1001

Harris J. Ryan

Edison Medalist

1925

write for Carrol

PRESENTATION CEREMONIES
AT
PACIFIC COAST CONVENTION
AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS
SALT LAKE CITY, UTAH, SEPTEMBER 8, 1926

MEDALISTS

1909 Elihu Thomson. *For Meritorious Achievement in Electrical Science, Engineering and Arts, as exemplified in his contributions thereto during the past thirty years.*

1910 Frank J. Sprague. *For Meritorious Achievement in Electrical Science, Engineering and Arts, as exemplified in his contributions thereto.*

1911 George Westinghouse. *For Meritorius Achievement in Connection with the Development of the Alternating-Current System for Light and Power.*

1912 William Stanley. *For Meritorious Achievement in the Invention and Development of the Alternating-Current System and Apparatus.*

1913 Charles F. Brush. *For Meritorious Achievement in the Invention and Development of the Series Arc Lighting System.*

1914 Alexander Graham Bell. *For Meritorious Achievement in the Invention of the Telephone.*

1916 Nikola Tesla. *For Meritorious Achievement in his early original work in Polyphase and High-frequency Electrical Currents.*

1917 John J. Carty. *For his work in the Science and Art of Telephone Engineering.*

1918 Benjamin G. Lamme. *For Invention and Development of Electrical Machinery.*

1919 W. L. R. Emmet. *For Inventions and Developments of Electrical Apparatus and Prime Movers.*

1920 Michael I. Pupin. *For his work in Mathematical Physics and its application to the Electrical Transmission of Intelligence.*

1921 Cummings C. Chesney. *For early Developments in Alternating-Current Transmission.*

1922 Robert Andrews Millikan. *For his experimental work in Electrical Science.*

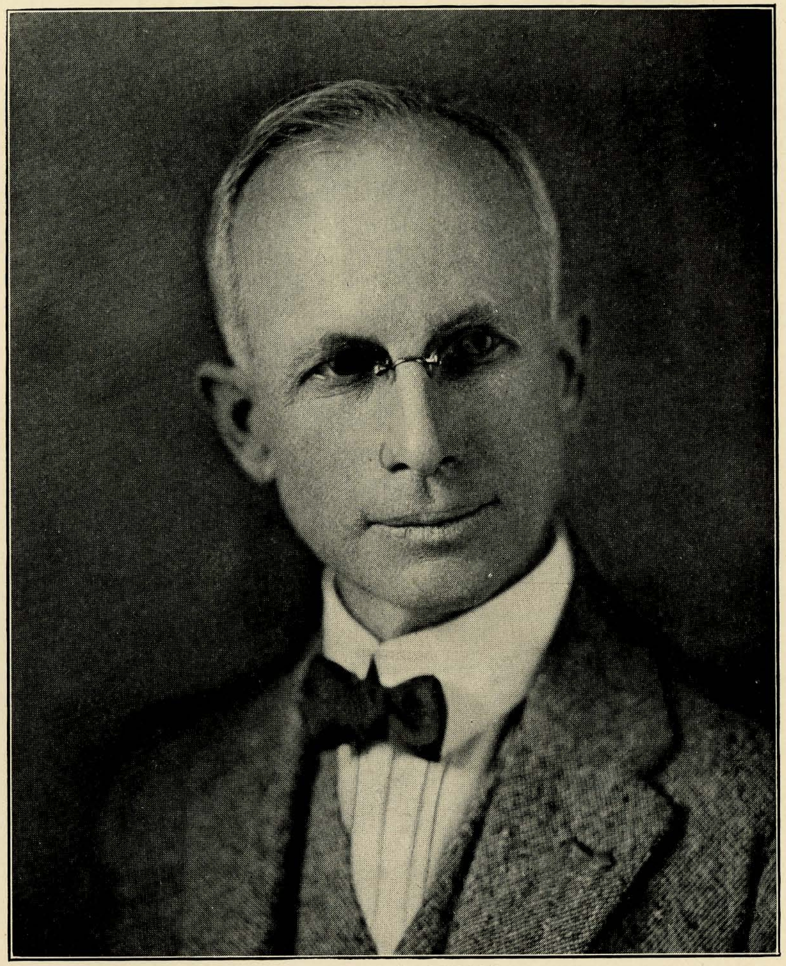
1923 John W. Lieb. *For the Development and Operation of Electrical Central Stations for Illumination and Power.*

