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No. 34 Monthly (10 issues yearly) May, 1972 P. O. Box 12 Kleberg, Texas 75145

EDITOR: Jim Cranshaw

FORMERLY NAMED:
THE ANTIQUE RADIO AND PHONOGRAPH NEWS
NOW NAMED:

THE HORN SPEAKER

MARCONI, HIS OWN

P. F. Collier & Son 1902

Marconi's Experiments.—The following is Marconi's personal narrative of his experiments, under date of May, 1899:

My first experiments were conducted in 1895, on my father's estate in Bologna, in Italy, and I was much surprised at the facility with which I found it possible to transmit messages without a wire for many miles. On coming to England on private business in 1896, I was advised by my friends and relatives to give a demonstration of the capabilities of my invention to the British authorities, who gave me facilities to test the system; and we were soon doing 9 miles across the Bristol Channel.

But, perhaps, at this point it will not be out of place to give a brief description of the apparatus, avoiding technicalities as much as possible. We will first take the transmitting or sending apparatus.

I used an ordinary 10-inch induction coil, somewhat similar to the familiar shocking coil, but on a much larger scale. Connected to the terminals of the secondary winding are two small spheres, about one or two centimeters apart. Between these spheres the spark passes and sets up the oscillations necessary for the transmission of signals.

WILLIAM MARCONI.

When long distances are to be bridged, a vertical insulated conductor, suspended by means of a mast, is attached to one sphere, and the other sphere is connected with the earth. If an ordinary telegraphic key connecting a battery with the coil be pressed, the current from the battery is allowed to actuate the induction coil which charges the vertical conductor, and discharges across the gap separating the two spheres. This discharge is an oscillating one, and the insulated conductor becomes a powerful radiator of electric waves. It will be easy to see how, by pressing the key for long or short intervals, it is possible to emit a long or short succession of waves, which, when they influence the receiver, reproduce on it a long or short effect, according to their duration, in this way reproducing Morse signals. *Continued on page 3.*

SYNC GAP

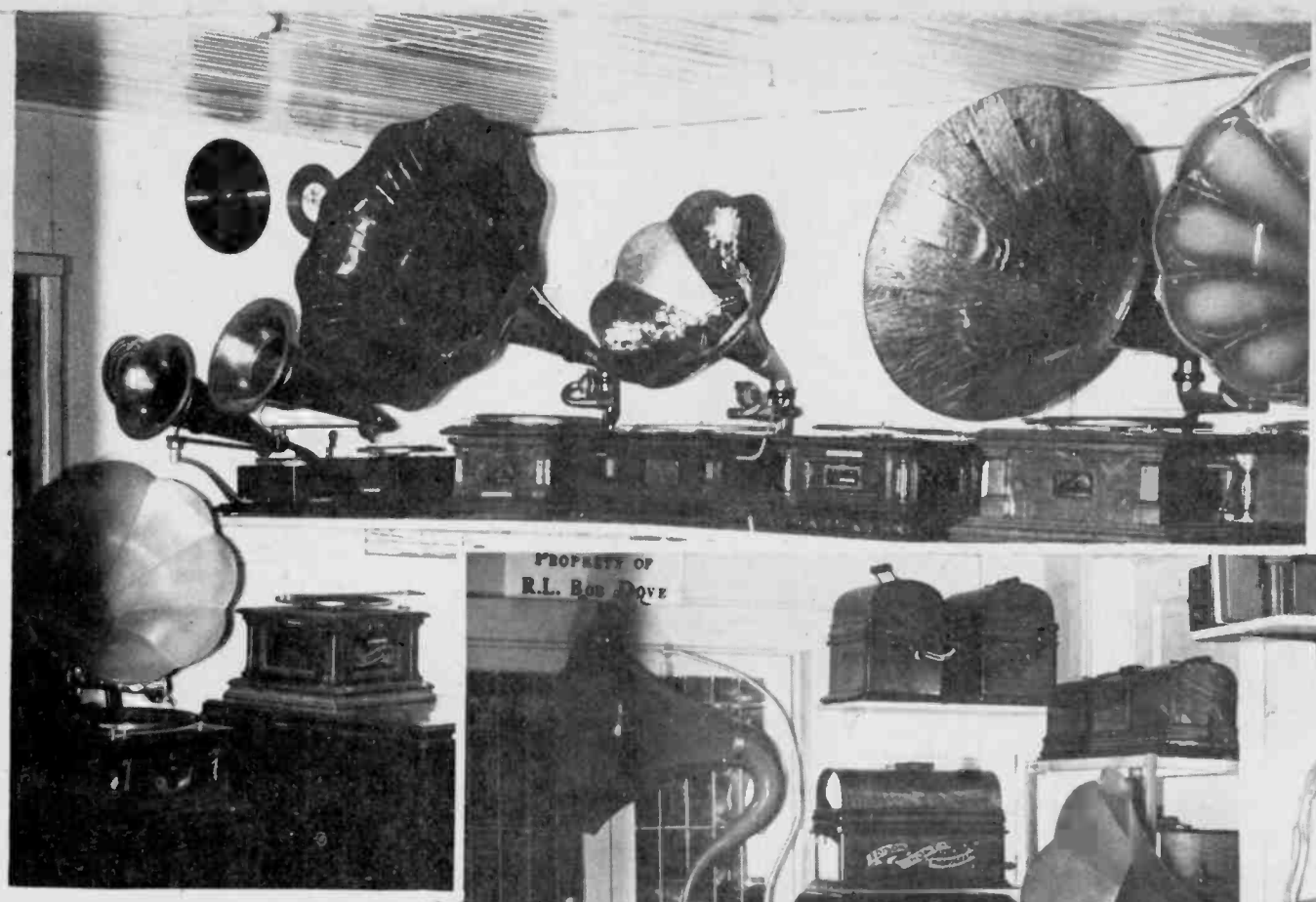
by S. A. Greever

There were several fascinating aspects of Spark telegraphy and that best remembered was perhaps the distinctive tone of each and every transmitter. Some of these were as easily recognized by experienced operators as the voice of different individuals. There are old-timers still around who will tell you, "you haven't lived," if you've never worked a one kw "Rock Crusher" hitched to a sync gap. There was an old gag about these rigs to the effect that they could be heard for miles around—just by opening a window in the "shack".

Tempus, does indeed, fugit and by the early 1920's Spark had been relegated to the limbo of outmoded things.

Up until the early 1920's Wireless communications had been carried on by commercial stations, and by amateur experimenters, using the dot-dash telegraphic code. At the same time experiments were being carried on at the Westinghouse station at Pittsburgh, with radio telephony which the advent of the three element vacuum tube initiated. These experiments were so successful that in 1920 KDKA broadcast the Harding-Cox election returns to a limited number of amateur receivers, and the news of the accomplishment kindled a craze for broadcasting which spread like wildfire. Almost overnight radio listening became a national pastime.

Radio broadcasting stations sprouted up like a springtime crop or weeds, before there was any significant commercial production of factory built, professionally engineered, receivers on the market. This resulted in a flood of do-it-yourself publicity in hobby magazines, and even many daily newspapers, on how to build a homemade receiver on an oatmeal carton. To assuage its enthusiasm for the new-found Tinker Toy, the entire population it seemed, was staying up until all hours of the night, frantically experimenting and rolling-their-own receivers, tickling the "catswhisker" on a crystal detector, trying to tune in, "KDKA,



THE WIRELESS AGE
DECEMBER, 1915

R. L. "Bob" DOVE

Collects

R.L. "Bob" Dove collects springwind phonographs of all kinds of exciting and rare sizes and shapes. He also repairs, strips, and refinishes phonographs. Bob can be reached by writing to 3324 Baylor St. Ft. Worth, Texas 76119.

off the Record

The Horn Speaker has been corresponding with some record collectors, who are very knowledgeable on records.

collecting.

Rick Wilkins who has made a study of distinguishing, rare and quality records has said that he would write about his expeditions for knowledge of old records and sources of discovery.

"A man's voice, anyhow"

NO way of amusing people is so sure of results as by means of an Edison Phonograph. Start one anywhere and everybody gathers around it. It is easy to entertain with an Edison. It will amuse any kind of a gathering.

The EDISON PHONOGRAPH

places music, formerly available only to the few, within reach of the many. No ear is too critical and no pocket-book too limited to enjoy the entertainment it affords.

There's Lots of Good Fun in the August Records

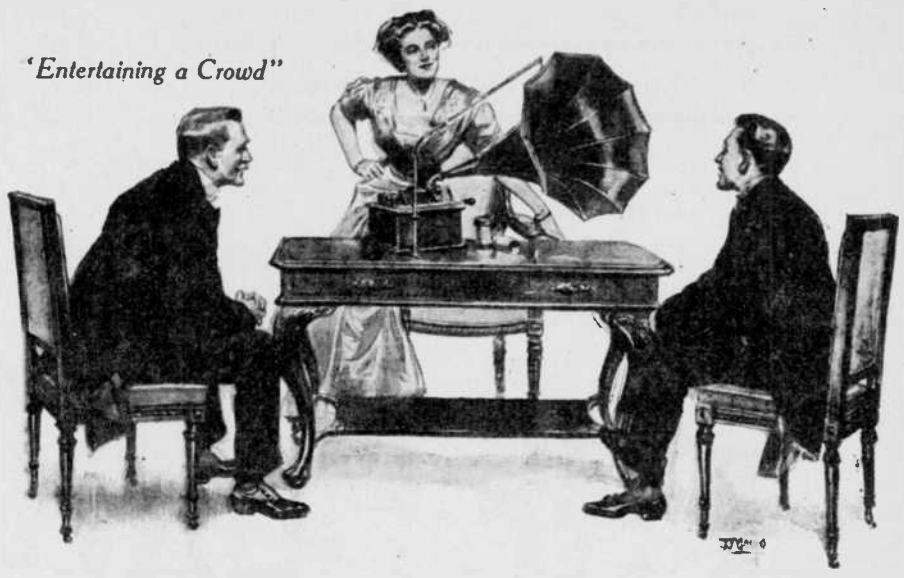
But the twenty-four new Records for August are not made up entirely of comic songs and the wit of clever comedians. There are good sentimental ballads, well-rendered band and orchestra selections, instrumental solos, and some sacred selections—the best of the new music and the best of the old. On July 25th they will be on sale at all Edison stores. Your dealer will be glad to play for you any of the following Records that you want to hear.

