HISTORICAL TV EQUIPMENT AT A.W.A. MUSEUM

The Association has been most fortunate in acquiring a wide variety of early television broadcast equipment from TV stations WROC, WOKR, and WXXI. One item was a huge television camera with tripod and studio dolly from WROC. Information was lacking on its origin until A.W.A. VP Ken Gardner (W2BGN) told us it was purchased in 1949 while he was Director of Engineering at Rochester’s pioneer TV station WHAM-TV (also clear Channel 50 KW AM and WHFM). To prove it, Ken sent us the above picture -- the same camera but with different call letters. The 28 year old camera is now in the A.W.A. Museum. Ken has retired and now living in New Hartford, N.Y.
NEWS and general correspondence, write Secretary: BRUCE KELLEY
(S.A.S.E. for reply) MAIN ST., HOLCOMB, N.Y. 14469

Membership DUES and ADDRESS CHANGE, write Treasurer: LINCOLN CUNDALL
69 BOULEVARD PARKWAY, ROCHESTER, N.Y. 14612

AWA NETS

PHONE (SSB)
Sunday ---- 12 noon 3903 Kc.
Tuesday --- 8 P.M. 3866 Kc.
Monday -- Wednesday -- Friday
9:30 A.M. 3866 Kc.
Tuesday -- 2 to 3 P.M.
14270 Kc.

NEW ENGLAND REGIONAL MEET
New England Wireless Museum
East Greenwich, Rhode Island
Saturday, Oct. 19 AM - 5 PM

COMING EVENTS
Antique Wireless Association
NATIONAL HISTORICAL RADIO CONFERENCE - Ford Science Museum
Dearborn, Michigan, Oct. 7-8-9

CLEARWATER HAMVENTION, Clearwater, Florida, Nov. 5 & 6
Sheraton-Key Hotel
ANNUAL BUSINESS MEETING
Sunday, Nov. 6, 1977
Sheraton Motel
Carandaigua, New York
2 P.M. - dinner to follow
A.W.A. CELEBRATES 25th ANNIVERSARY

The World's Oldest and Largest Organization Dedicated to Preserving and Documenting the History of Radio.

COMING UP . . . . .

NEW ENGLAND REGIONAL MEET
New England Wireless Museum
Frenchtown Road
EAST GREENWICH, RHODE ISLAND
SATURDAY, OCT. 1
9 A.M. to 5 P.M.

Full day of programming with flea market. Lunch at noon.
Send S.A.S.E. for program and detail information:
Robert Merriam
Frenchtown Road
East Greenwich, R.I. 02818

PINELLAS A.W.A. CHAPTER MEET
[Tampa Bay Area]
Nov. 5 & 6, Clearwater Hamvention
CLEARWATER, FLORIDA
Sheraton-Sand Key Hotel
Exhibits and old gear contest
Contact John Smith [W4ACG] for information: 1924 Dolphin Drive
St. Petersburg, Florida or
Tel.: 813-345-0464

ROCHESTER, N.Y.
--New York State A.R.R.L. Convention attracted an attendance of nearly 7000. AWA had its usual historical exhibit manned by several members. 12 acres of flea market proved a popular attraction. Like the huge Dayton flea market, there were a few selling old gear.

TORONTO, CANADA
--National A.R.R.L. Convention attracted 2500 amateurs from all over North America. Dozens of AWA members stopped at the historical exhibit manned by both AWA and CWMA members. Famous members included Walt Jackson (Dallas, Texas) and Aaron Solomon (Dartmouth, Nova Scotia). The Convention was also an occasion to present the Association's newest historical film documentary "The Early Years" starring Clarence Tucke telling about the founding of the ARL.

ROME, NEW YORK
--A.W.A. again had an excellent display of early equipment at the popular Rome Hamfest. Ken Gardner and Yates Hong manned the booth which had a steady line of visitors.

ELMIRA, NEW YORK
--"An American Inventor", the life of Maj. Armstrong, again proved to be an outstanding documentary when it was presented at the Antique Radio Club of America's Annual Meeting. The review of Armstrong's accomplishments definitely confirms his position as a leader in the development of radio. Congrats to the Peckham family for their fine job as hosts.

Review recent AWA Events:

AUBURN, INDIANA
--Joint AWA/LHSS Meet with record attendance and 100 staying over for the banquet. Fine programming and large auction for the collector. Lauren Peckham was official AWA representative.

IONIA, NEW YORK
--A.W.A. Spring Meet at the Museum and nearby Locust Lodge. Tom Rosica, W2GIR, presented an outstanding "paper" on the history of pioneer radio manufacturers in the Buffalo area. A short AWA Business Meeting preceded the dinner.

SUMMIT, NEW JERSEY
--Members of the Society of Wireless Pioneers and the Morse Telegraph Club had the opportunity to see the popular AWA show covering the life of pioneer Elmo Fickerill. Much credit is due Bill Brelsford for handling a difficult film program.

ON SCHEDULE FOR 1978

There's an excellent chance the Association will again hold a meet again at FOOTHILL COLLEGE, LOS ALTOS, CALIF. sometime in early April. This may be a joint venture with the local group. The SOUTHEAST REGIONAL Meet is set for June 9-11 at WINSTON-SALEM, N.C. under the capable hands of Lew Elias, W4DBT.

--although yet to be decided, there is an excellent chance the 1978 NATIONAL CONVENTION will return to Canandaigua.

--in addition, about a dozen regional meets and exhibits are planned.
The Allen-Bradley Company was founded by Dr. Stanton Allen and two brothers, Harry and Lynde Bradley.

The Bradley brothers were born in Kansas City, Mo. -- Harry in 1885 and Lynde seven years earlier. When Lynde was 13 years old the family moved to Milwaukee. Here he read a book titled "Electicity for Engineers" which was rather heavy reading for a 15 year old boy. We mention this because the book contained reference to a carbon pile resistance which in later years became the original basis on which the Allen-Bradley Company was founded.

Between 1898 and 1900 Lynde owned and operated an X-ray laboratory in the Pabst Building where he became acquainted with Dr. Stanton Allen, a specialist in orthopedic surgery. By this time his younger brother Harry was 14 years old and was receiving his early practical training in his brother's X-ray Lab.

X-rays were relatively new at the time and many doctors visited the lab including Dr. Allen who spent much time there investigating the new technique. The doctor and Lynde became close friends.

In 1900 Lynde became employed as an erecter and trouble shooter for the now non-existent Milwaukee Electric Company. His work in repairing and maintaining crane controllers awakened his latent interest in the motor control field which resulted in designing a carbon compression type controller with a working model being completed in 1901 when he was 23 years old.

This model and its performance created considerable interest among electrical engineers. Contact was made with the American Electric Fuse Co. (Chicago) to produce the controller under a royalty arrangement under the name Compression Rheostat Co. (which was incorporated in 1904).

Financial complications with the American Electric Fuse Co. in 1909 made it advisable to sever relations and the Bradley brothers with Allen decided to set up their own company. Since the agreement with the Fuse company had been with the Compression Rheostat Co., it was decided to seek a new identity and the name was changed to ALLEN-BRADLEY Co. on August 6, 1909.

Business prospered and at the start of WWI it was necessary to increase operations. In 1916 they purchased the plant they were renting and in spring of 1919 a two story addition was made giving them over 18,000 square feet of floor space.

The end of War I brought a recession -- orders were scarce and for a time the future did not appear rosy. Looking for a new outlet that might produce a few orders, they started to manufacture a small rheostat for adjusting battery charging current in automobiles. Unfortunately, there wasn't the volume they had anticipated.
for the automobile rheostats mentioned above since with slight modification it could be used in radios.

Over the next few years, millions of BRADLEYSTATS were sold to control the filaments of tubes. With the advent of the "B" eliminator another field was open for a voltage control device. Later, when rheostats were replaced by a "fix resistance" unit (cost reduction) the company was ready. A-B was now firmly entrenched in the ever growing radio field.

Radio "buffs" and collectors will remember these early products made by Allen-Bradley:
--Bradley-denser, --Bradley-stat,
--Bradley-leak, --Bradley-ohm
--Bradley-ometer, --Bradley-switch and many other items.

Harry Bradley died in 1965, Lynde passed away in 1942 and Dr. Allen in 1916.

Much of the above information was obtained by Peter Kailus from a book titled "The Allen-Bradley Story" published in 1965.
(Note: The largest four-faced clock in the world is on top of the A-B building in Milwaukee. Each clock face has a diameter of 40 feet, 3 1/2 inches and a minute hand 20 feet long! In comparison, London's Big Ben is only 23 feet in diameter with a 14 foot minute hand.)

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Ben Grauer, pioneer NBC announcer, dies
NEW YORK — Ben Grauer, a pioneer NBC radio announcer who was hailed as one of the greatest of all time, died Tuesday in his sleep after suffering a major heart attack, a hospital spokesman said. He would have been 69 on Thursday.

Mr. Grauer was admitted to New York University Medical Center for treatment of a heart ailment and suffered a major coronary attack last weekend. He was believed to be responding to treatment, but was found dead in bed at 8:30 a.m.

A versatile radio and television reporter, Mr. Grauer's range of coverage included much divergent events as the Berkshire Music Festival and the 1948 Israeli-Arab war.

He joined the National Broadcasting Co. in 1939, when the network was only four years old.


A native New Yorker, he probably was best known for his coverage of New Year's Eve from Times Square. He began in show business at age 7 on the Broadway stage and in movies. In 1918, he had a role in "Penny" with a young actress named Helen Hayes.