1924 John W. Howell. *For his Contribution toward the Development of the Incandescent Lamp.*

1925 Harris J. Ryan. *For his Contributions to the Science and the Art of High-tension Transmission of Power.*

THE EDISON MEDAL

AWARDED BY THE AMERICAN INSTITUTE
OF ELECTRICAL ENGINEERS
FOR MERITORIOUS ACHIEVEMENT
IN ELECTRICAL SCIENCE
OR ELECTRICAL ENGINEERING
OR THE ELECTRICAL ARTS



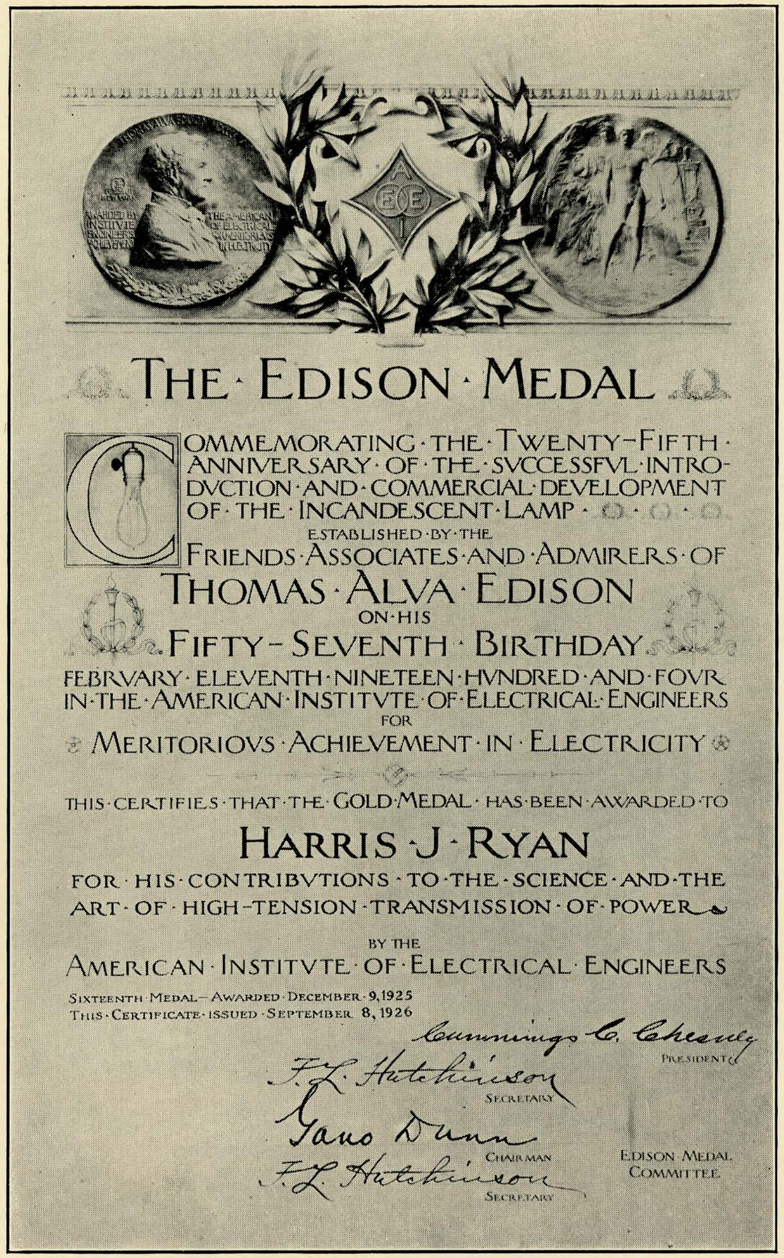
HARRIS J. RYAN

THE EDISON MEDAL

AWARDED BY THE AMERICAN INSTITUTE
OF ELECTRICAL ENGINEERS
TO

HARRIS J. RYAN

FOR HIS CONTRIBUTIONS TO THE SCIENCE AND
THE ART OF
HIGH-TENSION TRANSMISSION
OF POWER


THE·EDISON·MEDAL

COMMEMORATING·THE·TWENTY-FIFTH·ANNIVERSARY·OF·THE·SUCCESSFUL·INTRODUCTION·AND·COMMERCIAL·DEVELOPMENT OF·THE·INCANDESCENT·LAMP

