

August 26, 1954

(Suggested for October or November Bulletin)

25 Years Ago

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At the October, 1929 meeting of the Philadelphia Section, Mr. Elmer L. Brown, of the RCA-Victor Company, spoke on "The Progress of Aircraft Radio". Stuart Ballantine, of the Boonton Research Corporation, was the speaker at the November meeting, his subject being "Recent Developments in Broadcast Receivers". This paper included a discussion of neutralized radio-frequency amplifiers with a single ~~tuning~~ control; the use of shielded tetrodes in radio-frequency amplifiers; diode detection; and the use of a single pentode in the out put power stage. Mr. Ballantine was well-known to the Philadelphia Section, having participated in its formation and more than 200 members and guests attended.

These meetings were reported by Mr. E. T. Darlington as Acting Secretary.

November 5, 1954

MEETINGS

25 YEARS AGO

December Bulletin

The December, 1929 meeting of the Philadelphia Section inaugurated a series of "double features". The first paper, by Messrs. G. W. Pickard and G. W. Kenrick, summarized recent progress in the study of radio wave propagation phenomena. This was apparently a preview of a paper which was to be presented at the New York meeting in January, 1930. In addition, Mr. E. O. Hurlburt spoke on "Ions in the Upper Atmosphere."

January Bulletin

Following the precedent established at the previous meeting, two papers were also presented at the January, 1930 meeting. Mr. J. C. Schelleng of the Bell Telephone Laboratories discussed "Some Problems in Short Wave Transmission". This was followed by a paper by R. H. Goddard of Clark University entitled "The Development of a Rocket for the Investigation of the Upper Atmosphere". Attendance at this meeting, which was preceded by an informal dinner at Green's Hall, exceeded one hundred.

February Bulletin

The February, 1930 meeting of the Philadelphia Section was attended by about seventy members and guests. Mr. R. H. Ranger, of RCA Communications, spoke on "Recent Developments in Facsimile Transmission". The lecture was accompanied by demonstrations of the RCA transmitting and receiving units.

March Bulletin

At the March, 1930 meeting of the Philadelphia Section, Mr. R. K. Potter, of the American Telephone and Telegraph Company, presented a paper on "The Transmission Characteristics of Short Wave Telephone Circuits".

April Bulletin

The April, 1930 meeting was again addressed by two speakers. (Apparently, program chairmen had a wealth of material in those days.) Mr. L. P. Wheeler, of the U.S. Naval Research Laboratory, presented a paper entitled "The Master Circuit of Crystal Controlled Oscillators". Mr. W. R. G. Baker, of RCA, discussed the question "What Kind of an Engineering organization is necessary to lead the Radio Industry?" Attendance at this meeting was 160, or nearly 40% of the membership in the Philadelphia Section.

May Bulletin

At the May, 1930 meeting, Mr. C. D. Haigis, of RCA-Victor, discussed "Methods of Matching Dynamic Speakers to Vacuum Tubes".

June Bulletin

Mr. William F. Diehl, of the RCA-Victor Company was the speaker at the June, 1930 meeting. His topic was "Radio Test Methods and Equipment". At this meeting, the following new officers were elected to serve until June, 1931: Mr. W. R. G. Baker - chairman; Mr. C. D. Haigis - Vice Chairman; Mr. G. C. Blackwood - Secretary and Treasurer.

Note: The Philadelphia Section's own records begin with those instituted by Mr. Blackwood, who served four terms as Secretary-Treasurer. All of the information previously published concerning the early years of the Philadelphia Section has been reconstructed from outside sources.

MEETINGS

TWENTY-FIVE YEARS AGO

The first meeting of the 1930-1931 season was held at the Franklin Institute on September 24, 1930. Mr. W. R. G. Baker, the new Chairman, introduced the other new officers - Mr. D. O. Whelan, Vice Chairman, and Mr. George C. Blackwood, Secretary-Treasurer - and plans were presented by the various committees for the ensuing season.