9890 Sweet Sixteen March (Kerry Mills) . . . . . Edison Military Band
9891 Only an Old Fashioned Cottage (A sentimental home ballad) (Solman & Hayden-Clarendon) . . . . . Manuel Romain
9892 It Always Comes with the Summer (Serio-comic song) (Solman & Lamb) Dorothy Kingsley
9893 Lady Binnie and the Shores of Lake Erie (Violin) Original . . . . . William Craig
9894 I Want to be Loved Like a Leading Lady (The comic song success in "The Girl Behind the Counter") (Wade & West) . . . . . Ada Jones
9895 Yankee Doodle Comes to Town (From "The Yankee Prince") (George M. Cohan) Billy Murray
9896 By the Old Oaken Bucket, Louise (Davis & Jones) . . . . . Frederic Rose
9897 Forest Whispers (Losey) . . . . . Edison Symphony Orchestra
9898 Mother Hasn't Spoke to Father Since (Schwartz & Jerome) . . . . . Arthur Collins
9899 The Home Over There (Sacred selection) (O'Kane & Huntington) Edison Mixed Quartette
9900 Let Me Hear the Songs My Mother Used to Sing (Gabriel & Gordon) . Byron G. Harlan
9901 Blue Violets (Ellenberg) . . . . . Edison Concert Band
9902 When the Autumn Moon is Creeping Thro' the Woodlands . . . . . Will Oakland (This Record introduces a new Edison artist, Will Oakland. He has a counter-tenor voice of bell-like sweetness, which is heard to excellent advantage in this pretty, romantic ballad.) (Solman & Rosenfeld.)
9903 A, B, C's of the U.S.A. (Unique alphabetic duet) (George M. Cohan) Ada Jones and Billy Murray
9904 I'm Savin' Up My Money for a Rainy Day (A genuine comic rag-time song) (Wenrich & McDonald) . . . . . Edward Meeker
9905 "Dialogue"—Flute and Clarinet (An animated musical conversation between a flute and a clarinet) (A highly amusing Record) Hamm . . . Edison Symphony Orchestra
9906 All for Love of You (Ball & Reed, authors of "Love Me and the World is Mine") Harry Anthony
9907 A High Old Time in Dixie (Negro duet) (Schleiffarth & Lowen) . . . Collins and Harlan
9908 For the Red, White and Blue (An inspiring song of our new navy) (Rosenfeld) James F. Harrison
9909 The Kerry Mills Barn Dance (Kerry Mills) . . . . . Edison Symphony Orchestra
9910 I'm the Man (Camp & Norton) . . . . . Bob Roberts
9911 Fun at the Music Counter (A laugh-making burlesque on familiar scenes at a sheet-music counter) Original . . . . . Jones and Spencer
9912 Finnegan's Flat (A laughable descriptive sketch) Original . . . . . Steve Porter
9913 "Smarty" Medley . . . . . Edison Military Band

Ask your dealer, or write to us, for the new catalogue of Edison Phonographs, THE PHONOGRAM, describing each Record in detail; the SUPPLEMENTAL CATALOGUE, listing the new August Records, and the COMPLETE CATALOGUE, listing all Edison Records now in existence. Records in all foreign languages.

TRADE MARK
Thomas A Edison

National Phonograph Co., 11 Lakeside Ave., Orange, N. J.



"Entertaining a Crowd"

Songs and music never before offered in Record form can now be had in AMBEROL RECORDS for

The EDISON PHONOGRAPH

MUCH of the world's best music has heretofore been too long for any record of any sound-reproducing instrument. If used, it had to be cut or hurried.

Such music, executed as the composer intended it, is now offered in Edison Amberol Records.

Amberol Records play twice as long as standard Edison Records and longer than any other records of any kind.

Thus Amberol Records bring to Edison Phonograph owners an exclusive and unusual list of songs and musical selections.

The new Edison Phonographs play both the standard Edison Records and the Amberols. Any Edison Phonograph (except the Gem) can be changed to play both at a small expense by asking your dealer.

No instrument, except the Edison Phonograph, plays Amberol Records; so if you want the music that Amberols have made possible, your instrument must be an Edison Phonograph.

Any Edison dealer will play these new Amberol Records for you and supply you with both Phonograph and Records.

These people are among the greatest—entertainers in their lines in the country

Marshall P. Wilder

Harry Lauder

Ada Jones

Billy Murray

You know them, at least by reputation. They have spent the best part of their lives in perfecting themselves for the sole purpose of entertaining others.

They represent a few of the artists now contributing to the monthly programs offered in the form of Edison Records. The owner of an Edison Phonograph commands the services of this array of talent; not for himself alone, but for his family and friends; not on occasions, but all of the time.

If all of the artists who have contributed to the June list of Edison Records were billed to appear at a single performance, neither distance nor price could keep you away. There are forty June Records (twenty of them Amberols). Ask your dealer or write to us for catalogues of Edison Phonographs and Records.

National Phonograph Co., 11 Lakeside Ave., Orange, N.J.

Mabel McKinley

Grace Cameron

Anthony & Harrison

Manuel Romain

Will Oakland

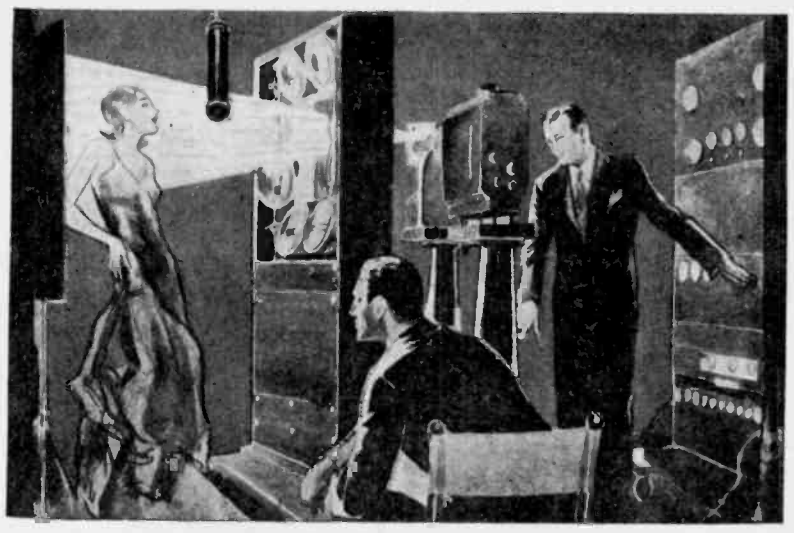
Canton, Texas has long been a favorite hunting ground for record collectors, who travel.

On the Sunday before the first Monday of each month hundreds of antique, merchandise and junk dealers set up their selling booths. There is also some activity on the first Monday.

The seventh annual Nostalgic convention in Oklahoma City should be a good place to look for records. See ad on page 6.

Hits Broadway

ppearance in the theatre when :reen, was put on as a feature Tew York vaudeville house



THE TELEVISION STUDIO

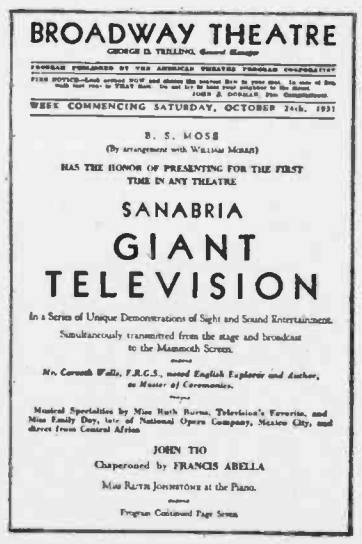
An artist's conception of the television transmitter in operation. This equipment was located in a glass enclosed studio, in full view of the audience. The transmitter output was carried to the projector equipment over wires

Hertzberg to make comparisons. He would rate the Sanabria images, projected on large screen with a 45-aperture disc, as "pretty od." They were clearly recognizable throughout 2000-seat theatre, and thus they probably fulled their purpose, although their illumination was t particularly bright. They are neither the best r the worst large screen images exhibited to te; they are highly creditable.

The Sanabria system is unique in its method of anning. The disc has only 45 holes, but these e arranged in three spirals of 15 each, each spiral vering 120 degrees of the disc, as shown in gure 1. The first hole of spiral 1 sweeps across e very top of the subject, and the fifteenth eeps across the bottom, not the very bottom, t a distance above it equal to the height two holes. The concentric scanning eeps do not overlap exactly, as in ordiry disc scanning, but are separated a disıce again equal to the height of two scanıg holes. Thus one-third of the entire rface of the subject is scanned in onerd of a revolution of the disc, which roes at 900 r.p.m.

Scanning System

As the disc continues to rotate, the first le of spiral 2 travels across the subject, rting directly under the arc traversed the first hole of spiral 1. The second e of spiral 2 starts just under the second e of spiral 1, and so on down the surface the subject until the fifteenth hole of ral 2 has passed under the path cut by fifteenth hole of spiral 1. Two-thirds the subject's area has now been covered. The first hole of spiral 3 then scans the ıaining space left blank between the t and second holes of spiral 1. Prossively down the subject the holes of ral 3 scan the last third of the surface,



BROADWAY THEATRE
GEORGE D. TRELLING, General Manager

PROGRAM PUBLISHED BY THE AMERICAN THEATRE PROGRAM CORPORATION
FIRE NOTICE—Look around NOW and choose the nearest Exit to your seat. In case of fire walk (not run) to THAT door. Do not try to leave your seat. JOHN J. DOOLEY, Fire Commissioner

WEEK COMMENCING SATURDAY, OCTOBER 24th, 1931

B. S. MOSS
(By arrangement with William Morris)
HAS THE HONOR OF PRESENTING FOR THE FIRST TIME IN ANY THEATRE

SANABRIA
GIANT TELEVISION

In a Series of Unique Demonstrations of Sight and Sound Entertainment.
Simultaneously transmitted from the stage and broadcast to the Mammoth Screen.