ESTABLISHED·BY·THE FRIENDS·ASSOCIATES·AND·ADMIRERS·OF

THOMAS·ALVA·EDISON

ON·HIS FIFTY-SEVENTH·BIRTHDAY

FEBRUARY·ELEVENTH·NINETEEN·HUNDRED·AND·FOUR IN·THE·AMERICAN·INSTITUTE·OF·ELECTRICAL·ENGINEERS FOR MERITORIOUS·ACHIEVEMENT·IN·ELECTRICITY

THIS·CERTIFIES·THAT·THE·GOLD·MEDAL·HAS·BEEN·AWARDED·TO

HARRIS·J·RYAN

FOR·HIS·CONTRIBUTIONS·TO·THE·SCIENCE·AND·THE ART·OF·HIGH-TENSION·TRANSMISSION·OF·POWER

BY THE AMERICAN·INSTITUTE·OF·ELECTRICAL·ENGINEERS

SIXTEENTH·MEDAL—AWARDED·DECEMBER·9,1925
THIS·CERTIFICATE·ISSUED·SEPTEMBER 8,1926

Cummings C. Chesney
PRESIDENT

F. L. Hutchinson
SECRETARY

Gano Dunn
CHAIRMAN

F. L. Hutchinson
SECRETARY

EDISON MEDAL COMMITTEE

CERTIFICATE OF AWARD

PRESENTATION CEREMONIES

The presentation of the Edison Medal to Harris J. Ryan took place on the Wednesday evening of the third day of the Pacific Coast Convention of the Institute, held in Salt Lake City, Utah, September 6th to 10th, 1926. In opening the presentation ceremonies, President C. C. Chesney, presiding called upon Secretary F. L. Hutchinson, who outlined the history of the Edison Medal. Vice President Paul M. Downing of San Francisco, then reviewed the life and professional career of Dr. Ryan, as follows:

The Life of Medalist

We are this evening to do honor to one whom we all respect, admire and love, a man whose accomplishments in the field of scientific research and engineering have pointed him out as one upon whom the American Institute of Electrical Engineers should confer this particular mark of distinction. To those of us from the far west this is a particularly happy occasion because for more than 20 years we have had the pleasure and the proud privilege of claiming Dr. Ryan and his charming wife as residents of our sunny state of California.

Born in Powell Valley, Pennsylvania, Dr. Ryan received his early education in Baltimore City College and Lebanon Valley College. Leaving the latter he entered Cornell in 1883, about the time that institution was inaugurating its electrical engineering course. After graduating from Cornell in 1887 he was for two years associated with J. White and D. C. Jackson then engaged in general engineering practise under the firm name of the Western Engineering Company. In 1889 he returned to Cornell as instructor in charge of the electrical machinery laboratory. This change marked the turning point in his career in that he left the field of commercial engineering to enter that of science research. Advancement in his chosen line of work was rapid. In 1890 he was made assistant professor in electrical engineering at Cornell and in 1895, when only 29 years of age, he was honored by being appointed as professor in full charge of the electrical engineering department. He remained in that position until 1905 when the "kid" professor as he was then known accepted the call of Stanford University to take charge of the electrical engineering department of that institution, which position he still holds.

In reviewing Dr. Ryan's accomplishments one cannot help but be impressed by the clear foresight and unprejudiced manner in which he has approached every problem confronting him. Scientific investigation is by its very nature pioneer work. It differs from that of engineering in that the scientist must work away out in advance of the engineer. He must point out the way by blazing a trail along which the latter may follow perhaps years later and put to practical application the fundamentals that have been established by the scientist. It therefore follows that if a man is to be successful at scientific research work he must love his work, he must be a man of broad imagination, and he must have unlimited enthusiasm. Dr. Ryan answers all of these specifications.

Since 1889, Dr. Ryan has been a liberal contributor to technical literature, many of his papers having been presented before this Institute. In reviewing his work one cannot help but be impressed with the fact that unlike many others engaged on more or less highly technical research work, Dr. Ryan has devoted his time and attention very largely to the scientific study of problems that have great practical and economic value to electrical industry. As substantial evidence of this we find that one of his earliest contributions to electrical progress was a paper describing the development and pointing out the advantages of using balancing coils, as they were then termed, designed to overcome field distortion and the shifting of the neutral point in direct-current machines, due to armature reactions. The first practical application of this principle was in the Thompson-Ryan generator which was the forerunner of the present day interpole type of construction now used almost universally in direct-current generators and motors. This one improvement alone has been of tremendous commercial value to the industry not only in the improved operation of d-c. equipment, but by its application, the size and weight of machines per unit of capacity has been materially reduced, thus reducing the price correspondingly.

