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Charles Edward Skinner

By John G. Sarber

We wish to express our appreciation to Mr. Skinner for his cooperation in providing the material for this article and to Westinghouse for both material and the accompanying cut.

I BELIEVE the future holds as many rewards and just as much durable satisfaction as the past for Engineers who are well trained and who love their work. There is, however, more competition, and industry, training, personality, and devotion to duty rather than striving for place and emoluments will be the winning factors."

This message should be an encouragement and an inspiration to every engineer, for it comes from Charles Edward Skinner, one of the most competent and successful engineers the world has ever known. We here at Ohio State in particular should take it to heart, for Mr. Skinner graduated from this University as a Mechanical Engineer in the class of 1890, and was the recipient of the Lamme Medal from his Alma Mater in 1931.

Mr. Skinner is a native son of the Buckeye State, having been born on a small farm near Redfield, Perry County, on May 30, 1865. As a boy he was primarily interested in things mechanical and asking "why." Farm tasks were exceedingly boring to him, but most of his early work had to be done on the farm. Additional employment in a stoneware shop, as a carpenter, and as a coal miner left him little time for diversion or hobbies.

The first indication of a tendency toward a research career was an incident which Mr. Skinner recalls with great amusement. During a visit to his father's mill he suddenly began to wonder if a cat could swim. Like the true engineer, he tried the experiment. The ultimate results of this and other boyhood experiments were quite painful, and seldom did his elders seem to appreciate his scientific undertakings.

Like so many great men, an extremely elementary country school provided Mr. Skinner's early education for about four months during the winter, when the farm work was necessarily rather light. At the age of seventeen he was able to obtain two terms at the Fultonham Academy and



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first contacted a scientific text there in Steele's *Thirteen Weeks in Physics*. After a year at home because of financial difficulties and the severe illness of his father, he resumed his education with a year at Ohio University as a preparatory student. While still in his middle teens, a then wonderful trip to a state fair at Columbus had furnished Mr. Skinner with the opportunity of visiting the Ohio State University. He was conducted through the buildings by Charles F. Scott (Class of 1885), then a student at the University. At that time he resolved to obtain a higher education at Ohio State if at all possible. So he took his second year of preparatory work here and began the study of Mechanical Engineering in 1886. During his entire schooling Mr. Skinner was compelled to finance himself with the exception of a very little help from home; he accomplished this by working on the Experimental Farm, in the University Dairy, and in the machine shop of the University directed by Professor Robinson. He spent four summers in the shop here, having no vacation from the time he entered school until more than a year after he graduated. His work had qualified him as a machinist, and he worked in that capacity for a brief period with the Columbus Cash Register Company. Following this he obtained a position with the Westinghouse Electric and Manufacturing Company, where he remained until his retirement as Assistant Director of Engineering, January 1, 1933. At the present time he is Consulting Engineer for the American Rolling Mills.

Mr. Skinner's first eight months with Westinghouse were spent as a machinist and sub-foreman in the department manufacturing controllers for street railway service. He was then placed in charge of the dielectric testing of the apparatus manufactured by the company. Since the testing of insulation and apparatus by means of dielectric test or high voltage was comparatively new and had not been used by Westinghouse previous to that time, the job necessitated the devising of testing equipment as well as the establishment of tests. After a year of this work he was placed in the experimental laboratory engaged in the in-

stallation of apparatus for the "Pomona transmission," the first high voltage constant potential system in the United States. In preparing this, testing apparatus capable of giving voltages of 35,000 to 50,000, far beyond anything previously attempted, had to be designed. Final tests of the transformers for this system were carried out by Mr. Skinner under the direction of the Chief Electrician, Mr. Charles F. Scott.