Mr. Carruth Wells, F.R.G.S., noted English Explorer and Author, as Master of Ceremonies.

Musical Specialties by Miss Ruth Burns, Television's Favorite, and Miss Emily Day, late of National Opera Company, Mexico City, and direct from Central Africa

JOHN TIO
Chaperoned by FRANCIS ABELLA
Miss Ruth Johnstone at the Piano.

Program Continued Page Seven

HOW TELEVISION WAS FEATURED IN THE THEATRE PROGRAM

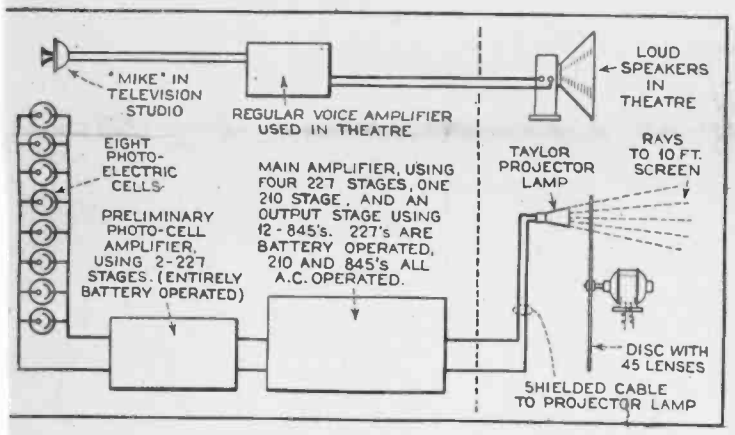
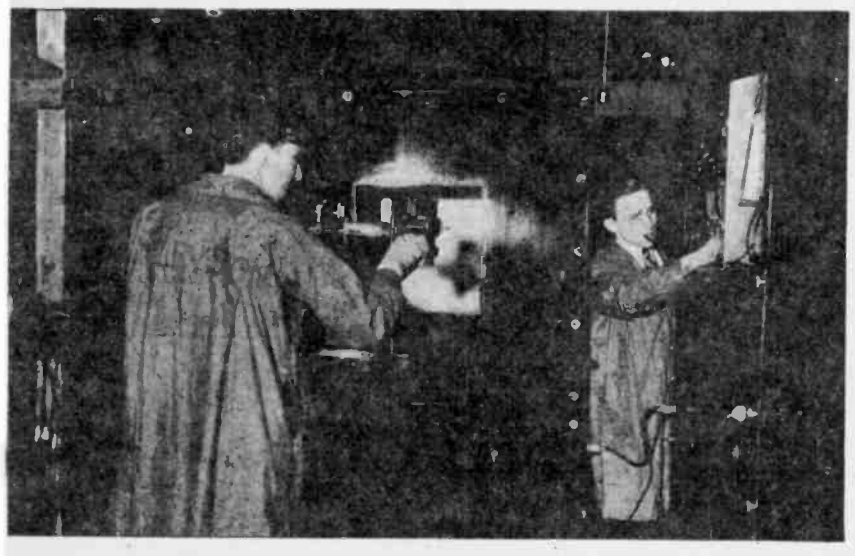


DIAGRAM OF THE THEATRE EQUIPMENT

Figure 2. The transmitter equipment for both image and sound are shown to the left of the broken line. To the right are the loudspeaker and the television projector equipment



THE SCANNING MIRROR

The scanning ray is directed on a small mirror, by which it is reflected, through the square hole in the photo-cell frame, onto the subject being televised. The engineer is here shown adjusting this scanning mirror

until the fifteenth hole sweeps across the very bottom limit.

At the receiving or reproducing end the process is the same, the scanning disc recreating the image in the same manner that it was broken down.

Since all three scannings take place in the total time of 1/15 of a second, they impress the eye as a single composite action. The eye's well-known characteristic of persistence of vision makes this possible.

Mechanical Precision

The successful operation of the Sanabria system as it is being demonstrated on the stage seems to be due to the precision of the mechanical members, and also to the sensitivity and power, respectively, of the photoelectric cells and the projector lamp. The arc light and disc mechanism of the transmitter are set up on a massive cast-iron stand about four feet high. The base is fitted with leveling and locking screws so that the whole unit will stay put in any desired position. The transmitting disc is small, being only about sixteen inches in diameter. The rays of scanning light that come through it are not thrown directly on the subject, but are reflected by a 45-degree mirror through a square opening in a seven-foot-high frame holding eight photo-electric cells. This arrangement is very convenient for the operator, as it allows him to see the subject at all times and to make any necessary focusing adjustments on the scanning rays.

The side of the disc facing the reflecting mirror is fitted with a revolving turret carrying four different lenses. The operator selects the best lens for the particular subject being televised.

The photo-electric cells are about the same size as ordinary receiving tubes, but they are given a formidable appearance by the highly polished reflectors in which they are mounted. The active sides of the cells do not face the subject, as most people seem to think, but are turned inward and are placed at the exact foci of the reflectors. Thus the scanning rays from the arc and the disc fall upon the subject. are reflected in varying degrees of strength into the polisned reflectors, and create weak currents in the photo-electric cells in accordance with the graduations of tone on the surface of the subject.

The output of the photo-electric cells is amplified by an eight-stage audio amplifier terminating in an output stage consisting of twelve 75-watt tubes in parallel. The whole amplifier is built up on a portable frame just like the photo-cell unit.

In the stage demonstrations the output of the audio amplifier is led by a short wire line directly to the projector apparatus, which is backstage about twenty-five feet away. Under these circumstances there is no radio transmission problem, and the images are free of the phantom snowstorms and other ghostly effects produced by stray bits of radio interference. A frequency band about 50 kilocycles wide is covered by the transmission.

The projector is a piece of machinery worth seeing. The disc is *three and a half feet in diameter,* and is driven by a five-horsepower synchronous motor. It is fully enclosed for the protection of everyone concerned. Instead of having mere holes, it is fitted with 45 lenses, each *two inches* in diameter. Directly behind the disc is a Taylor projector lamp. The exact construction of this lamp is something of a secret, but it is known to contain a mixture of helium and carbon dioxide and draws an energizing current of one ampere at 100 volts from the audio amplifier.

The whole projector unit stands about six feet high and is raised on a wooden platform so that it projects an even image on the back of a translucent glass screen ten feet square. The distance between projector and screen is about eighteen feet. The projector is not visible to the audience, although the flickering light of the lamp can be discerned faintly through the screen.

The men traveling with the apparatus are good fellows, and will probably be glad to show you the very interesting projector if you identify yourself as a radio man and make the necessary arrangements at the stage door.

The designer of all this equipment is Ulysses A. Sanabria, a quiet and modest young man of only 26. He has been doing independent television research in Chicago for about five years and has built several transmitters for Chicago stations. He supervised the New York demonstrations and will travel with the apparatus to make sure that it continues to work.

The writer sat through a complete show with Sanabria at the Broadway Theatre while he directed the operators by telephone from a balcony seat, and he was impressed by his earnestness and evident knowledge. The man has been devoting his life to television, and he is only just starting.

1932

VISUAL BROADCASTING (TELEVISION) STATIONS
RULES AND REGULATIONS GOVERNING VISUAL BROADCASTING

The Federal Radio Commission has adopted the following rules and regulations governing visual broadcasting:

That visual broadcasting be designated to include both television and picture broadcasting, or moving-picture broadcasting and still-picture broadcasting, and that all licenses issued be of an experimental nature for a period of six months only, the licensees to report to the commission the results of their experiments; the transmitters to be located outside the city limits and sufficiently distant from important receiving centers to avoid interference.

1932 ad

REPRINT of "THE FIRST ANNUAL RADIO SET DIRECTORY," which was included in March 1925 Radio News. It pictures 236 BC sets and gives trade name, model, type, tubes, batteries, control, aerial, price and manufacter's name. This directory, at a low price, will be available to subscribers of The Horn Speaker within a short time.

on the Air

Many collectors are looking for silk covered wire. If anyone has any of this seemingly rare wire for sale, The Radio Speaker will help spread the news of where to buy the wire.

Whether or not the Dallas Antique Radio Club succeeds in holding a radio show inviting the general public to it remains to be seen. The club failed to meet as scheduled on the 10th of April. The meeting was postponed to the 17th of April. However, the club is only a little more than a month old; it needs more time to become established.

Vacationing collectors are usually interested in local radio shows which makes them of national interest. The Radio Speaker is glad to report club news.

According to Antique Radio Topics of Cutler, Indiana, there will be a meeting of the Indiana Historical Radio Society at 10:00 a.m. on April 23, 1972 at the Waynedale Branch of the Peoples Bank and Trust building, Fort Wayne, Indiana. There will be exhibits and auctions.

History of Radio Inventions

By A. H. MORSE, A.M.I.E.E., Member I.R.E.*

We are happy to present to our readers a new and important work, entitled "History of Radio Inventions," by A. H. Morse, which is beginning in this issue.

This book, which is now running serially in RADIO NEWS, will be published afterwards in book form, in both the United States and England.

It will prove a gold mine to those interested in the history of all important radio inventions and will serve as a reference book to inventors and experimenters in the future.

Mr. Morse has been careful to give every patent number throughout the text, as well as all reference data, so anyone interested in any particular phase of radio development will have little trouble in locating important data.

—EDITOR.

INTRODUCTION

The term "Radio" is used herein to connote radio telegraphy and radio telephony, and not merely broadcasting.

The bibliography of radio is already very extensive, and while it contains much of a trashy or partisan order, the balance very well covers the technical aspects of the subject to date. There should, however, be room for a book which presents the subject in a novel or more lucid way, or for one that considers it from a new point of view; and it is in the latter class that it is hoped that this book will find a place.