Mr. Charles W. Horn of the National Broadcasting Company discussed in a non-technical way "The Problems of Chain Broadcasting". His paper described the lay-outs of typical studios, the means by which studios are linked together, and the necessary control arrangements. Sixty-six members and guests attended the meeting.

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The meeting of October 29, 1930, billed as a "Smoker and Get Acquainted Meeting", attracted an audience of nearly 300. This was, incidentally, the first recorded instance in which the Philadelphia Section met at the Engineer's Club. In lieu of a formal paper, demonstrations of various equipment were presented, together with short talks and sound films. Operative equipment at this meeting included an auditorium type Orthophonic phonograph, a Theremin, the latest model Philco receivers, the Victor home recording combination, and a facsimile transmitter and receiver.

The Secretary's account of the meeting says in part, "an extremely interesting demonstration was given of 'speech reversal'. In this, words were pronounced correctly by the engineer in charge of the demonstration followed by the same words pronounced backwards. A photofilm was made of this and two negatives prepared, one of them being reversed and attached to the end of the film. When projected through the transmitter, film first reproduced the words as pronounced by the engineer, then the reversed film converted the correct pronunciation of the engineer into backward pronunciation, and the backward pronunciation of the engineer into correct pronunciation." (Sounds like fun. Too bad the name of the talented engineer has been lost to posterity.) the/

The meeting closed with an appeal for old type radio apparatus to be assembled into exhibits and placed in the Smithsonian Institute.

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On November 18, 1930, the Philadelphia Section staged another double-barreled meeting. About 150 people heard Mr. O. H. Caldwell, Editor of "Electronics" speak on application of the electronic tube to medicine, industry, astronomy, and other fields. Mr. Caldwell's lecture was illustrated with slides, and included descriptions of many of the devices.

Following Mr. Caldwell's talk, Mr. G. N. Johnson of the Westinghouse Company spoke on the subject "the Electron in Harness". This included practical demonstrations of some of the equipment discussed, particularly the Stroboglow oscillator with several photocell devices as applied to smoke control, counting, and similar purposes.

TWENTY-FIVE YEARS AGO

The meeting of January 21, 1931 was devoted to electrical equipment, including radio, employed in aircraft. A paper prepared by Mr. A. H. French entitled "Application of Electrical Apparatus to Aircraft" was read by Mr. E. H. Alexander. Both of these men were associated with the General Electric Company.

Following the presentation of the formal paper, Mr. C. A. Brokaw and Mr. L. Linden, both of RCA-Victor, gave illustrated talks. Mr. Brokaw covered aircraft instruments, and Mr. Linden radio transmitters and receivers used in aeronautical work. In addition to the slides used during the talks, sample apparatus was demonstrated after the meeting.

On February 11, 1931, Mr. E. J. Sterba, of the Bell Telephone Laboratories, addressed the Philadelphia Section at the Engineers' Club on "Directive Antennae". Mr. Sterba described the directional and "amplification" properties of the antennas therein use for ship to shore and transoceanic telephone service. The talk was illustrated with slides and black-board demonstrations. Total attendance was 135 people.

The Section meeting was preceded by a meeting of the Executive Committee, which convened at 7:30 P.M. and adjourned at 7:55 P.M. (Things were simpler in those days). At this meeting, the total Section membership was reported as 561, and the cash balance as \$385.61.

The March meeting of the Philadelphia Section was also held at the Engineers' Club. Two hundred and seventy three people turned out to hear Mr. J. W. Horton of the General Radio Company talk about "What to Expect of Television". The Secretary reports "The lecture proved of great popular interest and the open forum, conducted at the close, brought forth prolonged discussion of the many points raised". This comment would probably be equally applicable today.

TWENTY-FIVE YEARS AGO

On April 8, 1931, Mr. Malcolm Hanson addressed some 250 members and guests on the subject "My Two Years in the Antarctic". Mr. Hanson, who had been associated with the Byrd Antarctic expedition as Radio Engineer, spoke primarily of the radio equipment, problems and experiments associated with the expedition's work. His talk, however, included many interesting comments on the general activities of the expedition. The lecture was illustrated with over 300 slides.