Mr. Grauer, a City College of New York graduate, had been heard by millions of radio listeners and later TV viewers from blimps, helicopters, telephone booths, diving bells and network studios in his 43 years of broadcasting.

From the front page of The New York Times, September 13, 1926.

WEAF MADE NUCLEUS OF NEW RADIO CHAIN

Radio Corporation Subsidiary to Broadcast Programs to the Entire Nation.

(The birth of NBC. Bob Morris, W2LV and several other AWA members were involved in this "deal"...
FRIDAY, OCTOBER 7, DEARBORN INN

8 A.M. Registrations start
9 A.M. - NOON REGISTER EQUIPMENT for Auction. See Page 16.
NOON - 1 P.M. Lunch on your own...
1 - 5 P.M. HUGE SWAP AUCTION Greenfield Room
   A great opportunity to buy and sell all kinds of equipment. All
   items must pertain to radio and at least 30 years old.
4 - 6 P.M. SUBMIT ENTRIES for OLD GEAR CONTEST -- Dearborn Room
   Contest handled by ARCA. Judges: Mel Comer, John Drake
   and Ralph Williams
   CLASSES:
   1. Crystal receivers
   2. TRF receivers
   3. Regenerative receivers
   4. Superheterodyne receivers
   5. Tube type transmitters
   6. Spark transmitters
   7. Untuned or broadband RF amplifier receivers
   8. Reflex receivers
   9. Tubes -- From World War I
      and before (unusual or experi-mental types.)
   10. Unusual and/or interesting
       wireless equipment-general.

7 P.M. DINNER Alexandria Room
   Program: GROTE REBER (Hobart, Tasmania) "Status of historical
   radio astronomy equipment."
   BYRON GOODMAN, WIDX (Newington, Conn.) "Status of
   A.R. L. Radio Museum"

SATURDAY, OCTOBER 8 FORD MUSEUM THEATER

9 A.M. DEVELOPMENT OF FEDERAL ARC, Thorn Mayes, Saratoga, Calif.
10 A.M. THE GREBE STORY, John Bruning and Al Shubert, Cincinnati, Ohio
11 A.M. "134 - WHO WAS AT THE KEY ?" Lou Moreau, Glenolden, Penna.
NOON LUNCHEON for all at GREENFIELD VILLAGE LOVETT HALL
   (Special tables for A.W.A. Advisory Committee Meeting and for the
   Antique Radio Club of America Business Meeting.)

FORD MUSEUM THEATER

2 P.M. "SHOW AND TELL" -- how you made or replaced a difficult part.
   Tricks on restoration. Bring sample if possible. MEL COMER M.C.

3 P.M. EARLY AUDIO FREQUENCY TRANSFORMER DEVELOPMENT
   Fred Hammond, VE3HC, Guelph, Ontario

4 P.M. THE CHICAGO RADIO LAB and ZENITH
   R.H.G. MATHEWS, ex-9ZN, Jalisco, Mexico

DEARBORN INN

5 - 6 P.M. View "OLD GEAR CONTEST" Entries (Dearborn Room)
6 P.M. COCKTAIL HOUR Greenfield Room
7 P.M. ANNUAL BANQUET Alexandria Room, Ed Redington, W4ZM, M.C.
   Guest of Honor: R.H.G. Mathews
   Houck Awards, Conference Award, Contest Results

SUNDAY, OCTOBER 9 DEARBORN INN

8:15 A.M. PIONEER BREAKFAST Dearborn Room, Ken Gardner, W2BGN M.C.
   Special invitation to AWA Net Members and O.O.T.C. and S.O.W.P.
9:00 A.M. Register for VACUUM TUBE AUCTION
10 A.M. VACUUM TUBE IDENTIFICATION and TUBE AUCTION [See p. 16]
   Lauren Peckham (Breesport, N.Y.) and Staff

If you need additional registration cards or information -- write: Dex Deeley,
8 Briar Circle, Rochester, N.Y. 14618 (Note: Limited Banquet facilities !)
FROM HEADQUARTERS

THE BIGGEST -- THE GREATEST

A little while back we received a news clipping telling of "the world's largest privately owned collection of old radios--". This is great -- but the source of this vital world wide statistic may have originated from only one man -- the owner -- who is at liberty to write anything he pleases. (how about some of the other newspaper copy you've been reading lately such as the Anderson Amateur radio/CB fiasco ?)........

To have the "world's largest" would require verification by several impartial observers who could compare this remarkable collection with other known collections. Was this done ? I doubt it.

Speaking of the "greatest" -- I know of a two story warehouse loaded with thousands of old receivers. The owner is NOT a collector, has no interest in selling the sets at this time and sees no publicity. Who's next ?

(Yes, AWA will defend itself as the largest historical radio organization. There are several "fraternal radio groups" such as QWA but they can hardly be considered "historical" since it does not provide historical programming, documentation or has ties with historical agencies such as public museums......)

DeFOREST PIONEERS

Members interested in joining this pioneer organization should write to Secretary Ken Richardson, 254 Vincent Ave., Lynbrook, N.Y. 11563 for application blank (Dues: $5 per year). They publish a newsletter telling of current activities relative to DeForest events plus news items of general interest to the radio historian.

A.W.A. MEMBERSHIP

Several hundred new members have joined the Association this year. Three recent members include the well known musician ALVINO BAY [WSUK], MICHAEL BOND [Peterborough, England] who is Station Engineer for British Relay Cablevision TV and LEO MEYERSON [W0U6Q] of "World Radio" amateur radio supplier fame.

In the haste to mail the June QST, membership application blanks were not mailed as planned. If you have a friend who is genuinely interested in historical radio, have him request an application from Holcomb Headquarters.

SILENT KEYS

JIM ROCKWELL- KBRR, Pioneer broadcast engineer and manager of WLW's famous 500 kw. Broadcast transmitter of the '30s.

AL MARCY - W4ID, broadcast pioneer and Charter A.W.A. member.

CHARLIE HENRY - early radio engineer associated with several manufacturing companies.

The Easy Answer

for a club program is the A.W.A.

SLIDE SHOW with TAPE COMMENTARY

Members who need program material for a radio club meeting will find the AWA 40 slide show and 32 minute tape cassette commentary ideal. In fact, it is even a great program for one's personal use.

The slides show all kinds of radio material in the AWA Museum with tape telling about the various pieces of equipment and its history. We might add the commentary was made by former CBS radio announcer Stew Metz. The show with tape is yours for only $21 postpaid. Make check out to A.W.A. and mail to:

AL CRAUM
16 COSTAR ST.
ROCHESTER, N.Y. 14608
Professor G. W. Pierce in his 1910 text, Principles of Wireless Telegraphy, states that around 1890 Professor Elihu Thomson and Nikola Tesla determined independently that currents of high voltage and frequency could be generated by a transformer circuit energized by an oscillating spark discharge. Thomson did not continue his work in this field, but Tesla did and performed spectacular experiments with high frequency currents. In 1897 Tesla took out patents on the equipment used which included vertical as well as horizontal secondary coils.

A Frenchman named Oudin was impressed with the displays and copied Tesla's equipment which he took to France where he gave exhibits. Oudin used the vertical secondary design, so unfortunately this construction is now usually referred to as an Oudin coil although it was originated by Tesla.

In the spark days of amateur wireless the experimenter had in his transmitter an ideal power supply for exciting a Tesla coil. Early station pictures in Q.S.T., Electrical Experimenter, or Modern Electrics frequently show Tesla coils as they were common in those days.

Early tube transmitters were of low power and would not properly excite the coils so the popularity of the Tesla coil faded out with the demise of the amateur spark transmitter. Experimenter's however, are becoming interested in these units so it is appropriate that the Old Timers Bulletin carry an article on their design and construction.

T. S. Curtis wrote a series of articles in Electrician and Mechanic for 1911 on their construction, then in 1918 published a book, High Frequency Apparatus, that was revised in 1920. This is by far the best material available as it describes the construction of Tesla coils and the exciting equipment in sizes from one inch spark coils to a four KW unit for stage use that will produce a spark five feet long.

In those days measuring instruments were in use, so little information is available on the electrical design. The whole system is easy to build but a little preliminary design work and later use of a grid dip meter will insure obtaining a spectacular display of high frequency sparks.

This article describes a small vertical Tesla coil design that will produce a brilliant display of streamers 9 to 14 inches long from the top of the secondary winding and discharge sphere, when powered by a small neon sign transformer of 5,000 volts. The principles outlined can be applied to building a larger unit by raising up the dimensions of the smaller design.

A vacuum tube oscillator does not properly excite a Tesla coil. The discharge from a coil so excited is usually a single R. F. arc extending up an inch or two from the ball on top of the coil. The ideal excitation is from a spark discharge. Circuit connections are shown in Figure 1 with a picture of the complete system in Figure 2.

For a given power input longer sparks can be obtained with the horizontal coil, but the sparks are thin and not as spectacular as the heavy brush discharge and streamers that come from the top of the vertical design, so the vertical design will be described.

Referring to Figure 1 operation is as follows: The high voltage transformer T increases the line voltage of 120 to 5000 which charges condenser C1. When the voltage across C1 is high enough to break across the spark gap G it sets up an oscillatory discharge thru the Tesla primary P1. The field generated by this current flow thru P1 cuts the Tesla secondary S2 generating a high voltage in it, causing a discharge into the air from the sphere on top of the secondary.