Within the last few years the radio field has been invaded by many thousands of persons who know nothing of its evolution, and are therefore sometimes unable to distinguish between what is new and what is old. The consequence is that they waste much time and money in re-inventing old devices, and in evolving others to circumvent imagined patents on inventions long since in the public domain. The case of the spider-web coil may be cited as an example. This will be found to have been illustrated and described several years before the Great War, but was heralded as a novelty two or three years ago. It is one of the author's objects to help to correct the perspective of these newcomers; and it is hoped that this book will be of some assistance also to British and American Patent Agents and Attorneys (new to the art), Inventors, Experimenters, Journalists, Radio enthusiasts and "Whymen" generally, on both sides of the Atlantic.

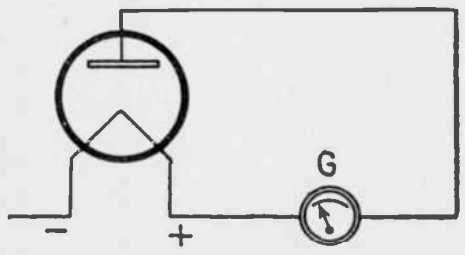


FIG. 1

Edison's original diode patented long before the advent of radio.

The evolution of the radio art is traced herein, mainly through the patent office records of inventions in use today, or their lineal forebears. As a consequence, many inventions of great merit and one-time promise receive little or no mention; and, except in a few cases, where inventions are cited merely as evidence of the contemporary knowledge of the art, the selection has been made, not by the author, but by the test of utility. It may be observed that this test has proved too much for some of the most heralded inventions.

Since so much reference is necessarily made to patents of invention, it may be well to warn the reader that an invention is not always novel, useful or practicable because it is patented.

While the loose practice of using the words "took out a patent," instead of "was awarded a patent," is to be unequivocally condemned, it must be admitted that the former often express a near-truth, particularly in connection with a new art, and in certain countries.

Patent Office Examiners are only human, and when they accept an application for a patent, it merely means that they know of, and have succeeded in tracing, nothing to upset the inventor's claims. Of course, in large settled countries, where there are specialist examiners for every art or branch of an art, a patent has more significance than it has in a new or undeveloped country, where a few examiners have to deal with applications for patents in relation to all the arts. Moreover, it is a fact that, until a few years ago—and perhaps they exist today—there were administrations which would, and often did, take an "inventor's" money for a patent on a "perpetual-motion" or "self-driving" machine. The U. S. Patent Office requires a working model with such applications, which is equivalent to refusal.

In any country a patent of invention is merely a "scrap of paper" until it has been supported by a law suit; and it is a wise inventor who knows whom to sue. Being blind, justice is only too liable to be influenced by a cloud of "expert witnesses," the which cost much money.

If over much attention appears to have been given to the arc, it is because, by reason of its simplicity and freedom from patent restrictions, it may continue to have extensive application; even if its present disabilities are not mitigated, which is unlikely. (There has been some improvement since this was written.)

In the hope that he may thereby help to correct some of the misapprehensions to which expression is so persistently given in the lay press, the author has ventured to look forward a little, and to hazard some opinions on the lines of future development.

Wherever the British or American—as the case may be—"equivalent" of a patent is known to the author, reference is given to it herein. It must not be assumed, however, that such "equivalent" covers the same patent protection in the two countries; because, in many cases, there is a wide discrepancy in this respect. When a patent number is prefixed (or suffixed) by (?), it means that the author has not personally verified the reference.

The author is gratefully indebted to the courtesy of the Commissioner of Patents at Washington, D. C., and to the Controller of His Majesty's Stationery Office at London, for permission to reproduce the extracts from American and British patent specifications respectively, which appear herein; and to the Director, U. S. Bureau of Standards, for the photo and diagrams illustrating the chapter on Beam and Short-wave Radio.

The author's thanks are also due to Messrs. E. A. B. Snoaden, H. F. White, H. R. Rivers-Moore and R. E. H. Carpenter, of London, for assistance in procuring reference to certain publications, not available in Montreal; and to the publishers for their courtesy and kindly advice on the arrangement of the subject matter.

Montreal, December, 1924.

CHAPTER I

THE PAST

IN connection with patents of invention, there is a somewhat commonly used metaphor to the effect that one cannot get a patent on the use of an umbrella to keep off the sun. This, however, cannot be said to apply to the radio art; for instance, J. A. Fleming was awarded a perfectly good patent on the application to radio of a well-known effect and instrumentality; and H. H. C. Dunwoody secured an equally good one on the similar application of a hitherto unsuspected property of carborundum. In each case the invention was of a high order of commercial utility, since the former led to one of the greatest developments in the evolution of the art, while the latter sustained the art during one of the most needy periods of its application to commerce, and is still in extensive use.

The evolution of radio has been characterized by comparatively few original inventions of outstanding merit and commercial utility; and by fewer still that, for one reason or another, have found any practical application, until they were about 10 years old. Moreover, the borrowings from other arts have been all too few and tardy.

In this chapter we will endeavor to note in chronological order the discoveries and inventions which are more or less strictly relevant to the present state of the art; omitting those which have or had no important practical application, regardless of their academic merit.

1678. Christian Huygens, a Dutch mathematician and physicist, propounded the undulatory theory of light.

1843. Professor Joseph Henry communicated to the American Society that he had succeeded in magnetizing needles at a distance of 220 feet.

1867. Ruhmkorff perfected the "Ruhmkorff coil" which 35 years later was used almost exclusively in wireless stations.

James Clerk-Maxwell propounded the electro-magnetic theory of light. This theory confirmed and extended that of Huygens, and was supported by mathematical proofs which form the basis of radio engineering today.

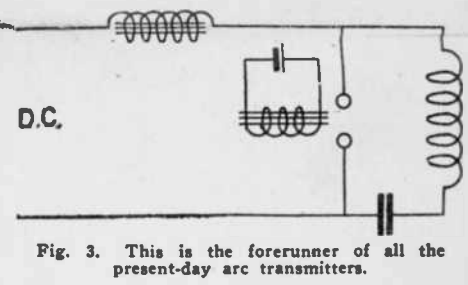


Fig. 3. This is the forerunner of all the present-day arc transmitters.

1879. Professor D. E. Hughes, of London, gave a private demonstration of the

*Late Supt. Dom de Forest Wireless Telegraph Co. and United Wireless Telegraph Co.; Engineer, Marconi's Wireless Telegraph Co.; Wireless Adviser, Indo-European Telegraph Co.; Managing Director, Marconi Wireless Telegraph Company of Canada.

Television for Amateurs

By S. R. WINTERS

Here is a preliminary report of a new and simple device which makes the transmission of sketches possible to amateurs.

THE army of approximately 20,000 radio amateurs may be on the threshold of a new and fruitful period of experimentation. Radio vision—the sending and receiving of photographs, sketches, script, maps and autographed letters—is now in its infancy, just as radio telegraphy was 20 years ago. This revolutionary system of the transmission and reception of distant scenes by radio has been proven sound in principle; it remains now for the real experimenters to translate the laboratory achievement into practical performance.

THE INVENTOR

C. Francis Jenkins, inventor of the motion-picture projecting machine and credited with many other far-reaching discoveries, has not only developed a system for the sending and receiving of pictures and sketches by radio, but has demonstrated its value in performance tests in the laboratory and afield. Very recently he has invented and built a small and simple machine that will put radio vision within the reach of the radio amateur. It marks the introduction of a practical realization of what Mr. Jenkins prefers to call a service to the eye, just as radio now is a service to the ear.

The machine built for use by radio amateurs is inexpensive and, when compared with its marvelous accomplishment, is very simple in construction. This unit may be connected to a small electric motor or victrola as a governor control, which engages with a gear as a means of driving a shaft. On each end of this shaft a brass cylinder is mounted. A second threaded shaft engages with the cylinder shaft through a pair of gears. Mounted on this threaded shaft is a pair of arms connected together with an insulated bakelite bar. The rotation of this threaded shaft moves the bar of bakelite longitudinally with respect to the cylinders. Furthermore, mounted on this insulated bar are two contact fingers, one coming in touch with the cylinder used for sending photographic impressions and the other makes contact with the cylinder employed in receiving the maps, sketches, pictures, etc.

TRANSMISSION

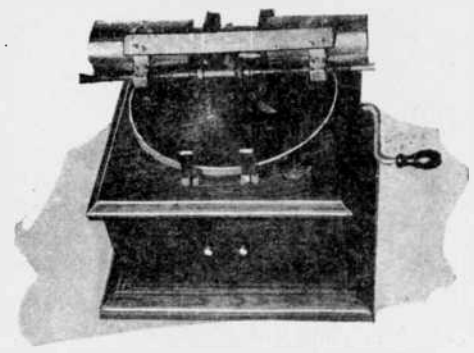
The message, whether taking the form of a business letter or a sketch to represent a radio diagram, is written with a pen on white paper. The ink used in making this impression is peculiarly adapted to this purpose, having been invented by Mr. Jenkins. This strip of paper containing writing to be sent by radio is wrapped around one of the brass cylinders and secured thereto with a fragment of sticky paper. A switch is closed in an electric circuit which connects the cylinder at the contact finger with the transmitting machine. Whenever a line of writing passes under this contact finger a radio wave is propagated into space just as the closing of a telegraph key sends forth an electric impulse. At all the receiving stations of this photo-letter system of communication the incoming radio signals pass through the contact finger on the receiving cylinder and make a chemical mark on the paper. That is to say, every time a line of writing at the sending station passes under the contact finger a mark is made on every receiving station cylinder.

Mr. Jenkins told the members of the Third National Radio Conference that he would not ask for any special allocation of wavelengths for the transmission and reception of pictures and photographic copies of messages, letters, sketches, etc., by radio. This means that radio amateurs in their experimental efforts in the field of radio vision may further investigate the possibilities of short wave-lengths or high frequencies. Therefore, when the President of the American Radio Relay League speaks optimistically of the potential value of short wave-lengths he may also include in the picture the prospects of radio vision within these once idle and worthless bands of frequencies. Mr. Maxim states: "This new territory, of unplumbed possibilities, and a great and far-reaching achievement of the radio art is rapidly gathering headway as these thousands of experimenters take up and solve the problems they encounter on these short waves.