But important as his studies in the field of direct current have been, those having to do with alternating current are of even greater importance. Looking back from our present position to the early 90's, it seems easy in the light of present day knowledge to imagine how a high-voltage system might very easily have been brought into existence, but at that time the scientific world knew but little about alternating currents and less about high voltages. There were wide differences of opinion respecting the possibilities of developing and transmitting power over long distances and there were wider differences of opinion on the question of whether alternating current or direct current was best suited for transmission purposes.

It was in the laboratory at Cornell University that Professor Ryan began his studies in connection with the use of high voltages. Suitable equipment and facilities for carrying on his investigations were not available. Much of what he needed had to be built in the laboratory under his direction. Even at that time, when so little was known about high voltages, his foresight and wisdom in determining what the design and construction of such equipment should be were sound and it is interesting to know that the 90,000-volt dry insulated transformer built by him many years ago is still in service and is an important part of the Cornell laboratory equipment.

His paper on transformers presented before the Institute in 1889 is one of his outstanding accomplishments. It was received by the scientific world with an enthusiasm that immediately brought the author into the limelight of international fame.

No small part of the success attending the investigations covered by this paper is due to the development of the cathode ray wave indicator, or as it is now generally called the cathode ray oscillograph. Its development was more or less of an incident in connection with the solution of the bigger and more important problem being studied but it proved to be a most important factor in obtaining results that otherwise might not have been possible. It not only served a most useful purpose in connection with the work then in hand but during recent years it has found a broad field of usefulness in studying the high frequencies used in connection with the transmission of the human voice.

A few years after this paper was presented experiments conducted on certain lines operating in the Rocky Mountain region resulted in the announcement by transmission engineers that 40,000 volts was the limit for transmission lines and it was useless to attempt to go higher. Doubting the truth of this announcement, Dr. Ryan with a pioneer spirit born of that type of mind to which all attainment is but a challenge to further effort, definitely determined to prove that the use of much higher voltages was not only possible but entirely practical. His investigations and studies along this line continued until 1904 when he summarized the results in a paper presented before the Institute entitled, "The Conductivity of the Atmosphere at High Voltages." The fundamentals set forth in this paper were a distinct contribution to electrical science. By establishing the law of corona formation the problem of transmitting power at high voltage was materially simplified and the former theory that 40,000 volts was a maximum beyond which it was impractical or impossible to go was completely disproved.

During recent years Dr. Ryan has devoted a great deal of his time and attention to the study of insulation and insulators for use on high-voltage lines. The results of his investigations covering the distribution of voltage across the different units making up a string of insulators and the best manner of equalizing same, the cause and effect of aging of porcelain, the causes of failures and flashovers of insulators and other similar work have been of inestimable value to the engineering fraternity in the design and successful operation of present day high-voltage lines. As a result of these investigations, insulator manufacturers have been able to improve the design and quality of their product to a point where today we find 220,000-volt transmission lines operating more satisfactorily in every respect than do those of lower voltages constructed at times when we knew less about insulators and insulation than we do now.

No one will question the fact that during the past 30 years, transmission of electric power has been one of the very great, if not the greatest, factors contributing to the growth of material wealth and the relief of labor. That growth has been made possible in a very large measure by the splendid work that has been done and is today being done by Dr. Ryan and others in working out the highly complicated problems that have confronted the industry without the solution of which progress would have been greatly retarded.

In recognition of the importance and value of the work that has been done and as substantial indication of their desire to have it continue, a number of electrical companies, both manufacturing and central station, have contributed toward the establishment of a modern up-to-date high-tension laboratory at the University where research work well in advance of the industry can be carried on. As a compliment to our honored past president and co-worker, this new laboratory, known as the Harris J. Ryan High-Tension Laboratory, will forever stand a splendid monument to the untiring energy and ability of the man whose name it bears. So far as funds will permit the laboratory is well along toward completion but it is not yet fully equipped.

