balance hard work with play. John Meigs was a model schoolmaster. It was an education in itself to be associated with him in teaching.

Instead of remaining simply one year, I stayed four. Toward the end of every year, the "Professor" offered inducements, including a good increase in salary. Finally, in June, 1890, I was released. Early in July of that year I attended the Meeting of the National Educational Association in St. Paul. It was the first time I had been as far West as Chicago. After the Convention was over, I made a visit of one week at Dr. Dobbin's home in Faribault, Minn. I had known him by reputation, but had never met him before. I remember him most pleasantly as also Mrs. Dobbin (Mrs. Ames in her first marriage), their two boys Edward and John, and Joseph Ames who just previously had gotten his A.B. degree at Johns Hopkins and arrived home while I was there. Since that time he has been Professor of Physics and then President of Johns Hopkins.

In Sept., 1890, I registered at Cornell for postgraduate work in Physics and Electrical Engineering. My work was of such a character that I spent much of the vacation and holiday time in the laboratories; thus, I accomplished more than a normal year's work. The Professors whom I majored under were Dr. Edward L. Nichols and Harris J. Ryan. They gave me the M.S. degree at Commencement, 1891.

On August 10, 1891, classified as an "Expert" I began work with the Thomson-Houston Electrical Manufacturing Co., Lynn, Mass. The hours were fifty-nine a week, 6:30 A.M. to 6 P.M. for five days with one hour out for dinner and 6:30 A.M. to 1 P.M. Saturday. The duties of the Experts were of great variety and quite novel to me, such as testing machines and electrical apparatus of all kinds after it was completed and before shipment: assembling trolley cars and testing: taking care of the motors driving the shop machinery; keeping all wiring and switches concerned in lighting the offices and the shops, in repair, etc., etc. After a few months of this general work, I was transferred to the Engineering Department, in Feb., 1892, to H. G. Reist's Office, Engineer in charge of Direct Current Generator Design and Other Special Apparatus. I was then put on the Engineering Pay Roll at a small salary. Six or seven months later I was made Assistant Engineer of the Department. Just

prior to the appointment I was given an option by Mr. E. W. Rice, Chief Engineer of the Company, of undertaking to become Engineer of the Long Distance Transmission, a proposed new department. I told Mr. Rice that I wanted to get experience in machine design and to be close to an experienced design engineer; hence I preferred to stay with Mr. Reist.

The developments on hand at that time proved of great importance as they involved two entirely new machines,—the Induction Motor and the Synchronous Converter. The most of my time the next two or three years was spent on these two classes of machines. Another class of machine that took up considerable of my time in 1893 was the low voltage direct current generator for separating gold and silver from copper, smelted from certain ores.

About this time Charles P. Steinmetz joined us who was destined with his great mathematical and scientific mind, his indefatigable energy and industry to work revolutions in design and calculation methods.

The General Electric Company,—combination of the Thomson-Houston and the Edison General Electric Company,—came into existence at this time. Late in 1893 we learned that decision had been made by the Directors of the newly formed Company to concentrate the Executives, the Engineers, the Leading Commercial Men and the Manufacturing at Schenectady. The hegira occurred largely in the first two months of 1894. I remained in Lynn to follow the completion and testing of important machines for the Portland, Ore., General Electric Co. On the morning of April 10, 1894, I reported for work at the Schenectady Works.

A new Department, the Alternating Current Engineering, was organized with H. G. Reist, Engineer, and I, Ass't Engineer, Steinmetz working with us for a time.

Mr. Reist and I spent thirty-seven delightful years together, designing and building new and better machines repeatedly. Often orders were received for machines to replace those we had designed years previously although still in good condition. The reason for this was the latest were so much superior that no enterprising operating company could afford not to throw away his old and buy the new.

I cannot think of any other profession the pursuit of which would have given more satisfaction than Electrical Engineering during the period of my life. Contributory to this satisfaction and of great importance, if one is to enjoy life, is the character of his associates. I have been most fortunate in this respect. Within our own Company I had close relations with such engineers as E. W. Rice, Jr., Steinmetz, W. L. R. Emmet, Prof. Thomson and W. B. Potter. Outside the Company I had the friendship of many Consulting Engineers, Executives and Engineers of

Customers. My activities within the American Institute of Electrical Engineers (A. I. E. E.) brought me into contact with the leading engineers of competitive Companies as well as the engineering profession in general.