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On May 13, 1931, Mr. C. Stuart Ballantine, of the Boonton Research Corporation, delivered a paper on "The Technique of Loud Speaker Measurements". Mr. Ballantine's paper, which was a condensation of one to be delivered at the annual meeting in Chicago, described equipment used for the determination of frequency versus sound pressure curves, including a new logarithmic optical recorder permitting the automatic registration of frequency-response characteristics.

The meeting closed with the nomination of the following officers for the 1931-1932 season.

Chairman - Mr. G. W. Carpenter, of RCA-Victor
Vice-Chairman - Mr. R. S. Hayes of the Bell
Telephone Co. of Pa.
Secretary - Treasurer - Mr. G. G. Blackwood
(Mr. Blackwood's meeting notes have been the
source of a number of these columns)

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At the May meeting, announcement was made that the next meeting would be on June 17th, at which time Mr. Edward B. Patterson, of the RCA-Victor Company would speak on "Producing Color by Music". Since this was also the annual meeting for the election of officers, it presumably was held. However, no report of it has been found.

TWENTY-FIVE YEARS AGO

Mr. G. W. Carpenter, the newly elected Chairman, presided at the meeting held at the Engineers' Club on November 18th. Mr. J. B. Coleman, of the RCA Victor Company spoke on "The Present Trend in Transmitter Development".

In his preliminary remarks, Mr. Coleman discussed the work of the Federal Radio Commission and the International Technical Consulting Committee in establishing basic requirements for commercial and broadcast transmitters. Power ratings for broadcast transmitters in the United States and Europe were compared. Measures to improve frequency stability and to reduce audio distortion and noise were discussed, and various methods of modulation were compared. The talk concluded with descriptions of broadcast transmitters ranging in power from 250 watts to 50 kilowatts, police and commercial service transmitters, and special equipment for Hawaiian Islands service operating in the frequency range from 35 to 54 megacycles.

TWENTY-FIVE YEARS AGO

Mr. Ralph Hayes, Vice-Chairman of the Section presided at the meeting of January 21, 1932, which was held at the Engineers' Club. The speaker, Dr. Ralph Bown of the Bell Telephone Laboratories, presented a paper entitled "Problems in the Latest Development of Transoceanic Radio Telephony". At that time there was four telephone circuits between the United States and Europe made up of radio links across the water, with wire line extensions at the two ends. One of these radio links employed a single sideband suppressed carrier circuit operating in the 60 KC region; the other three used double sideband circuits in the 9 M.C., 14 M.C. and 19 M.C. regions. Dr. Bown compared the relative merits of the long and short wave circuits and described the antenna and station equipment involved. About 150 members and guests were present.

It is interesting to note that in the latest additions to the circuits between North America and Europe, the transoceanic link is provided by submarine cable facilities, while microwave radio is used for a portion of the land line extension.

YESTER-YEAR

On February 18, 1932, Mr. H. W. Jones of the RCA Photophone Company addressed the local section on "Tricks in Sound Photography". Mr. Jones traced the early development of talking pictures, beginning with movies coordinated with phonograph records. He also commented upon the development of motion picture~~x~~, cartoons, the dubbing-in of sound on silent pictures, and ~~discussed~~ the equipment used in these processes. About one hundred members and guests were present.

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Mr. Loy E. Barton, of the RCA-Victor Company was the speaker at the meeting held March 31, 1932, at the Engineers' Club. Mr. Barton's paper, entitled "Application of Class B Amplifiers to AC Operated Receivers" was properly illustrated by slides. In the report of the meeting, it is noted that this paper was also scheduled for presentation at the National Convention in Pittsburgh.

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At a meeting of the Philadelphia Section on April 20, 1932, Dr. Leo Behr, of the Leeds and Northrup Company spoke on the subject of "Resistance Boxes for Use on Alternating Current". Dr. Behr described new types of shielded and unshielded resistance boxes for this purpose. He also exhibited a new form of coil construction and two new types of decades.

