

*In Memoriam**Reginald Aubrey Fessenden*

*On July 22, 1932, in Bermuda, there passed away this great scientist, radio pioneer, inventor and deep thinker. Outside of scientific circles, where he was well known, little was heard of Fessenden, as he was of a retiring nature and would rather let his accomplishments speak for themselves*

**R**EGINALD AUBREY FESSENDEN was born of stern New England stock in the little town of Milton, Province of Quebec, Canada, on Oct. 6, 1866. Although born in Canada and living in Bermuda for a considerable period Fessenden never relinquished his American Citizenship and made many valuable inventions for the use of his Country. His Summer home in Boston was a rendezvous of the technical and financial brains of America. After his early education he graduated from Bishop's College, his father's Alma Mater, in the Province of Quebec and from 1885 to '86 was principal of the Whitney Institute of Bermuda. A little figuring will show what a young man he was to be principal of an established school. During the period of 1887-90 he was head chemist of the Thos. A. Edison Laboratories, leaving there to become from 1890 to '92 electrician for the Westinghouse Company of Newark, N. J.

*Man and Scholar*

His love for educational work again asserted itself and he became Professor of Physics and Electrical Engineering at Purdue University from 1892 to '93. He became Professor of Electrical Engineering at Western University of Pennsylvania from 1893 to 1900.

Entering Government Service he became from 1900 to 1902 Special Agent in the U. S. Weather Bureau in charge of Investigation of Wireless Telegraphy and the daily collection of weather reports.

From 1902 to 1910 he was General Manager of the National Electric Signalling Co. which controlled the famous Fessenden System which was able to compete with the then established wireless companies and showed several marked advantages without infringing existing patents. In fact, an examination of the U. S. Patent Office will show over 500 patents issued to him, and that he is well up among the first ten individuals holding the most patents.

Since 1910 he had been Consulting Engineer for the Submarine Signal Co. and had been active until the end.

While in Bermuda he met the girl who was later to become his wife and they were married in 1899. One son, Reginald Kennelly Fessenden, was born of that marriage which through all the years has always been a beautiful association.

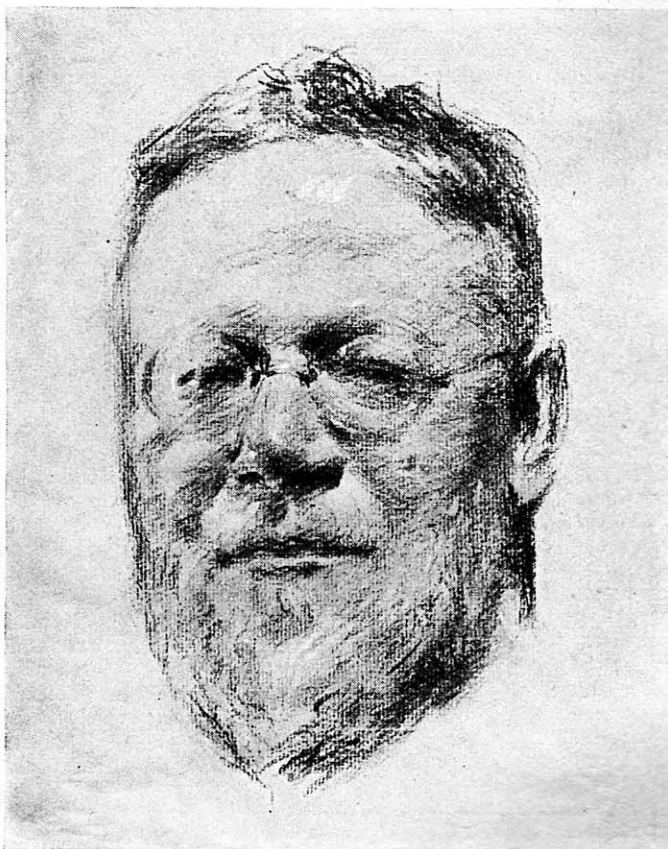
Fessenden was a man of imposing appearance and was never forgotten if you once met him. He was well over 6 feet tall with sandy hair and Van-Dyke beard, which in later years was pure white and added dignity to his appearance. He was an advocate of the white suit and black-lined Inverness cape from his long residence in Bermuda and he often was so attired on his trip to the states. His entrance into a crowded restaurant in New York City brought all eyes his way.

*A Keen Analyst*

His kindly blue eyes, and keen mind were felt immediately when in his presence. His grasp of a problem was enormous and he quickly absorbed all phases of the problem and then drew on his enormous store of knowledge so rapidly that he seemed to make snap judgment answers to problems. Usually after long research on a line that was new to you, it was found that he was right and had hit on the simplest method of approach.

The following resume of a few of his patents is not in any way complete but is included to show the

wide range of science he was familiar with. Early in the radio art Fessenden found that the telephone receiver was more sensitive at about one thousand cycles than on the low rough frequencies then in use. He conceived the idea that if he could make his transmitter emit a musical note he would be able to cover longer distances and partly overcome static. He conceived the whole theory of the synchronous rotary gap, where the wheel carrying the spark electrodes was mounted on the generator shaft in such a manner that the spark discharge took place at the peak of the voltage. He foresaw that he must so design the generator and transformer that when the



**DISTINGUISHED RADIO PIONEER\***  
1866 1932

\* Drawing reproduced through courtesy of David L. Hardenbrook.

spark took place and short-circuited the transformer the secondary voltage immediately dropped to zero. This quenched the spark and in consequence it was ready for the next discharge. The early Fessenden sets were remarkable for their bell-like tone and distance-carrying ability.