![Diagram](attachment:image.png)

**Fig. 1**

**CONNECTION DIAGRAM.**

T---High voltage transformer  
C1--- " condenser  
G---Spark gap  
P1---Tesla primary  
S2--- " secondary  
RFC---Radio Freq. choke  
P---Fuse  
S---Switch  
Fil. Primary filter

Frequency of oscillation in the primary circuit is determined by the value of C1 and the inductance of P1 plus the mutual inductance between P1 and S2. Natural frequency of the secondary circuit depends on the inductance of S2 and its distributed capacity C2. The secondary can be forced to oscillate at primary circuit frequency but maximum voltage and display occur when the primary is tuned to the natural frequency of the secondary. This is accomplished by changing the value of C1 or the number of active turns in P1 or both.

The secondary voltage of a transformer operating at 60 Hz is equal to the primary voltage times the ratio, secondary turns divided by primary turns. The Tesla transformer does not operate in this way as the secondary voltage is practically independent of turn ratio, but is dependent on ratio of capacitances in primary and secondary circuits as shown above.
DESIGN

The Quaker Oats Company deserves a lot of credit for electronics development in the U. S. as they have since 1915 to my knowledge, packaged their product in excellent cardboard cylinders that have been used by experimenters for years.

Their small oatmeat boxes are 4 inches diameter by 7-1/8 inches long, are strong and are available. One inch thick tight fitting wooden discs mounted in the ends permit making coil forms 7-1/8--14-1/4--and 21-3/8 inches long so they were selected for the secondaries.

PRIMARY

The primary was made of copper (or brass) ribbon 1/2 inch wide .015 inches thick, wound in a spiral of eight turns with an inside diameter of 5 inches outside of 6 inches. This ribbon is held in saw cuts in eight radial supporting arms that are glued, not nailed, to a center support.

After the primary was completed, it was mounted at right angles to a piece of plywood that had been marked off into two inch squares.

The four inner turns were excited as shown by the wiring diagram on curve T-2 and readings of field strength were taken with an absorption frequency meter. These readings were plotted on curve T-2 and show the field pattern generated by the primary. Three secondary coil heights are also shown in dotted lines on this curve.

SECONDARY

To evaluate the effect of design changes, a grounded disc of 1/4 inch mesh hardware cloth was mounted above the coil under test so that it could be changed in height to measure spark length. The test arrangement is shown in Figure 2.

Ten secondaries were wound on 7-1/8 inch high forms and tested to determine the effect of winding and insulation changes. Turns varied from 185 to 359, wire size from #20 to #32, coverings--bare, enamel, enamel single cotton and double cotton insulation. Some coils were close wound, some with spaced turns. Several were wound, tested, then given a coat of air-dry varnish and retested.
There was little difference in the spark lengths generated by the different secondaries although the spark from the 350 turn coil was slightly longer than from the 185 turn coil. Enamelled wire was equivalent to bare, and size made no noticeable difference. I would therefore recommend #24 to #28 wire size with whatever insulation is available, though a final covering of cotton soaked up varnish and gives a good mechanical structure. On large coils spacing the turns will use less wire.

Coil #G was typical of the 7-1/8 inch height design. #J with 10-3/4 inch height and #E 14-1/4 inches were then wound and for a check on greater height, #G was stacked on top of #E.

Dimensions and performance of these four coils is shown in Figure 3. Spark length is plotted against coil height in Figure 4 which shows that little is gained by exceeding 14-1/4 inch height.

All secondaries had a wooden disc in the top end of the secondary winding. These brass discharge balls are 2 inches in diameter and were from corner posts of early brass beds.

TRANSFORMER

Small neon sign or oil-burner ignition transformers should be available in used condition for around $15. They are rated 10,000 to 12,000 volts with grounded center taps on the secondaries so 5,000 to 6,000 volts can be obtained from them at 20 to 30 milliamperes current. All pictures of spark displays were taken using one of these transformers.

The filter across the primary shown in Figure 1 made of two small, .01 micro farad capacitors will reduce the possibility of interference back thru the power line.

SPARK GAP

The spark gap is an important part of the system. A quenched gap would give a slightly longer spark from the Tesla coil but it would require more attention than the gap shown. Dimensions are not critical and can be scaled from the picture. Cooling fins are important and were provided by turning the two gap sections from one inch diameter aluminum rod, with sparking surfaces reduced to 1/4 inch diameter.

CONDENSER

Most Tesla coil failures can be traced to use of a condenser with too little capacity. The best design is the mica construction built in cast aluminum cases by Dubilier and Wireless Specialty Apparatus Company around 1920 for the Navy for use in spark transmitters. They came in units rated 12,500 volts .004 Mf. capacity. Three of these would be adequate for this small Tesla coil.

If the above are not available, don't give up, for they can be easily built up from glass plates. In the spark days, photo studios were still using glass plates instead of film so there was an ample supply of 8 x 10 inch plates of excellent quality. A 6 x 8 inch sheet of aluminum foil mounted on each side of one of these plates has a capacity of .001 Mf, so 13 glass plates and foil will give .012 Mf. If the photo plates are not available, single strength window glass will stand 6,000 volts if it is bubble free.

ADJUSTMENTS

Connect one lead from the condenser to the start of the inside of the primary winding. A small piece of sheet copper or brass should be mounted on the wooden support for the secondary, directly above and connected to the start of the primary winding. The lead from the lower end of the secondary winding is bent under the lower wooden head so that when the secondary is set on the primary, the two windings are connected together.

The high voltage lead from the condenser connects to one terminal of the spark gap. A clip lead from the other side, should be long enough to reach half way around the primary so correct number of turns can be selected.

Now short circuit the gap and with a grid-dip meter measure the resonant frequency of the primary circuit as primary turns are varied from one to eight. Make a plot of frequency against primary turns.

Mount the secondary on the primary making sure the wire on the bottom of the secondary rests on the primary contact. With the discharge sphere assembled on top of secondary and the primary clip lead including the estimated turns for resonance, measure the resonant frequency of the secondary. Compare this value with your curve which will indicate the correct number of primary turns. Move the clip lead to this value and repeat the grid-dip measurement and if necessary, make a final correction.

Remove the short circuit from the gap and connect the high voltage transformer leads across the condenser, the grounded end to the case. To protect the transformer from kickbacks from the oscillating circuit, radio frequency chokes should be inserted in the two transformer leads. As the current is not over .030 amperes, 30 turns of #26 enamelled wire wound on 3/4 inch diameter form should be adequate.

(Continued on next page.)

**Fig. 4**

Spk. Length vs Secy. Ht.
OPERATION

Open spark gap to 1/8 inch and apply power to the system. Final adjustment of primary turns should be made to give maximum spark length. All adjustments should be made with power disconnected as the 6,000 volt primary circuit is dangerous; direct contact across the high voltage transformer could be fatal. For maximum spark length, open the spark gap as wide as possible, still maintaining continuous operation. Turn to turn secondary sparking occurs when the primary circuit is not exactly tuned to the secondary.

Your Tesla coil is now in operation and you can enjoy the beautiful high frequency display. A fluorescent lamp lights up when brought near the resonator and it provides an easy way to draw sparks from the discharge sphere on top of the secondary. Beware of the primary circuit as it is dangerous.

This system does produce radiation that interferes with TV and radio reception. I operate mine in a room screened with 1/4 inch mesh hardware cloth. If you plan to operate for a prolonged time, the set should be screened and grounded.

The pictures were taken with TRI-X film ASA 400, 1/2 second exposure lens opening F8 with an 80 MM lens. Longer exposure does not show the lace like formation of the individual sparks and the whole discharge become milky due to the large number of sparks recorded.

Radio in 1985 Bigger, Better With More Profit Says Study

In 1985, radio will be bigger, better, and more profitable than it is today, according to the "Radio in 1985," a study commissioned by the National Association of Broadcasters and conducted by the consulting firm of Frazier, Gross, and Clay of Washington, D.C. The study finds:

- By 1985 there will be 500 million radio sets, or 2.4 per person, compared with today's 401.6 million sets. Of all radios sold today, 65 percent are FM or AM/FM. By 1985 the government may require all radio sets to be AM/FM.
- FM radio will compete on a more equal footing with AM as quadrophonic FM comes into general use, and as FM signal reception problems are reduced. FM stations are projected to attract 51.7 percent of the total radio audience of 1985.
OLD TYME HAM ADS

OLD TYME ADS are FREE to members interested in collecting and restoring historical equipment as a hobby. They are not to be abused.

RULES FOR ADS:
1. Ad MUST be written on separate sheet of paper—not part of letter. Send SASE for acknowledgement.
2. Material must be over 25 years old and related to radio or electricity.
3. Give full address and zip.
4. AWA will not print repetitious ads or ones indicating regular sale for profit.
5. The Association is NOT responsible for any transaction.
6. AWA retains the right to reduce size of add if over 8 lines including address.
7. Only one ad per issue per member.
8. Deadline for ads is 6 weeks prior to mailing date:
   - March issue -- JAN. 15
   - June issue -- APR. 15
   - Sept. issue -- JULY 15
   - Dec. issue -- OCT. 15

Important! To insure delivery, out-of-state mail should be sent one week prior to dates noted above.

Mail all ads to:
Antique Wireless Assn.
Main Street, Holcom, N.Y.
14469
U.S.A.