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On May 31, 1932, Professor Charles Weyl spoke to approximately one hundred members and guests of the Philadelphia Section on the subject "Orchestra Broadcasting from the Musician's Point of View". Professor Weyl had been associated with Leopold Stokowski and the Philadelphia Orchestra for the past seven years and reported on the results of extensive investigations directed toward the improvement of orchestra broadcasting techniques.

At this meeting it was announced that the next meeting, on June 30, 1932, would be devoted to an address by Robert Adams, of the Philadelphia Electric Company, on Radio Amateur Activities. No report of this meeting has been found.

TWENTY-FIVE YEARS AGO

The Philadelphia Section of the IRE meet at the Engineers' Club on October 6, 1932. Mr. Henry W. Byler, Chairman, introduced Mr. F. A. Cowan, Engineer of Transmission, Long Lines Department, American Telephone and Telegraph Company, who discussed the networks provided by the telephone system for chain broadcasting. Mr. Cowan's talk covered the construction and maintenance of the audio networks, as well as the switching and monitoring arrangements required for successful operation. Approximately 100 members and guests were present.

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The meeting on November 3, 1932, was devoted to a description and inspection of the new 50 KW transmitter for WCAU. At the Engineers' Club, Mr. W. L. Lyndon, of the RCA-Victor Company, disclosed the program equipment installed in the new studio at 1620 Chestnut Street. Mr. J. E. Love, also of RCA-Victor, presented a complete description of the transmitter equipment located at Newtown Square, including the short wave transmitter, W3XAU. Both of the speakers had been associated with the design of the new station.

Following the presentation of these papers, the meeting was adjourned, and a fleet of around 100 cars conveyed the members and guests (over 300) to the transmitter site. The Philadelphia Police Department cooperated by furnishing an escort to facilitate the movement through the city. (Nothing is said about how the fleet got through Upper Darby).

At the transmitter location Mr. J. G. Leitch, Technical Director of WCAU, and his assistants conducted the party, in groups, through the station.

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On December 1, 1932, Mr. Harry Diamond, Radio Engineer of the Bureau of Standards, presented a paper entitled "Aircraft Radio, Its Growth and Future". Mr. Diamond's paper dealt with the development of aircraft radio from the viewpoints of both the development engineer and the pilot, and included a discussion of radio range beacon systems. The meeting, held at the Engineers' Club, had an audience of about 100 people.

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The meeting on December 29, 1932 was held at the Haddon Hall Hotel in Atlantic City, in conjunction with the annual meeting of the American Association for the Advancement of Science. The IRE portion of the program included the following papers.

"Creative Broadcasting from the Musician's Viewpoint" - C.H. Weyl, University of Pennsylvania.

"The Measurement of Overall Characteristics of Broadcast Receiver" - A. V. Loughren, RCA-Victor.

"Electricity in Medicine" - Dr. Richard Kovacs, New York Polyclinic Medical School.

"Study of Reception from Synchronized Broadcasting Stations" - C. B. P. Aiken, Bell Telephone Laboratories.

"High Quality Ribbon Telephone Receivers" - F. Massa, RCA-Victor.

Of these, the paper by Dr. Kovacs apparently aroused the most interest, since he was invited to present it again at a Section meeting in Philadelphia. Professor Weyl's paper was presumably along the lines of the one which he had previously given to the Philadelphia Section in May, 1932, based on his study of broadcasting problems with the Philadelphia Orchestra.



THE INSTITUTE OF RADIO ENGINEERS

INCORPORATED

SECTION CORRESPONDENCE

November 29, 1957

PLEASE ADDRESS
REPLY TO

Mr. Edward B. Rosenberg, Editor
Almanack
Box 5616
Remington Rand Univac
Philadelphia 29, Penna.

Dear Mr. Rosenberg:

Attached is material for the winter and spring 1958 issues of the Almanack, covering the meetings of 25 years ago.

