To my good friend “Matty”

With cherished recollections of the good old days—when the Audion, and radio—and we were young!

Sincerely and 73—Lee de Forest.

Sept. 1926.

Lee de Forest with RJ-4

See story on page 9.
COMING EVENTS
ANTIQUE WIRELESS ASSOCIATION

NORTH CAROLINA
ANNUAL SOUTH-EASTERN AWA CONFERENCE, CHARLOTTE, N.C.
Historical program---Large Flea Market---Contests---Fun for everyone!
Program will be mailed to area members. For additional information, write:
Ron Lawrence, 2334 Westerly Hill, Charlotte, N.C. 28208

INDIANA
April 15 and 16
Auburn-Cord Museum
Auburn, Indiana
Old Tyme movie Friday PM--Swap Meet--Contest--Large auction--Banquet!
Registration: $3. Banquet only $1. Program in mail to area members or write:
Ross Smith, 1133 Strong Avenue, Elkhart, Ind. 46514

NEW YORK
ARRL Convention and Hamfest
County Fairgrounds, Rochester, N.Y.
MAY 20, 21, 22. Largest hamfest in the N.E. AWA exhibit, 12 acre flea market!
Commercial exhibits. AWA Museum open Sunday at 10 AM and 2 PM. For more
information, write: R.A.R.A., Box 1388, Rochester, N.Y. 14603

MINNESOTA
May 20 and 21
Regency-Plaza Motel
10th St., Minneapolis, Minn.
Friday Nite "get-to-gether", flea market, contests and historical programs plus
"open house" at Pavek Museum. Programs will be mailed to area members, or
write: Joe Pavek, 2632 Nicolette Ave., Minneapolis, Minn. 55408

A.W.A. ANNUAL MEETING
November 7, 1982

At the Annual Meeting of A.W.A. two new
Directors were elected. They are Charles
Billey and Stephen Sykes, both of Rochester.
Chuck Billey, K3NAU, an active amateur,
is employed at Harris Corporation RF
Communications Division, a high technology
SSB/FM radio manufacturer. Working with the
Educational Division of Harris, Chuck
was instrumental in making the fine video
tape movie of the A.W.A. Museum. As a
historian, he has just completed a booklet, "The
Billey Electric Company -- The Early Years
1930-1955", about this pioneer quartz-
crystal manufacturer.

Steve Sykes, KA3KGM, is an active ama-
teur who also is employed at Harris RF. He
has contributed much to our organization for
several years, notably his work with Bill
Ehlers in wiring our new building. Steve is an
active participant in the A.W.A. Old Tyme
CW Contest, having made several early trans-
mitters.

Both these new Directors bring to the
Board considerable knowledge of A.W.A.
affairs and will contribute well to Board
activities.

At the Board Meeting Dick Fish, W20WF,
was elected 2nd Vice-President. This posi-
tion has been vacant for several years. Dick
has been a Director since 1979. He recently
retired from Taylor Instrument Company
where he was in their Electrical Engineering
Department. Dick is a very knowledgeable
and active radio amateur who has constructed
apparatus for display use in our Museum.
Dick is a member of the Historical Preservation
Committee and will continue in this
capacity along with other special assign-
ments.

The 1983 Annual Conference was approved
for September 29, 30 and October 1 at the
Sheraton Canandaigua Inn.

Reports from the Treasurer and Comptrol-
ler stated that A.W.A. continues to be in a
sound financial condition.

The Directors voted to discontinue mailing
the Old Timer's Bulletin by third-class mail
effective July 1, 1983. Thereafter the Bulle-
tin will be mailed by first-class mail and dues
will be eight dollars per year.
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COMING EVENTS

ANTIQUE WIRELESS ASSOCIATION

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AWA NETS (EST/ESDT)

PHONE (SSB) -- 3866 kc. Tuesday 8 p.m. Mon. - Wed. - Fri. at 9:30 a.m.
Sunday -- 7242 kc. at 12 Noon
Tuesday -- 14274 kc. at 5:30 p.m.

CW -- 3584 kc. daily at 4 p.m.
First Wed. each month at 8 p.m.

2 meter FM
Starting April 3rd, W2AN will start operation on the Victor FM repeater (22-82) every Wednesday at 9 PM. Local amateurs are encouraged to check in for latest activities, etc.

NO MORE 3rd CLASS MAILING

The 1982 Annual Meeting approved a motion to eliminate 3rd class mailing ($6.00). Bookkeeping problems, non-delivery and additional handling by volunteers prompted the move. Henceforth, all dues will be the same: $8.00 yearly, with first class mailing.

Writing AWA Headquarters? Please enclose SASE for prompt reply.

Change In Address?
Mail information to the Treasurer who handles current mailing list.
(NOT the Secretary)
L. A. CUNDALL, W2LC
69 BOULEVARD PARKWAY
ROCHESTER, NY 14612
AWA/VRPS MEET IN DALLAS

A.W.A. joined with the Vintage Radio & Phonograph Society of Dallas, Texas, for a meeting November 12-14, 1982. Attendance was good. In addition to attendees from Texas, A.W.A. members came from Colorado, Kansas, Arkansas, Louisiana and Tennessee. President Brelsford represented A.W.A. headquarters.

The technical session concentrated on restoration techniques. There was a very fine talk and demonstration about wiring and metal parts of old gear. The large equipment contest contained many excellent entries. Most items were radios, but a few beautiful phonographs were shown. Saturday afternoon there was a spirited auction for the mutual benefit of buyers and sellers.

Following a fine dinner, Brelsford presented “Radio Museums” – a slide-tape show describing radio museums in many sections of the country. Chevie Crandell, John Ganster and the Dallas committee hosted an excellent convention for A.W.A.’s first Texas gathering with the V.R. & P.S.

From the President

Contributions to the A.W.A.

Friends, members and interested public make contributions to the A.W.A. each year. These gifts may be in the form of radio equipment, money or services.

Each quarter the Bulletin lists contributors of radios, components, books, magazines, etc. Monetary gifts were received this past year from the following:

John G. Adams
George Batterson
E.R. Drake
Morris L. Groder
Bill Halligan
Wm. R. Holly
Phil Howell
Bruce Kelley
Helen Long
Carlott Maylott
Rollin Moffatt
Wm. Gould
C. Orval Parker
Joseph Pavek
Sidney Prior
Clarence Seid
E. A. Smith
M. D. Stahl
J. Albert Warren
Dick Weibezaahl
Jack L. R. Williams
Williams Woltz Jr.
Steve York
E. M. Zandonini
Mark Twitchell
Gertrude Tyne

The Canadian Broadcasting Corp.
The Civil Air Patrol

A.W.A. – B.V.W.S. MEET

It has been decided to postpone the joint meeting with the British Vintage Wireless Society until next year (1984), to allow sufficient time to make plans. Several members have already indicated they will attend. More in future Bulletins.

HOUCK AWARD NOMINATIONS

The time has come again for members to select nominees for the Houck Awards. There are two Awards: One for Historical Documentation and the other for Historical Preservation. Give serious consideration as to your selection and send names to the Awards Committee:

Robert Morris, Chairman
Sunset Lake Road, RFD #1
Sparta, New Jersey 07871

BACK ISSUES

The following OLD TIMERS BULLETINS remain in stock. Make out check to A.W.A. and mail to:

DEXTVER DÉELEY
9 Briar Circle
Rochester, N.Y. 14618

Vol. # Vol. # Vol. # Vol. #
16 -3 18 -4 21 -4 23 -3
17 -2 21 -2 23 -1 24 -1
18 -3 21 -3 23 -2

$1.50 each p. (1st class mail)

13 -3 15 -4 19 -4 22 -3
14 -4 16 -4 20 -2 22 -4
15 -2 17 -1 21 -1

$2.00 each p. (1st class mail)

19 -1 19 -3 20 -1 20 -4
Issues with Monograph

$3.00 each p. (1st class mail)

17 -4 (Index) 18 -1

$4.00 each p. (1st class mail)

Vol. 1 #2 and #3 (reprints for reference). 50c each pdd.
SCENES AT RECENT A.W.A. CONFERENCE
Photos by Dr. Harry Norry, VE3GRC

Fred Hammond (VE3HC) at left receives Hoeck Award from Chairman Bob Morris (W2LY).

President Brelsford (K2WW) presents Ed Culver (WA2JAA) the President's Award for outstanding services to A.W.A. during 1982.

Ralph Williams (K3VT) smiles as he tells Linc Cundall (W2LC) that his L.W.T. Type "D" Tuner won the Elle Award for Craftsmanship.
PART I

The story of Adams-Morgan/Paragon closely parallels that of Clapp-Eastham. Both companies began around 1910 and built their reputations during the teens with a mail-order business in wireless components. Both were early Armstrong licensees who saw a great future with the dawn of radio broadcasting in the twenties. Both were initially successful in this field, but clung to the regenerative circuit too long, and both tried to be big-time radio manufacturers without a dealer organization or advertising. Both wound up on the scrap heap.

For a few facts and anecdotes of Alfred P. Morgan's early career, I am indebted to Serge Krauss who interviewed him informally a number of years ago. Al started the firm of Adams-Morgan about 1910 as a mail-order house. He attended MIT for a year but never graduated; on one occasion he bragged so much about a Poulson arc generator he had built that he was requested to bring it to class. Preparing to demonstrate it, he was pushed aside by the professor who said, "This is my class and I do the demonstrations." But the professor didn't allow enough time to purge the air from the arc chamber, resulting in an explosion that blew the lid off and knocked over some front-row students. Luckily no one was hurt.

Al Morgan was a prolific writer. "The Boy Electrician" of 1913 was the first of many such books, published all during his life. The 1912 "Wireless Telegraph Construction for Amateurs" went through several editions, and he also wrote many pamphlets on wireless topics for the publishing partnership of Cole and Morgan. "The Pageant of Electricity" from 1943 is one of the better historical-survey books of its type. Al also wrote, for a time, a Question-and-Answer column for one of Gernsback's magazines, but quit when he failed to pay him. He worked for de Forest, and obtained his first Audion for $5 when de Forest needed money quickly to buy Tesla dinner.

Adams-Morgan's entry into the receiver-manufacturing field, and its subsequent line of Paragon sets, was the work of another New Jersey man, Paul Godley. Godley had been to Brazil in 1913 installing government radio stations; on his return in 1914 he met Armstrong at a Radio Club meeting and was amazed to learn that Armstrong had consistently been able to hear these stations. The secret, of course, was the regenerative circuit. Since Armstrong was only interested in the commercial applications and in any case had not been able to make his circuits work on short waves, Godley adapted the regenerative principles to short wavelengths and the Paragon receiver was born.

