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HOLCOMB, NEW YORK 14469

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NEWS and general CORRESPONDENCE, write Secretary: BRUCE KELLEY (Send S.A.S.E. for reply.)
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Membership DUES and ADDRESS CHANGE, write Treasurer: LINCOLN CUNDALL
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DEPOT NOW MUSEUM

NEW MUSEUM IN OMAHA

The Union Pacific Railway recently donated their beautiful Union depot in Omaha, Nebraska to the city and the new Western Heritage Society of Omaha is converting the building into a museum to be known as the Western Heritage Museum.

Art Trauffer, across the river in Council Bluffs has donated most of his Lee de Forest Memorial collection to the new museum. The de Forest collection is in four glass-enclosed illuminated display cases in a prominent location. In fact, the de Forest collection was the first display to be setup in the museum! The new museum was opened to the public on Nov. 22, 1975 and had over 3000 visitors the first two opening days.

Trauffer saved a few de Forest items for display in the Lee de Forest Building at the new Western Community College in Council Bluffs. Trauffer is curator of both projects. If you have any de Forest items you would like to donate to either display for posterity, you may send them to Art at 120 Fourth St., Council Bluffs, Iowa 51501 or phone 712-322-6275. Donors are given credit on printed cards in the displays.

Mary A.W.A. members are active radio amateurs who frequently talk to one another "over the air". Their interest in collecting and historical material has increased to where it is now necessary to expand A.W.A. Operating Schedule. Of interest, many amateurs have written in saying they listen regularly to the A.W.A. Net.

Note the new 20 meter phone schedule. The sked has been tried with success with station from East and West coast participating.
The meeting was called to order by Pres. Brelsford with (17) Officers/Directors, Attorney and members present. Minutes of June Meeting approved. Report on vote concerning dues increase for 1st Class mailing: 16 in favor, 1 opposed. A detailed report was read by Asst. Treasurer Deeley followed by financial status of 1975 Conference. Approved. Lincoln Cundall read report of Advisory Board Meeting held Oct. 4 1975. Items discussed included location for 1976 Conference, limitation of membership, emphasis on purpose of A.W.A., elimination of conflicting dates for various "meets" and disposition of duplication equipment in Museum.

Nominating Chairman Triggs presented slate of Officers and Directors for coming year. No nominations from the floor. Motion made for Secretary to cast one ballot for the following: President- Brelsford, Vice-Pres.- Gardner, Secretary- Kelley, Recording Sec.- Blodgett, Treasurer- Cundall, Asst. Treas.- Deeley, Directors- Marsey, Daykin, Peckham, Batterson and Ransley.

Discussion of 1976 Conference location ended in motion it be held at Canandaigua Oct. 1 and 2. Dearborn (Ford Museum) was considered but had to be eliminated because of conflict in dates. Other Regional Meetings were reviewed and motion passed to appropriate $1,400 to supplement traveling expense for designated persons attending and presenting program material from A.W.A. Headquarters. Museum activities were reviewed by Kelley who reported approximately 3,000 visitors from 34 states in the brief time the building was open. He noted there was much more work to be done in the spring before re-opening. Motion made to thank the work crew for setting up and maintaining the Museum.

Gardner reported on the Forthcoming Old Time Transmitting Contest to be held in January and Triggs reported on the new logo for the Association. Peckham stated the 14 members of the newly formed Vacuum Tube Committee met in October during the Conference. A motion was made to give Chairman Peckham operating expenses. Brelsford: progress on Museum Inventory (ITEM listing) and that books from Morgan McManon were available to be sold with commission going to the Museum Fund. Ransley will handle the books.

The 1976 Budget was read in detail. Attorney agreed it fulfilled all legal requirements. The meeting was adjourned and followed by a dinner and entertainment.