The character of my work required for best results my presence in the Works where the machines were being built and tested. But occasionally I would be asked to go away. It might be a conference on customers' premises with reference to new machines or a visit to machines that were not operating satisfactorily. Thus, I had trips to many places in the United States and occasionally to foreign countries.

An event pleasing to me and to my friends was the conferring of the honorary degree of Doctor of Science by Williams College at Commencement, 1925. On that occasion, Mrs. Foster and I were the guests of the College. Five others received the Doctor's Degree at the same time,—Dwight P. Morrow, Edward Bok, Hale Holden, a Congregational Minister of Hartford, Connecticut, and the President of Wesleyan College. While we were partaking of the Alumni Luncheon, our wives were entertained at luncheon by Mrs. Garfield, wife of the President of the College.

Another event, long to be remembered, was the Dinner given in my honor on the occasion of my retirement from active work. This occurred a few evenings before the retirement date, July 1, 1929. The Dinner, a formal affair, had been arranged some days in advance, nicely engraved invitations sent out, etc. The evening was spent largely in reminiscence. There was much after dinner speaking, and the presentation of gifts. Mr. Reist gave me a very pretty Longines gold watch, engraved in the inside "A Souvenir of 37 Years Association"; other members of our Department gave a chain to match the watch. Another gift was a large Album filled with photographs of nearly all present, many of them taken for the occasion.

About two years after retiring, I was notified by the National Secretary of the A. I. E. E. that I had been selected as the Lamme Medalist for 1931, and asking if it would be agreeable to me to receive the Medal at the Annual Meeting of the Institute in June at Asheville, N. C. It was arranged as he suggested. A short session was scheduled for the Presentation. Later in the summer The Institute issued a little pamphlet entitled "Presentation of the Lamme Medal to William James Foster," from which I quote in full the address that was most personal, given by a comparatively young man who had been for some years in my Department in the General Electric Co., now a well known engineer, Philip L. Alger.

MR. ALGER'S ADDRESS

No one has been more intimately and continuously associated with the development of large electrical machinery during its period of most rapid progress than Mr. W. J. Foster.

After graduating from Williams College in 1884, he taught physics and chemistry at the Hill School in Pottstown for four years. While there, he grew interested in the local electric plant, and he not only assisted in its operation, but also tutored the operator in electricity so well that the man later became an independent consulting engineer. Through Mr. Foster's experimental and teaching work at the Hill School, he gained a clear appreciation of the fundamental laws of physics and particularly of the principles of heat flow, in which he took especial interest.

In August, 1891, William Foster joined the Thomson-Houston Company in Lynn as an expert, with a rate of pay of ten cents an hour. Dissatisfied with this income, he inquired for means to increase it, and was told that by passing an underwriter's examination he could be raised to fifteen cents an hour. He accomplished this objective in a short time, and thus achieved great distinction among his fellow experts, who were jealous of his magnificent income.

In 1892 Mr. Foster entered the design department, and he rapidly came into prominence in the design of special machines. Mr. Foster's first design job was on the first induction motor for commercial use built by the company. The man who started this work had become so impressed by the magnitude of the task before him that he suddenly left the company without giving notice.

One day in 1893 Mr. Foster received word that the Niagara Power Commission was expected the next day, and had asked that some method of changing from alternating current should be shown them. In the absence of the department head, Mr. Foster felt it was up to him to meet the emergency, and it suddenly occurred to him that he could construct a converting apparatus by adding slip-rings to a direct-current generator. Mr. E. W. Rice, Jr., was told of this proposal, and said at once that a model should be made ready. Mr. Foster, therefore, spent the whole night in the shop reconstructing two direct-current machines, removing the commutator of one and replacing it by slip-rings, so that it could be operated as an engine driven alternator, and adding slip-rings to the other, so that it could be driven as a motor. The next morning the machines were operated, and it was found that direct current could be taken from the commutator of the motor, as Mr. Foster had predicted. The Niagara Commission was much interested in the demonstration and in this way the development of the rotary converter by the Thomson-Houston Company was launched.

From this time on, until his retirement, he took an active part in the design of every important alternating-current machine built by the General Electric Company. For many years, he was responsible for the electrical design of all synchronous machines,

and in this way he was a leader in the gradual transition from revolving-armature, smooth-core machines to the modern deep-slot, revolving-field machines of tremendously increased ratings.