PARAGON RA-6 (New England Wireless Museum)
Looking around for a way to manufacture and market his new creation, Godley invested some of his money in a share of the local firm Adams-Morgan. The October 1916 issue of *QST* announced the Paragon RA-6, for a reasonable $35. It wasn’t long before many of the better ham stations had RA-6s, as the pages of *QST* will testify.

May of 1917 saw the last RA-6 ad, and soon Adams-Morgan was working on wartime orders. Paul Godley went to American Marconi at Aldene, New Jersey, for the duration. After the war there is a curious hiatus in the Adams-Morgan chronology. They did not advertise themselves, yet they do seem to have made receivers for hams. Chicago Radio Labs was selling RA-6s in October 1919, and there is other evidence that RA-6s continued to be made, as well as a model RA200 "Universal Range." Perhaps, after a taste of wartime contracts, A-M was not too anxious to go back to

[Continued on next page]

The Adams-Morgan factory building is now occupied by a theater group.
The popular Paragon RA-10 (tuner) and DA-2 (detector and amplifier).

the limited ham market, already saturated with RA-6s in any case.

But radio broadcasting was something else. Godley returned to A-M and designed the RA10. Preferring to be a manufacturer only, not a sales agency or dealer, A-M joined with Continental Radio & Electric Company, a New York distributor recently formed by well-placed radio men which also had an RCA franchise. Continental did all the advertising for the RA10, and indeed many existing RA10s bear Continental nameplates as well as Adams-Morgans.

Footnotes:
3. A detailed electrical description of the RA-6 and its performance is in an article by David Stout in the SCARS Gazette 4-1.
4. QST May 1920, p. 88

Part II will describe later Paragon models and the end of a famous company.

Navy detector (1919) made by Adams-Morgan (Dan Gaidosz collection).
In Memoriam

AWA Director and Charter Member

CLARENCE DENGLER, W2LK

Clarence built his first set before World War I, being interested in radio from his early days. He also built the first police radio (WPDJ) transmitter for the Rochester Police Department in 1931 and remained in charge of their system until retiring in 1963. He was the pioneer operator at WHAM in 1924/25, that station being owned by the University of Rochester then and located in the Eastman School downtown.

“Duck” as he was familiarly known was President of the Rochester Radio Club in the 1920’s, the club which preceeded RAAs. He also was active in the Antique Wireless Association where he was a Director.

He was National Historian for the Association of Public Safety Communications, formerly Association of Police Communication Officers. He is nationally known for his articles entitled “Glancing Back”.

THOMPSON MEMORIAL AWARD

1983 CONFERENCE

A fund has been setup by friends of Eunice Randall Thompson, WMMP, to honor her memory. This will enable AWA to award yearly a plaque appropriately inscribed. The Conference Committee has decided to designate this award for the recipient of the “Best of the Show” in the early equipment contest. This is especially fitting since Eunice was an enthusiastic promotor of historical radio.

A BRIEF HISTORY


She was a descendant of an early Loomis family and life member of the DAR. Of interest, she was NOT related to pioneer radio experimenter Dr. Mahlon Loomis, although she did dedicate her book to him. Mary died June 7, 1960.

Frederick Terman

Dies at 82

Radio historians, engineers and students are familiar with the name Terman, vice president and provost emeritus of Stanford University. Dr. Terman joined Stanford’s electrical engineering staff in 1925 after receiving his doctorate from M.I.T. He was the recipient of numerous awards and author of several engineering books.

COVER STORY:

This rare autographed picture of Lee De Forest was given to AWA by Betty Mathews, widow of R.H.G. Mathews, 9ZN. Note the 1926 date. Although Mathews became a Silent Key on July 3, 1982, at his retirement home in Mexico, it wasn’t until December that Mrs. Mathews’s letter verified the fact. Hence the tardy report.

“Matty”, Chairman of the first ARRL Convention in Chicago (1921), was king of the amateurs in the early 20’s. Acting as ARRL Traffic Manager for the Central Division, he and his mighty spark signal of 9ZN were the envy of all. AWA was fortunate to have him as Guest of Honor at the 1977 Annual Dearborn Conference. (For more on this famous pioneer, see page 7, June ’77 OTB.)

“I love everything that’s old— old friends, old times, old manners, old books, old wine... and old friends are best”

Oliver Goldsmith (1773)

SILENT KEYS

Everett Brant, ex-W8PQH
H. B. King, W8DJ1
Stan Markun, WWSS
H. Meridith, W5POA
C. F. Smith, W2DSS
Ben Tweet
W. A. Shedlock
George Wakefield
W. E. Lehnert, W9ACC
Nicholas VanGoff, W8OUS
EARLY HISTORY OF THE VERSATILE VIDICON
by Bro. Patrick Dowd, F.S.C., W26K

The earlier TV-Pickup tubes (Iconoscope, Image Dissector, Image Iconoscope, Orthicon, Image Orthicon and Image Isonicon) were all of the photomissive type. These were large, complex, and expensive tubes and required rather formidable camera systems. There existed a large market for a compact, lightweight and inexpensive TV-Camera that would be simple to operate. In 1947, in an attempt to satisfy this need, work was initiated at the RCA Labs in Princeton, New Jersey, to investigate the feasibility of developing a photoconductive type TV-Pickup tube. Although the application of photoconductivity to TV-Pickup tubes had been investigated in the mid and late thirties with little or no success, the knowledge and experience gained over the past decade gave reasonable hope for a satisfactory solution to the problem.

Accordingly, the RCA researchers worked on two approaches: One group (A. Rose, R. Bube, R. Smith and others) began fundamental research on Cds and other high-gain photoconductors; the other group (P. Weimer, S. Forgue and R. Goodrich) began work on the practical aspects of developing a photoconductive TV-Pickup tube. Over the course of the next three years many experiments were conducted. The first promising photoconductor tested during this period proved to be amorphous selenium. It was unknown to the researchers at the time that this form of selenium had been used in earlier experiments in xerography and is, in fact, still used in Xerox copiers.

The amorphous selenium target, when scanned with a low velocity beam, gave an excellent B&W picture. The target had high dark resistivity, good sensitivity over most of the visible spectrum (red excepted), and excellent resolution and speed of response. The new target proved so sensitive that the customary electron multiplier and image sections used in the Image Orthicon could be eliminated. The small target area (matched to 16mm optics), low velocity scanning, magnetic focusing and deflection, and the lack of multiplier and image sections all contributed to the ultimate simplicity of the new pickup tube. It was named the 'Vidicon'. (The name 'Photocon' was preferred, but this name had already been copyrighted in England.) The Selenium Vidicon made its debut at the I. R. E. National Convention in 1950.

An early problem with the amorphous selenium photoconductor soon surfaced. It was found that after several hundred hours of operation at the slightly elevated temperature of the Vidicon Camera, the amorphous selenium was gradually converted to the more conducting metallic form, resulting in a corresponding degradation of the picture quality of the tube. Fortunately, about this time, it was discovered that antimony sulfide (Sb2S3) made a very stable photoconductor with good spectral response and reasonable freedom from lag at normal light levels. It was also shown to be unique in its ability to accommodate an automatic gain control by variation of the target voltages. These features proved to be of considerable advantage for inexpensive cameras with a fixed iris.

One of 7 Vidicon panels in the Dowd exhibit at Manhattan College, New York City.

The early Vidicons had a characteristic 'side-tip' located about ¼” below the tube window. The photoconductive layer was evaporated onto the inner surface of the window at this point and the opening was sealed just prior to tubulation. This side-tip limited the effective length of the deflection yoke which resulted in some deflection distortion. The side-tip was eliminated several years later. (Continued on next page)
The first commercially available Vidicon (Type 6198) was announced by RCA on August 7th, 1952. As advertised: a new-type of TV-Pickup tube for industrial use: its small size (6¼" x 1½") and simplicity will greatly facilitate the design of associated camera equipment; it utilizes a photo-conductive layer (antimony sulfide) as the light-sensitive element with a spectral response approaching that of the human eye; 400 line resolution (increased to 600 lines by release time); requiring only 100/200 foot-candles of incident scene illumination; operation on relatively low DC voltages; ideal for compact, lightweight TV-Cameras; target area location and size permits a wide choice of commercially available (16mm) lenses.

The RCA 6198 Vidicon released by RCA August 7th, 1952.

The 6198 was the first of a large family of Vidicons using porous antimony sulfide targets (either as a whole or in part) released over the next thirty years or so. These became known as the 'Sulfide' Vidicons. These Vidicons are still very much in use today in broadcast film-pickup cameras and in inexpensive TV-Cameras. However, the sensitivity and lag of the Sulfide Vidicons are not entirely acceptable for Broadcast Studio use.

Cross-section of a Vidicon

During the first twelve years the sensitivity of the Vidicon target was greatly increased. Various forms of the Vidicon were miniaturized, ruggedized, given variations of electrostatic, magnetic and electromagnetic focusing and deflection, and in many ways underwent great physical improvement. However, it was not until the introduction of the lead-oxide Vidicon (Plumbicon) that the Vidicon made any inroads into the Broadcast Studio Field. The Plumbicon was released by the Philips Company of Eindhoven in the Netherlands in their Tri-Color Camera in 1964.

Within a few years, other companies released their versions of the lead-oxide Vidicon: English Electric Valve Company released the 'Leddicon', RCA released the 'Vistacon', etc. By the arrival of the seventies the lead-oxide Vidicon was well on its way to supplanting the Image Orthicon as the Broadcast Studio 'work horse'. During the seventies this transition became just about complete - the lead-oxide Vidicon was established as the Broadcast Industry Standard. In recent years the lead-oxide Vidicon supremacy is being threatened by two relatively new Japanese Vidicons: Hitachi's 'Saticon' and Matsushita's 'Newvicon'. The photo-conductive target of the Saticon consists of amorphous selenium mixed with a small amount of arsenic and tellurium to improve its stability and red response. The Newvicon target uses a double-layer of ZnSe - ZnCdSe.

In the mid-sixties work was initiated by many companies, both here and abroad, to develop a solid-state imaging device to replace the TV-Camera tube. Very commendable results were obtained from several different approaches to the solution of this problem and a number of companies reached the product stage during the seventies and early eighties. These devices are comparable in size and appearance to the standard IC's on the market today. At present, these devices are limited to industrial and inexpensive TV-Camera use. If history is to repeat itself, it is not unreasonable to expect a 'Studio Quality' Solid-State Imaging Device to reach the commercial market during this decade.

ACKNOWLEDGEMENTS:

(1) Special thanks to Paul K. Weimer, 'Father of the Vidicon' and a recently retired Fellow of the Technical Staff of the RCA Research Labs in Princeton, New Jersey, for his generous help. (2) A. Danford Cope, 'Father of the ¾" Vidicon' and member of the same Staff. (3) The RCA Standardizing Notices of the period.