Now that we have a new editor, I suggest that we get rid of the abominable title of "Yesteryear", under which these notes have appeared for some time, and substitute "Twenty-five Years Ago". "Yesteryear", if it means any thing in connection with a column appearing in 1958 should be 1957, and could conceivably be stretched in meaning to apply to the 1956-1957 season. I see no reason for imitating a second-rate poet who thought that "Yesteryear" was the equivalent of Villon's "antan", thereby proving only that he knew neither English nor French.

Yours very truly,

TWENTY-FIVE YEARS AGO

January 5, 1933

Mr. I. G. Maloff, of the RCA Victor Company, discussed "New Methods of Solving Vacuum Tube Problems". After pointing out the difficulty of applying pure analytic methods to fundamentally non-linear devices, Mr. Maloff described the inverse method of calculating tube performance. In this method, a desired output is assumed, and the necessary input is computed by means of graphs and charts. The talk was accompanied by blackboard demonstrations of the solution of typical problems.

February 2, 1933

At this meeting, Dr. Richard Kovacs of the New York Polyclinic Medical School, repeated the talk on "Electricity in Medicine" which he had given at the December meeting of the American Association for the Advancement of Science in Atlantic City. The paper dealt with the application of radio tubes and associated apparatus to the practice of medicine, and included interesting sidelights on the activities of charlatans. Guests at the meeting included a number of members of the medical profession.

March 2, 1933

Mr. Clarence W. Hansell, Transmitter Development Engineer for RCA Communications, described the RCA Communications Network. Details were given relative to antenna systems, transmitters, receivers, checking and measuring apparatus, automatic recorders and operating techniques. The talk was supplemented by phonograph records of the first trans-Atlantic broadcast, the opening of the Vatican short-wave transmitter (including the interference setup by some unknown source) and others illustrating advances in clarity of transmission.

Mr. H. H. Beveridge was a guest of honor at this meeting, and participated in the discussion which followed Mr. Hansell's presentation.

April 6, 1933

The results of the first student paper contest conducted by the Philadelphia Section were announced at this meeting. First prize went to Mr. John G. Haines (Haverford College) for his paper on "The Development of Communications in the Field of Ultra-short Waves", which was presented at the meeting. Mr. S. C. Spielman (Drexel Institute of Technology) won second prize with "A System Utilizing Radio Signals for the Blind Landing of Aircraft".

May 4, 1933

At the final meeting of the 1932-1933 season, Messrs. J. P. Schafer and W. M. Goodall, both of Bell Telephone Laboratories, presented a paper entitled "Exploring the Ionosphere". Reporting on the results of recent experiments, including those made during the solar eclipse of August 31, 1932, the authors showed that there are at least five layers in the upper atmosphere which can reflect radio waves, and that the variation of ionization is strikingly different. Slides and pictures were used to illustrate the various points under discussion.

At the annual meeting of the Section, which followed the presentation of the paper, the following officers were elected for the 1933-1934 season.

Chairman - William F. Diehl
Vice-Chairman - E. L. Forstall
Secretary-Treasurer - George C. Blackwood

TWENTY-FIVE YEARS AGO

Mr. William H. Diehl, Chairman, presided at the Philadelphia Section meeting held on October 5, 1933, at the Engineers' Club. Mr. E. W. Kellog, of the RCA-Victor Company, presented a paper on "Sound Recording on 16 MM. Film", which dealt with improvements recently made in this field. About 80 members and guests attended.

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The meeting of November 2, 1933, drew a turnout of about 150 people to hear Dr. Harvey Fletcher, Physical Research Director of the Bell Telephone Laboratories, discuss "The Loudness of Sound". Dr. Fletcher's paper dealt with the terms and scales used for measuring loudness, and gave a method for calculating total loudness from the measured intensities of individual components of a sound. It also included a description of the experiments from which the constants used in such computations were developed.