The including of a Jenkins' duplex photogram machine, so called, in the radio equipment of the amateur station means that when these pioneers in wireless development tire of exchanging telegraphic code with friends in Australia that they can switch to the picture-sending unit and show the Australian amateurs, at long range, scenes of the objects about them. These photographic impressions may take the form of a pencil-writing greeting, a sketch of the antenna system at his station, a map of the section in which he lives, or a picture of the transmitter that he uses. Irrespective of the subject thus treated, there will be an irresistible fascination in this unbroken ground of experimentation.

IN USE

This so-called service to the eye, to quote



A phonograph may be used to synchronize the copying devices at the two stations.

Mr. Jenkins, in introducing the system to the United States Post Office Department, is "a method of transmitting messages by radio instead of by steamship, Washington to Panama in five minutes. It has the authentic character of an autographed letter and the speed of radio. It is the beginning of a radio service to the eye, where heretofore radio has been an address to the ear only. Will the time soon come when the Post Office Department will deliver by radio photographic copies of our business letters at the speed of light, rather than the relatively laggard delivery of the originals by mail plane? Such an exchange of intelligence would wonderfully speed up industry because, like an army, industry can go no faster than its means of communication."

Fitting, is it not, that Mr. Jenkins, whose mechanical ingenuity conceived the beginning of the billion-dollar-a-year motion picture industry, should also invent the practical machine that ushers in radio vision to the 20,000 amateur radio stations? He has been experimenting along the line of picture projection for more than 30 years. He has been issued more than 300 American and foreign patents—ranging from spiral liquid containers to self-starting devices for automobiles. He foreshadows a time when radio vision will make it possible for us to view the Olympic games in Europe, and people of other nations will be enabled to see at long range the inaugural ceremonies of a President of the United States. The placing of duplex photogram machines in the hands of radio amateurs is a step in that direction. It means a thorough exploitation of the abstract idea of seeing as well as hearing by radio.

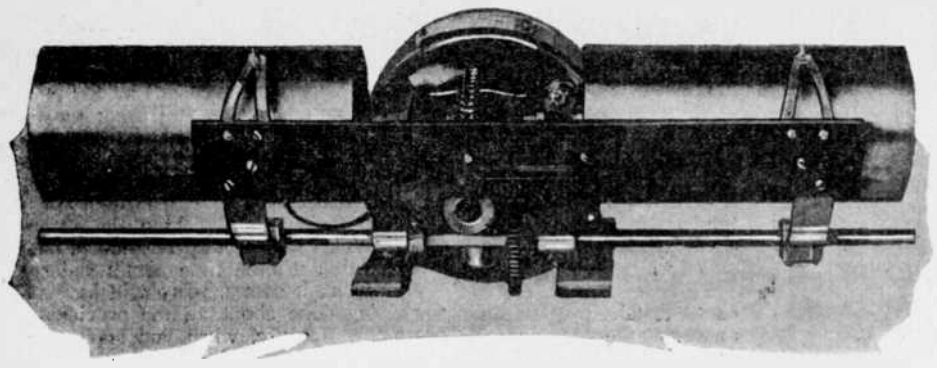
The action of the apparatus is the simplest possible. The picture to be transmitted is drawn on paper with a copper sulphate solution in such a way that when the needle passes over the written lines the chemical ink transmits an impulse through the cylinder and needle, which is, in turn, sent into the radio transmitter.

At the receiver, an amplifier is used after the detector, and the amplified impulses sent out by the transmitter are passed to the receiving pen and cylinder. A paper moistened with potassium iodide or ferrocyanide is placed on the receiving cylinder. When the amplified current passes through the needle the electrolytic effect discolors the paper, giving perfect reproduction of the original picture.

THE "PENS" ARE SIMPLE CONTACT POINTS

The beauty of this system is, of course, its simplicity. The victrolas at the two stations may be exactly synchronized by adjusting their governors. The cost of the two-cylinder arrangement is small; in fact, it may even be constructed by the amateur. The motor method is likewise simple.

This little arrangement bids fair to open up a whole new field to the amateur experimenter.



Another form of the device employs a small motor for turning over the cylinders which carry the "pens" and the chemically treated paper.

MARCONI

The principal point in my receiver is the sensitive tube or radio-conductor, or, as it is generally termed, the coherer. It consists of a small glass tube, about four centimeters in length, into which two silver plugs are tightly fitted. A small gap separates them, and in this gap a mixture of nickel and silver filings is placed. Under ordinary conditions, the resistance of this gap is too high to allow of any current passing from the local cell or battery; but, under the influence of electric waves, these filings instantly cohere, and the tube becomes a comparatively good conductor. Connected to this tube is a cell and a relay. By the cohesion of the filings, the current from the cell is allowed to pass through the tube and actuate the relay. When once this is achieved, it becomes a very simple matter to make a bell ring, or work an ordinary Morse inkwriter.

But one peculiarity with this cohesion of the filings, under the influence of an electric wave, is their power of remaining cohered unless tapped or shaken up. I have overcome this difficulty by using an automatic tapper or discoherer, which is somewhat similar to an electric bell tapper minus the bell. This is so adjusted as to tap the tube and shake the filings up, thus decohering them and bringing them to their normal condition, when they are again in a state to receive another impulse. This is worked by the relay and another local battery.

It will now be easy to follow the various actions which take place. The oscillations set up by the transmitter at a distant station act on the vertical conductor or resonator which is connected to the sensitive tube at the receiving station, cohere the filings in the tube, and allow the local cell to actuate the relay. The relay, in its turn, causes the larger battery to pass a current through the tapper or interrupter, and also through the electro magnets of the recording instrument. The practical result is that the receiver is actuated for a time equal to that during which the key is pressed at the transmitting station.

With apparatus as thus explained, and with the addition of a few important details which for brevity I shall not describe, I have made most of my experiments and worked numerous important installations.

After the experiments across the Bristol Channel, I gave some important demonstrations to the Italian naval authorities at Spezia. With the transmitter on shore and the receiver on board an Italian warship, a distance of 12 miles was bridged. A series of trials were also carried out with other ships, and between ship and ship, and the Italian navy was not slow in permanently adopting my system.

On Salisbury Plain, I introduced kites as a means of raising and suspending the vertical conductor to a considerable altitude. In these experiments I attained my greatest distances—between Salisbury and Bath, a distance of 34 miles.

Immediately after this, I set up two experimental stations, one at Alum Bay, in the Isle of Wight, and the other at Bournemouth, the distance between them being 14 miles, in order to test the practicability of the system under all conditions of weather, and also to afford an opportunity of proving that "wireless telegraphy" was not a myth, but a working reality.

It has apparently been thought that the weather, or varying conditions of atmospheric electricity, may interfere with or stop the signals transmitted by this system; but experience of over 14 months of continual every-day work has brought me to the conclusion that there is no weather which can stop or seriously interfere with the working of such an installation.

We have given demonstrations to several eminent scientists who came down, often when we did not expect them, but on no occasion have they found any difficulty in the work of transmitting and receiving messages between the two stations. Among others who inspected these stations, was Lord Kelvin; and he was kind enough to express himself as being highly pleased with what he saw. He sent several telegrams to his friends and insisted on paying one shilling royalty on each message, wishing in this way to show his appreciation of what was done, and to illustrate its fitness at that time for commercial purposes.

In July of last year, we gave an interesting demonstration at Kingstown Regatta, in reporting from a tug the results and incidents of the several yacht races. The relative positions of the various yachts were thus wirelessly signaled, while the races were in progress, sometimes over a distance of 10 miles, and published long before the yachts had returned to harbor. On one of these excursions we had the company of several stock brokers and business men of Dublin, who transacted business on the receipt of the daily Stock Exchange quotations sent off from our shore station, much to the amusement of all on board.

After finishing at Kingstown, I had the honor of being asked to install wireless telegraphic communication between the royal yacht, "Osborne" and Osborne House, in the Isle of Wight, in order that Her Majesty might communicate with H. R. H. the Prince of Wales, who at that time was suffering with a fractured knee. Though quite hidden from one another by intervening hills and trees, constant and uninterrupted communication was maintained. These obstructions would have rendered direct signalling between the two positions impossible by means of any flag, semaphore or heliograph system.

In December of last year, it was thought desirable to demonstrate that the system was quite practical, and available for enabling telegraphic communication to be established between lightships and the shore. This is a matter of great importance. By

(*Continued on page 7*

1932

ALPHABETICAL LIST OF VISUAL STATIONS BY STATES

(Furnished by the Dept. of Commerce, Radio Division)

Location of Transmitter	Call Signal	Frequency in Kilocycles	Power in Watts	Owner
California:				
Bakersfield	W6XAH	2000 to 2100		Pioneer Merc. Co.
Gardena	W6XS	2100 to 2200	500	Don Lee (Inc.)
Los Angeles	W6XAD	43000 to 46000		Don Lee, Inc.
		48500 to 50300		
		60000 to 80000		
Illinois:				
Chicago	W9XAO	2750 to 2850	500	West. Television Corp.
Chicago	W9XAP	2000 to 2100	2500	Chicago Daily News
		2100 to 2200		
Downers Gr.	W9XR	2850 to 2950	5000	Great Lakes Bdct. Co.
Indiana:				
W. Lafayette	W9XG	2750 to 2850	1500	Purdue University
Maryland:				
Silver Springs	W3XK	2000 to 2100	5000	Jenkins Laboratories
Massachusetts:				
Boston	WIXAV	2850 to 2950	1000	Short and Television Laboratory (Inc.)
New Jersey:				
Camden	W3XAD	2100 to 2200	50	R. C. A. Victor Co., Inc.
		43000 to 46000		
		48500 to 50300		
		60000 to 80000		
Passaic	W2XCD	2000 to 2100	5000	DeForest Radio Co.
New York:				
Beacon	W2XBU	2000 to 2100	100	Harold E. Smith
Long Is. Cy.	W2XBO	1750 to 2850	500	United Research Corp.
Long Is. Cy.	W2XR	2100 to 2200	500	Radio Pictures (Inc.)
		2850 to 2950		
		43000 to 46000		
		48500 to 50300		
		60000 to 80000		
New York	W2XAB	2750 to 2850	500	Atlantic Bdct. Corp.
New York	W2XBS	2100 to 2200	5000	Nat. Bdct. Co. (Inc.)
New York	W2XCR	2000 to 2100	5000	Jenkins Television Corp.
New York	W2XF	43000 to 46000		Jenkins Television Corp.
		48500 to 50300		
		60000 to 80000		
New York	W2XDS	43000 to 46000		Jenkins Television Corp.
		48500 to 50300		
		60000 to 80000		
Schenectady	W2XCW	2100 to 2200	20000	General Electric Co.