The history of the television camera tube is a technical field which few members are familiar with. W2QK summarizes the development with emphasis on the Vidicon. Authorities on the subject, including RCA engineers, believe his documented display of 12 panels of camera tubes is the largest and most comprehensive in the world. AWA is most fortunate to have such a dedicated historian as a member.

DID YOU KNOW ---

that Western-Union handled 300 million messages in 1926 and only 5 million in 1981!
THE DEFOREST
DV-DL SERIES

by Bill Condon, Santa Monica, California

The early twenties was a period of turmoil and frustration for the DeForest interests. Seemingly endless lawsuits and patent litigation drained the resources of the Company and the time of its officers. RCA controlled the Fleming patents and had been granted an injunction which prevented DeForest from marketing triodes. DeForest himself was involved in the development of Phonovision (sound movies) and was not active in the affairs of the DeForest Radio Telephone and Telegraph Company.

The Fleming patents expired in November of 1922, clearing the way for DeForest to once again manufacture Audions. The initial tubes advertised were the DV-1 and DV-6, first publicized in DeForest Catalog K of early 1923. The V indicated a short pin or UV base while the number was the approximate filament voltage. The DV-6 was listed as having a .5 to 6 volt thoriated filament drawing .5 amps. A cylindrical element structure mounted in a horizontal plane was employed. This tube was rather short and ungettered. (See Figure 1)

Tests run on a number of DV-6's indicate that the filament was basically straight tungsten, running at the characteristic white-hot temperature of that material. A DV-6 data sheet packed inside the tube carton gave a somewhat more accurate description of filament operation than Catalog K. The data sheet gives a filament voltage range of 3 to 5 volts at .5 to .7 amps. The DV-6's tested actually drew about .75 amps at 4 volts. This tube had a nickeled base, unmarked except for the notation "PAT. APL'D FOR". The bulb had no sticker, but was etched "DeFOREST" in a circle around the top of the bulb. This etch is generally faint and sometimes unreadable.

The DV-1 was described as having a 1 to 1½ volt oxide filament drawing .2 amps. This tube also had a horizontal element structure and a short bulb. Ads dated March 1923 gave essentially the same information as Catalog K, also several books printed about that time. In all these sources only the DV-6 is illustrated, no pictures of the small DV-1 can be found. Since the DV-1 appeared somewhat later in a quite different form - a tall bulb with a 3 volt fila-
ment—the question arose as to whether or not the 1 volt tube was actually sold.

Extensive investigation failed to produce a definite answer, but it is the authors opinion that while a 1 volt oxide filament DV-1 may have been made briefly, the introduction in 1923 of the more rugged and better performing UV-199 might well have provided the motivation to redesign the DV-1. The fact that the type number was not changed after the redesign was not inconsistent with the generally erratic marketing policies of the DeForest Company.

The first ads for the DV tubes to run in major radio magazines appeared in September of 1923. The tubes described were the DV-1, DV-6A, and the DV-2. These tubes had nicked bases marked "DE FOREST AUDION" and carried patent numbers along with the restrictive notice "SOLD ONLY FOR AMATEUR AND EXPERIMENTAL USE". The bulbs were gettered and had small round orange and black stickers giving the type designation. (See Figure 1) The DV-1 shown had a tall bulb and a 3 volt thoriated filament. The electrical characteristics were quite similar to the standard '99, and the DV-1 was described as a "Dry Cell Tube". The DV-6A shown was an improved version of the earlier DV-6. The electrode structure was the same, but a thoriated filament was used which reduced the filament current by half. The tube was now gettered and was listed as a "Universal Tube". The DV-2 was a new addition to the series and had a 5 volt at .25 amp filament.

Although described as a "Wet Cell Power Amplifier Tube", its essential characteristics were not much different than the UV-201A and could be used in the same applications. However, the recommended bias voltages for the DV-2 were lower than those of the '01A, resulting in higher plate current and somewhat lower plate impedance. Used in this manner, the DV-2 was capable of slightly more output but could hardly be considered as a power amplifier. Later DeForest data described the DV-2 as a voltage amplifier and did not recommend its use as a output tube. The DV-1, DV-2, and DV-6A were advertised through March of 1924. These early tubes were packaged in conventional cardboard cartons, unlike the later types which came in round metal cans.

In April 1924 new ads showed major changes in the series. The use of metal bases was stopped in favor of new materials. The DV-1 and DV-6A were dropped, and the DV-3 was added. The DV-6A with its high filament current and low Gm was not competitive with either the '99 or '01A and was no doubt discontinued due to poor sales. The DV-1 was replaced by the DV-3, which had near identical performance. The DV-3, however, had a short bulb and a horizontal element structure as opposed to the tall bulb and vertical construction of the DV-1. The first DV-3's used a bakelite base, the color of which varied from maroon to dark brown. Molded into the base was a round logo which was nearly identical to the paper sticker except for the omission of the type number.

The DV-2 was retained but the base was changed to Isolantite, a ceramic material with excellent electrical properties. (See Figure 2) Early DV-2 Isolantite bases often have a somewhat rough texture, with tool marks indicating that they were perhaps turned on a lathe. Some of these early
bases were also made with a glazed finish over the Isolantite. The first DV-2's had a stamped circular logo on the base similar to the molded markings on the DV-3. This logo was used only briefly and then modified by adding the wording "Isolantite-base mfg for exc" above the circle.

DeForest sales brochures of the period describe the DV-2 and DV-3 as having Yttrium or Yttriated filaments. The earlier DV-1 and DV-6A probably used the same material. Since General Electric controlled the thoriated tungsten patents, it is not surprising that DeForest resorted to other materials. No mention is made of Yttrium in later data. The expiration of the DeForest triode patents in early 1925 brought a flood of independent tube makers into the market and the general use of thoriated filaments. It should be noted that by early 1923 DeForest had sold his interest in the Radio Telephone and Telegraph Company and all references to DeForest refer to the Company only.

![Image of tubes: DV-5, DV-3A, DV-7.]

November of 1924 brought several changes. The company had been reorganized and was now known as the DeForest Radio Company. The base of the DV-2 was changed from Isolantite to bakelite. The molded logo was the same as used on the DV-3 and the paper sticker was unchanged. The bakelite bases were used on the DV-2 and DV-3 into 1925 but by the end of that year had been switched to Isolantite. (See Figure 2)

1925 saw the introduction of two new tubes to the series and also a new label. (See Figure 3) The DV-3A was the first of these new tubes and was electrically the same as the DV-3 but had a smaller base which was compatible with the standard '99 socket. The base marking was changed to a square format and included the DV-3A type number. This was the only tube in the entire series to have the type number on the base.

The small round sticker used on earlier tubes was replaced with a larger label which wrapped half way around the tube. This label gave the type number, filament voltage, and general function of the tube. There was also a space for the dealers name, test date, and buyers name. This label was used on all new types and only the DV-2 and DV-3 can be found with either the small sticker or large label. The other new tube of 1925 was the DV-5. This tube was used mainly as an audio amplifier and had higher plate voltage ratings, Gm, and u than the DV-2. The DV-5 was useful as a driver for a power output tube.

The last tube in the DV series was the DV-7. This tube appeared in late 1925 or early 1926 and was the first output tube in the group. (See Figure 3) The DV-7 had a 5 volt at .5 amp filament and was intended for use in the last audio stage only. Despite the higher filament current the DV-7 was only capable of about 65 mw output, not much more than an '01A and gave improved performance with weak signals when used in RF stages. This tube was also recommended for use as an oscillator in superhet receivers. The other tubes released that year were the DL-2, DL-5, and DL-7. These types were identical to their DV counterparts except for the UX bases. (See Figure 4) These three tubes were made for a while with black bakelite bases, (See for left tube in Figure 5) but by 1927 Isolantite was being used.

1927 brought the last four tubes of the DL series onto the market. The DL-3 was a UX based DV-3, but the other types were all new designs. The DL-14 was a medium power audio tube with low output impedance. This tube had the same recommended plate and grid voltages as the UX-171 but had somewhat higher plate impedance. The DL-14 had a max output of about 600 mw which the '71 would produce 700 mw. A larger bulb was used for the DL-14, the same size and style as used on the earlier Moorhead VT.

During 1927 the DL-7 was modified to use this same larger bulb. (See Figure 5) Another power tube brought out that year was the DL-9. This tube had a max output of about 1.5 watts, slightly less than the UX-210. The DL-9, however, required a 500 volt plate supply and had a rather low Gm for a power tube. The DL-9 probably had a rather short period of use due to the introduction in early 1928 of the UX-250. Under similar operating conditions the '50 had about three times the output power and required less filament current.

The last tube in the series was the DL-15, designed for use as a detector only. This tube had a rather high u and Rp, much like the UX-200A, and the DeForest data sheets claimed superior results for the DL-15 when working with weak signals. To verify these claims a special test circuit was built up using lab quality calibrated signal sources and measuring equipment. The circuit itself was a basic grid leak detector stage in a well shielded enclosure so that operation at low signal levels could be checked. Several DL-15 tubes were tested and found to have consistent but disappointing perfor-
Fig. 4 Left to right: DL-2, DL-3, DL-4 and DL-5.

As a detector the DL-15 was found to be slightly inferior to the average '01A and much less efficient than an '00A.

An examination of the DL-15 structure revealed several interesting items. The plates had a series of rectangular slots punched out, perhaps an attempt to reduce the grid-plate capacity. There was a small cylindrical metal button attached to the top of the plate, similar to the one used on the '00A to hold the active material from which the caesium vapor was formed. The DL-15 was gettered, but showed some discoloration in the getter material at the top of the tube. The RCA '00A was not gettered, and it is the author's opinion that the DL-15 was in fact an alkali vapor tube and that over the years a chemical reaction between the magnesium getter and the alkali material took place, which now prevents the formation of the gas vapor. The lack of this gas vapor would account for the rather poor performance noted in the detector tests.

With the advent of the DL series in 1926 (UX bases) all new types introduced after that time were made with the DL base only, thus the DL-4, DL-9, DL-14, and DL-15 do not have DV counterparts. However, the earlier types were marketed with both base styles through 1927. The author has a large DeForest ad of 1927 which shows that the entire series, including all DV types, were all available at that time. (This listing does not include the DV-1, 6, or 6A which were dropped in 1924.) The DV-DL tubes were phased out in 1928 with the appearance of the familiar DeForest 400 series tubes which were equivalent to standard RCA types. Isolantite bases were used for a short time on the 400 series.