That the electrical industry is willing to recognize and accept its indebtedness to Dr. Ryan and the University, not only on account of the splendid work that has already been done but also on account of the broad liberal policy concerning future work, is evidenced by the generosity of the donors without whose financial assistance and support the ideals of Dr. Ryan and his co-workers could not have been realized.

But beyond all of his accomplishments in the field of scientific work we must not overlook other of his achievements that can be measured only in terms of human value. During the more than 30 years that Dr. Ryan has devoted to training the minds and habits of young men he has endeared himself to all with whom he has come in contact and in this brief resumé of Dr. Ryan's achievements as a scientist and a teacher, I could not properly conclude without paying a tribute to Mrs. Ryan. Along with Dr. Ryan she has always taken a parental interest in the work and welfare of their students. Their home has always been open and students have always been received with a hearty welcome.

What this means to young men at college can best be judged from a statement of one of his former students at Cornell, a man now prominent in the electrical industry. He refers to Dr. Ryan as a kindly and helpful man, an enthusiast who goes whole-heartedly into everything he undertakes, a teacher whose outstanding characteristic is his painstaking care, in endeavoring to drive fundamentals into the minds of others, a man with modesty in his own achievements yet with a personality that stimulates others to do their utmost, a man so intensely human that it is a delight to be near him.

Making the presentation President Chesney said:

It is now my great privilege, in accordance with the wishes of the Edison Medal Committee, and also of the American Institute of Electrical Engineers, to present to you the Edison Medal and the Certificate setting forth your achievements. My congratulations, sir.

Response by Medalist:

In response Dr. Ryan spoke in part as follows:

I appreciate profoundly the award of the Edison Medal and the opportunity that I have now had of receiving the certificate of award and the medal from the hands of those who have been my life-long friends and virtual co-workers functioning as the officers of the Institute.

At this extraordinary moment in my life my mind goes back to the beautiful and inspiring resolution that the Edison Medal Association made a part of its deed of trust to the American Institute of Electrical Engineers for the award of the Edison Medal which reads:

Whereas: it seems to the (Edison Medal) Association that the most effective means of accomplishing the object for which it was formed would be the establishment of an Edison Medal which should, during the centuries to come, serve as an honorable incentive to scientists, engineers, and artisans to obtain by their works the high standard of accomplishment set by the illustrious man whose name and features shall live while human intelligence continues to inhabit the world.

Its full significance will be born in upon us when we remember the things of incalculable value in the world today that would be absent had there been no Edison. No man ever lived to be a finer example of the glory of work for the amelioration of the conditions under which mankind must live and be happy.

The Certificate of Award and the Edison Medal are received by me in a deep consciousness of their significance and most earnestly do I hope that I may continue to deserve them as long as life shall last.

It is eminently proper when a man has been awarded the Edison Medal by the American Institute of Electrical Engineers that he should be called upon to give an account of himself and that I now gladly do.

Forty-three years ago this fall I entered Cornell as a freshman to take up the curriculum in electrical engineering, that had just been established and for which students were being admitted for the first time. The electrical engineering laboratory of the University was little more than the electrical section of the Physics laboratory of that day. The little more just referred to was one direct-current generator invariably referred to as the Gramme dynamo that was built by Professor Wm. A. Anthony, the 1890-1 President of the Institute.

Professor Anthony visited France immediately after 1872 when Gramme had completed his direct-current generator, generally conceded to have been the first direct-current dynamo of an ample size to reveal its possibilities in the engineering industries. Professor Anthony visited Gramme, saw his generator, and on returning to Cornell immediately set about to construct a replica thereof. It was completed in 1874 and exhibited just a half century ago at the Centennial in Philadelphia. Curricula in electrical engineering at Columbia, Cornell and other universities were announced somewhat less than ten years after the Centennial.

Anthony's Gramme dynamo was given at Philadelphia an award of merit for its novelty and enterprise. It was placed in the historical exhibit at the Chicago International Exposition only 17 years later, and was given an award for its historical merit. I was a member of another section of the Chicago World's Fair jury and had nothing to do with the award of historical merit for "Anthony's Old Gramme." However, I shall never forget the deep impression that the award made upon me. Even then after only 17 years of progress in our country the dynamo had become one of the great implements of our civilization. The lesson of the extraordinary progress that the electrical sciences and arts were making, was inescapable.