Submitted by: Henry Blodgett, Recording Secretary

"Early birds" attending the Annual A.W.A. Business Meeting pay visit to Museum. L to R: Ransley, O'Neil, Peckham, Cundall, Triggs, Smith, Deeley, Snyder, Kelley, Blodgett, Dergler, Lott and Marsey. Note old gas light at left. There are two of these 1880 street lights in front of the building which burn 24 hours a day. [Photo W28WK]
FROM HEADQUARTERS

OTB MAILING: as noted elsewhere, members may receive their BULLETIN 1st Class Mail by paying for special handling and additional postage. We can’t figure out what is going on at various U.S. Post Offices. Some OTB’s mailed 3rd Class are delivered in the same time period as 1st Class -- others seem to end up in storage (?) and are delivered at the whim of the local Postmaster. There appear to be bottlenecks in some large metropolitan areas such as New Jersey where 3rd Class mail is delivered 3 weeks while some towns in New England and Texas deliver the Bulletin to members in less than 5 days...  

FINANCE: how are A.W.A. accounts allocated? Very simple. There are two accounts: 1. GENERAL A.W.A. Account consisting of money received (mainly dues and conference) and paid out (printing, postage, general expenses, etc.) 2. MUSEUM Account consisting of all money received for the Museum Fund (donations, sale of surplus equipment, etc.) which is used to maintain and perpetuate the Museum (rent, maintenance, insurance, purchase special equipment, etc.) Both Funds maintain an interest bearing account.

ROSTER: "How come AWA doesn’t have a membership list?" About every two years we have to answer this question. Two reasons: AWA membership is on IBM and the cost of printing and updating a Roster with 1500 names and addresses is prohibitive. Second -- Many AWA members wish to remain anonymous while others have indicated they don’t want their names on a "sucker" list which is exactly what a roster would provide...

DUPLICATES: Some time ago it was announced the Museum Committee would review duplicate material in the Museum for possible sale to members with proceeds going to the Museum Fund. The project has been held up since all extra time has been devoted to restoration and setting up the new museum. Hopefully, time will be available this year to review the inventory list and where necessary, obtain owner’s (donor) approval for sale. The latter is very important. We might add, it is preferable the owner handle the sale instead of the Association.

DUES: PAYABLE TO TREASURER
Lincoln Gundell  
69 Boulevard Parkway  
Rochester, N.Y. 14612

FIRST CLASS MAILING: 1 year: $6.50  
2 years: $12.00

THIRD CLASS MAILING: 1 year: $5.00

HISTORICAL MAGNETIC TAPES
Howard Schreder, tube historian, has generously donated to AWA a large selection of reel-to-reel historical tape interviews with famous vacuum tube pioneers and historians. One can hear the voices of DeForest, McCandless, George Clark and others as well as learn about tube development at Highbridge. Thanks Howard.

NEXT ISSUE OF OTB ------

--- Story behind Zenith’s famous Trans-Oceanic receiver.
--- Instructions how to plate metal parts at home.
--- Part II of Publication Dates of Early American Radio magazines.
--- More on the development of All Metal tubes.

SOUTHERN A.W.A. MEET
Full details in the June OTB. Advance info may be obtained from Lew Elias, 3939 Poindexter Dr., Winston-Salem, North Carolina 27106

SILENT KEY: H. YAGI, inventor of Yagi antenna at 89 yrs. in Tokyo (Jan.18 ’76)
The Old Equipment Contest held at the National Conference (1975) was the best ever. A record of 81 entries were displayed with much more time scheduled for detailed examination and study. The large number of entries and the extended viewing time were practical because of the cooperation of all, especially the ladies. This year we will be able to improve further, particularly in the display times because of this year’s success.

**CLASS I REGENERATIVE RECEIVERS**
1st-- Grebe CR-6 Lauren Peckham
2nd-- Paragon RA-10 Alan Douglas
3rd-- Remler Panel John W. Johnson
3rd-- Dima (German) John Caperton

**CLASS II CRYSTAL SETS**
1st-- 1917 Cohen Ralph Muchow
2nd-- Nesco CN-133A Tom Brooker
3rd-- Wireless Improvment Joe Pavek

**CLASS III TUNED RF RECEIVERS**
1st-- AK-9 & Log F. W. Sloot
2nd-- Kennedy XV Gary Schneider
3rd-- Grebe MU-1 Ray Sieracki

**CLASS IV SUPERHETS**
1st-- Magnaformer John Caperton
2nd-- 1924 Receptored Alan Douglas
3rd-- Leitz Model C Lauren Peckham