There were 23 tubes in the DV-DL series if base and bulb style variations are counted, and the acquisition of the entire set would be a difficult but rewarding task for the serious DeForest collector. To assist the collector in this project the series has been broken down by base type as shown below.

Nickel Base - DV-1, DV-2, DV-6, DV-6A
Bakelite Base - DV-2, DV-3, DL-2, DL-5, DL-7

Published technical data on these tubes is very scant, and even DeForest data sheets and ads seldom gave more than recommended operating voltages. Due to this situation it was the authors intent to include in this article complete technical data for the entire series, and this information is given in the following table. The basic operating conditions (filament, plate, and grid voltages) were all obtained from DeForest data sheets and sales brochures.

The other data in the table (plate current, Gm, etc.) was gathered from a variety of generally obscure sources and modified as needed per the results of tests. To verify the accuracy of the infor-
Fig. 5 Left to right: DL-7, DL-7, DL-14 and DL-15.

Ition two to eight tubes of each type were tested by the author and all parameters measured. Lab quality instrumentation was used for all testing. In most cases the measured data was in general agreement with the published figures; however some significant errors were found. One exception to the above procedure was the DL-9. The author did not have a working sample for testing, so the data in the table for the DL-9 has not been verified.

| CHARACTERISTICS OF DeForest DV-DL SERIES TUBES |
|-----------------|-------|-------|-------|-------|-------|-------|-------|
| Type        | Fil. Voltage | Fil. Current | Plate Voltage | Grid Voltage | Plate Current | Rp   | u   | Gm   |
| DV-1        | 3.0V     | .07A     | 67.5V | -1.5V | 2.6Ma     | 16K  | 6.4  | 400  |
| DV-2        | 5.0V     | .25A     | 90V   | -1.5V | 4.8Ma     | 9.6K | 8.0  | 830  |
| DL-2        | 3.0V     | .06A     | 90V   | -4.5V | 2.7Ma     | 15.7K| 6.6  | 420  |
| DL-3        | 5.0V     | .25A     | 90V   | -1.5V | 5.3Ma     | 8.5K | 9.5  | 1120 |
| DL-4        | 5.0V     | .74A     | 60V   | -1.5V | 1.0Ma     | 30K  | 8.1  | 270  |
| DL-5        | 4.0V     | .36A     | 60V   | -1.5V | 1.4Ma     | 23K  | 7.4  | 320  |
| DL-6        | 5.0V     | .50A     | 135V  | -9.0V | 6.5Ma     | 6.9K | 7.1  | 1025 |
| DL-7        | 7.5V     | 1.6A     | 500V  | -51V  | 35Ma      | 6.0K | 6.5  | 1083 |
| DL-9        | 5.0V     | .50A     | 180V  | -40.5V| 15Ma      | 2.6K | 3.0  | 1100 |
| DL-14       | 5.0V     | .25A     | 45V Grid Ret to Fil. + | 3.9Ma | 23K | 17  | 725  |
NEW MEMBERS
who are (or were) with the electronic communication or related industry.

Information in this column is obtained from the member's Application Form. If you are not listed, you didn't fill in the form properly.

John Ettler (W2ER) RCA Global Communications
Martin Groce (W8NRE) Station KUOM
Peter Cunningham (Hurlstone Pt., Australia)
Two-way radio communication

Roland Brunelle, Station KVMA
Daniel Lanciani (WINB) National Co., Trinité
Ray Yecansen (W5JSQ) Dir. of Service, Magnavox
Homer Clark (W2WYO, W6HIO, W6YRP) Zenith, L. T. T., Hughes, Bell Aero, etc.

Ken Zichl, Co-ordinator instru. TV station
Rex Wilson (W7B7T) Chief Engineer KAAA, KZZZ
Ed Holton (K6HGC) Super. Hawaii Institute of Geophysics Communications
Wm. Miller (K4MM) KDKA, WWSW, RCA marine
Ray Tonks (Sidney, Australia) Amal. Wireless
Australia Electronic engineering

Allen Abel, Station WSSR
William Frey, Edmac Assoc., I.E. C. Electronics
Nick Hurbut, Bell Canada
Lee Gustik, General Electric Co.
James Hillman, Stations KDKA-TV, WJAS, etc.
Bill Kelly (W2DHA) NBC, WPIX, Marine radio.

Pete Mohila, Station WPOP
John Suter (W5FEW) Stat. KNJB, NDZ, NAT, NCD
Don Wick (K3HBB, W6FSA) Hewlett-Packard Co.
Donald Reinmsa, Aviation Electronics USN.
John Littin, W2JCM, Bell Tele. Co.

Ed Reichwald, Color TV/Video electronics
Davis Beck (W2FM, W3GFS) Hazeltine Corp., G. E., National Co., Hammam, etc.

Richard O'Brien (W3JEZ, W6ORU) CBS TV
Ray Seppeler, Radio/TV retail, A. F. Comm.

Guy Bireau (Comto-jo Comte, France) broadcast transformer manufacturing
Albert Jones (K6DIA, W1TX) BC stat. Eng.
Jerome Maslowski (K58B, W5LKM) Lear, Inc.
Bruce Peters (K7TL, F7FL) Stat. WHAM, WSKY, WAXC and WYLF

Bob Turner, Stat. WGCJ and K3JO

Sewickley Academy, Stations WDQI, WPLW
Ray Long (W5TY) Lt. Col. U. S. Signal Corps
John Sandison (V6SAAS) Stats. CKTV, CFMQ
Charlton, (W3EGR) A T. & T. Long lines
Henry Brown (W6DXJ, KYL7END) Ship & BC oper.
C. W. W. (W2LL) Radio Officer, US Merchant Marine

Jim Haube (W3OER) Stat. WTAE, WSKT, WIC
Duke Campbell (K5GDH) Commun. Chief U. S. Signal Corps
George Fathauer, Electra Co., RCA

Wm. Losey, Bell Tele. (Microwave Div.)

Christopher Hausler (WB2TLL) Stat. WOKP
Andrew Eggers, Educ. Communication SUNY
Elmer Torrey (W3JFY) Stats. W5VS, WMJ
Fred Bashian (K912X, W9NXJ) RCA Dist.
Albert Wild, General Elec. broadcast equip.
Ira Current, State College broadcast/Trans.

James Ottman, G. E. Co., General Dynamics, Harris R. F.

Wm. Miller, Radio station announcer

Hugh McQueen, U. S. A. F., AACS
Cliff Hedkeph (K4MLD) Stat. WTAR AM/TV
Norman Nitschke, Gen. Electric, Western Elect.
Michael Callahan, Harvard Univ. Film/Comm.

Stanley Clasen (WAS1KF) Nat. Bur. of Stds.

William Paterson, Stations WJBY, WWTR
Charles Hertel (W6KJD) Western Electric Co.

Bob MacFarland, Stats. WHLA, WFLY
Lawrence Cannon (W5KOK) E. T. M., USN

John Terry (W5OYQ) Raytheon Corp.

Reg Washburn, former Asst. Editor "Radio News" and Editor "Radio-Craft" mag.

Geo. DiGugli, G. E. Electronics

Ray Moore (KIDBR) Hytron, Raytheon, Crystalion

Sam Marquis (W2ERU) Mackay Radio, W8I, etc.

Jack Hartman, U. S. Navy Research Labs
Ed Matney (K5FCH) Tech. Bell Helicopter Co.

Dean Barker (W6LY) Communication Consult.

Delisle Conway, Stat. WAGE, WAER, WESO, General Electric broadcast engineering

Joe Pentecost (W4YGE) Stat. WTVF (TV), CBS

Pieter Windey (ON6PW) Hamme-Moerzeka, Belgium

Bob Willis, Stat. WMTL, Microwave/Telemetering

Al Abramson, CBS television

Kashiho Nose (KH6JW) Honolulu, Hawaii, Radio sup.

Walt Golden, Stats. KQV, W8FW, WHBM

Larry Myers (W3MNE) Stats. NPL, NPO, NPM

Quick reference to
RECENT ORIGINAL ARTICLES
of interest to radio historians

TV's Felix the Cat

ARCA, Vol. 11, #4

Radio in Canada

NFRA, Vol. 3, #1

Outstanding Restoration Hints

MAARC, Vol. 4, #2

Phillips Y. T. Receiver

BVB, Vol. 7, #1

Minerals used in detectors

BVB, Vol. 7, #1

The Colin B. Kennedy Co.

ARCA, Vol. 10, #2

Tropical Radio Tele. Co.

SOWP, Vol. 5, #1

Museums

N. Y. R. S. Vol. 3, #2

Operando & AK Mod. 41 sets, Radio Age, Vol. 8, #7

Pioneer Joseph P. Agostino

ARCA, Vol. 10, #3

RCA Products

Radio Age, Vol. 8, #8

Cleartron "Lodge N" receiver, BVB, Vol. 7, #2

Navy SE-2454A DF receiver, SCARS, Vol. 7, #1

Salvaging paper condensers, N2VRS, Vol. 3, #3

VLF converter

Radio-Electronics, Jan. '83

Super-regeneration

Historical Radio Society of Australia #2 and #3

ER-733, Radiol, AR-1300, Radiola V

Radio Age, Vol. 8, #10

Brief history BBC "75" mag. Jan. '83

List of National Receivers

Freqex, Jan. '83
Probably the most frustrating part of using antique battery-powered radios is supplying the wide range of A, B and C voltages required. Automobile batteries with chargers. Lantern and glow-plug batteries – usually dead. Costly, rare ‘B’ batteries. ‘C’ supplies consisting of strings of flashlight cells spreading across the floor. Wires that make the bench top reminiscent of the Sargasso Sea. Is there no cure for this madness?

Take heart. After a particularly frustrating session of battery-itis, I found the cure! Here is a universal A-B-C battery eliminator, suitable not only for most battery powered antiques, but also for those new-fangled devices like transistors and integrated circuits. This device is a deluxe unit with fully adjustable and metered IC regulated A and C supplies, a Zener regulated B supply and wide output capabilities, and all in a nice little 4½ x 7½ x 8½ inch package. All parts should be readily available from junk boxes, or Radio Shack stores and TV repair shops.

CONSTRUCTION

The power supply uses two transformers— an 18V CT/4 amp for the A and a small power transformer for the B and C. This radio power transformer is not particularly critical but must have a 400 to 550 volt CT at 100mA high voltage secondary and two filament windings (usually one 5 volt at 1-2 amp for the HV rectifier tube and one 6 volt at 2-4 amp for all other tubes). These are quite common in AC only receiving equipment from the 1940’s and 1950’s, so a junk box radio is the best source. Usually, these old receivers also contain a filter choke. Nice matched set. Use new filter capacitors, however.