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On December 7, 1933, Stuart Ballantine, of the Boonton Research Corporation, repeated for the Philadelphia Section a paper he had previously presented to the New York Section on "High Quality Radio Broadcast Transmission and Reception". The talk covered the results of a survey of current American broadcasting systems from microphone to loudspeaker, with emphasis on possible sources of amplitude and frequency distortion. Approximately 300 people were present, and an extended discuss followed the presentation of the paper.

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TWENTY-FIVE YEARS AGO

January 4, 1934

Dr. A. W. Hull, Assistant Director of the General Electric Company's Research Laboratory at Schenectady, spoke on "The Physics of the Thyatron", with particular reference to the effect of gas pressure upon the conductivity and glow potential. Many experimental types of tubes were presented, and certain practical problems, such as the disintegration of the anode by positive ion bombardment, were treated.

Approximately one hundred people attended the meeting, and an extended discussion followed Dr. Hull's presentation.

February 1, 1934

"The Curious Progress of Electrical Measurements along the Frequency Scale" was the title of the paper presented by Professor J. W. Horton, Chief Engineer of the General Radio Company, at the February meeting of the Philadelphia Section. Principal emphasis of the paper was on the development problems involved in extending the frequency range of measuring equipment to keep pace with the constantly broadening radio spectrum.

Social Note: Attendance at dinner - 10
Attendance at meeting - 80

March 1, 1934

The speaker at the March Meeting was Dr. W. F. G. Swann, Director of the Bartol Research Foundation. Dr. Swann discussed the nature and causes of the earth's atmosphere potential gradient together with such related matters as the electrical conductivity of the atmosphere over land and over oceans, and the effect of radio-active material in the soil and atmosphere on the conductivity. The effects of cosmic radiation on the conductivity of the upper atmosphere and the relation of these matters to radio propagation were also touched upon. a

Dr. Knox McIlwain led the discussion of Dr. Swann's paper.

TWENTY-FIVE YEARS AGO

MARCH 1, 1934

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APRIL 5, 1934

Dr. V. K. Zworykin, Director of Electrical Research for the RCA-Victor Company discussed "Television Image Pickup and Reproduction by means of Electron Streams". Dr. Zworykin gave a detailed description of the Iconoscope tube used for television pickup and the Kinescope tube used for receiving television pictures. Curves of different factors limiting the physical possibilities of television pickup were shown, and the method of fitting the Iconoscope to a camera for pickup purposes was described. The paper also included a discussion of the electrical lens used to focus the cathode rays. Wide interest in the subject attracted an audience of over 300 people.

MAY 3, 1934

Mr. O. B. Hanson, Chief Engineer of the National Broadcasting Company, described the recently completed Radio City Building studios and equipment. In the talk, which was illustrated with numerous lantern slides, he discussed both the large and small studios; sound-proofing and air-conditioning arrangements; echo and delay sound rooms; arrangements for varying the "liveness" of particular rooms; and the intricate maze of control equipment needed in a major broadcasting center.

Following Mr. Hanson's talk a short business meeting was held. The following officers were elected for the 1934-1945 season.

Chairman - Ellsworth D. Cook
Vice Chairman - Knox McIlwain
Secretary-Treasurer - R.L. Snyder

MAY 28-30, 1934

The Philadelphia Section of the IRE was the host at the Ninth Annual Convention of the Institute, which had its headquarters at the Benjamin Franklin Hotel. Thirty-two papers were presented, essentially in full, at eight technical sessions, and 56 exhibitors used a complete floor of the hotel for display purposes. Total registration for the convention amounted to 940 persons, the largest in many years.

A dramatic scene in a then current controversy was enacted at the informal banquet. E. H. Armstrong, who had been awarded the first Institute Medal of Honor in 1918 for "his engineering and scientific achievements in relation to regeneration and the generation of oscillations by vacuum tubes" attended the convention for the expressed purpose of returning this medal "because of a chain of circumstances well known to many of us".

At the banquet President C. M. Jansky speaking for the Institute, stated in part:

"That the present Board of Directors with full consideration of the great value and outstanding quality of the original scientific work of yourself and the present high esteem and repute in which you are held by the membership of the Institute and themselves, hereby strongly reaffirm the original award, and similarly reaffirm the sense of what it believes to have been the original citation".