1932

OGRE OF THE AIR WAVES

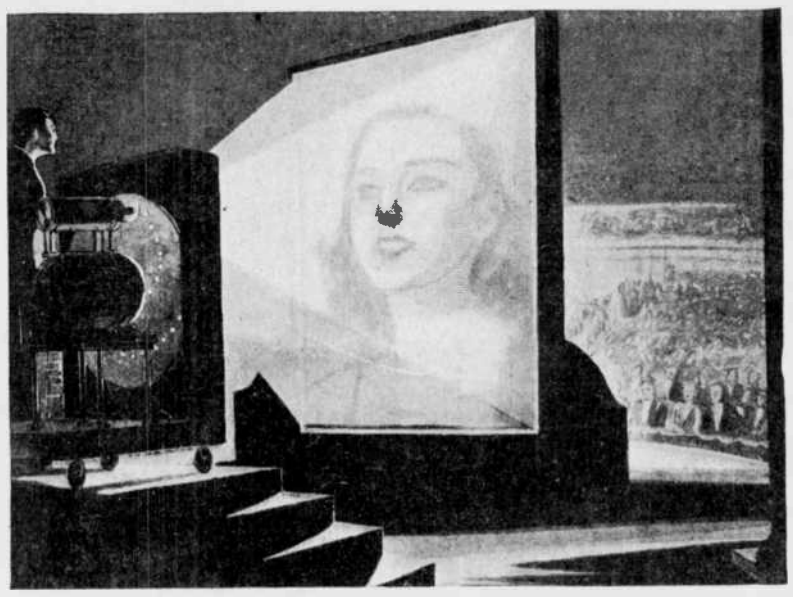
Television's first mystery character, "The Television Ghost," is raising the hair of lookers-in to broadcasts from Columbia's television station W2XAB every Thursday night at 9:30 P. M., E. S. T. Weird scenic and sound effects contribute to the spine-chilling effect of the spectre shown above in his role as the shade of a murderer. Naturally, since ghosts are nameless, this one is anonymous. And considering the Eighteenth Amendment, isn't it startling to learn that spirits are now being sent through the air?

Pennsylvania:				
Pittsburgh	W8XT	2100 to 2200	20000	Westinghouse Electric & Mfg. Co.
		660	25000	Westinghouse Electric & Mfg. Co.
Wisconsin:				
Milwaukee	W9XD	43000 to 46000	500	The Journal Co. (Milwaukee, Journal)
PORTABLE				
Masschusetts:				
Boston	WIXG	48500 to 50300	30	Shortwave & Television Corp
		60000 to 80000		
New Jersey:				
Passaic	W2XAP	60000 to 80000	250	Jenkins Television Corp.
Bound Brook	W3XAK	60000 to 80000	5000	Nat. Bdct. Co. (Inc.)
New York State	W2XBT	60000 to 80000	750	Nat. Bdct. Co. (Inc.)
		2000 to 2100		
		2100 to 2200		
		43000 to 46000		
United States	W1OX	48500 to 50300		
Unted States Throughout	W1OXG	60000 to 80000	500	DeForest Radio Co

TELEVISION

Television made its initial
a demonstration, using a ten-foot
of the regular program in a

By Robert



THE PROJECTOR EQUIPMENT

The television projector was mounted on the stage, behind a ten-foot translucent screen. Loudspeakers, for the reproduction of the sound portion of the program, were located at the base of the screen

THE prediction has often been made that the public will get its first sight of television in the theatre. This is one prediction in a terribly over-predicted field that has finally been fulfilled. On October 24, 1931, the Sanabria apparatus went on the stage of the B. S. Moss Broadway Theatre, New York, and took its place on a typical Broadway variety bill of girls, comedians, dancers and movies. Television was easily the feature attraction and packed the house from noon to midnight.

The television act as it was presented in New York has been booked for a regular vaudeville tour. According to a representative of the booking agency, several identical units will be built and sent out on the "road." If the act reaches your city, by all means go and see it, not for its entertainment value, which is negligible, but for its technical features. The equipment used in the stage demonstrations is worth examination from the mechanical standpoint alone, for it certainly is the largest and most ambitious disc machinery produced so far. Regardless of whether the disc idea survives or not, the Sanabria system represents one important school of television thought, and is exceedingly interesting from a number of angles.

"Ballyhoo" Announcing

The theatrical people, having discovered an ace drawing card in this television stuff, are ballyhooing it extravagantly. Unfortunately, they are leaving many things unsaid, and they are only compounding the confusion that now plagues the potential radio-television market. If the press-agents and spotlight seekers would keep off the stage and allow Sanabria himself or some competent lecturer to deliver a sane and simple explanation of the works, the effect on the audience would be better and the whole stunt would look more like the genuine scientific exhibition it is supposed to be.

When the hired blurb-spouter points to a ten-foot screen and a ton of machinery, and makes the remark that television will soon be in the home, he is certainly misleading his listeners. He is also making things unpleasant for the local radio dealers, for those same people, after witnessing the rather impressive demonstration, visit the radio stores and inquire about "television attachments" and "television receivers," and delay the purchase of new radio sets with the intention of waiting for the arrival of the promised miracle.

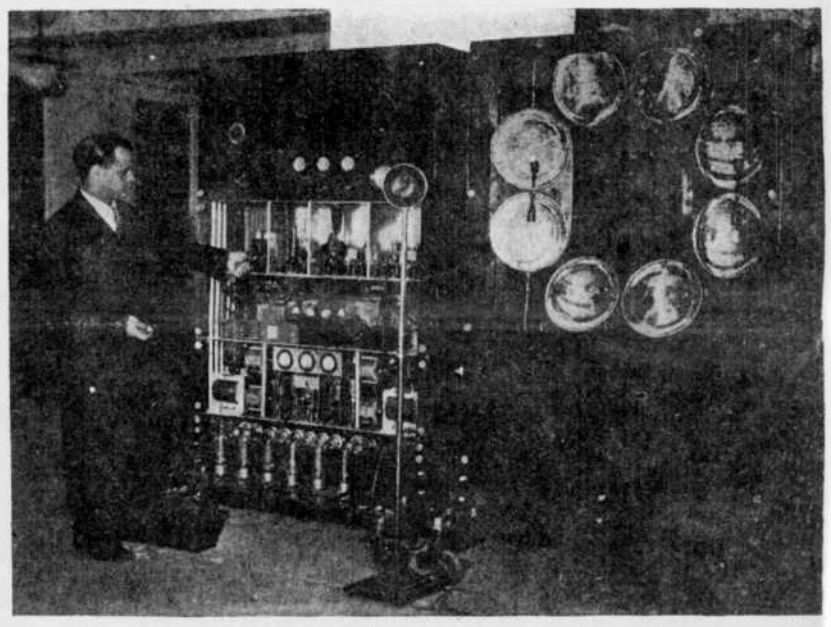
The Sanabria Set-up

The set-up on the stage is simple. The transmitting apparatus, which comprises an arc light, a scanning disc, photo-electric cells and audio amplifiers, occupies one end of a glass-enclosed studio, with a small piano, a microphone stand and some chairs at the other end. Two men attend the equipment, one at the scanner and the other at the amplifiers. The studio is about fifteen feet long, seven high and seven wide, and is of the usual soundproof construction. Its entire contents are visible to the audience.

After a preliminary spiel, the announcer and two or three entertainers enter the studio, the theatre is darkened, and the scanner turned on. A dim light that does not affect the photo-electric cells is left shining in the studio, just to show the audience that everything is on the level.

At the Broadway Theatre the studio was lowered a few feet into the stage by a disappearing elevator. Then a ten-foot square glass screen just behind the studio was uncovered, and the image of the announcer appeared in a bluish green light, filling the entire screen. Voice accompaniment came through an ordinary theatre sound system.

Now the writer has seen every open television demonstration of importance during the past five years, and he is in a position



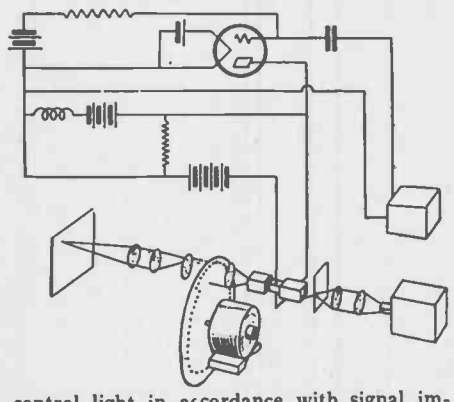
PARTS OF THE TRANSMITTER EQUIPMENT

Ulysses A. Sanabria, designer of the equipment, is shown in front of the immense eight-stage audio amplifier used to step-up the tiny output of the photo-cells. At the right is the photo-cell frame with its reflector equipment

Patents

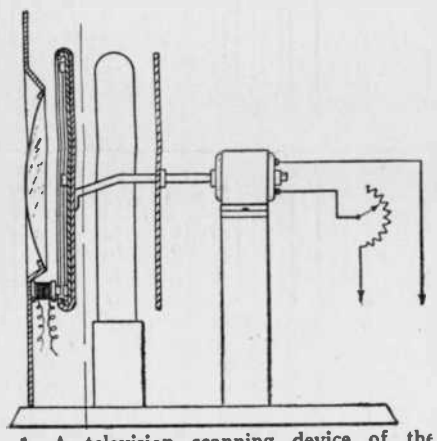
1,828,667. TRANSMISSION OF PICTURES. Ray D. Kell, Schenectady, N. Y., assignor to General Electric Company, a Corporation of New York. Filed July 8, 1929. Serial No. 376,592. 3 Claims.