Use of TV power transformers is not recommended as their normal 800-1000 V secondaries are just too high. Only 175-200 V is required for the B+ regulator chain, which consists of a dropping resistor and several Zener diodes. The Zener voltage regulators can be 5 or 10 watt units, in either the listed values or composed of series 11 V and 12 V diodes. 22
V/5W Zeners are 1N5358, 11 V/5W are 1N5348 and 12 V/5W are 1N5349. These are available as GE replacement parts through TV repair shops. A bleeder resistor is included to safely discharge the filter capacitors.

Several B+ voltages may be used simultaneously, as for, say, RF amp- 90VDC, detector- 45VDC and audio amp- 125VDC. Don't exceed a total current drain of 50-75 mA, or the Zeners will fry.

The C supply is also provided by the power transformer from the unused filament windings. The 5 and 6 VAC windings are to be connected in series (proper phasing) so that their voltages add. The resultant 11-14 VAC is supplied to a voltage doubler, which provides around 30 VDC to the voltage regulator. Be sure that the no-load voltage into the LM350K does not exceed 35 VDC or it will go poof! A small heat sink is advised on this device.

The A (filament) supply is straight-forward, with an 18 VAC CT/4amp transformer and [Cont. on page 29]
FROM HEADQUARTERS

Close-Up

The First Video Game

Seems the 1966 date noted on page 24, Sept. OTB, as the date for the first video game is under question. Another article in the Oct. '82 issue of "Creative Computing" states the game was invented in 1950 by a Willy Higinbotham at Brookhaven Lab. Each author takes a positive approach...reminds me a little of the controversy about the first broadcast station---all depends on definition.

Transmitter from "Los Angeles"

Jim Reddig sent me a photo of the Telefunken transmitter from the U.S. Naval dirigible, the ZR-3 "Los Angeles"....and you would never guess where it is...in the aviation collection at the University of Dallas.

As you know, the old ZR-3 was of German origin including the radio equipment. The set doesn't appear as sophisticated as other 1920 equipment. It may even have a wooden panel....

1929 - 30 Company

The Association was recently given two large scrapbooks of news clippings covering the formation of the Universal Wireless Communication Co. of Buffalo, N.Y. The organization was set up with 40 shortwave channels to handle traffic between 110 cities.

This naturally caused quite a stir with rival RCA and resulted in much news coverage. The scrapbooks were compiled by Dubilier attorney H. R. Van Deventer and given to AWA by Paul Bailey. Can anyone shed light on what happened to Universal Wireless?

Dial Display

How's this for something different...Gene Black (W2LL), an old ship operator, has a nice display of vernier dials such Pilot, Marco, etc. Not a bad idea, doesn't take much space and not too costly. This reminds me of an exhibit of tube sockets in Fred Hammonds museum....see, there are other things to seek other than just receivers.

Collins KWS-1

John, W4ACG, would like to know how many members have a KWS-1 transmitter? Here is a start: W2AN, W4ACG, W6ASI and VE3HC. Any others?

Latest in IC's

I just read that the Japanese firm Mitsubishi has been successful in developing two small IC's that make a complete color TV chassis (minus tuner, power-driven transistors and CRT). Remember when an early TV set had as many as 30 tubes and required two men to haul it into the living room...? And more...Sony has a complete AM/FM receiver with just ONE IC (plus a few capacitors, coils and speaker). The tiny IC even has a power amplifier!

Tudor Rees

A note from Tudor Rees (Bristol, England) states the cost of his radio catalog (page 4, Sept. '82 OTB) is £1.71 surface mail and £3.50 airmail. He also points out the best way to handle overseas payments is through International M.O. or your VISA or Mastercharge.......

Delayed Echoes

Robert Freyman (retired from Los Alamos National Lab) was recently honored by the Soviet Academy for his explanation of long-delayed radio signals. Normally, radio signals travel the globe in a seventh of a second, rarely making more than two trips.

In 1927, a Dutch transmitter was discovered to be generating signals that were followed by echoes at three second intervals. Since then, 30 second delays have been recorded!

Freyman proved the signals are delayed because they are caught up in

(Continued on next page.)
On Review

Review: THE BLILEY ELECTRIC CO.
Pioneer Crystal Manufacturer

Some time ago I asked Charles Bliley, K3NAU, to write a short history about his father's company for the OTB. Chuck agreed and started to collect information and pictures, but like so many projects, it got out of hand.

Research into the Bliley company resulted in a wealth of historical information -- too much for an OTB article. This prompted a suggestion it be printed as a monograph. Since AWA no longer publishes monographs because of high printing costs, the Bliley Company volunteered to pay part of the expense. Result: AWA members have an excellent documentary on one of the country's leading crystal manufacturers.

The founder, F. Dawson Bliley (1906-1955), a radio amateur (W8GU/W3GV), founded the company in 1931. Originally a supplier of crystals for amateur transmitters, it became a leading manufacturer for commercial and the military during WWII with over 1300 employees. The booklet will be available at AWA meets and sent on receipt of two (2) 20¢ stamps.

NEW PUBLICATION:
The I. E. E. E. Center for the History of Electrical Engineering has started to publish a "newsletter". The first issue shows great promise. Here is a partial list of contents: A report on a computer museum, a laser project, a Marconi anniversary and a Faraday-Maxwell exhibit.

MARCONI PLAQUE
A ceremony was held last fall at Glace Bay, Nova Scotia, on the site of the Marconi station "GB". It was at this station the first two-way trans-Atlantic transmissions were made in 1902. To celebrate the 80th Anniversary, Mrs. Gioia Braga, Marconi's daughter, unveiled a large plaque mounted in a stone monument.

--- Harold Reid
QUE: Which company(s) besides Magnavox made an amplifier and horn speaker combination?

ANS: Only one other company was known to make a combination amplifier and horn speaker. It was the Victory Radio-Electro Co. They made a loud speaker and two-tube amplifier in a cylindrical shaped base with the straight neck and bell protruding up and out.

The Bristol Co. of Waterbury, Conn., made a cabinet model 1-tube amplifier which was advertised extensively in several radio magazines. The one-tube amplifier has become a collectable item with or without a Bristol horn speaker. A picture of the amplifier and Bristol "Sr." is shown.

QUE: Has anyone made a study of horn speaker shapes and what percentage of all horns made were simple goose-neck design?

ANS: Over 305 manufacturers of horn speakers and over 600 models of horns were surveyed. Using a simplified categorization, the following percentages of each shape were manufactured:
- 35% -- gooseneck
- 25% -- straight neck
- 10% -- cabinet
- 4% -- cabinet
- 3% -- table lamp
- 3% -- neck type
- 20% all others

Straight neck and megaphone shapes tend to be early. Cabinet and table lamp designs hid the horn shape and offered a living-room decor (probably appealing to the housewife). Other styles included floor lamp, floor pedestal, sea shell, fruit bowl and auditorium speakers.

Callophone
Loud Speaker

OF NEW YORK
216 Mercer Street New York

QUE: Which horn manufacturers made square-shaped bell designs?

ANS: Several. Not including cabinet horns, WorkRite Mfr. made a small light-weight papier mache bell with a "C" neck. Callophone (R-1202) made a large metal square bell 14" square that had a "C" neck.

Others include Ovenshire (page 207 of V.R.) made a 10" square wooden bell. United Motors Service sold a Delco "Ham" straight neck speaker in 1931 with a square bell approx. 3" per side. Timbretone (wood) came out with a violin-shaped base with a square neck and bell. Lastly, Acme and Trinity made square bells.
QUE: I just acquired a Mecograph key. Were many of these keys made and how are they dated?

ANS: There are three types of Mecograph keys with the right angle design. The one illustrated was made in 1909. There were an earlier form in 1907 and a combination right angle and hand key, circa 1908.

There was also the Ultimate key, popularly called the “73” key because the trademark is also a right angle style. There were two models of this one: A 1925 model for the professional with a hinged dust cover and a 1926 version of “white metal” advertised for amateur use. In this model the dust cover is not hinged.

An overseas version of a right-angle semi-automatic was made in Australia known as the Simplex Auto key. All right angle keys are rare.
BUILDING A KIT POWER SUPPLY

ASSEMBLING THE RCS-728 A, B, C, POWER SUPPLY

I just assembled one of Gary Schneider's commercial A- B- C kits to power several battery sets. It took several hours two evenings or a total less than 5 to assemble and wire the kit. This saved me nearly $30.

The instructions were fairly easy to follow and I encountered no problems. The only thing I questioned was the zener which projected below the chassis. Since it was live, I covered it with a piece of electrical tape.

I checked the power supply on an AK-20 and a Radiola III-A which used 199 and 120's with adapters. No problems, no hum.

The power supply delivers 22, 45, 67 and 155 volts and 3 to 22 v. "G" taps with a .3 to 7.0 variable regulated "A" supply which is set by a meter.

Originally I was going to buy the components and punch/drill the chassis since I could save money. Maybe so, but I think I am further ahead with a pre-design kit and punched chassis. A commercial job also has greater resale value.

--- Bill Shaw, W2HYN

The complete set with all instructions sells for $108.50 PPD. Write Gary Schneider, 6848 Commonwealth Blvd., Parma Hgts., Ohio 44130

BATTERIES FOR SMALL SETS

Do you have a one or two tube set such as a Crosley Pup or Radiola III which needs batteries? #6 dry cells are costly and not always handy at the local store. Try using ordinary "D" flashlight cells in parallel or series depending on whether the tubes are WD-11's or 199's. For "B" battery, snap together a series of 9.0 volt transistor batteries, 3 to 5 will do for most small sets.

--- Sam Sargent

1929 QSO PARTY

Building 1929 Vintage Equipment

To encourage the building of early transmitters (1929 vintage) and to help members who have difficulty making contacts with this equipment, it has been suggested AWA have a QSO party restricted to members in this category.

The date will most likely be a weekend in September. It will, of course, in no way detract from the big annual January contest. Hopefully, participants will bring their sets to the Conference for display. Here are the suggested rules:

1. Transmitters must be self-excited oscillator such as TNT or Hartley. (No Mopa or xtal control.) Operator must use handkey.

2. Input must be less than 10 watts. Typical tubes: 201A, 112A, 210, etc.

3. No restrictions on antenna or power supplies. Use whatever available although it is recommended the use of an antenna coupling system to reduce harmonic radiation.

4. Operation will be around 3590 kc. Participants will exchange RST and power (watts input). There will be no scoring. Recognition will be given to stations making greatest DX contact.

To further increase interest in 1929 vintage equipment, members may wish to build a receiver. Here are some suggestions:

1. The receiver should be a regenerative detector with one or two stages of audio.

2. All components should be of 1929 vintage (or earlier) including head-phones. Typical tubes: 201A or 199 for DC and 224, 227 with AC supply.