WANTED

-- Binding post cap for Radiola I (One), Type ER753A, WE 218G input xfmr, tuning dial for Crosley 51, RA Unit w/o case. Carl Weizbezahl, 305 Bevidere Ave., Washington, D.C. 07882. Tel. 201-689-7727
-- Owner's manual, sales catalogs, etc. for Crosley 50, 51, 52 & 853; also Freshman Master-piece (exposed dual type). No magazine ads. Need AFT for Freshman. Paul Neupper, 32 Delton St., Tonawanda, N.Y. 14150
-- Audio for Crossley X, Crossley "Pop", Edison cyl. mach. parts Arlon Amundson, 3671 Gerchwin, St. Paul, Minn.
-- Front panel identification nameplate for Collins 390 A receiver & megacycle change knob. C. G. Taylor, VESCL, 99 Huron St., London, Ontario Canada N6A 2B9
-- Pay top dollar for National SW-54 in excellent cond. Also need Collins spkr for 75A4 or similar. David Knepper, Box 436, Sylvania, Pa. 15055. Tel. 814-487-7468
-- Crossley stuff: knobs for Jewell box, panel for Ace 3-B, 4-28 xformer, 50 panel or extra parts of junk sets, Crossley homes, backbox, Gembox, & Ace V. Dave Crossley, Tavern Path, Plymouth, Mass., 02360
-- One WD-11 working order for 15 yr. old neighbor. Found Radiola in antique shop and now applying for AWA membership in new-found interest. Eddie Dunn, W2EH, 25 Butter sweet Rd., Fairport, N.Y. 14450
-- Tube Chart for Receiite Mod. 431 Tube Test, Inst. Man. (or repro) for Hickok Mod. 16 Gen. Proc. Electro Mod. 251. Sig, tracer. Have Philco 19 repro. Send SASE. Ed Wyspianski, 27 Sunny Water Pk, Norwich, Ct. 06360
-- Cabinet for DeForest F-5, deForest & Western Electric anything. Robert Corwin, 125 Locust Ave., Wallingford, N.J. 07687. (201)-773-0118

WANTED

-- Ant. cond., grid leak cond. & AFTs for Radiola IIIA or works for Aerola Sr., III or IIIA. Also knobs, etc. for Radiola by Wireless Speciality. Bob Husted, 286 E. Boca Raton Rd., Boca Raton, Florida 33432
-- Power transformer for Johnson Viking Pacemaker transmitter or junker with good transformer. Norm Parsons, W8BJN, 22 Forest Street, Branford, Conn. 06405
-- Socket for RCA Type V99 tube. Price plus mailing please. Woody Cook, W9GJS, 410 Brew- er Place, Greenwood, Ind. 46142
-- Collection of old battery sets. Prefer Crosley, Kennedy, deForest, Kellogg or Gilfillan. Also F-3 horn tube base. Floyd Paul, W6THU, 1545 Ray mond, Glendale, Calif. 91201
-- Help in researching history of Hayne-Griffin Radio Service Co. for future OTB article. Need historical on Co., products & Haynes himself. George Boettcher, WB3DTX, Box 255, Dungmarn Ferry, Penna. 18323
-- Info or set named Muselman also Hudson Super Six. Swap Vocarola loudspeaker horn for Amplion or Barns bell horn. SASE for list of sets, etc.
-- Charles Day, 30 Sagemore Drive, S.Dartmouth, Mass. 02748
-- Coil boxes, coils, crystal detectors used for IF-500 & CN-239 receivers (p. 64 of Vintage Radio). Robert Meislenhofer, 13000 S.E. 44th Place, Bellevue Washington 98006
-- AK breadboard, will trade proffessional like dollars, Gernbach or Rider manuals or RCA TV receiver with disc (1928). James Notaris, 155 Butler Ave., Ambler, Penna. 19002
-- Knobs for Zenith 6-8-152 or equivalent. Also early TV and Atwater Kent AC models. Jeff Autik, 803 N. Chicago Ave., Rockford, Ill. 61007
-- Deforest D-7-A loop antenna, panel & panel mount tube socket for Clapp-Eastham III, Grebe CR9 AFT & hold down brackets for Kennedy V. Bob Lessard, 4817 N.E. 5th St., Minneapolis, Minn. 55421

12
--QSTs before 1930 please state price & condition. D. R. Kilman, W4JYN, 5147 Heming Ave., Springfield, Va. 22151

--1916 issues of QST for Jan, Feb, Mar, Apr, June, July, Aug., Sept. Will purchase or swap antique gear. Also need driver housing for AK Type L horn & info on Fisher Type GC dia. mach. Pete Bides, 750 W. Fleming Rd., Montgomery, Ala. 36105


--National SW-3's, parts, coils, any models, any condition. W6NCS F. R. Tesche, 3728 Mosswood Dr., Lafayette, Calif. 94549 or tele. 415-254-5606

--Need CRT 3RF, AFT for Thompson Mod. 23, want AK boardbook any model, D. A. Swindle, 1112 San Jose Lane, Hanahan, S.C. 29410

--Help! I have in a small-working condition EH Scott Mod. 8LR-F receiver. Need history, and info on restoration. Thanks. Alan Stiles, 240 E. 35 St., Apt. 1-H, New York, N.Y. 10016

--National SW-3; Cash or will swap Johnson Viking 1, D. M. Shoehan, 15 Arcadia Ed., Andover, Mass. 08100

--KKKO verification stamps of 1926's. Paving 75¢ each for stamps in allama; any quantity. Rod Phillips, W4ABX Box 584, Bryn Mawr, Pa. 19010

--Colonial "Globe" AC set, any Marconi set or info on Marconi Radio Co., also Grebe Synchrophase. Richard Cane, 8391 N.W. 21 St., Sunrise, Florida 33323

--NVPHillers/Posters/calendars by Rene Vincent (1922-30) or repro. 1930's ISW League "Monitor's", Ed. 1, 2 of WGH, Early QSL cards of SW BC stations. up thru WW2, L. B. Zimmerman, 8448 N. Harding Ave., Skokie, Ill. 60076

--Pre-1950 3" & 5" TV sets. Also RCA CTC 100 color TV (1953) & projection sets. Also picture tubes for projection sets STP4, 3NP4, etc. David Long, 330 West Main St., Batavia, N.Y. 14020

--Western Electric 2-B tuner, for use with WE 4-D broadcast monitor. Carl Elkins, 1701 Woodland St., Nashville, Tenn. 37205


--Magnavox 16" or larger horn (we have driver), base for Crosby Musicone & Trudacyne cabinet. Will swap horn speaker parts (British) or cash. Alan Breault, 52A Cam St., Timaru, New Zealand

--4522 (or 4521) tubes used in Collins 32V2 xmr. Also ARC-5 interconnecting cables & mechanical control. State cond. and price. Greg Greenwood, Box 1015, Weaverville, Calif. 96083

--Wiring diagram, schematic or any other info for a McMurdo Silver Masterpiece V. Daniel Gandoz, 342 West River Road, Orange, Conn. 06477

--Scott Philmacronic XXX, will pay cash or trade for some nice early battery sets. Tim Martin, WAIWE, 42 Henry Ave. Pittsfield, Mass. 01201

FOR SALE and/or TRADE

--trade Vol.1 thru 4 Rider Manuals for Vol.17 thru 23; also trade AK-20 (large) for FE-55 or FE-6, want tubes cond for Zenith 3R or 4R. Clarence Fulley, W7KE, 1109 S. 2nd St., Hamilton, Montana 59840

--Swap only--Vol. 6, 10, 11, 12&14 Riders Perpetual Trouble Shooters Manuals. Excellent to good condition. Want Vol.1 & 3. WillA, 2137 Grayson Place, Falls Church, Virginia 22043


YOUR "AD" MISSING? Three letters were received indicating "ads" were enclosed -- but they were not! "Ads" are opened and type-ed just before printing which does not give us time to give you notice of missing info... Please double-check for it is easy to forget...


--sell/trade AK-Radiola, Fada, Kolster & others. New 1 tube Crosby Mod. 50, Ace of Pup. Have tubes, early parts, etc. SASE for list. Chet Wainer, W1ER, 1014 Main St., Dalton, Mass. 01226

--swap or buy: swivel telegraph resonator & lineman's pocket set. Have misc. keys, bags, sounders & relays to trade. C. Cutover, WAGYED, 761 9th, Glenwood Springs, Colo. 81640

--Authentic horn speaker cords, new galena crystals, other parts for xtal sets. Old style cloth covered AC line cord. SASE for sample. Want wireless call using 30 tube for Philco console 39-5f, Goodman, 7643 Ponce, CP, Calif., 91304

GOOD READING

"100 YEARS OF RECORDING"

by Ivan Berger
Stereo Review Magazine July '77

Members interested in the history of recording will find this article a real "package" deal since the author covers the entire field from Edison's cylinders to Berliner's discs to the LP hi-fi of the late 40's. Subject matter is limited on stereo and tape development.

(Joe Garcia)

Hiram Percy Maxim: Father of Amateur Radio

NEW REVISED SECOND EDITION) by Mike Link Schoenr

This biography belongs on the bookshelf of every Amateur because Hiram Percy Maxim is the man who probably made more than any other, made Amateur Radio possible as we know it today. He not only gave Amateur Radio a start but also invented the Maxim barrage, the first railroad armament use held in the U.S. Learn about this fascinating individual—or order your copy today.