### Early Inventions

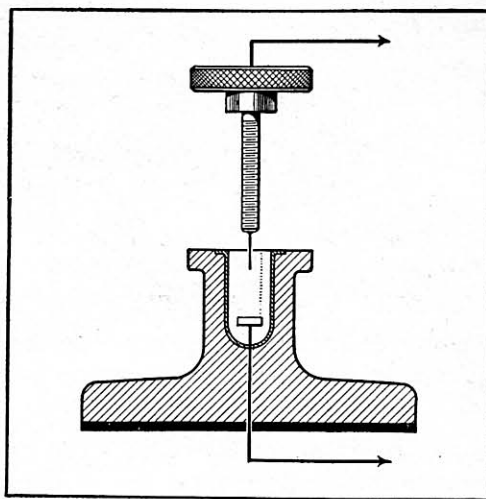
Fessenden's first great invention in the radio art was his discovery of the electrolytic detector, which was much more sensitive than existing detectors of the time and had the ability of keeping its adjustment for long periods. To show the way Fessenden's mind worked when confronted by this problem, he conceived the idea of rectifying by dipping a fine point into a dilute acid solution at the same time applying a low potential across the junction so that electrolysis would cause a bubble to form over the electrode that would be broken down by received signals. He found that the area of the wire dipping into the acid had a marked effect on the sensitivity of the detector. After experimenting with various wires he decided on a platinum wire as it was acid proof. He was unable to get platinum wire less than one one-thousandth of an inch in diameter, so he suggested that this fine wire be heavily plated by silver and again passed through a drawing die. This resulted in the birth of Wollaston wire. When the silver coating was dipped in nitric acid, the silver dissolved and left the fine platinum wire one-tenth-thousandth of an inch in diameter, ready for use.

The first order for high-frequency alternators was placed by Fessenden with the General Electric Co. and a then young engineer by the name of Alexanderson was assigned to the development of the alternator. Alexanderson so improved his design in later years that he was able to build 200 kw. alternators, and until the advent of the vacuum tube, these alternators proved to be the most reliable method of transatlantic communication.

### Transoceanic Radio

Fessenden describes, in a paper before the A.I.E.E., radio telephony between his famous Brant Rock station and Jamaica, N. Y., in the year 1906. On telegraphy, he regularly communicated with Scotland. He is often credited as being the first to transmit radio telephony and telephoto or pictures.

Fessenden is the inventor of the heterodyne, the principle upon which all modern superheterodyne broadcast receivers as well as all car-



EARLY INVENTION

Diagrammatic sketch of one of the inventor's developments used in the early stages of wireless telegraphy—the so-called "whisker point" electrolytic detector

### Among Fessenden's Inventions

**F**ESSENDEN conceived the idea of the synchronous rotary gap emitting a high musical note, the electrolytic detector, the high-frequency alternator, radio telephony (1906), the heterodyne, systems in microphotography, long playing phonograph records, picture transmission and reception, television without scanning discs or cathode ray tubes, submarine signalling systems and depth finders, turbo-electric and diesel-electric drives for battleships, automatic parking systems for garages, and hundreds of other inventions in varied fields.

rier current systems are based. He was a great exponent of methods of storing knowledge and he was well versed on microphotography. Several patents have been issued to him covering systems of reproducing pages of a book on a space about the area of a pin head and a method of producing phonograph records that will run 15 minutes on a 1½-inch diameter record.

### Television

At the time of his death he was trying to promote a system of television that he guaranteed results with. He used no scanning discs or cathode-ray tubes. This shows his usual independence of recognized methods of attack.

His methods of submarine depth finding are well known and are now used by nearly every Navy in the world. His system operates on the principle that the ship sends out a signal that is reflected back by the ocean bottom or any intervening obstruction. The time interval between the time of sending the signal and the reception of the reflected sound enables the navigator in time of fog or clear weather to plot his course. Variations of this system are used for locating submarines and the location of ore or oil deposits.

He was inventor of the turbo-electric and Diesel-electric drives for battleships.

As head of the Canadian Commission for Generation and Distribution of Electricity generated at Niagara Falls, he laid out this gigantic system.

Several antenna patents were issued to him, such as shooting a stream of water vertically into the air; the wave chute; half-wave antenna where the mast of proper height is the only antenna used, no wires being part of the antenna.

He was greatly interested in archeology and geology. His patents covered such a wide range of subjects that it would take a good-sized book to do justice to all of them.

Within the last few years Fessenden won a settlement of \$2,500,000 from the largest communication concerns in the world for infringement of his patents and he also won a case against our government for use of his patents during the War. Hundreds of other patents of this great inventor form the nucleus for many large and important corporations in the radio field.

Radio mourns the recent loss of this great mind whose contributions to science in general and radio in particular will be greatly missed.

Morton W. Sterns.

### INVENTED BOOK THAT READS ITSELF

To quote part of the first paragraph of Fessenden's patent taken out in 1920, drawings of which are reproduced below: "My invention relates to methods and apparatus for recording and reproducing language and pictures and the like, and more particularly to recording and reproducing books. . . . Such reproductions are entirely permanent and durable in contradistinction to the present methods of printing on paper"

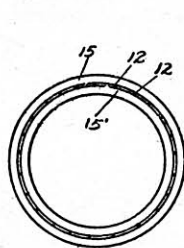


FIGURE 5

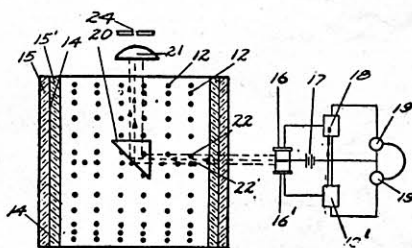


FIGURE 6

INVENTOR

Reginald A. Fessenden.