1. The method of utilizing a Kerr cell to



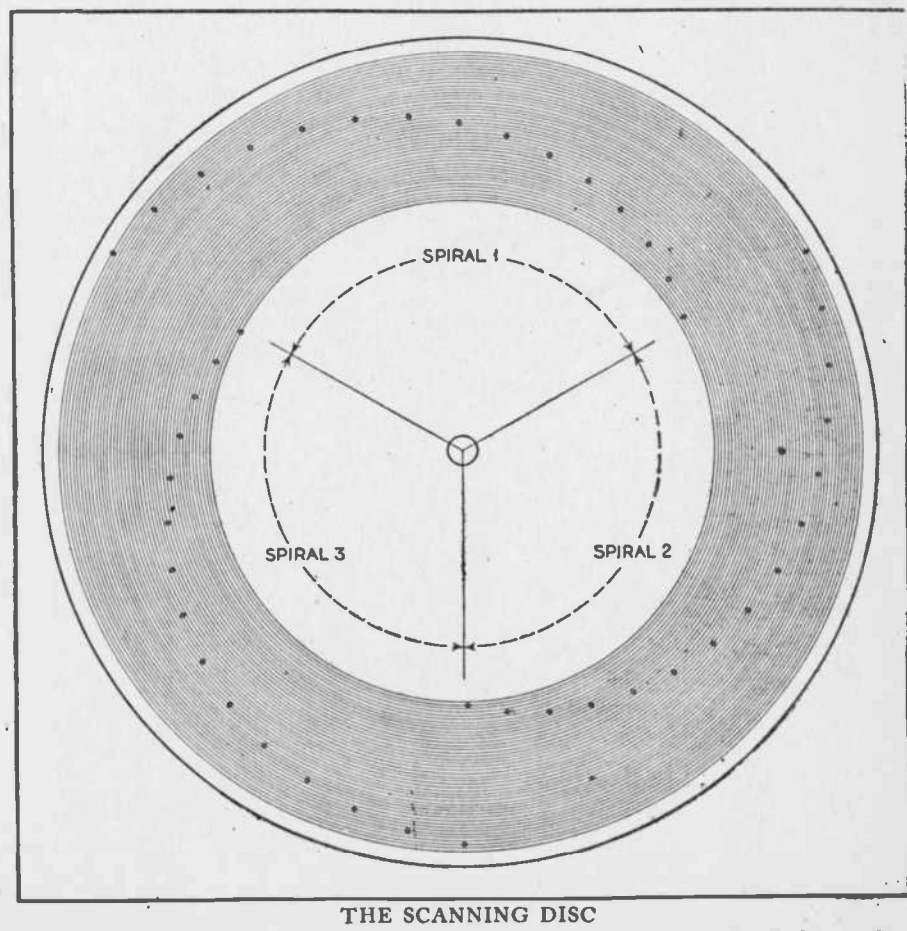
control light in accordance with signal impulses which includes biasing said cell to one of its higher volt-light characteristics, and applying said impulses to said cell.

1,826,836. TELEVISION SCANNING DEVICE. Michael Stacho, Cleveland, Ohio. Filed May 1, 1930. Serial No. 448,965. 5 Claims.



1. A television scanning device of the character described comprising a pair of rotable disks having slots therein for the passage of light to a subject, and magnetic means for periodically retarding the rotation of one of said disks with respect to the other of said disks with each revolution thereof.

1932 ad.



THE SCANNING DISC

Figure 1. A triple-spiral system of scanning is used. In the projector disc each "hole" is actually a two-inch lens

transmission and reception of radio signals up to a distance of several hundred yards. Those present were W. H. Preece, Sir. Wm. Crookes, Sir W. Roberts-Austen, Professor W. Grylls Adams and Mr. W. Grove. Early in the following year Professor Hughes gave a similar demonstration to a professor of Cambridge, who stated that all the phenomena could be explained by known electro-magnetic induction effects. This so discouraged Hughes that he decided not to publish the results of his experiments until he was in a position to prove that he was making use of hitherto unknown phenomena. Consequently, his experiments were not made public for many years; meantime the phenomena had been identified by others, and commercially applied by Marconi. In 1899, in commenting on Hughes' work, Sir Wm. Crookes said: "It is a pity that a man who was so far ahead of all other workers in the field of wireless telegraphy should lose all the credit due to his great ingenuity and prevision." In later years Hughes might have had recognition of his work, but he resolutely refused.

1883. Professor A. E. Dolbear, of Boston, evolved a system in which he proposed to use an elevated aerial, earthed through the secondary of a Ruhmkorff coil, having a telephone transmitter and battery in series with the primary. He also proposed in 1886 to elevate his aerial by means of a kite and to put a Morse key instead of a telephone transmitter in the primary circuit (see U. S. Pats. 350,299 and 355,149), which were acquired by the United Wireless-DeForest Company.

Thomas A. Edison, of New Jersey, applied for an American patent on a diode for use in the voltage control of electric lighting systems. (U. S. Pat. 307,031.) This invention caused considerable scientific interest, but does not seem to have had much practical application. (See Proc. Royal Society, London, Vol. xlvii, 1889-90, p. 118, J. A. Fleming.) (Fig. 1.)

1885. Edison proposed the use, in an inductive system of wireless telegraphy, of an elevated and earth aerial for land stations, and an inverted and earthed "L" aerial for ship stations. (Fig. 2*a*, *b*, *c*.) (U. S. Pat. 465,971.) He also proposed the use of balloons covered with conducting foil and connected through transmitting or receiving apparatus to earth. (Fig. 2*d*.)

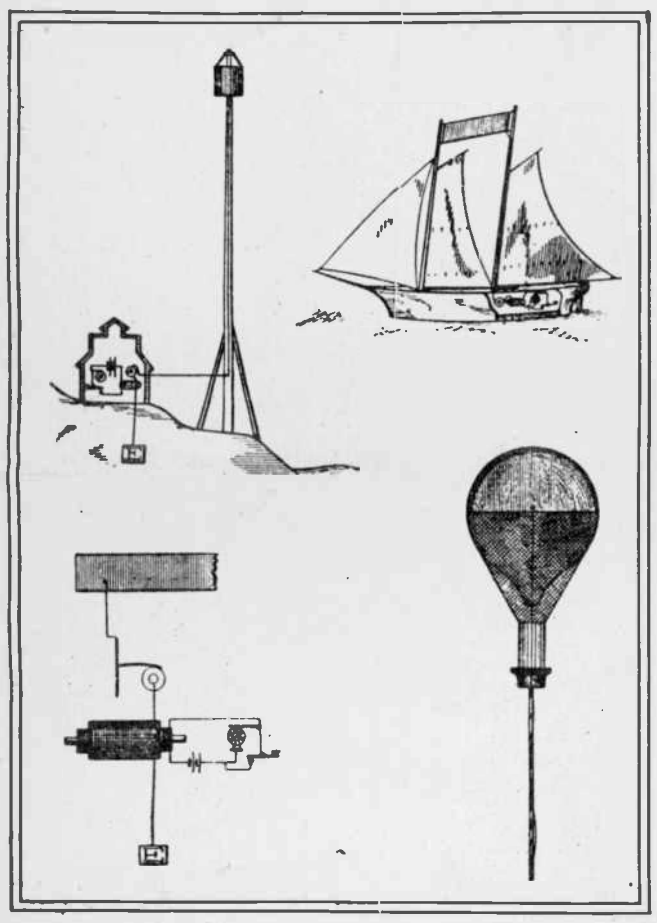


Fig. 2. Showing three antennae which Edison proposed using.

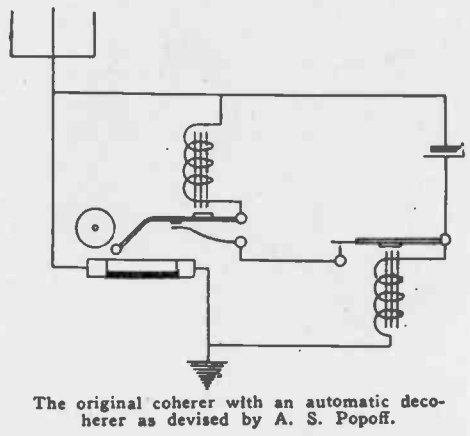
1888. Professor Rudolf Heinrich Hertz, a German, demonstrated experimentally the possibility of creating electro-magnetic waves in the ether, and confirmed their identity with those, which according to Clerk-Maxwell's theory, were the conveyors of light. Apparently Hertz was unaware of Hughes' earlier experiments with a microphonic detector and a telephone, because he (Hertz) used for a detector a simple metallic loop containing a minute spark gap. Hertz succeeded not only in detecting the waves, but in measuring their velocity and length. He also demonstrated that they were capable of reflection, refraction and polarization.

1890. Professor Edouard Branly, of Paris, found that a "coherer" was a detector of Hertzian waves. The "coherer" effect had previously been noted and commented on by others, and it had been used by Hughes in his unpublished experiments of 1879. Although it was known at this date that the filings or granules could be decohered by tapping, no automatic provision seems yet to have been made to this end; and it was not until 1897 that Lodge disclosed that when used with a telephone, a filings "coherer" did not require to be tapped.

It is related that, in the course of some experiments to ascertain the conductivity of an iron chain under various degrees of tension, Branly noted sudden current rises, for which there was no apparent reason. In the course of his inquiries for the cause, he discovered that in another part of the building a person was making simultaneous experiments with a Ruhmkorff coil, and that—as we would now expect—there was a current rise in the chain each time the coil came into operation. The writer has not been able to verify this story. (Branly received the Nobel Physics Prize in 1921 for his researches in Radio.)