Reg. price $4.50
Special until Oct. 1 only $3.95

Mail check to: HAM RADIO
Greenville, New Hampshire 03048
(Note: Add $3.50 for postage)
--sell/swap many old radios, books, etc. Send SASE. Want
ham transceiver, old Air Corps radios. WA9DFK, IA. Pratt, 114
W. Lakeview Ave., Milwaukee, Wisc. 53217
---Bass base UV-20AS. SASE for
other antique electronics.
Want Heathkit hi-fi equipment.
Fred Ger, 6052 Brookridge Rd.
Jacksonville, FL. 32210
---Sell/swap battery sets like
AK-21, Crosley X, Federal 110.
SASE for list. Want 21" wooden
horn for Music Master, novelty
sets, character radios, etc. Bob
Lane, 2301 Independence Ave.,
Dallas, Tex. 75201
---sell/swap AK Mod. 55/sprk.
Sentinel TV Mod. 400TV, Philco
Jr. Scope Mod. 701. Want Nat.
5W-3 early battery sets. Bruce
Burkhardt, Railroad Ave.,
St. Michaels, Md. 21663
--repo DeForest loop $60. Rad-
ola AG-814 loop, new price of
$37.50. Radiola V wood top @
$10.50. Radiola Grand grill @
$17.50 (10% sales to AWA Mu-
seum). For info & new list, send
large SASE/24 postage. Glenn
Streeter, 20000 Gramshaw Blvd.
#106D, Torrance, Calif. 90405
---sell extra tubes, magazines,
receivers, etc. Have deforest Aud-
ions, WDls, WD2s, brassbase
201 & 201As. List for stamp.
Erv Rasmussen, W6YPM, 104
Lowell St., Redwood City, Calif. 94062
---22 Radio News '22-29, trade
only for 7, 11, 12, 101, 2, 3, 7, 8, 20;
1, 4, 2/1, 3, 2/1, 1/25 Radio News;
Radio Engineering, other 20s
mags; bound for IRE Trans '13
thru '21, 24, 25. Need G-R .001
var., cond. Westinghouse mercury.
Alan Douglas, Box 222, Pocatello,
Mass. 02550
---Crosley collectors-carry hand
nark generator used by para-
troope complete with seat, legs,
crank, mint condx. made by
Crosley plus early battery sets.
SASE for list. D. Dexter, 104
02351
---sell clarostat for scanning
disc, Radiola III with good WD-
lls & AFT, National "B" supply
eliminator, want escutcheon
plate for Grebe MU-1 vernier
tuning. Harry Williams, WO1N, Pleasant
Hill, Mo. 64080
---Marconis: selling out collection of drawings 1912 to
1920. No reasonable offer ref-
used. Len Silvern, R6XKU,
Box 49899, Los Angeles, Calif. 90049

IMPORTANT!
1. A.W.A. does NOT, under any circumstances, accept tax
deductible items without prior approval from Museum Com-
mittee.
2. A.W.A. does NOT appraise tax deductible gifts given to the
Museum. All such items must be evaluated by an independent source for I.R.S. purposes.
SUMMER NET ACTIVITY

14 mc. ssb activity came almost to a standstill with only occasional contacts between W2ICE and W0KOM and W7AIK. Now the fall season is with us again, how about a little more activity on 20?

Along this same line -- anyone interested in a 7.0 mc fone Net? This is a good band for a 1000 mile haul such as between W4's and the "gang" in the North or Southern Cal and W7's -- Comments?

The latest "letter" game has also hit several AWA members. W2QY is now W2LC, Ralph (WA3SNR) now sports N3VT and Mike (originally a W4 from Florida) is now N4FS in Virginia. We might add Mike has been calling in the AWA ssb net quite successfully with only 2 watts.

Sad news: W5DC was wiped out during the summer when a bolt of lightning burned out his entire station.

Congrats to AWA members who have been manning the Smithsonian Institution Station NN3SI. This includes of course Elliot (K3RJA), and Bob (K3BV) and Ed (W4ZM -- all of whom have checked in on the AWA Net one time or another.

Lastly, a new AWA Net Roster will be available this winter.....and a final reminder, start preparing for the Old Time Contest now -- even a pre-WW2 receiver will give you a good multiplier. Early National, Hammarlund and Hallicrafter receivers work great on 80 CW.....

THE RME-99

If you don't want to struggle with a SW-3 (or other type regen set) in the OT Contest, try one of these sets for a multiplier...they're pre-WW2 and vy fb!
MEET THE COLLECTORS

What's Happening

Congrats to our old friend BOB SHAW in New Hampshire on his 80th birthday... STAN ATKINSON would like to see AWA publish a brief story on the life of A. FREDERICK COLLINS, radiophone experimenter [1900], prolific writer and head of Collins Wireless Co. Any volunteers?

Speaking of volunteers, DON PATTERSON said he would try and get info on NORDEN-HAUCK. Who where they? What happened to them?

Can you help Don? DON BURTON (AM/FM Station WLBC) is searching for WE-387W and 600A DB carbon mines -- and for good reason -- they were stolen from his modest collection in his office. . .

We note with interest that our British Friends (BRITISH VINTAGE WIRELESS SOCIETY) are issuing forms to members to register their equipment. The completed form will be on file at BVWS headquarters where it will serve several purposes including theft (?). On the subject of BVWS, AWA member DAVE BRODIE attended their annual meeting and was elected their overseas representative. Dave reports having a great time and found everyone friendly. He tells us we’re very fortunate here in the States since old wireless gear of any kind is difficult to find in Great Britain.

MORGAN MC MAHON's article on Collecting and Restoring was well written (Popular Electronics magazine) and should bring more interest to our hobby.

OLD TIME RADIO PROGRAM "buffs" are having a "meet" at Meriden, Ct. on Oct. 1. Write Jay Hickerson, Box C, Orange, Ct., 06477 for information.

REMEMBER

A.W.A. NEW ENGLAND "MEET"
Saturday, Oct. 1st. -- see information elsewhere in Bulletin.

THREE NEW COLLECTOR CLUBS IN NEW YORK STATE

Western New York:
"Niagara Frontier Wireless Assn." has had several fine meets already this year at the Old Amherst Colony Museum, East Amherst, N.Y. Members in the Buffalo/Niagara Falls area should write Dick Schamberger, 1975 Hertel Ave., Buffalo, N.Y. 14214 (Tele. 716-836-4028) for more information.

Eastern New York:
"Antique Radio Collectors of Schenectady" will have a meeting Sept. 22 at the Schenectady Museum at 7:30 P.M. Members in the Albany/Troy/Schenectady area are welcome to attend. For more information, write Jack Nelson, W2FW, 915 Sherman St., Schenectady, N.Y. 12303 or Tele. 518-6997

Southern New York:
"Long Island Antique Radio Society" was formed last winter and has had several successful meets. Members in the New York City/L.I. area may write Jack Allison, 160 South Country Rd., East Patchogue, N.Y. 11772

IMPORTANT AUCTION INFORMATION

1. All items MUST be registered before the Auction.

2. There will be a $10 minimum sale on all items at regular Auction on Friday. In other words, bids must start at least $10. If not, items will be set aside. Suggestion: If you have several $1 and $2 items, package them together to equal $10 minimum.

3. Tube Auction (Sunday A.M.): All tubes must be boxed or have label or tag identifying make and type (if unknown, mark as such). Tubes MUST indicate whether they have good or "open" filament.

4. Minimum Tube sale is $5.

5. 10% of all sales goes to A.W.A. Museum Maintenance Fund.
BOB LESSARD (Minneapolis, Minn.) really found a gold mine including such items as Grebe CR-9, Kodel crystal set, Crosley X and an AK Mod. 19. He topped it off with two breadboards: #4052 and 4445 ! "TEX" SLOAT (Ridgefield, Wash.) is currently working on a Bremer-Tully where he finds it necessary to machine new parts that were pot metal.

JOHN SMITH (St. Petersburg, Fla.) is now the proud owner of a Golden Leutz.

FRANK PAGANO now has a new location of Meriden, Conn. It required two van loads weighing over 35000 pounds to move his collection.

PAT STEWART (Walla Walla, Wash.) reports he has one of the rare W.E. power supplies for the WE 7-A amp. He also has the operating manual.

HUGH COACHMAN (Clearwater, Fla.) is now showing a one-owner mint AK-5 with original warranty !

PETE SIDES (Montgomery, Ala.) without trying hard ends up with a Fada 170-A neut. with brass base 201's and horn speaker.

JACK NELSON (Schenectady, N.Y.) has a choice camel-back pre-1900 telegraph key to show. Jack was with G.E. in the 20's working on the old Radiola 60, 18, 33 and 44's.

WARREN GREEN (Mercer Is., Wash.) had a call from a friend who cleaning out an old house and found a Leutz C-7 plus an early Silver Marshall. This is the way to find them.

GREG DOCKTER (Bismark, N.Dak.) attended a local rummage sale run by a man named Preiss. A little investigating proved the fellow to be related to the same Preiss who sold radios and phonographs years ago in the Twin Cities area ! Greg's latest find is a Scott Philharmonic.

CHET WISNER (Dalton, Mass.) just found a Gariola III with three brass UV-199 tubes and a Federal 110. His friend, TIM MARTIN came up with a great find: a deForest spherical Audion with control box ! He also has a one-tube Sodion receiver and a Westinghouse RC set that cost $23 at a flea market.

DAVID PECKHAM (Breesport, N.Y.) helped his father clean out the remains of a 1915 ham station and found a mint spherical Audion for his tube collection. Other additions are a W.E. 212-E and a nice early Phillips tube.

CARL WEIBEZAHL (Washington, N.J.) reports a good year of collecting including a W.E. 7-A amp. with 518W horn speaker, AK Mod. 10 (#4550) with a box of breadboard parts, an Aerola Sr. and E.I. Co. 1" spark coil.

GLENN STREETER (Torrance, Calif.) found a nice 1914 Marconi 101 and a deForest P-300 amp to match his T-200 tuner. After contacting several sources, he has a Paragon RD-5 with A-2 amp. and 10-R rf amp.