By following these simple rules, no participant will be at a disadvantage.

Time and date for QSO Party will be announced in the June OTB. We would like to have it before the Conference. Suggestions ??
In the September OTB I described various methods of controlling feedback in a regenerative (r.f./det./aud.) of the early 30’s. I will now review five popular methods of coupling the preceding r.f. stage to the detector. To simplify circuitry, triode tubes (such as the 227) are shown without feedback in the detector.

The popular tuned-plate impedance method is shown in Figure A. Theoretically, this system is advantageous in that a closer approach to maximum amplification is obtained from the screen-grid tube, through the tuned high impedance load in its plate circuit. However, the difference in potential across the tuning condenser C2 is productive of noises unless a very good condenser is employed. Also the grid condenser C1 must be of high quality to prevent leakage into the grid of the detector tube, thus causing lack of sensitivity and still more noises. Exceptionally good results can be had from this system, providing that high quality parts are used throughout.

Figure B shows a slight improvement over the previous system; the only difference being that the plate of the R.F. tube is now connected to a tap placed somewhere about midway in the coil L1. This is a form of auto-former coupling, and there is some voltage step-up in the coil itself. Also selectivity is improved somewhat. But alas, it is subject to the same faults as the previous method, and extra good condensers must be employed at C2 and C1.

In Figure C a resistor is placed in the plate circuit of the radio-frequency amplifier tube, and again we employ the condenser C1 as a means of coupling. However, another detector grid condenser C2 is used and there is now less likelihood of leakage through the two condensers thus placed in series. Furthermore the tuning condenser C is now at ground potential. The disadvantage of this system lies in the necessity of a larger applied voltage to the amplifier, due to the larger voltage drop across the resistor R.

To overcome this fault a radio-frequency choke is used in place of the resistor, as shown in Figure D. The D.C. resistance of the choke is negligible and if a good unit having low distributed capacity is used, satisfactory results can be had.

In all of the above cases the actual coupling between the two tubes is made through the condenser C1, and as previously mentioned this condenser must be of good one or noisy reception and lack of sensitivity results. This condenser, then, is the weakest spot and its elimination is desirable.

Therefore in Figure E is shown what is perhaps the safest and most efficient method of coupling used today. It is the familiar inductive coupling method, and has several advantages, the first of which is that there is no longer any change of leakage from the radio-frequency plate circuit to the detector grid. Furthermore, we now have a means of controlling the selectivity of the receiver through an increase or decrease in either the number of turns on the coil L1, or in the degree of coupling between this coil and L2. This system therefore proved to be the most practical, due to its advantages of increased selectivity and the reduction of tube and condenser noises.
HISTORICAL ARTIFACTS

Insertions in this column are free to members interested in preserving and restoring early radio equipment for personal use.

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1. Only ONE ad per issue per member. Send SASE for acknowledgement.
2. Material must be over 25 years old and related to electronic communication.
3. Give full name, address and zip (and call).
4. AWA will not print repetitions of ads or ones indicating regular sale or profit.
5. The Association is not responsible for any transaction.
6. AWA retains the right to reduce size of ad if over SIX (6) lines.
7. Only ONE ad per issue (no doubles).
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   - October issue: OCT. 10
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RICHARD RANSLEY
17 SHERIDAN ST., AUBURN, NY 13021

WANTED

-- manual for Radiola 28 and also loop antenna for same. T.A. Drogeski, 207 Coal Valley Road, Clairton, PA 15025

-- Federal 58 tuning capacitor & audio xfr; Zenith Super VIII battery door; coils, socket and audio xfr for Grebe CR18; panel for Tuska Superdync Jr; GE S-22A chassis. Bob Lane, 2301 Independence Ave., Kansas City, MO

-- Hallcrafters H-13 from early 1930's and info on same. Also 1938 Allied Radio catalog and other mail order catalogs from 1930's. John Nangle, K4KJ, 12330 Lawyers Road, Herndon, VA 22071 Tel. (703) 620-3666

-- Echophone (Meteor) cabinet wanted. Slam front, hinged top for a 3 tube. Art Harrison, 1021 Falcon Dr., Columbia, MO 65201

-- 4F-7 coils (osc. & det.) #FB-A covers 11.4 to 19.5 mc and #FB-B covers 7 to 11.7 mc. Mill Kessie, 16820 Hubbard Rd., Livonia, MI 48154

-- Thordarson capacity and leakage tester made about 1936. Also any parts welcome. James Fred, RI, Cutler, IN 46929

-- replacement for 4-ang tuning condenser for Majestic 70-B. English tubes type MS4, 164V and P650. Also info on English made Columbia Graphophone Model 310-OC radio/phonio. Dave Frohman, 10308 Wood Road, Fairfax, VA 22030

-- Paragon DA-2 in any condition. Cabinet with front panel would be OK. Also Paragon audio transformers and owners manuals. Literature, etc. Rick Weizbahl, 305 Belvidere Ave., Washington, NJ 07882

-- bugs, keys, landline and wireless items wanted. Please send description. Bill Bradford, K7EA, Seagull Dr., Salt Lake City, UT 84120

-- Pilot Super Wasp either AC model WPS or DC model W/BE. James C. Haube, W30ER, Box 78 RD2, Tarentum, PA 15084

-- ARRL Handbooks for my collection: 1926, 28, 29, 30, 32, 37, 38, 40, 49 and 1953. M. Rosenfeld, 812 Morth Rd., Scottsville, NY 14546

-- schematic for Majestic Standard B current supply, 2 BH rectifier tubes or substitution schematic using modern diodes, 5 good 201A tubes. Bill Johnston, 365 Grant St., Sharon, PA 16146

-- original on/off switch knob for Philco cathedral model 90,90A or 90B. Harry Richardson, 1227 Wiltshire Drive, Sarnia, Ontario, Canada N7S 3W3

-- information on Meepon variometer tuned crystal set sold in Britain in 1924 and made in U.S. D. Smith 50 Hollycroft, Hinckley, Leicestershire, England

-- AK cathedral Model 165, Riders Vol. 1, 2 and 5. Jewel plate milliamper meter for 1924 Jewel tube tester pattern 95 with 2½" dia. face, warranty card for AK model 4700 BB, reprint OK. C. Werblan, 1426 Tomili Dr., Girard, OH 44442 (216) 539-6853

-- early Westinghouse apparatus. Bill Branson, 888 Seventh Ave., New York, NY 10016 Tel. (212) 247-8700


-- information on 1924 M.W. Obermiller 7 tube radio manual. In Lynbrook, NY also any info on the history of the company. All leads appreciated. J. Lawrence, 247-16 Union Tpke., Bellerose, NY 11426

-- National SW-3 with coils. John E. Liffin, Troquos Ave., Landing, NJ 08750

-- Philco cathedrals with decent cabinets. Please state model number and describe. Sketch of grille would help. R. J. Reinold, 260 River Rd., Winthrop, MA 02152 Tel. (617) 846-0589

-- Pooley console cabinet for AK10. Factory made crystal sets. Al Reymann, 657 Pt. Phillips Road, Bath, PA 18014 Tel. (215) 837-9633

-- tuning and coupler knobs for Crosley Pup; Also Crosley 50 or 51 w/tubes in excellent condition; SW-3 with coils; crystal set (Perfer Lambert) and a complete 1930's low pwr xfr. State price in first letter. P.A. Philippi, 31 Platt Blvd., Myrtle Beach, SC 29577

26
--Scott coil shield covers (late copper type), Music Master radio in Deluxe cabinet, Crosley Pup. diced Howe, 9318 Wickford, Houston, TX 77024 (713) 660-9945

--Radiola Model 67, Riders Manuals 1-16, tube tester, oscilloscope and other gear for repairing old radios; Decals for Cheney phonograph; Philco, Montgomery Ward Airline, Vanta radios, old QSTs. George Fisher, 2927 Ewing Ave., S., Minneapolis, MN 55417 (612) 925-2129

--101 Short Wave Hookups by Hugo Gernsback. Will consider copy. Brush crystal headphones or other type prew. supply for radios; final audio xfrmr for AK20. Early wall phone; disc phono w/horn, Jack Spencer, 403 Dell Ave., SE, Huntsville, AL 35802

--replacement power cord for AK40 and later sets. 50 ft $14.50 postpaid. SASE for sample. Ralph Williams, Terry Mufford House, R1 Box 44, Orient, NY 11957

--Scott radio, original literature, radios and memorabilia. Also Scott radio, in cabinet which displays chassis in open on top of console. Steve Chapman, 419 Bird Lane, Washachie, TX 75165 Tel. (214) 937-2726

--spherical audion and RE4 or RJ5 audion detector. Original or replica detector is OK. Felix L. Lucetold, Langenhagen 2, CH-4153 Reinsch (Switzerland)

--power transformer for Radiola 80; also info on Stromberg Carlson Model 10. Robbie Tugwell, 2608 Jefferson Drive, Greenville, NC 27834

--cabinet for Atwater Kent cathedral model 84 or 90. Horn speaker bases for Radiola UZ-1325, AK type M and Brandes. Herman Fothe, 10 Jackson St., Sloatsburg, NY 10974

--cabinets for Federal SB, Kennedy 435, Kenney 281 and Nordy Hauck radio. Joe Stahl, WALT, 228 Plummer, Oil City, PA 16301 Tel. (814) 677-4042

--tuba socket for W.E. 205B or VT-2 (see page 287 of Saga). Doug Britton, Box 150, Hanover, Ontario, Canada N4N 3C4

--chassis & knobs for Michigan MRC-2, 1 Brass based WD-11, schematic for Ecko 221 VIFM. Have W.E. 215A and Bakelite WD-11 for trade. H.K. Frederickson, VE5UV, 218 Skymen Cr., Saskatoon, Saskatchewan, Canada S7K 4G8

--info on the P.A. Starck Piano Co which made Starck Classique 1929 receiver. Also ad, info pictures and prices for communications/military sets 1916-60. Bill Taylor, Box 132, Unionville, PA 19375

--Fried. Eisemann and Federal APT's, voltmeter and grid leaks for Garod V, cabinet for Federal A-10, APT's, for Radiola RC, tuning condenser for Bremerman T, AC Counterphase, Harvey Faulkner, 6130 10th Ave. S.W., Naples Fl 33999

--info on Navy aircraft receiver Model ARB (MMII). On what aircraft did it fly? Fred Chesham, 144 Fiske St., Waterbury, CT 06701

--need 2 interpanels for Deforest. One with rheostat particularly. Will buy or trade. Also will buy or trade early tubes. Have Sodion 021, Rogers Sovereign, Marconi, N.E. 215A and WD-11 brass base tubes. Don Iverson, 10115 N.W. St., Helens Road, Portland, OR 97231

