in automotive and aircraft engines, has been elected president of the American Chemical Society for 1944.

Dr. Midgley will take office as president-elect on January 1, when Dr. Per K. Frolich, director of the Chemical Division, Esso Laboratories of the Standard Oil Development Company, Elizabeth, N. J., a leader in the development of synthetic rubber, becomes president, succeeding Dr. Harry N. Holmes, head of the department of chemistry at Oberlin College.

Dr. Midgley was chosen by the council from four nominees receiving the largest number of votes in a national mail ballot of approximately 32,000 members of the society. The council includes national officers, directors, editors of the publications, past presidents, the chairmen of eighteen professional divisions and councilors from a hundred local sections, and councilors-at-large.

Dr. Walter A. Schmidt, president of the Western Precipitation Company, Los Angeles, Calif., was elected a director-at-large to succeed Dr. Midgley. Dr. Leason H. Adams, of the Geophysical Laboratory of the Carnegie Institution of Washington, and Professor Robert E. Swain, of Stanford University, were reelected regional directors.

New councilors-at-large are: Dr. M. L. Crossley, director of research of the Calco Chemical Division, American Cyanamid Company, Bound Brook, N. J.; Professor Vincent du Vigneaud, head of the department of chemistry, Cornell University Medical College, New York; Dr. W. Albert Noyes, Jr., professor of physical chemistry in the University of Rochester, and Professor R. L. Shriner, chairman of the department of chemistry of Indiana University.

According to the official announcement of the society:

> Dr. Midgley has won recognition for discoveries which are outstanding both from the standpoint of pioneering in new fields and from the standpoint of commercial importance. His discovery in 1922 of tetraethyl lead as an antiknock agent was made after he and his colleagues in the General Motors Research Laboratories had tried more than 33,000 different chemical compounds without success.
>
> The performance of the modern military and transport plane, it is pointed out, is due in large part to the spectacular development of high-octane gasoline, a development in which tetraethyl lead, now a vital war material, has played an important role.
>
> He has contributed largely to the knowledge of the chemistry of rubber and the methods of synthesizing rubber. With Dr. Albert L. Henne, of the Ohio State University, he developed the organic chlorofluorides which have become widely used as non-inflammable, non-toxic refrigerants. He was associated with the developments connected with the recovery of bromine from sea water.

Dr. Midgley, speaking on the occasion of the award to him of the Willard Gibbs Medal of the Chicago Section of the American Chemical Society on May 22 of this year, stated that "America's acute shortage of rubber must be laid to rubber technologists who have failed to develop practical methods of separating this vital material from plants growing plentifully in our own country."

Dr. Midgley has also been awarded the Priestley Medal of the American Chemical Society, the William H. Nichols Medal of the New York Section, the Perkin Medal of the Society of Chemical Industry and the Longstreth Medal of the Franklin Institute. Wooster College conferred the honorary degree of doctor of science upon him in 1933. He is a member of numerous scientific organizations.

Dr. Midgley was born on May 18, 1889, at Beaver Falls, Pa. His father, Thomas Midgley, an inventor and manufacturing executive, came to the United States from London, England, at the age of six. Dr. Midgley attended the public schools of Ohio and later Betts Academy at Stamford, Conn. He received the degree of mechanical engineer from Cornell University in 1911.

After his graduation he entered the employ of the National Cash Register Company, Dayton, Ohio. Later, with his father, he established the Midgley Tire and Rubber Company of Lancaster, Ohio. In 1916 he returned to Dayton and began work under Dr. Charles F. Kettering, with whom he has since been associated in various activities, including the organization of the General Motors Research Corporation. He is vice-president of Kinetic Chemicals, Inc., chairman of the Board of Directors of the American Chemical Society and vice-president of Ohio State University Research Foundation. He holds about one hundred patents.

AWARD OF THE EDISON MEDAL TO DR. ARMSTRONG

THE Edison Medal for 1942 has been awarded by the American Institute of Electrical Engineers to Dr. Edwin Howard Armstrong, professor of electrical engineering at Columbia University, "for distinguished contributions to the art of electric communication, notably the regenerative circuit, the superheterodyne, and frequency modulation." The medal will be presented to Dr. Armstrong an the evening of January 27, in the Engineering Auditorium, 33 West 39th Street, New York, N. Y., during the national technical meeting of the institute to be held in the Engineering Societies Building from January 25 to 29.