I had up to the time of the Paris Exposition in 1889 encountered the then traditional attitude of mind that dwelt much upon the historical background of things from out of which one looked with anticipation of few out-and-out new expediences and implements arriving at a slow rate as always.

But the extraordinary personal exhibit of Edison at the Paris Exposition of 1889 began to change all that sort of thing for me as it did for a host of others of my generation and the Chicago 1893 award to Anthony's Old Gramme finished the change of mind for me, as I know it must have for many others. From that time to this I have belonged to the group that with all the persistence and enthusiasm its individuals can muster has held steadily to the purpose of finding out about things from the depths of the unknown; of opening up new seams in the face of the rock that must be penetrated to know what is within and beyond.

Attitude of mind is an enormous factor of human progress—and progress there must be, so long, as human beings will hold the power of changing this old world from what it is to what it ought to be.

In the fourth year of the Institute I began my work as a faculty man at my alma mater. I soon found the real meaning and value of the American Institute of Electrical Engineers to all in the electrical arts and sciences. I found that I was wholly unprepared to assist my students effectively to an understanding of things without end, encountered everywhere; particularly was this so as matters stood in that day, for the transformer in the alternating-current circuit and the armature reaction effects in the continuous current machine. The alternating-current system for economic incandescent lighting so well suited for the needs of the new rapidly growing American towns and cities had been introduced three years before, *i. e.*, in 1885-6 and its use was being extended rapidly.

With the aid of a friend of my student days, Ernest Merritt, past-president of the American Physical Society, I worked through the summer of 1889 upon the problem by systematic measurement upon a particular transformer in sufficient detail to meet our requirements for teaching. The work was done at Buffalo, New York, through the courtesy of C. R. Huntly, Executive, and H. H. Humphreys, Engineer, of a lighting company of that city. We selected for our specimen at 10-light, 2000 50-volt, 133-cycle transformer.

Through Dr. E. L. Nichols, past-president of the Institute, I was invited to present a paper based upon our work on the transformer and the results obtained. The paper was duly prepared and presented at the December, 1889, meeting of the Institute in New York City and was published in the proceedings in January, 1890. Then to me the entirely unexpected thing happened. The paper interested most of the trained workers in the electrical industries everywhere. It was republished seventeen times in America and Europe including Russia. From that time to this I have had friends everywhere throughout the electrical and

related industries who have always wished me well and were ready with their helpful cooperation at all times. It was to me in relation to the Institute a wonderful lesson in many ways, particularly in two:

I. The value of getting at the facts singly and in their aggregate relation concerning phenomena and equipments for which uses are being found in the industries.

II. The extraordinary value of the American Institute of Electrical Engineers to its individual members and the electrical industries they promulgate.

The direct-current dynamo was put forward by the Italian Paccinoti in 1864 and first developed for engineering duty as already stated by the Frenchman, Gramme, in 1872. Like every great implement upon which our civilization is today established and maintained, the direct-current dynamo arrived as a product of the minds and industry of Paccinoti and Gramme complete in a sense and highly useful, but little understood as to details and as to their relation to the aggregate result. The lack of adequate knowledge of such details individually and collectively was a great handicap in education and for the progress of the art. To understand this one needs only to go back to the many distortions of the rational forms of continuous current machines that were put forward in many illusory efforts to make improvements nearly forty years ago.

With the aid of my students we began in 1892 a series of studies of commutation and characteristic behavior in relation to the shape of poles, length of air-gap and related factors. The results clearly indicated the helpfulness of the pole-face winding and commutating pole as they are now known. We were not the only persons to discern these helpful results, though we did enjoy with others the privilege of pioneering in these things. The final approach to perfection of the continuous current machine was not feasible in "the late nineties." That approach has been quite dependent upon the arrival of a good working understanding of polyphase current circuits.

The continuous current machine in recent years has rounded out its first great cycle of development. When in America, it will enter upon its obvious second cycle, or better, its second round on its spiral of evolution, cannot today be foreseen. It is assuredly worth while for some engineers to remember always the wealth of expediency now available for such second round of evolution of this form of generator or motor. Should long distance transmission of power ever demand the use of the constant continuous current generator and motor, there will be found a veritable mine of discernible expediency for evolving its success.