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OCTOBER 2, 1934

At the first meeting of the 1934-1935 season, which was held at Houston Hall, University of Pennsylvania, Mr. Charles J. Young of the RCA-Victor Company described "A Direct Printing Facsimile Recorder and its Application". The equipment, using direct printing carbon paper, produced pictures in half-tones on a strip of paper 8 1/2 inches wide in sufficient detail to make ordinary newspaper print readable. Transmission time for an 8 1/2 x 11" sheet amounted to about eight minutes, and no developing and fixing was necessary.

Among the exhibits were facsimiles of weather maps
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Among the exhibits were facsimiles of weather maps transmitted to ships at sea during severe static conditions.

NOVEMBER 1, 1934

At the November meeting of the Philadelphia Section Mr. R. C. Mathes of the Bell Telephone Laboratories presented a paper on the Compandor, a compressor-expander arrangement which had been in commercial service on a New York-London long wave radiotelephone circuit for about two years. Prior to the use of the compandor, manual adjustment had been used to reduce the range of signal intensities applied to the radio channel from about 70 db to approximately 30 db. This permitted improved loading of the transmitter and a better signal-to-noise ratio. Manual adjustment, however, was incapable of following the rapidly varying amplitudes of the various speech sounds from syllable to syllable and withⁿ syllables. By the use of control voltages varying as a function of the signal envelope, complementary gains and losses were introduced in the overall circuit, effectively reducing the range of signal intensities applied to the radio channel to about 15 db (combined manual and compandor effect). In addition to improving signal quality during conditions of moderate noise, the compandor permitted commercial operation under noise conditions which previously precluded such use.

DECEMBER 6, 1934

69 Two papers were presented at the December meeting of the Philadelphia Section. The first by G. H. Brown and H. E. Gihring, both of the RCA-Victor Company, dealt with "General Considerations of Tower Antennas for Broadcast Use". In it they summarized the factors influencing the action of towers when used as radiators, and showed that the results predicted from the simple theory of sinusoidal distribution of current on the tower were not borne out in many actual cases. Measurements on scale models of actual structures were found to correlate well with performance of the prototypes and indicated that non-sinusoidal current distributions were involved. Means for correcting the current distribution and improving the overall performance were suggested. T/

The second paper was presented by W. F. Diebel, of the RCA-Victor Company, who described "An Improved Portable Cathode Ray Oscillograph" and also demonstrated the equipment. The paper covered the use of the instrument for radio and intermediate frequency alignment, percent modulation and frequency measurement of received radio signals.



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THE INSTITUTE OF RADIO ENGINEERS

INCORPORATED

PHILADELPHIA SECTION

Moore School of Electrical Engineering
University of Pennsylvania
Philadelphia 4, Pennsylvania

TWENTY-FIVE YEARS AGO

January 3, 1935

At this meeting, held at the Engineers' Club, a paper was presented by Messrs. B. J. Thompson and E. R. Ferris, both of the RCA Radiotron Company, on "The Input Resistance of Vacuum Tubes at High Frequencies." This consisted of a theoretical analysis leading to the conclusion that, with no direct current flowing to the grid of the vacuum tube, the effective shunt resistance between grid and cathode was inversely proportional to the product of the transconductance of the tube, the square of the electron transit time between cathode and anode, and the square of the operating frequency. Experimental data confirming this relationship were offered which showed, for example, an effective input resistance of 20,000 ohms at 10 meters wave length for a conventional type of radio-frequency amplifier tube.

February 7, 1935

Philo T. Farnsworth, Vice President of Television Laboratories, Inc., described the "Multipactor" which is a cold cathode vacuum tube that makes use of the phenomena of secondary electron emission. It is well known that when a conductor is bombarded with primary electrons it gives off other secondary electrons and that under favorable conditions (depending on the nature of the surface being bombarded and the velocity of the primaries) it is possible to get as many as ten secondary electrons for each primary electron.