BERNARD PAYNE (Calgary, Alberta) heard of an old hardware store that had some "electrical stuff" for sale. The gear included 15 early receivers such as three loose-coupler crystal sets and all kinds of parts. Most everything had been carefully wrapped and was in excellent condition.

JIM HAGER (St. Louis, Mo.) is pleased with a Pilot Wasp which included a complete set of coils. Later he found an original blueprint and schematic. [Continued on page 20]
Hugo Gernsback has been credited with coining the word "television," heralded as the "father" of modern science fiction with the statuettes awarded its top writers named "Hugos" in his honor, and acclaimed as the inventor of radar. His inventions also include the "Radiotrola," which was the first radio console with a loop aerial, the "Staccotone," a radio piano, and the "Osoophone," a bone-conduction hearing aid which unfortunately aided only those willing to walk around with a microphone in one hand and a hard rubber mouthpiece between their teeth.

This is but a glimpse of the breadth and depth of Hugo Gernsback. To do justice at all to this creative genius, it is necessary to narrow appreciably our field of view and length of focus. Even so, one is hard-pressed to more than penetrate the surface of this remarkable person.

At his death in August, 1967, at the age of 83, Gernsback held eighty scientific patents. He was editor-in-chief of the monthly magazine Radio-Electronics, and Chairman of the Board of Gernsback Publications, Inc. Since 1908, he had initiated the publication of more than fifty periodicals, ranging from humor through economics, photography, aviation, and crime detection.

In 1908, Gernsback published his first book, The Wireless Telephone, a combination of progress report and hopeful prediction. Radio Electronics described it as an attempt to speed the development of the art.

Three years later, in 1911, Gernsback wrote what is considered to be his most important work, Ralph 124C 41plus. This science fiction novel predicted rather accurately the progress of science and invention for the next half century and beyond. The novel was serialized in Modern Electrics in 1911. It contains a description and illustration of radar that could be used to teach radar today. The imaginary equipment was actually used to locate a space vessel.

Ralph 124C 41plus also mentions two-way television, germicidal rays, tape recorders with quarter inch tape, night baseball, artificial silk and wool, stainless steel, magnesium as a structural material, and flourescent lighting. All this was envisioned by Hugo Gernsback as early as 1911.
perimenental electrical goods. The first amateur wireless outfit in America was made and sold by Electro and the writer, the pioneer in amateur wireless, is not without good reason called "The Father of Amateur Wireless" by his many friends and followers.

In 1919, Gernsback began publishing the nation's first "purely radio magazine," Radio Amateur News. The following year the name was changed to Radio News, and it has enjoyed a lasting sojourn with its subscribers. The March, 1925, issue featured a cover story on "How to Make an Ultra Short Wave Receiver," as well as articles devoted to Marconi's "Radio Beam Transmitter," "The Life and Work of Lee de Forest," and the "Inventions of Reginald A. Fessenden."

The same issue also contained the First Annual Radio Set Directory, compiled with photography by Hugo Gernsback. This feature became a most popular addition to Radio News.

Another well-known publication of the Experimenter Publishing Company was Practical Electrics, which Gernsback initiated in 1921. The issue of February, 1923, included articles on the titanic power line in California, loudspeakers, in schools, talking and singing films, traveling electrical beautification, and an article by President Gernsback on "Gloves That Talk." The gloves "talk" when the operator placed his gloved left hand lightly against the cheek of a lady while both of them hold to the handles supplying the high tension current. The lady's face, the glove, and the hand inside it are the condenser which talks. As Gernsback explains, you also need a microphone, a B size battery, and a few pieces of wire. The author writes very directly, and with a sparkle and verve that tend to excite the reader to try the experiment.

Short Wave Craft was another of Gernsback's more than fifty periodicals he published during his illustrious career. The August-September, 1930 issue is headed with his editorial "Short Wave Opportunities." In its closing paragraph, Gernsback notes that the

(Continued on next page)
"Surface of short-wave possibilities has not yet been scratched; and that sooner or later, we will certainly have a real boom in short-wave radio." A striking feature of Short-Wave Craft was its series on "Men Who Have Made Radio."

In the issue of October, 1930, Count Georg von Arco was featured. Arco was a vital part of the triumvirate of German radio pioneers along with Slaby and Braun. Among many of Arco's accomplishments was a transmission system which gained international prominence as the Slaby-Arco system.

Among the best known of all the Gernsback publication is Radio-Electronics which debuted in 1939. The issue of November, 1966, contains the inscription "Over 55 years of Electronic Publishing."

The contributions of Hugo Gernsback to radio, to publishing, to writing, to life itself, are immeasurable. We are indeed in his debt.

--- ABOUT THE AUTHOR ---
Dr. Myron Shaw is on the teaching staff, Dept. of Communication, State University of New York at Geneseo. This article contains excerpts from a paper he delivered at the 1975 AWA Conference.

WITH THE COLLECTORS
(Continued from page 17)

JOE SZABAT (Oil City, Penna.) has a mint AK-19, Comet -Pro and a RADA plus a Westinghouse 26-C amp.

ALAN DOUGLAS (Pocasset, Mass.) located a Clapp-Eastham Radak R-4 for his collection. Later Al recognized the set as one he had repaired for a friend over 18 years ago!

LARRY FLEGLE (Hialeah, Florida) made a good swap and ended up with a rare New World Globe radio made by Colonial Radio Co.

BRUCE BURKHARDT (St. Michaels, Md.) made an early TV set for a Murdock detector, Clapp-Eastham loose-coupler and a Chelsea Condenser! He recently bought a box of old tubes that included several UV-200s, ten deForest Audions with porcelain bases, two WD-1s and a Moorhead amp... nice going.

--- ADDENDA TO ESPIONAGE TRANSMISSION BY ARC ---

Ed. note: Much as been written about the famous WWI German station WSL at Sayville, L.I., New York (OTB 18-4-30, 17-3-20). There has always been some question as to type of transmitter used at the time the "secret" transmissions were sent. The station at one time or another had a Goldschmidt alternator, an arc transmitter [AWA has the arc keying relay] and a spark transmitter. We believe Don de Neuf has the answer.

As a result of extensive research spade work by Thorn Mayes (W6AX) it now seems certain that the mode of the WSL transmissions in question was neither arc or alternator but made by a 30 kw. quenched gap 500 cycle spark set!

In addition, Bob Morris, W2LV has told W6AX that there was a broadcast station (WJZ) interview Dec. 27, 1934 with Apgar who told about his work in 1915 in recording the WSL signals, and that he made a tape of the Apgar interview from the original aluminum master disc owned by WJZ (now in AWA Museum).

As part of the interview, Apgar played some of his old wax cylinder records carrying the WSL signals and they are not only unmistakable those of a 500 cycle quenched gap, but Ed Raser (W2ZI) recalls copying WSL many times and there is no question in his mind that the recorded signals are those of this station capable of working POZ at Nauen, Germany direct.

Thus we wind up this saga with "espionage -- maybe -- but by spark and not arc.

--- DON DE NEUF, WA1SPM ---

DR. LEONARD FULLER made Honorary A.W.A. Member at semi-annual business meeting. Dr. Fuller's career has been noted in previous Bulletins and a picture is on page 4, Sept., 1974 OTB. It is a privilege to welcome such a distinguished engineer to our roll of Honorary Members.
WHAT'S COMING NEXT!

in the "Old Timer's Bulletin"
"OLI CORTLAND STREET"
"HISTORY OF BARKER & WILLIAMSON"
"HISTORY OF DAY-FAN RADIO CO."
"600 METER WATCH"
"HISTORY OF WESTERN COIL CO."
"HISTORY OF THE THORDARSON CO."
"HISTORY OF COLONIAL, KING AND COLONIAL RADIO COMPANIES"
"COLLECTING CAR RADIOS"
"REVIEW OF THE 1977 AUCTION"

Be sure and attend the "SHOW AND TELL" session at the Dearborn Conference to find out how to restore old radios...

--- BROKEN DIAL GLASS ---

To replace a broken dial glass similar to the type used in the 8½" round convex Zenith's pf the 30's -- try finding one at a clock repair store. Clocks use a variety of similar glass dial covers.-- A.M. Zellmer, KSMGQ

AUDIO FREQUENCY REPLACEMENT TRANSFORMERS will be available at the Dearborn Conference...in addition, other items will be available for the collector restoring early receivers...If its your first Conference, you will find the flea market a great attraction!
A reminder: There will be a minimum on auction sales...

WHITE VALVE (Br.) c. 1916
[Photo courtesy of John W. Stokes, Auckland, New Zealand]

The White Valve was invented in 1916 by G.W. White, MSc. at the Cavendish Laboratory, Cambridge. Precise date of manufacture is unknown, but it was used in cascade with an Audion in h.f. British Army amplifier in April, 1917.

It was a soft valve with three-wire platinum pinch at the base; grid was led out to metal bayonet base (shell), filament leads to the brass studs in base and anode was led out through the top terminal.

The filament was made of platinum (apparently oxide coated) and consumed 2.8 amps. at 6 volts. The grid was copper and the plate made of iron (coated with mercury) with voltage ranging between 25 to 75 v.

This is a rare tube. My gratitude to Mr. W.K.E. Geddes, Deputy Keeper (Telecommunications) of the Science Museum, South Kensington, London, England, for supplying material for this article. It is much appreciated.

(Floyd Lyons, San Francisco)
AN EXCITING SIDE-LINE FOR ANY COLLECTOR

COLLECTING HEADSETS

Many collectors have found their hobby more interesting if they concentrate on the development of only one or two pieces of equipment. Collecting headsets is an example.