Professor (now Sir) Oliver Lodge published the results of his researches and experiments in electrical resonance or syntony, and explained that a closed oscillatory circuit was a feeble radiator and a feeble absorber.

1892. In the course of a paper in the *Fortnightly Review*, in February, Sir Wm. Crooks said: "Rays of light will not pierce through a wall, nor, as we know only too well, through a London fog; but electrical vibrations of a yard or more in wave-length will easily pierce such media, which to them will be transparent. Here is revealed the bewildering possibility of telegraphy without wires, posts, cables or any of our present costly appliances. Granted a few reasonable postules, the whole thing comes well within the realms of possible fulfilment. At present experimentalists are able to generate electric waves of any desired length, and to keep up a succession of such waves radiating into space in all directions. It is possible, too, with some of these rays, if not with all, to retract them through suitably shaped bodies acting as lenses, and so direct a sheaf of rays in any given direction. Also an experimentalist at a distance can receive some, if not all, of these rays on a properly constituted instrument, and by concerted signals messages in the Morse code can thus pass from one operator to another. . . . At first sight an objection to this plan would be its want of secrecy. . . . This could be got over in two ways. If the exact position



The original coherer with an automatic decoherer as devised by A. S. Popoff.

of both sending and receiving instruments were known, the rays could be concentrated with more or less exactness on the receiver. If, however, the sender and receiver were moving about, so that the lens could not be adopted, the correspondents must attune their instruments to a definite wave-length, say, for example, 50 yards. . . . Even now, indeed, telegraphing without wires is possible within a restricted radius of a few hundred yards, and some years ago I assisted at experiments where messages were transmitted from one part of a house to another without an intervening wire by almost the identical means here described." (A similar suggestion is reported to have been previously made by Professor R. Threlfall, of Sydney, Australia.)

Professor Elihu Thomson, of America, applied for a patent on an arc method of producing high frequency currents. His invention incorporated a magnetic blowout and other essential features of the arc of today, but the electrodes were of metal and not inclosed in a gas chamber. (See U. S. Pat. 500,630.) (Fig. 3.)

1893. Nikola Tesla lectured before the Institution of Electrical Engineers in London on "Experiments with Alternating Currents of High Potential and High Frequency," wherein he disclosed ways and means of generating the currents that were required for radio telegraphy.

1894. Professor Oliver Lodge transmitted and recorded signals across a distance of 60 yards.

1895. Professor A. S. Popoff, of Russia, used a coherer in series with an elevated aerial and ground, with a recorder in shunt with the coherer, for the purpose of studying natural electro-magnetic waves or "atmospherics." His coherer was fitted with an automatic tapper. Commenting upon his experiments (in December, 1895), he said: "I entertain the hope that when my apparatus is perfected, it will be applicable to the transmission of signals to a distance by means of rapid electric vibrations—when, in fact, a sufficiently powerful generator of these vibrations is discovered." (Fig. 4.)

1896. In June, Professor Ernest Rutherford, of Cambridge, succeeded in receiving signals over a distance of half a mile. In place of a coherer he used a magnetic detector of his own invention.

In the same month Guglielmo Marconi filed an application for a patent on an invention whereby "electrical actions or manifestations are transmitted through the air earth or water by means of electric oscillations of high frequency." The provisional specification which accompanied the application dealt chiefly with modifications in the Ruhmkorff coil, the coherer and coherer circuits, and associated tapper. For the "greatest possible distance" of communication, it recommended the use of reflectors at the transmitter and receiver.

In September, Nikola Tesla filed an application for a British patent on "Improvements relating to the Production, Regulation and Utilization of Electric Currents of High Frequency, and to Apparatus therefor," the latter of which included the synchronous rotary discharger. The application was accepted on November 21, whereupon was disclosed a method of producing radio frequency oscillations, which was the most approved for 20 years. (Br. Pat. 20,981/96.)

NOTE.—In this year, also, Professor C. W Röntgen discovered the X-rays.

(*To be continued*)

MARCONI

By the kind permission of the officials of Trinity House, we connected the East Goodwin Lightship—the outermost lightship guarding the dangerous Goodwin Sands—with the South Foreland light house, 12 miles apart. The apparatus was taken on board in an open boat and rigged up in one afternoon.

The installation started working from the very first without the slightest difficulty, and it has continued to work admirably through all the storms which during this year have been so severe. By its means two vessels have already received quick and valuable assistance. Both ran on the sands in a fog. The lightship noted their signals of distress, telegraphed for assistance, indicating the exact spot where it was required, and tugs and lifeboats were soon rendering every aid. Various members of the crew have learned how to send and receive signals, and in fact run the station. Previous to our visit to the ship it is highly probable they had scarcely heard of wireless telegraphy, and were certainly unacquainted with even the rudiments of electricity. Their knowledge is very valuable when the assistant, who is a poor sailor, is unable to attend to the work himself.

The latest installation that I have fitted up is across the English Channel, between the South Foreland lighthouse and Boulogne, a distance of about 30 miles. This has worked with great success from the start, and at the present moment a message is being received respecting a vessel which has run on shore close to Wimereux. The French authorities are most enthusiastic over the results.

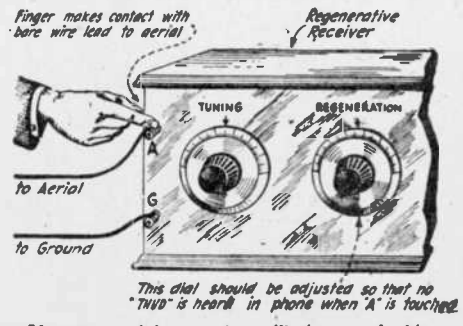
All the above experiments have been made with what we term the vertical wire system; but I think it would be desirable, before closing this summary of events, to bring before my readers some observations on the use of parabolic reflectors, as a means of controlling the propagation and intensifying the effects of the waves. As in ordinary optics, so also in the optics of electro-magnetic oscillations, it is possible to reflect the waves radiated from the oscillator in one definite direction only. The advantages obtainable by their use are obvious. With the vertical wire system, the waves have been allowed to radiate in all directions and would affect all suitable receivers within a certain radius, although it is possible by means of syntonizing arrangements to prevent this to a certain extent.

By means of reflectors it is possible to project the waves in one almost parallel beam, which will not affect any receiver placed out of its line of propagation. This would enable several forts or islands to communicate with each other without any fear of the enemy's tapping or interfering with signals; for if the forts are situated on small heights, the beam of rays would pass above the position which might be held by an enemy.

The possibilities and importance of the uses to which these reflected radiations can be adapted are enormous. More especially will this system be applicable to enable ships to be warned by lighthouses, lightships or other vessels, not only of their proximity to danger, but also of the direction from which the warning comes.

HOW TO TELL WHEN A SET IS RADIATING

There are still a great many single circuit and other types of radiating receivers in use. These sets may be acting as miniature transmitters, and radiating in the ether waves that may be interfering with other broadcast listeners' sets.



This dial should be adjusted so that no "THUD" is heard in phone when "A" is touched

If your receiving set is oscillating, a plucking noise will be heard in the head-phones when the aerial binding post is touched by the finger.

Contributed by Floyd French.

Radio News for March, 1925

Ads

WANTED: Early ham equipment prior to 1930, Xmitters, receivers, tubes, test equipment and components. State condition and price. W6DLY Guy Martin, P. O. Box A Azusa, Calif. 91702.

VINTAGE RADIO book for radio collectors $3.95, 25¢ for mailing. Wm. S. Miller, 2212 10th St. Greeley, Colorado 80631.

WANTED: Old radio and phonograph publications. Jim Cranshaw, 9820 Silver Meadow Dr. Dallas TX 75217.

BUY, SELL, TRADE & REPAIR all wind-up phonographs: Wanted Edison & Columbia reproducers, horns & 2 min. records. Ken Wood, 1731 E. Austin Nacogdoches TX 75961.

WANTED DESPERATELY: Early Negro blues and gospel records. Race series 78s. Doty Tullos, 5795 North Circuit Drive, Beaumont, Texas 77706.

FOR SALE: Telegraph Equipment. Largest inventory of telegraph equipment in the world. We have keys, sounders, relays, meters, WW I sets and you name it & we may have it on hand. Special WWII 2 brand new, mint and in the original box Telegraph key J-5-A, has a heavy massive bronze arm and two (2) large brass binding posts, only $6.95 postpaid. SSAE for free list C. B. Goodman Co., 5826 S. Western Ave. Chicago, Ill. 60636.

NEED WD11 tubes, K. Parry 17557 Horace, Granada Hills, Calif. 91344

WANTED: Fan paying top dollar for Elvis Presley records on SUN label. Price and description to Phil York 7027 Twin Hills, Dallas TX 75231.

FOR SALE: Westinghouse Aeriola SR receiver type RF, RCA Radiola 26 portable super-heterodyne, RCA Radiola III type R1, and a Radiola III A type RL. Write for prices, Jim Cranshaw, 9820 Silver Meadow, Dr., Dallas TX 75217. Tel. 214-286-1673.

FOR SALE: Crystal radios, horn phonos, battery radios, hurdy gurdy grind organs, etc. Send SASE for free list to S. Leonard, Speakeasy Antiques, 799 Broadway, New York N. Y. 10003. Tel. 212-389-4144.

OLD RADIO TUBES: Prethirties, 250 types all guaranteed. Send $1 for list. Refundable first order. Limited supply. MIDCO HS5 Box 15370 Long Beach CA. 90815.

WANTED: Information from booklet, "5 Meter Radiotelephony" by Frank Jones 1934. If you can help, write: John Martin, 612 N. 1st, Wellsville, Mo. 63384.

INTERESTED in buying or trading for collections of radios or parts. Ham equipment available for trade. Walt Jackson, W5ZYA, 2929 N. Haskell, Dallas TX. 75204 Day time 214 526-2023, 214 262-7855 evenings or weekends.

PROFESSIONAL CW operators, retired or active, commercial, military, Gov't, police, etc. invited to join Society of Wireless Pioneers, W7GAQ/6, Box 530 Santa Rosa, CA. 95402.

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