--AK Model 9 or 10. Also want the type M speaker with bakelite and brass driver and several UV201A Radiotrons with brass base and tipped glass envelope. James Notaris, 1100 Welsh Road, Ambler, PA 19002 Tel. (215) 646-3631

--need Regency Model TR-1 transistor pocket size radio for museum project. It uses a 22/12 battery. Trade or cash. Ross Smith, 1139 Strong Avenue, Elkhart, Ind. 46514


--large list of radio magazines and literature available for five 20c stamps. Gary B. Schneider, 9951 Sunrise Blvd., #9, North Royalton, OH 44133

--early receivers, crystal set parts, bus bar wire, cotton covered wire and other restoration materials. SASE. C.A. Days, P.O. Box 2058, S. Dartmouth, MA 02748

--General Electric mercury arc rectifier tube, catalog #86655 in original factory carton, never used. See VR p.189. Two available. $50 ea. Daniel Gaidosz, 342 West River Road, Orange, CT 06477

--one KW rotary spark xmr in working order: SW-3, SW-5, FB-7 all with power supplies and full sets of coils and tubes. Broming Drake & 2 tube Reinnatz and more. Send SASE. Joe Horvath, 522 Third St., San Rafael, CA 94901

--battery eliminators with 1.4, 2.0, 3.3 and 6.0v filament and all 12 and 6 volt. Available with or without PC board or in oak case. For more info send SASE to Peter Vanczar, 835 Bricken Pl., St. Louis, MO 63122

--Grebe CR9, $475; several AK breadboards; Radiolas, Crosleys, Kinsnet; Freshman; Philco; horn speakers and old tubes. Will sell one or all. Charles Seldel, 925 Starlite Pass, OR 97526

--Western Elec. 616A mike, Shure 58 mike with ring & floor stand. SASE for list. Want Loew 333 radio w/3NF multiple tube; Deforest VT w/Shaw pase & Deforest catalogs. George Potter, 239 Village Dr., Lewiston, TX 75067 (214) 436-3944

--Radiola 25 with tubes. Fred Gross, 95-24 91st St., Ozone Park, NY 11416

--SW3 excellent cond w/matching power supply and 12 plug-in coils $90; BC221M frequency meter $25; Sprague 70-4 cap tester $30. George Gyu, Box 174, Onancock, VA 23417 (804) 787-7564
-- Western Electric 2B Antenna Tuner, 40 Superhet, 7A audio amp. $485 or best offer for all. Bob Goodman, 7943 Ponce Ave., Canoga Park, CA 91304
-- Magnavox base for R-3B gold finish Magnavox M-1 horn, W.E. Shawophone (early) horn speaker, F-5 DeForest receiver. SASE F.A. Paul, 1545 Raymond, Glendale, CA 91201
-- antique radios for sale and trade. No lists, state wants in SASE. F. Valiancourt, Ox Bow Road, Hinsdale, NH 03451 Tel. (603) 256-6208
-- History of Radio to 1926 and Big Business and Radio by Gleason Archer. Printed card attached with compliments of David Sarnoff. Prefer trade. Frank Canemisch, K6800, 209 San Francisco Blvd., San Anselmo, CA 94960

-- Radiola/Victor 9-55; several Scotts; AK's; AK model R horn; any Philco parts and much more. SASE for list. Trade Federal DX58 for Mercury Super. Al Jocham, 2047 College Ave., Quincy, IL 62301
-- very rare tubes - 3 Mazda TM263, Wunderlich 27, Mullard LF, Mullard DFA, 3 WD25, 2 WD12, Arcturus 127, WE VT1, R126A, 216A, 208A, RAC-3, 2 WX12, DV1, DV3, D1-early 201. All for $800. Eddy Clement, 6395 St. Zotique, Montreal, Canada H3M 3H7
-- IP501A in excellent condition. Best offer by March 30. Send $1 for large list of radios and parts. D. Spence, D-203 A.N.L., Argonne, IL 60439
-- Philco 37-84 and AK53 cabinets only; complete every-ready #2 tested. Also want to trade Columbia Graphophone type BE cylinder phone for any complete AK breadboard. Brian Rhodes, 2413 Grier Ave., Linden, NJ 07036
-- Atwater Kent Model 33 $50; Crosley 3R3 Tridyn $75; Radiola 20 $85. Send large SASE for complete up to date list. Ron Boucher, 376 Cilley Rd., Manchester, NH 03103 Tel. (603) 662-1698
-- Dumont scope 164E being disassembled for parts. State your needs. Al Smith, Stonedale, Lincoln, MA 01773
-- Tel. (617) 259-9351

WANTED: COMMERCIAL OPERATOR

--- I'd like to get a JOB sending YS ---
RESTORING OLD EQUIPMENT

How did you SOLVE a problem when re-storing a receiver? Drop us a note telling how you did it.

NEW DRIVER FOR HORN SPEAKER

I, like others, found the enameled wire in an old horn speaker driving unit corroded beyond repair. After much hesitation about re-winding the coil, I chanced to note that I had a small PM speaker which nicely fitted into the space where the driver was. Voila! – out with the old coil and in went the PM speaker plus a small output transformer to match the ’71, which is around 2000 ohms. Needless to say, the tone is far superior to the original. I have since restored several old horn speakers with midget PM units.

--- Howard Adams, Midwest City, Okla.

NOT GUARANTEED

Dear Bruce,

While restoring an Atwater-Kent Model 20, I removed the brass nameplate on the cabinet lid and found stamped in the wood the words: “Not Guaranteed”.

I then checked another Model 10 as well as a Model 33 and found the same stampings under the plate. I wonder if all early A-K compacts had this or just models for export. Enclose find a photograph of the Model 20.

Alan Brehaut, Timaru, New Zealand

DID YOU KNOW-----?

that the McMurdo-Silver Company failed in November, 1938, and was absorbed by E. H. Scott Company......

(CONT. FROM PAGE 19)

BATTERY ELIMINATOR

silicon diode full wave rectifiers supplying another LM350K regulator. The LM350K is rated at 3 amps and must have a large heat sink. A suitable heat sink is the Radio Shack 276-1361. Use #18 or larger wire in the current carrying paths in this section.

Additional notes on the LM350K: connect the .1 and 1 uF tantalum capacitors very close to the regulator (short leads) to prevent oscillation. Note that the case of the TO-3 type container is also the V out terminal, and must be electrically isolated from other current paths. Use power transistor mounting kits with thin mica insulators.

Voltage and current metering are optional, but extremely nice to have. Nobody enjoys the results of 12 volts on a WD-11 filament. See the Radio Amateur’s Handbook for design of shunt and multiplier resistors to allow use of cheap surplus “tuning” meters.

Goodbye, batteries!

ATWATER KENT BELT DRIVE REPAIR

Flat bronze drive belts of gang-tuned receivers, such as AK Models 35, 37, 35, etc, usually break at one of the drive-pin holes. Damaged drive belts may be repaired in the following manner:

a.) Clean broken ends of belt.

b.) Lightly tin area near ends of belt ½-inch beyond drive-pin hole.

c.) Butt ends of belt together and place on flat surface.

d.) Cut two ½-inch long pieces of “Soder-Wick” and place in position on surface of belt to bridge break on each side of drive-pin hole.

e.) Touch and press soldering iron at each end of “Soder-Wick” to form soldered joint with belt surface.

f.) Shape soldered joint to approximate contour of pulley surface; enlarge width of drive-pin hole to accept drive-pin, if necessary.

g.) Assemble drive belt to pulleys and set tension so as not to overflex repaired joint.

--- H. Paul Behlender, W3VVS
I wouldn't call this set a "classic". The set was designed in early 1922 and was made for use with the Western Electric Model 1-A and 2-A broadcast transmitters as a monitor. Hence, few were made. W.E. was primarily a manufacturer of broadcast transmitting equipment including tubes. The exception to this (in the radio field) was their popular 7-A audio amplifier and 518-W loudspeaker.

The 2-A monitoring receiver was phased out in the latter part of 1922 with the introduction of the 3-A which used (4) 215-A tubes. The 3-A was more selective since it had two stages of untuned RF. The 2-A, as noted, had none.

Both the 2-A and 3-A were superseded by the popular 4-B and 4-B superhet which were described by W2LV in the Dec. '77 OTB.

Note the set was non-regenerative which allowed the station operator to monitor his transmitter as well as pick up spark and 1CW on the "600 meter watch".

Members interested in designed will immediately recognize the familiar WE wooden cabinet and panel which is very similar to the 7-A. Tube historians can also well appreciate the three tubes---rare 203-B's! Like the set, not too many 203's were made. I wish to thank Carl Maylott, W2YE for the schematic.

---Charles Willett
DAYTON HAMVENTION

Do you plan to attend the big Dayton Hamvention this year? If so, be sure and attend the Hallicrafter historical program tentatively scheduled for Sunday at 11 A.M.

AWA member John Nagle, K4KJ will act as moderator with former Hallicrafter official Fritz Franke and Chuck Dachis, WD5ELOG (top Hallicrafter collector) on the panel. Learn first hand the history and development of a famous line of receivers.

ANOTHER LANDMARK

Prompt action by Bob Merriam, WINTE of the New England Wireless Museum, is saving another landmark--the building that housed the old Massie Wireless Telegraph station PJ at Point Judith, R. I. Bob is undertaking the extremely difficult task of moving the two-and-one-half story building to the N.E. Museum complex 20 miles away. The famous landmark may well be the oldest surviving station to have been in operation between 1903 and 1910.
The AUDION

Several members have shown interest in the Flame Audion described on page 21 of the June '82 QST. In fact, two are considering building one.

While thumbing through some old clippings, I found a letter written by Major Armstrong in 1931 commenting on this device. DeForest claimed the Flame Audion inspired him to develop the triode tube. Armstrong's thoughts on the subject should prove of interest to the radio historian.

To the Editor of The New York Times:

In your issue of Sunday, January 25, 1931, under the title, "The Conqueror of Space Celebrates a Jubilee," you publish a statement by Dr. De Forest regarding the origin of the audion. This statement is that the idea of the audion originated in some observations on the effect of a spark discharged on a Welsbach gas flame in 1900; that Dr. De Forest carried on the development by placing platinum electrodes in a Bunsen gas flame, creating the so-called Bunsen burner detector, and that later on he evolved this into the three-electrode vacuum tube which was introduced to the world in 1906.

As one who witnessed the exposure of this fable in court during the litigation between the Marconi Company and the De Forest Radio Telephone and Telegraph Company in 1916, in which the origin of the audion was traced directly to the Fleming valve, may I here state the facts as they were disclosed in these proceedings, together with excerpts from the court's decision?