Vince Highmark [W6EVO], Two Harbors, Minn., has an outstanding collection of 100 different makes/models while A.W.A. proudly displays about 60 in the Museum.

Printed below are the Headset manufacturers (U.S.) as listed in the McGraw-Hill 1926 Radio Trade Catalog [reproduced with permission]. You will undoubtedly find headsets in your collection not listed since they may have been made before 1926 (such as Holtzer-Cabot) or a later manufacturer. In addition, of course, there are foreign makes such as the well-known "Brown" made in England.

HEAD-SETS, Complete

Two Head Set Receivers held together by Head Band including telephone cords for connection to radio receiver

Ajax Electric Specialty Co., 1926 Chestnut St., St. Louis, Mo.
Ambassador Sales Co., 108 Greenwich St., New York, N. Y.
American Electric Co., 6401 S. State St., Chicago, Ill. "Army and Navy" "Keytone" "Victor" "Swedish-American"
American Mechanical Laboratories, 285 N. Sixth St., Brooklyn, N. Y. "AMI"
AMI—see American Mechanical Laboratories
Ampl-Tone—see Union Fabric Co.
Aristocrat—see Dictograph Products Corp.
Army and Navy—see American Electric Co.
Baldwin, Nathaniel, 3474 S. 22nd East St., Salt Lake City, Utah
Bee-Zee Products Co., 511 Chapel St., New Haven, Conn.
Bel-Canto Radio & Telephone Equipment Co., 872 Broadway, New York, N. Y.
Bemco Mfg. Co., 243 W. 55th St., New York, N. Y.
Berwick—see Triangle Electro Trading Co.
Bestone—see Hyman & Co.

Blue Streak—see Marinette Electric Corp.
Brandes—see Federal-Brandes, Inc.
Camco Cannon-Ball—see Cannon & Miller Co.
Camco Grand—see Cannon & Miller Co.
Cannon & Miller Co., Springwater, N. Y. "Camco Cannon-Ball" "Camco Grand"
CIC—see Connecticut Instrument Co.
Connecticut Instrument Co., 219 South St., Stamford, Conn. "CIC"
Connecticut Telephone & Electric Co., 70 Britannia St., Meriden, Conn.
De Forest Radio Co., Jersey City, N. J.
De Luxe—see International Radio Telephone Apparatus Co.
Delta Electric Co., Nebraska & 33d Sts., Marion, Ind. "Gold Stripe"
Dependable—see Trimm Radio Mfg. Co.
Dictograph Products Corp., 220 W. 42d St., New York, N. Y. "Aristocrat"
Duraphones—see Warren Radio Phone Mfg. Co.
Dymac—see Electrical Products Mfg. Co.
Dysemann Magneto Corp., 165 Broadway, New York, N. Y.
Electrical Products Mfg. Co., 69 Sprague St., Providence, R. I. "Dymac"
Elwood Electric Co., 900 Housatonic Ave., Bridgeport, Conn.
Essex Mfg. Co., 40 Lawrence St., Newark, N. J.
Everytone—see Pacent Electric Co.
Federal-Brandes, Inc., 200 Mt. Pleasant Ave., Newark, N. J. "Brandes"
Federal Radio Corp., 1738 Elmwood Ave., Buffalo, N. Y.
Friedlander-Kopple Radio Service, 149 Church St., New York, N. Y. "Welbilt"
Frost, Inc., Herbert H., 100 N. La Salle St., Chicago, Ill.
Gold Stripe—see Delta Electric Co.
Hamburg Bros., 450-52 Seventh Ave., Pittsburgh, Pa. "Pennsylvania"
Hart & Hegeman Mfg. Co., 342 Capitol Ave., Hartford, Conn. "H & H"
Hartford Metal Products Co., 112 Allyn St., Hartford, Conn.
H & H—see Hart & Hegeman Mfg. Co.
Hyman & Co., Henry, 220 W. 14th St., New York, N. Y. "Bestone"
International Radio Telephone Apparatus Co., 17 Gramercy Park, New York, N. Y. "De Luxe"
Kellogg Switchboard & Supply Co., 1066 W. Adams St., Chicago, Ill.
HEAD-SETS

Kennedy Co.—see Kennedy Corp.
Kennedy Corp., Colin B., 2017 Locust St., St. Louis, Mo. (Sole Selling Agents for Colin B. Kennedy Co., St. Louis, Mo.)
Keystone—see American Electric Co.
Klismet—see Radio Telephone & Telegraph Corp.
Kodel Radio Corp., 507 E. Pearl St., Cincinnati, Ohio. "Quality"
Lark—see Leich Electric Co.
Leich Electric Co., Genoa, Ill. "Lark"
Literate—see Premier Electric Co.
Little Gem—see Triangle Electro Trading Co.
Little Spitfire—see Tower Mfg. Co.
Little Tattler—see Tower Mfg. Co.
Little Tattler—see Marionette Electric Co.
Manhattan Electrical Supply Co., 1 Park Pl., New York, N.Y. "Red Seal"
Marionette Electric Corp., Marionette Wils. "Little Tattler" "Blue Streak"
Mozart-Grand Co., Newark, N.J.
Narragansett Radio Corp., 135 Dyer St., Providence, R.I.
New-Tone—see Newton Pressed Steel & Mfg. Co.

Pacent Electric Co., 91 Seventh Ave., New York, N.Y. "Everytone"
Pal Radio Co., 1204 Summit Ave., Jersey City, N.J.
Peerless—see United Radio Corp.
Pennsylvania—see Hamburg Bros. Co.
Perfectone—see Teleradio Engineering Corp.
Pico—see Penberthy Injector Co.
Potter Tool & Machine Works, 79 E. 130th St., New York, N.Y.
Premier Electric Co., 3805 Ravenswood Ave., Chicago, Ill. "Literate"
Professional—see Trimm Radio Mfg. Co.
Quality—see Kodel Radio Corp.
Radio Telephone & Telegraph Corp., 130 W. 42d St., New York, N.Y. "Klismet"
Radio Echo Mfg. Co., 696 Jelliff Ave., Newark, N.J.
Radiotite Corp., 5317 21st Ave., Brooklyn, N.Y. "Silken Voice"
Red Seal—see Manhattan Electrical Supply Co.
Rector-Smith Co., 233 Broadway, New York, N.Y.
Royal Electrical Laboratories, 109 Tichenor St., Newark, N.J. "Royalfone"
Royalfone—see Royal Electrical Laboratories

Scientific—see Tower Mfg. Corp.
Silken Voice—see Radiotite Corp.
Spartan Electric Corp., 348-52 W. 34th St., New York, N.Y.

Splitsdorf Electrical Co., 392 High St., Newark, N.J.
Stromberg-Carlson Telephone Mfg. Co., 1060 University Ave., Rochester, N.Y.
Summit Radio Products, Inc., 30 Hague St., Jersey City, N.J.
Sunlight Lamp Co., Newton Falls, Ohio.
Superette—see Newton Pressed Steel & Mfg. Co.

Swedish-American—see American Electric Co.

T. B. H. Radio Co., Dansville, N.Y. "Vloodyne" "Vilana"
Teleradio Engineering Corp., 490 Broome St., New York, N.Y. "Perfectone"
Tillman Products Co., 505 Court St., Brooklyn, N.Y.
Triangle Electro Trading Co., 4077 Park Ave., New York, N.Y. "Berwick" "Little Gem"
Trimm Radio Mfg. Co., 24 S. Clinton St., Chicago, Ill. "Dependable" "Professional"
True Tone Radio Mfg. Co., 186 N. La Salle St., Chicago, Ill.
Union Fabric Co., Houstonic Ave., Derby, Conn. "Amp-Tone"
United Radio Corp., 115 Caledonia St., Rochester, N.Y. "Peerless"
Victor—see American Electric Co.
Vloodyne—see T. B. H. Radio Co.
Vilana—see T. B. H. Radio Co.
Warren Radio Phone Mfg. Co., S. Main St., Warren, R.I. "Durophones"
Welbilt—see Friedlander-Kopple Radio Service
Western Electric Co., 100 E. 42d St., New York, N.Y.
White Beauty Electric Co., 4416 N. Western Ave., Chicago, Ill.
Wonderphone—see Philmore Mfg. Co.

BROADCAST HALL OF FAME
Radio "buffs" who like old time radio programs may find the BROADCAST HALL OF FAME, Freehold, New Jersey to their liking. The museum is located in a revamped bank building and features artifacts, playback programs of the early days of radio, etc...plus a few pieces of early radio gear. A.W.A. members Bro. Pat Dowd, Bob Morris and Bob Phillips attended the opening ceremony which had several well known radio personalities in attendance including Arthur Godfrey.

CORRECTION FOR JUNE OTB:
Pages 30 and 34 were interchanged...
QUE.- What is the difference between the Western Electric 201-A 201-B tubes?

ANS.- These tubes differ only in the bases. The 201A had a 3-pin base, specified by the U.S. Navy. The fourth terminal (one end of filament) being the base shell. This proved to be unsatisfactory because of the variation in contact resistance between the shell base and the socket. Hence, the base was changed to a standard 4-pin Western Electric base and the modified tube was designated 201-B.

QUE.- Many of the first A.C. receivers used tubes with three different voltages on the filament: 1.5, 2.5 and 5.0 volts. [Ex.- UX-226, UY-227 and UX-171A] Why so many different voltages for the same receiver? Why did they not standardize the familiar 2.5 volts at an earlier date?