In his iron and steel testing, Mr. Skinner encountered some of his most interesting work. The phenomenon of aging, by which is meant the increase of loss in transformer iron when subjected to the normal use in the transformer. Westinghouse detailed Mr. Skinner to the work of determining the cause and cure of aging. Although he was partly successful, final success was not achieved until the invention of silicon steel by Hadfield about 1905. Owing to circumstances, it was necessary for Westinghouse to carry on an independent development of the Hadfield material for its own use, without any knowledge as to methods or materials used by Hadfield in securing his results. Mr. Skinner describes the undertaking as follows:

"This work was to me one of the most interesting developments of my career. I was given carte blanche by the officers of the Westinghouse Electric and Manufacturing Company and the American Rolling Mills Company, with the understanding that we were to secure non-aging steel in commercial quantities and at a commercial price in the quickest time possible. No experimental equipment was available; consequently, experiments had to be carried on in a full sized commercial open hearth furnace and chances taken which might involve the whole equipment in disaster. For reasons of secrecy, the main part of the work was usually carried on between midnight and morning. Sixty thousand pound heats went bad and had to be scrapped as best we could. Material was produced which threatened to wreck the rolling mill when rolling was tried; after many hectic days and nights and the necessity for overcoming difficulties which many times seemed insuperable, success was finally achieved in less than three months time. The preliminary success was, however, only the beginning of experimental work which has continued to this day with an ever increasing knowledge of the magnetic characteristics of iron and its alloys and an ever increasing efficiency in the character of the material used in the product."

During Mr. Skinner's employment, Westinghouse grew from a small beginning to one of the largest manufacturers of electrical machinery in the United States. It has pioneered in many fields, and Mr. Skinner's work was in close contact with the work of this period. The results of his work with Westinghouse may be summed up as follows:

- (1) The development of a system of insulation control with definite specifications for all insulation work included in the manufacture of electrical equipment.
- (2) The development of a system of purchase specifications.
- (3) The development of a process engineering tech-

nique now covering nearly every process followed by the company.

(4) The development of various control laboratories in chemical, magnetic, physical, insulation, and other work.

(5) The development of a research laboratory for advanced research in nearly every field.

During the early part of the war he spent six weeks in London to secure a better understanding between American and British electrical manufacturers concerning specification for electrical machinery. During the latter part of the war he was in charge of research and testing in connection with munitions, such as 4, 6, 8, and 16-inch shells manufactured in large quantities by his company.

Mr. Skinner has lead an interesting life beyond his professional field, despite his great activity. He has traveled broadly. From 1895 to 1915 he traveled more than a million miles on company business through the United States, and Canada. Westinghouse sent him to Europe on a four-months tour to survey conditions in the electrical manufacturing industries there. In 1900 he made a survey and report on high tension transmission and electrical installations on the Pacific Coast and in Mexico. He also made an extensive survey of plants and conditions in the electrical manufacturing industry in Mexico. Following his trip to Tokio as a delegate in 1929, he continued around the world, visiting Korea, China, the Philippines, the Straits Settlements, Burma, India, Ceylon, Egypt, and Italy.

During a brief visit to the office of THE OHIO STATE ENGINEER recently, Mr. Skinner told of his plans for his next globe-trotting jaunt, a lecture tour in Japan under the auspices of the Iwadari Foundation. This foundation was set up by a Mr. Iwadari of Japan to send students to the United States for advanced educations in scientific and engineering lines, and to bring lecturers on scientific and engineering fields to Japan. Mr. Skinner is the second lecturer to go, and the first engineer to be chosen. He will leave about the middle of March, and plans to be abroad between two and three months.

And still Mr. Skinner finds time for those hobbies which were denied him in his youth. He is recognized as quite an expert in movie and still photography. Gardening, woodwork, and archaeology study (especially Mexico and Central America) are the other diversions which appeal to him most.

Some of the outstanding points of this man's life have been mentioned; innumerable facts have been omitted. Briefly, his life is one which should furnish a goal toward which each and every engineer should strive. If you achieve only a small part of the success he has realized, your life will have been well directed. In view of conditions during the past few years and the charges made against the engineers of too much specialization and machine production, it is extremely reassuring to have a man who knows the engineering field as well as Mr. Skinner express his faith in its future.