The Edison Medal was founded by associates and friends of Thomas A. Edison, and is awarded annually for "meritorious achievement in electrical science, electrical engineering, or the electrical arts" by a com-

mittee consisting of twenty-four members of the American Institute of Electrical Engineers. A statement issued by the institute reads:

Edwin Howard Armstrong was born in New York City on December 18, 1890. He began his engineering studies at Columbia University and became a protégé of Michael I. Pupin, Edison Medal recipient in 1920, with whom he worked closely on many important research undertakings.

While an undergraduate he became interested in the operating properties of the audion detector and set out to learn more of the principles of operation of thermionic tubes. The research that followed at his home in Yonkers, New York, resulted in his invention of the feedback or regenerative circuit which became the means not only of increasing the sensitivity of the audion as a detector of radio signals but also became the means of producing for the first time continuous high frequency oscillations by means of a thermionic tube. He filed applications on this invention in the latter part of 1913 and a patent was issued to him on October 6, 1914. In December, 1914, he published the first scientifically correct explanation of detection and amplification in the audion detector and in March, 1915, disclosed the regenerative and oscillating circuits.

This keystone of radio development was later to become involved in fourteen years of litigation and which in the end was decided by lay courts based on errors of fact and judgment which were contrary to the scientific facts.

He was graduated from Columbia University in 1913 with a degree of electrical engineer, and continued as an assistant in the department of electrical engineering. In 1915, he received the Trowbridge Fellowship from Columbia University.

In 1917, Armstrong entered the service of the United States Army as a Captain in the Signal Corps, and later was promoted to rank of Major. While serving in this capacity in France, he made his second invention which was destined to be another cornerstone in the development of the radio communication art. This was the superheterodyne receiving system.

This system of receiving far surpassed any development up to that time and it is still the type of circuit used to-day in practically all radio receivers.

The third outstanding invention was his development of the super-regenerative circuit which was disclosed to the art in 1922. This system of radio reception provides a means of increasing the sensitivity of a detector above that normally obtained by means of simple regeneration. This receiving circuit supplied the principal means of exploring and developing the ultra short wave channels.

The fourth outstanding invention of Major Armstrong was the development of wide band frequency modulation in 1933. This system is now recognized as the basis for an entirely new era in radio broadcasting and communication. All the broadcasting companies and many individual broadcasters have either applied to the Federal Communications Commission for licenses or have transmitters in operation using this system. There are 17 stations already on scheduled operation and it is conservatively estimated that 30 or more will be in service by the end of the year. The Federal Communications Commission has over 150 applications pending before it at this time.

This system of radio communication is radically different from the amplitude modulation system now in general use. It provides a means for producing static-free and noise-free signals with a fidelity and tonal range not previously obtained with the present broadcast facilities. In addition to eliminating much of the noise level from broadcast radio programs which are prevalent in urban areas the system provides means for transmitting on several separate channels over one carrier and in addition makes possible the use of the same carrier frequency by a number of stations separated by only a few hundred miles without causing mutual interference on that frequency.

Probably no one man has contributed as many fundamental radio inventions which so closely touch on our everyday life as Major Armstrong. The discovery of the regenerative circuit made possible long distance wireless communication and the building and operation of world-wide communication systems. Then, as broadcasting began to grow, the superheterodyne circuit became the greatest stimulant to the art bringing with it better reception and the attendant increase in enjoyment to millions of listeners. At the same time the manufacture of apparatus and the building and operation of stations brought work and prosperity to thousands. The super-regenerative circuit made practical the first 2-way police communication systems on the ultra short waves and has resulted in more rapid police action in safeguarding property and in the protection of life and limb. Now the frequency modulation system of communication is beginning to give the public a finer radio service and like Major Armstrong's other inventions is destined to add much to the nation's enjoyment and wealth.

Professor Armstrong has received many honors, including the degree of doctor of science from Columbia University in 1929, and from Muhlenberg College in 1941, the Medal of Honor of the Institute of Radio Engineers, 1917, the Egleston Medal of Columbia University, 1939, the Holley Medal of the American Society of Mechanical Engineers, 1940, the Franklin Medal of the Franklin Institute, 1941, and the John Scott Medal, awarded by the Board of Directors of City Trusts, City of Philadelphia, 1942. He was made a Chevalier de la Légion d'honneur by the French Government in 1919. He received one of the nineteen national awards of "Modern Pioneer" by the National Association of Manufacturers in 1940.

SCIENTIFIC NOTES AND NEWS

SIR HENRY DALE was reelected president of the Royal Society at the two hundred and eightieth anniversary meeting which preceded the celebrations of the tercentenary of the birth of Isaac Newton.