JOHN HAYS HAMMOND'S CASTLE
A museum at Gloucester, Mass.
Radio historians touring New England will find a visit to Hammond's home an unique experience. The millionaire radio inventor completed his 56 room castle with drawbridge in 1928.
It was here he lavishly entertained such celebrities as Truman Capote, the Ringling Bros., Cardinal Cushing and Admiral Byrd...just to name a few.
The castle is situated on the rocky coast south of Gloucester -- the setting for Longfellow's "The Wreck of the Hesperus". An ideal location for the Hammond Radio Research Laboratories...which is another story.

ANS.- They had to use the tubes which were available at the time the receiver was designed. The earliest a.c. tubes were of the filamentary type and it was desirable that the voltage across the filament be kept as low as possible in order to reduce the a.c. hum. Such tubes were not suitable for use as detectors.
To provide a suitable detector tube it was necessary to have a unipotential cathode. This resulted in the development of the indirectly-heated tube, UX-227, for which 2.5 volt heaters were best. This was a more expensive tube, hence was used only where necessary, i.e. as a detector.
The 5 volt UX-171A had been developed for use as an output tube in DC sets and was found to be the only tube available to perform a similar function in the early AC sets.
It was replaced in 1929 by the 2.5 volt UX-245 developed for this purpose.

EARLY EDISON LAMP REPLICA
Members are advised the replica bulbs noted in Dec., 1976 QTB are no longer available (at any price) from the GE Cleveland Plant.

JUNE BULLETIN LATE?
Did you receive your June Bulletin late? So did everyone else since it was mailed several weeks later than usual. For the first time in 15 yrs. our printer missed his schedule --- and for good reason. He and his wife were vacationing in Europe for the first time -- and a vacation justly deserved.
Members have frequently called our attention to the excellent off-set printing work done by Don. An example was the beautiful cover on our 25th Anniversary cover and the center-fold on the June issue of Wilson's Menlo Park Laboratory. Top craftsmanship!
HISTORICAL EQUIPMENT

WESTERN ELECTRIC 7-A AMPLIFIER WITH 2-A POWER SUPPLY

So you have a W.E. 7-A audio amplifier -- but the odds are you don't have the companion No. 2-A power supply shown above. This little gem is a rare one and the half-wave rectifying tubes [217-A] are equally rare. The sketch was sent to AWA by Pat Stewart who is the proud owner of not one -- but two 2-As!

STRICT CHECK AT DOOR

Complaints have been received that non-members have participated at AWA events. In the future, a check will be made on all registrants, particularly persons entering the auction area and display area during the Conference.

110 VOLT LINE CORD

Howard Granoff found it impossible to find a replacement 110 volt resistor type line cord for an AC-DC set he was restoring. The physical construction of the set made it impractical to mount a high wattage dropping resistor (which would dissipate heat) on the chassis.

A note from Belden Wire Co. indicated they would make such cords if there was sufficient interest. Howard will tabulate the requests for Belden. Write:
Howard Granoff, 2445 Lyttonsville Rd.
Silver Springs, Maryland 20910

BACK ISSUES OTB

Summarizing the requests for back issues of the BULLETIN indicated great interest but not sufficient to warrant reprinting.
A check with the printer tells us that to set up his press, run off 100 to 200 copies, collate and staple plus mailing would run around $3 per copy which we feel is borderline in cost.

We plan to investigate the cost to Xerox back issues. There will be some loss in quality (particularly pictures) but the information will be available and possibly at a lesser cost.
"COLLECTING OLD RADIOS AND CRYSTAL SETS" by Max Alth

In the past few months a new book has been published about collecting and restoring old radios titled as noted above (Pub. by Wallace Homestead Book Co., Des Moines, Iowa at $7.95).

It has chapters on history, circuit theory, operation, repair, collecting and a comprehensive price guide for different models. Sounds great?

Not quite. It is full of errors and a few are the forgiveable typos and misspellings.

The pre-1920s historical material is generally good, though loosely organized. In the chapter giving histories of individual companies, however, there are errors in nearly every paragraph. For example, from page 29: "Atwater Kent began some time late in 1920 with a line of quality radio components for home assembly. In 1921 the company produced five models, none the following year, but jumped forward in the years following to produce a total of 53 different models. The company manufactured bread-board receivers until 1924, when it presented its Mod. 12 for $105. This appears to have been a seven-tube receiver with two stages of RF amplification and a tuned detector."

To set the record straight (thanks to Ralph Williams, Radio Age and the AWA Bulletin), Atwater Kent began making radio components about January, 1922. His first factory breadboard (Model 3925) dates from November, 1922. He made most of his breadboards in 1924 and 25.

The Model 12 was a six tube set! And to contradict other statements in the book, the Model 5 was not his first set, for at least ten factory-wired models preceded it. The "5" was introduced on Sept. 7,1923, the same day as the "10".

The chapter on repair is greatly simplified, aimed at the new collector who knows nothing about radio. It may do its job satisfactory for such people, but to me it seems disorganized and confusing. It may be a hopeless job to make repair instructions both simple and useful.

I can't resist quoting one paragraph on how to tell a transformer from a capacitor if both are sealed in a container: "Electrically paper capacitors always show a complete open circuit, when good, and they are almost always good. Therefore, if you see four connections and none show a resistance of under one hundred thousand, you have a capacitor. Also you will get that momentary surge of current which is visible on the ohmmeter as a low resistance that changed to high (?) which you won't on a coil." (p.47). I wish I had Mr. Alth's luck with capacitors.

Aside from some questionable advice on buying radios in antique shops ('--never ask the dealer if he has any old radios for sale. Don't smile at any time.' the chapter on collecting is worth reading.

The author devoted a great deal of space to so-called 'crystal-tube' receivers, or those using crystal detector followed by audio amplifier stages. Offhand, I can't think of any model among the thousands of old radios that meets his description, not even the Radiola V. It may not be fair to single out a few 'boners' in an entire book, but this gem from page 41 deserves immortality: "Reflex receivers, often called regenerative receivers, were patented by Armstrong sometime in 1918." And I am not referring to the 1914 date being wrong!

Finally, we come to the 'fiction' part of the book, the price guide. This is a chapter listing many brands and models of radios and their market values.

(Continued on next page.)
On Review

(Cont. from previous page.)

Just where Mr. Alth got these prices is anyone's guess; my opinion is that he pasted random numbers on his wall and threw darts. Some are low, some are correct, but the vast majority are high, as much as eight times too high. Unfortunately, many collectors and dealers will take them as gospel.

The collector who buys an Atwater Kent 20 at the listed price of $350 will be rather unhappy to learn he could have bought one at almost any radio swap meet for $50.

On the other hand, I'd be delighted to buy as many Aerola Jr. crystal sets from Mr. Alth at his $100 price as he could find.

As if the outlandish prices weren't bad enough, this price guide lists some of the strangest off-brand sets imaginable, while ignoring most of the common models that collectors see. (Maybe it's just as well!)

(Book reviewed by ALAN DOUGLAS)

"NYMPH AND THE LAMP"

Members who have read this novel by Thomas H. Raddall [reviewed in earlier OTB] will be interested to know he has recently completed his memoirs. In this book, "IN MY TIME", he tells of his experiences as a brasspounder following the first World War. It was published last fall by McClelland & Stewart, Ltd., Toronto, Ontario, Canada.

Anyone not having read "Nymph and the Lamp" would do well to read this first and follow up with his recent account. Mr. Raddall's writing has been highly considered by writers such as Kipling and John Buchan [Lord Tweedsmuir].

Selwyn Blake, K1CPS
(Book obtainable from J.B. Lippincott Company at $14.95)

TYNE'S SAGA

Yes, Jerry's vacuum tube book will be printed about the time you receive this Bulletin. After much procrastination and delays by ARNO Press, the huge manuscript was turned over to the well known publisher SAMS who promptly started work on it.

Members who sent in advance requests will be notified and copies will be available at the Conference (Dearborn, Oct. 8). There will be available both soft and hard cover editions.

BROADCAST STATION WHAM

Yes, we goofed. In listing WHAM personnel in the March OTB, we overlooked AWA Director Clarence Dergier ("Ducky"), W2LK -- one of their original staff members nearly 50 years ago! "Ducky" remained with WHAM for several years and then erected and was in charge of the first public safety communication (police) system in the Rochester, N.Y. area until his retirement a few years ago. [FDR]

Another WHAM engineer to join AWA is Ed Stiles, W2BJW. Ed is an old timer having started in the game in 1922 [E2JW]. Ed's QTH? -- Holcomb, N.Y. !
New Equipment

in A.W.A. MUSEUM

Clyde Ingalls, Ted Duvall, Paul Feldman, Mel Comer, Whitney Baston, Charles Colman.


Several interesting new pieces of gear have been placed on display in the Museum this past summer. Of interest to the general public is a huge 1936-37 reflector type television console receiver made by RCA and donated by Whitney Baston.

Early Marconi equipment finds a large 1914 Marconi commercial ship receiver from the estate of W3HI and a huge encased variable condenser of very early vintage from Carlos Clark. Pete Trestan left a mint broadcast station mixer control of the 1930's and Warren Green carried in his lap (while on the plane) from Seattle a rare Western Electric "S" tube.

The "S" tube has an interesting history since it was one of the several modulator tubes used during the famous 1915 Navy radiophone tests at Arlington (NAA). The "S" tube is the companion of the "W" which was used in the oscillator. It would be difficult to place a value on such a rare historic item. It is pictured in Tyne's "Saga" and on page 367 of "The History of Engineering in the Bell System."

It is hardly necessary to add that much of the heavy material delivered to the Museum was handled by George Batterson and his work crew. Without George, there would be no AWA Museum...