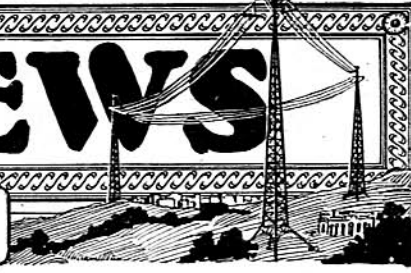




RADIO NEWS



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RADIO STEPS OUT

By HUGO GERNSBACK

THERE was a day, many years ago, when radio was not "radio" at all, but was merely "wireless." The art at that time was merely one of communication; that is, the transmission of intelligence by signals from one point to another without intervening wires. So things stood, more or less, until the advent of the vacuum tube, after which soon followed the first really successful wireless telephone, which today we term the "radiophone," as applied to broadcasting.

Broadcasting itself is, of course, only the propagation without wires of signals to be received at the other end. But radio does not stop here, although the public at large is not aware of the fact that the art of radio is used for hundreds of different purposes aside from broadcasting and telegraphy. The following few remarks may be of interest to those who have not given close attention to the tremendous growth, in every direction, which radio actually has attained.

There was, for instance, the *Dynamophone*, invented by myself and described in the first radio magazine in existence, "*Modern Electrics*," in the May, 1908, issue, when wireless was just getting into its stride. The *Dynamophone*, as described in that magazine, was an apparatus whereby it was possible, with the human voice, to start an electric motor or any other electrical appliance from a distance. In short, it comprised a microphone in circuit with a relay and condenser, which, in turn, were attached to a battery and spark coil, aerial and ground. At the receiving end I had a coherer and a decoherer, a relay, a number of contacts, local batteries, and an electric motor. Every time a word was spoken into the microphone, the transmitter would be energized, sending out impulses; whereupon the motor at the receiving side would start and run as long as the words were spoken into the distant transmitter. While it was at that time but a toy, the apparatus foreshadowed broadcasting, because this was before the days of the wireless telephone, and the human voice actually did create effects at the receiving end.

Then, at a not much later date, there was the now famous *Ceraunograph*, also described in "*Modern Electrics*" for July, 1908. This was invented by the Rev. P. J. Phillippe, S.J., of Spring Hill College, Mobile, Ala. This was an automatic lightning recorder, and was constructed from the then-existing wireless apparatus. It recorded on a paper tape lightning discharges at a great distance. (It is interesting to note that a very similar device, employing the same principle, is used today by the New York Edison Company at its great Riverside power station in New York to record the approach of thunderstorms many hours before they actually arrive in the city.) Both of these old-time devices were invented, of course, before the day of the vacuum tube.

This marvelous tube makes possible, not only the radio telephone and broadcasting, but also many other important developments. It is really from the time of its advent only, that radio has stepped out from its home sphere and invaded other and older arts, causing and creating many revolutions in them. For instance, up to the time of the perfection of the vacuum tube, it was not possible to talk by wire from New York to San Francisco. The telephonic repeater coils, loading coils and others, as well as the very heavy wire lines necessary for transcontinental communication, made this feat impractical. The vacuum tube changed the situation altogether and today it is used in long-distance telephony to an extent which the public very little appreciates. Here is only one case where radio principles are applied to wire telephony, and make possible the bridging of great distances, impossible to cover otherwise.

A fly hops upon a steel bar, a quarter of an inch square. What

happens? Off hand, you will say "Nothing." Just the same, the weight of the fly depresses the steel bar to an extent which can be measured today, impossible as this sounds. The instrument, in fact, measures a movement of the incredibly short distance of three billionths of an inch and is called the "*Ultra Micrometer*." It measures distances about 15,000 times shorter than have hitherto been detectable with microscopes of the highest magnifying power. Again, radio instruments and the vacuum tube are called in to achieve the result just cited, because the heavy steel bar upon which the fly hops is but a part of a condenser; and the change in the condenser's capacity, although the fly weighs practically nothing, is sufficient to be accurately measured.

The "*talking motion picture*" would not be a success if the vacuum tube and radio principles were not used in some of the various stages. The same statement is true of the modern phonograph, where both the recording and reproducing are now done by means of radio instruments. One of the most popular new electric phonographs on the market relies entirely upon radio instruments for its reproduction of sound; and a regular radio amplifier with but few changes is used to regulate the music from *pianissimo* to fog-horn volume. And more recently it has been found possible to make the leading violin louder than an entire orchestra by attaching a small microphone to the violin itself and amplifying it to such a degree that the violin will overshadow a 50-piece orchestra without difficulty.

You are probably familiar with the method of trapping thieves by making it impossible for them to approach a safe within three feet, as explained in a recent issue of *RADIO NEWS*. By upsetting the fine electrical balance of a system of radio instruments, it is thus possible to give an alarm before the burglar or safe-cracker has even touched the safe itself.

There was also described a few months ago, in *RADIO NEWS*, a method whereby all employees emerging from a factory passed through a certain gate, which would immediately indicate to an observer whether or not the employee carried an excess of metals on his body. By means of vacuum-tube amplifiers it is even possible to detect as small a quantity of metal as the gold in a man's teeth, when he passes through this gate.

A recent invention, also of interest, is the use of a condenser in radio amplification, whereby the small variations in the capacity of the condenser are used to reproduce phonograph music in a way not dreamt of heretofore.

Of the television apparatus so far constructed, practically all of the inventors rely upon radio instruments in one way or another; and you may be sure that, when television finally is developed completely, the solution will be found in the use of radio instruments.

It may be safely said that the surface of what remains to be done has as yet not been scratched. There is hardly an industry today that cannot make use of radio instruments in some phase of its work. When it is realized that by means of radio instruments it is possible that the heart beats of a chicken can be magnified so that an audience of thousands of people can hear the sound throughout an auditorium, it should be apparent how wonderful and how universal the uses of radio apparatus have become.

The applications cited by me are not just freak experiments, for many of them are in actual and constant use, day in and day out.

Though radio instruments have been applied by many fakers to the ailments of the human body, there yet remains to be done a large amount of legitimate scientific work, wherein actual investigation of the functions of the various parts of the human body can be conducted in a way that we do not even dream of.

Wherein the Editor points out that broadcasting is only one little exemplification of the applications of Radio—recalls a few promising ideas of the pre-vacuum-tube era—and the revolutionary introduction of the three-element audion—a few of the wonders which this infinitely-delicate apparatus has brought about within a few years—what wonders of the near future are to be accomplished by an application of the radio experiments of today—when Radio hits its real stride.