Many of the machines of Mr. Foster's design are of especial interest, because they marked turning points in the art. Among these may be mentioned the Lachine Rapids generators, built in 1896, of 700 kw., 4,400 volts, with internal revolving fields, which had the first dry tape and varnish insulated coils; the 12,000-volt, 750-kva., 38-cycle, water-wheel generators at Mechanicsville, built in 1897; and the external revolving field generators of 3,750 kva., 250 r.p.m., built for Niagara Falls in 1900, which had the highest efficiency then attained.

Later important machines were the Keokuk 9,000-kva., 58-r.p.m., 11,000-volt generators, which have been in continuous service for 20 years; the Cedar Rapids generators of 10,000-kva., 56-r.p.m., built in 1913, which had 136 poles, and an outside diameter of more than 37 feet; the 32,500-kva. Niagara generators of 1918, which had an efficiency of over 98 per cent at unity power factor; and the 65,000-kva. Niagara generators built in 1922.

Mr. Foster has been an outstanding leader in the development of turbine generator designs from their first beginnings until they reached a size of over 50,000 kilowatts. He designed the 5,000-kilowatt steam turbine drive generator, built for the famous Curtis turbine in the Fisk Street Station, Chicago, 1903, which was the first of the modern steam turbine driven units. Among the later turbine generators Mr. Foster designed, two of the most important are the 30,000-kw., 0.85-power factor, Calumet machines, and the 50,000, 1,200-r.p.m. units for the Commonwealth Edison Company.

All of Mr. Foster's design work was characterized by an insistence on adequate ventilation and conservative values of the design constants, so that many of his machines have made outstanding records for long service. He was a leader in the development of subdivided conductors to avoid stray losses, the use of radial ventilating systems in turbine alternators, the development of varnished cloth insulation, and the procurement of sinusoidal-voltage wave forms.

Mr. Foster's careful attention to details of design, and his wonderful memory, have made him a foremost authority in his field, so that operating and construction men throughout the country have sought and valued his advice. On one occasion, after records had been searched for hours to locate information on a very old machine, Mr. Foster gave offhand the inside and outside diameter and length of the punchings, and the number and size of the armature slots. All dimensions were exact, except the width of the slot, which was off by three mils. This is one of

many instances when Mr. Foster gave offhand details of design and performance of machines that were 15 or 20 years old.

Mr. Foster became a Fellow of the Institute in 1913, he has presented many papers before it, and served as a member of the Electrical Machinery Committee for ten years, 1920-30, being Chairman during the year 1928-29. In 1929 he retired from active work.

Throughout his career of forty years in electrical design, Mr. Foster has been one of the greatest and most productive workers, and the examples of his fine character and his ideals have been almost as valuable as his high ability and wonderful industry. Power station superintendents and operators the country over have asked about him and spoken words of high praise and appreciation years after he had visited them, while all his associates have developed a real affection for him. I believe there is no one alive today who has played a more important part in the development of the electrical design of large machines than Mr. Foster has, and I, therefore, consider that he is eminently worthy of the honor which has been conferred upon him.

The teachers, most helpful to me were John Martin at the District School: George A. Hoadley at Argyle Academy: Fernald, Professor of Greek, Griffen, Professor of English, Mears, Professor of Chemistry, and Mark Hopkins (at 82 years), Professor of Philosophy, at Williams College: and Edward L. Nichols, Professor of Physics at Cornell University.

My Church connections in chronological order have been,—United Presbyterian, Hebron, N. Y.: Congregational, Manchester, Vt.: Presbyterian, Pottstown, Penna.: Congregational, Lynn, Mass.: Dutch Reformed, Schenectady, N. Y. I have been at times teacher in S. S.

Fond of exercise, I have enjoyed gardening all my life: tennis and bowling earlier in life: but my favorite sport is golf.

My clubs are Mohawk Golf, Schenectady: Taconic Golf, Williamstown, Mass.: Williams Club, New York City.

I am Fellow of the American Institute of Electric Engineers: Fellow of the American Association for the Advancement of Science: Member of the Academy of Political Science. My name is to be found in Who's Who in Engineering: Men of Science: Who's Who in New York.