By suitable construction of the electrodes it is possible to give energy to secondary electrons by applying a high frequency field equal to the resonant frequency of the electrons oscillating within the tube. The structure of the cathodes may be two plane parallel discs having a ring shaped anode midway between them in which case a magnetic focussing field is needed to guide the electrons between the cathodes and prevent them from hitting the anode. Other structures (cylindrical and spherical) cathodes and anodes, respectively are self focussing by virtue of the radial electron fields.

These tubes can be made to multiply small currents, such as photo currents, as high as ten to the fifteenth power of the starting current. They are used as amplifiers and oscillators having several different modes of oscillation.

Jan 60 Almanach



THE INSTITUTE OF RADIO ENGINEERS

INCORPORATED

PHILADELPHIA SECTION

Moore School of Electrical Engineering
University of Pennsylvania
Philadelphia 4, Pennsylvania

MARCH 7, 1935

Mr. Irven Travis, of the Moore School of Electrical Engineering presented a paper on the differential analyzer which had recently been completed at the University of Pennsylvania. This device is capable of solving differential equations up to the tenth order having as many as four variable coefficients. The historical development of mechanical devices for solving differential equations was scanned, after which the principle of operation of the differential analyzer was outlined. The relaxation oscillation equation which Van der Pol solved by the isoclyne method was taken as an example. The meeting concluded with a demonstration of the machine.

APRIL 4, 1935

This was the annual joint meeting of the Franklin Institute and the Philadelphia Section of the IRE. Dr. Phillips Thomas, Director of Research for the Westinghouse Electric and Manufacturing Company took as his topic "Research and the End Zones", a non-technical discussion of recent advances in research into the end zones of macro- and micro-entities. The lecture, which was accompanied by numerous demonstrations, attracted an audience of almost 300 people.

MAY 2, 1935

Two papers were presented at this meeting. The first, by Messrs. Charles J. Young and Maurice Artzt, both of RCA Victor, described a chronograph system for rapid determination of the daily rate of a watch or clock. The mechanical noises ("ticks" and "tocks") generated by the excursions of the balance wheel or pendulum are picked up by a carbon or crystal microphone. The resultant currents, after amplification, operate a recording mechanism which impresses a row of dots across a two inch wide tape moving at a constant rate. If these dots form a line normal to the length of the tape, the watch is running exactly to time, while any slope can be read directly in terms of gain or loss in seconds per day.

The tape is driven by a small motor whose speed is determined by the frequency of an alternating current generated by a tuning fork accurate to five parts in a million. The whole operation of rating the watch for several positions takes only a few minutes.

The second paper, given by Mr. D. G. Luck, also of RCA Victor, discussed the principles used in detecting the presence of metallic objects within a region to be protected. Details of a commercial device for detecting the presence of guns carried by visitors to prisons were outlined, and the device itself was demonstrated.

The annual election of officers for the 1935-1936 season resulted in the following:

Chairman - Knox McIlwain
Vice Chairman - Irving Wolff
Secretary-Treasurer - R. L. Snyder

JUNE 6, 1935

The June meeting of the Philadelphia Section of the IRE was held at the WCAU auditorium, then at 1620 Chestnut Street. Mr. Raymond Sooy, of the RCA Manufacturing Company, spoke of his personal experiences with both old and new types of recording during some thirty years of association with the Victor Company.

Mr. J. G. Leitch, Technical Supervisor of WCAU, described the Photona, an electronic organ. His paper mentioned the early experimental work done in the mechanical and electrical generation of tones, and listed the then current methods. Lantern slides were used to show the work done by Mr. I. I. Ereameeff, who was largely responsible for the construction of the Photona. Experimental work using moving film was described, together with the generation of tones by means of rotating discs acting as shutters between a source of light and a photoelectric cell as used in the Photona. After a demonstration of the electronic organ by Mr. Hayes Watson, the meeting concluded with an inspection trip through the KYW and WCAU studios.