A third of a century ago from a faculty man's point of view, that of helpfulness to his students, I began the study of high-voltage phenomena by constructing an oil immersed 30,000-volt transformer. The first decisive experimental result with it was soon obtained. It "burned out", but why, one could not tell. The most significant thing about the tragedy was a large smoke bubble that came to the surface of the dark heavy oil that was generally used at this time for insulating transformers. That was in 1893. During the following year we rebuilt it, using air in lieu of oil for immersion so that if it burnt out again we could see the fire and perhaps learn something of the cause. We kept the same core and coils and rebuilt the transformer the sixth time in 1899, air immersed and to have an output of 10 kw. at 90,000 volts, 133 cycles. The major insulation between the high and low-voltage circuits was made by the Corning, New York, Glass Works of refractory glass. Each of the 30 high-voltage coils was equipped with a 6000-volt non-arcing spark arrester. After that the transformer rendered satisfactory service at my alma mater through many years. It is a trivial incident in the telling but it made a real beginning for me as a high-voltage worker.

In 1897 we learned through the pioneer high-voltage studies of past-Presidents Charles F. Scott and Ralph D. Mershon, that at 40,000 volts, more or less dependent upon a variety of obscure factors, the electric current would escape into the atmosphere and a serious waste of power would in consequence occur.

The success of the long distance transmissions of power in the far west and from Niagara Falls to Buffalo caused a large division of the electrical engineers to set out upon the route that led to the establishment of the modern power industry. This division was directed on the right and left by the economic guidance of Kelvin and Sprague. The former asserted that the transmission of power is accomplished most economically when the existence and loss costs of the transmission conductor are equal. The latter asserted that economy in electrical power transmission varied directly as the voltage and inversely as the distance.

The discovery of Scott and Mershon that at a comparatively low voltage electric power would escape from the power transmission line sent a strong mental shock to this power division. As a faculty man greatly interested in the welfare of students preparing for service in the power division, I felt the shock keenly. For the cause of those students there was but one thing to do, viz., to get at all the material facts as quickly as possible and then to study them for strategy in action. By February 1904, we had some of the facts and their relations well enough in hand to present a paper to the Institute that was received everywhere by the power division in such a whole-hearted manner of appreciation that I could not do otherwise than hope to have the privilege of being its permanent recruit.

I must interrupt this narrative in regard to my contacts as a faculty man with those who are establishing the power industry to say that through brief but highly appreciated years I have seen and enjoyed detached services in the large division of communication. In so doing I cooperated with those of my students who established the arc converter system of continuous wave radio telegraphy at home and abroad. My war work in the Supersonics Laboratory of the National Research Council, the purpose of which was aid of the allies in the perfection of the echo method for submarine defense, netted an experience in mechanical radio that has been highly valuable because of the many uses I have found for the same in my work with students. Thus it has been that I have learned abundantly in both the power and communication divisions of

the electrical industries how enormously welcome a faculty man is to ask the privilege of camaraderie if he will but play the game right-mindedly. He must remember that he is a faculty man at all times and see to it that he is acting as such and that he is not acting to replace an engineer on the firing line of practise.

And now, my narrative must come to a close. I have five years more to go in active service when I will be called up for retirement. You can well understand how I wish there might be many times five years to go. If I had my life to live over again and a choice as to what it should be, I would ask that it be just as it has been with all the interesting turns in the road that the electrical engineers have made. Thus I am at this moment most forcefully reminded of a beautful verse by an unknown author that reveals at once so much that is like the electrical engineers and again that is unlike them. It is:

There's a legion that's never been listed,
That carries no colors nor crest,
But split in a thousand detachments
Is making the road for the rest.

Some one who has the gift of saying things beautifully will rewrite this verse to make it fit the spirit and work of the electrical engineers—he will leave its beauty unimpaired and yet somehow contrive to make it say:

There's a legion that's ever been listed,
That carries both colors and crest
And joins in a thousand detachments
In making the road for the rest.

Dr. Ryan then showed some interesting lantern views of the new 2,000,000-volt laboratory at Stanford University, where further high-voltage researches will be conducted.

The ceremonies ended with a brief address by H. T. Plumb, concluding with the following sentiment addressed to Dr. Ryan: "For your achievements as teacher, engineer and scientist, WE HONOR YOU! For your sincerity, devotion, humility and service, WE LOVE YOU!"

THE EDISON MEDAL COMMITTEE

1925—1926

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