It is true that some time around 1900 and thereafter Dr. De Forest attempted to make flame detectors principally by placing platinum electrodes in Bunsen gas flames, but it is not true that experiments were the origin of the audion. They resulted in failure. Nothing of the slightest importance came of them at the time, nor has anything of importance come of them since. There the matter ended.

In 1904 Dr. John A. Fleming of London, England, invented a incandescent lamp detector, sometimes referred to as the two-element vacuum tube; more commonly, perhaps, as the Fleming valve. Learning of the Fleming invention, De Forest proceeded to experiment with it, to add a battery in the manner generally used with detectors at that time, to rechristen it the "audion" and to apply for a patent on it in his own name.

What was in England a Fleming valve became in America a De Forest audion. No grid was included in the bulb. With the exception of the battery — a common adjunct of detectors at that time — it was the identical device of Fleming. A year or so later the grid was inserted in the bulb by De Forest, the name "audion" was transferred to it, and the invention of the audion detector became an actuality.

Question Raised in 1916

The question of the origin of the audion was squarely raised in 1916 in a suit brought by the Marconi Wireless Telegraph Company of America, owner of the Fleming valve patent, against the De Forest Radio Telephone and Telegraph Company, owner of the De Forest audion patents. The case was tried in the Southern District of New York before Judge Mayer. The Marconi Company contended that the De Forest audion was an outgrowth of the Fleming valve and that its use was an infringement of the Fleming patent.

The De Forest Company defended on the ground that the origin of the audion lay in the so-called Bunsen burner experiments of De Forest, and since this work was prior to the date of the Fleming invention Fleming's work had no bearing on the matter. They further contended that the purpose of the filament in the De Forest audion was to act not as a source of electrons, as did the filament in the Fleming valve, but as a heater of the gas within the bulb in the same manner that the Bunsen burner flame was employed.

The court found to the contrary on all these contentions. In holding the use of the audion to be an infringement of Fleming's invention, Judge Mayer said:

"De Forest had long been proceeding on a theory different from that of Fleming. Having read Fleming's article he began to experiment with the incandescent lamp detector. He prob-
ably doubted its efficacy at first, but within a very short space of time—perhaps a week, perhaps a month—he changed his mind, and, discovering that Fleming was right, wrote his solicitor, after he had filed his application for No. 824,637, that the "new receiver is the best yet". Thereafter he used the language of the incandescent lamp, and in an address on October 20, 1906, before the American Institute of Electrical Engineers, really described fundamentally the Fleming lamp detector, although using phraseology which has since become audion vocabulary.

Hough Affirmed Decision

On appeal, Judge Hough of the Circuit Court of Appeals for the Second Circuit, in affirming the decision of the court below, said:

"It is not often that any case contains so much history as does this one. It is true that Dr. De Forest, through the whole line of the counter-claim patents, sought after a commercially useful detector and ultimately produced one; but it is not true that he consistently followed one concept or theory and tried to reduce that to practice. He began with the heated-gas theory; he ended with the three-electrode audion employing the commercial vacuum, and before he produced that success he learned of Fleming's invention and the latter's address before the Royal Society.

He promptly utilized the knowledge so acquired, and it is the endeavor to connect these differing lines of effort and conceal their lack of normal connection that has produced the theorizing of this record, and also the persistent use of the word 'audion' as applied even to the earliest De Forest patents, which are of dates before that word was coined.

"Among the curiosities of evidence in this record are numerous extracts from technical periodicals giving the opinions of the authors on the subject matter of this suit. One, from The Electrician of November 21, 1913, is a just comment on the cause:

"'We think that Dr. De Forest might be more generous in his acknowledgment of the work of Dr. J. A. Fleming. Our readers generally will probably agree that the audion, although differing widely from the Fleming valve, is an offshoot from it.'"

So in 1916 the courts frustrated an attempt to appropriate the work of Dr. Fleming.

Those whose experience in radio dates back of the broadcasting era of course know the truth about this situation; but in spite of the decisions of the courts and in spite of common knowledge of the facts among radio engineers this fable about the origin of the audion is continually being supplied to the press. In justice to Dr. Fleming and in justice to your readers, to whom the excerpts from the court's decisions may be a guidance in the understanding of radio history, I trust you will publish this letter.

EDWIN H. ARMSTRONG
New York, February 4, 1931

FLORIDA FALL MEET

Pictured is part of the AWA historical exhibit at the Sun Coast Amateur Radio Convention, Clearwater, Florida. The display was under the direction of John Smith, W4ACG with the help of Art Ashley (W4EXS) who provided a 160 meter breadboard transmitter. Bill Turner showed his replica SW-3 and other items. As usual, it was one of the more popular attractions. (Photo by W4DLL)
USING AN SW-3 AS A PRE-SELECTOR WITHOUT MODIFICATION
by John J. Nagle, K4KJ

The September 1982 issue of OTB described a technique for using an SW-3 or equivalent receiver as a preselector for an FB-7 or other super heterodyne receiver without an rf stage. Unfortunately, the method described required modifications to the SW-3. Many collectors who own FB-7s also have SW-3s and would like to improve the performance of their FB-7, but do not want to modify their SW-3.

A variation on this circuit that did not require modifications to either the SW-3 or the FB-7 has also been published, but I don’t remember where.

Briefly, wrap three or four turns of insulated hook-up wire around the detector coil of the SW-3, twist the leads together and run the twisted pair to the antenna terminals of the FB-7. See figure 1.

Twisted pair to FB-7 any length.

2 to 4 turns wound on detector coil.

Adjust number of turns and position for best performance.

Tune the SW-3 and FB-7 to the desired frequency and set the SW-3 regeneration control to just below regeneration (detector not regenerating); adjust the pick-up coil for maximum signal by sliding the pick-up coil up or down on the detector coil.

This arrangement gives two stages of preselection, one of which is regenerative, without requiring modifications to either receiver.

You can even compare the two receivers by plugging headphones into the SW-3 and comparing the signal from the SW-3 with that from the FB-7.

After you’ve won the AWA Old Timers’ contest with the hottest receiver on the band, remove the pick-up coil from the SW-3 and put both receivers back on the shelf still in their original mint condition. Save the hook-up wire for next year.

In the above material, I have used the terms “SW-3” and “FB-7” only to be explicit. The scheme will obviously work using any regenerative receiver, preferably with a stage of rf amplification. The greatest improvement will be obtained with a superhet that does not have an rf preselector. Don’t expect any improvement with an HRO.

When using older receivers on today’s bands, two words of caution are in order: First, average signal levels today are considerably higher than they were in the early 1930s, so that early receivers may overload. I suggest connecting a small capacitor, about 50 pf (or 50 uufd in the old days) between the receiver antenna terminal and the antenna.

The second caution is that most antenna systems today are 50 ohms. Yesterday’s receivers were designed for much higher antenna impedances, 300 - 600 ohms. This may make the receiver appear dead unless an impedance matching device, such as a pi-coupler is used.
The above picture was reproduced from a May, 1909, newspaper showing the United Wireless Telegraph Company station at Buffalo, New York. It was one of the several shore stations established in 1907-8 to handle commercial and ship traffic on the Great Lakes. Through the generosity of Ed Raser, W2ZI, the AWA Museum now has ALL the equipment seen in the picture—a complete authentic 1908 U. W. T. Company station!

Original components consist of oscillation transformer and spark gap (upper left, W2ZI). UWT 10 Leyden jar rack (AWA), 5 KW “coffin” transformer (W6GH), UWT Type “D” tuner (W2ZI), Holtzer-Cabot phones (W2ZI), UWT key (W2ZI), meters, large slate panel, and telephone (AWA).

The station will be in a special room on the third floor. In addition, plans are being made to have two complete Marconi wireless stations circa 1899-1907, consisting of original instruments: rare 1899 coherer, relays, etc. and a Marconi multiple tuner, magnetic detector, 10” spark coil and associated equipment.

AWA is modest in believing the U. W. T. display will be the oldest complete commercial station in the country. The original 1906 Willenborg display on the 2nd floor may well be the oldest complete amateur station. Much of the Willenborg equipment is of French origin, since it pre-dates E. I. Company and other early manufacturers of amateur equipment.
NEW EQUIPMENT
in A.W.A. Museum
sets, parts, magazines, books, etc.

WIPNY, W2PZH, W2R1Z, W2UAD, W2Z1,
W2JMH, KB2XA, WA2MVK, KOSVJ,
VE1OC, VE4ZX, J. Reddig, G. Schneider,
C. Seigfred, Bud Bedker, P. Bailey, E. I. L.

In late December, UPS dropped off 8 boxes from E. I. L. Who or what is EIL? There was no address or follow-up letter. Each box contained either an early wattmeter or laboratory potentiometer. Can anyone solve the mystery?

NEW MUSEUM DISPLAYS

1983 will be big year for the Museum. Several organizations and groups have already signed up for tours, and announcements in QST and other publications will bring in more visitors. Dedicated workers will soon be ready to make the several exhibit changes. AWA is fortunate to have volunteer members within the immediate area who are available on short notice during the week. Each member will be responsible for a specific area.

A very generous monetary gift from Gertrude Tyne will allow the Museum Committee to purchase necessary lumber and lighting fixtures for three new "station" displays.

Another project being planned is a map of the building showing location of exhibit areas. Yes, 1983 will be a big year.

A.W.A. HISTORICAL MUSEUM

East Bloomfield, N.Y.
Bruce Kelley, Curator

Museum Hours:
Sunday ——— 2 to 5 P.M.
Wednesday ——— 7 to 9 P.M.
May through October

Open to groups by appointment
Tele. (716) 657-7489

Free Admission

Museum Telephone:
(716) 657-6260

NEW SECURITY SYSTEM

The Town Historical Society and A.W.A. are negotiating a contract with Seneca Gorham Security for an ultra-modern security system in the Academy Building.

The system is sensitive to any kind of intrusion as well as instantly signalling tampering or break in the line. In addition, 14 heat sensors and detectors are distributed throughout the building.

The entire system is monitored by 3 operators working 8-hour shifts. S.G.S. headquarters is approximately 1000 feet from the Academy. The installation is costly, but the A.W.A. Board feels every precaution should be taken to safeguard A.W.A. artifacts.

Rochester Museum
& Science Center

Your Association recently provided material for a "radio station studio" at the Rochester Museum. The public exhibit was set up to celebrate the 60th Anniversary of pioneer station WHAM (1922-32). Equipment included early microphones, station mixing console and turntable, old time radios and a large display of pictures.

A similar WHAM "studio" will be set up in the AWA Museum when the material is returned from the Rochester site.