**CLASS V TUBE TRANSMITTERS**
1st-- 1919 Grebe Ralph Muchow
2nd-- De Forest OT-3 Tom Brooker
3rd-- VT-2 Modulated Wilson Norwood oscillator

**CLASS VI SPARK TRANSMITTERS**
1st-- Torikata 1910 Ralph Muchow
2nd-- Clapp-Bastham 1kw Tom Brooker

**CLASS VII LOOSE COUPLERS**
1st-- Metes 1919 Ralph Muchow
2nd-- Cliff Navy Lauren Peckham
3rd-- Homebrew F.W. Sloot
3rd-- Antenna Tuner A.G. Wentzel

**CLASS VIII LOUD SPEAKERS**
1st-- Clapp-Bastham horn Bert Hoyes
2nd-- Magnavox R-2 horn Gary Schneider
2nd-- Two Sarnoff horns Ralph Muchow
3rd-- L.E. Knott Mod B John Johnson

**CLASS IX AUDIO AMPLIFIERS**
1st-- DeForest 1915 audio L. Whitlock
2nd-- 1920 Magnavox D. Cleland
3rd-- Porcelaines 1917 L. Peckham
(French make)

**CLASS X TUBES**
1st-- Pickard 1915 Triode R. Muchow
2nd-- Audion (Wallace) A. Douglas
3rd-- Pingen detector S. Johnson

ARCA Old Time Equipment Judges: John Drake, Mel Coner and Chairman Ralph Williams. The same group have volunteered again to handle the 1976 Contest. Rules are simple: Equipment entered must be owned by an A.W.A. member. A winning set can compete only once. Not noted in the above winners is the BEST IN SHOW -- awarded to Larry Whitlock for his beautiful pre-WWI DeForest Audion amplifier.
PROPERLY CLEANING THE SMALL HARDWARE IN THE OLD EQUIPMENT WE GET IS PROBABLY THE LEAST ENJOYABLE PART OF THE HOBBY OF RADIO COLLECTING. EVEN AFTER YOU THOROUGHLY CLEAN SOME PARTS, THERE STILL REMAINS SOME VISIBLE OXIDATION OR OTHER DEPOSITS THAT YOU JUST CANNOT GET AT EVEN WITH A VERY FINE BRUSH AND PLENTY OF 'ELBOW GREASE'. IF THE PART HAPPENS TO BE A NICKEL PLATED THUMBSCREW, YOU ARE LIKELY TO REMOVE MUCH OF THE PLATING ON THE HIGH SPOTS BEFORE YOU EVER CLEAN OUT THE CREVICES IN THE KNURLING. SUCH PROBLEMS CAN BE ELIMINATED TO A LARGE DEGREE BY USING AN ULTRASONIC CLEANER TO DO THE JOB. IT IS EASIER, FASTER AND THE END RESULT IS BETTER!

There are a number of small cleaners on the market for less than $100.00. The tank capacities range from one half to one pint of cleaning solution. Most of the cleaning tanks are round but a few tanks are rectangular and for our purposes, I think the rectangular tanks are more useful. It is my personal opinion that the Heathkit GD-1150 ultrasonic cleaner is one of the best low price units around.

An ultrasonic cleaner uses cavitation to clean a surface. In the cleaner there is a high frequency power oscillator that excites a piezoelectric element bonded to the base of the cleaning agent. When the parts to be cleaned are put into the tank, microscopic air bubbles become trapped in and around dirt and oxidation. The sound waves cause these small bubbles to expand and collapse in such a way that local pressures in the bubbles reach thousands of pounds per square inch! The violent collapse of the bubbles brings the cleaning agent into near perfect contact with the material to be removed. The speed and completeness of cleaning is dramatic when the proper cleaning agents are employed and the proper cleaning steps are taken.

Poor cleaning action can almost always be traced to the use of the wrong cleaning agent and not to the ultrasonic cleaner. Agents that work well with 'elbow grease' often prove useless in such a cleaner. The most important thing to remember is that any agent must have the lowest possible surface tension. Most household cleaners have in them chemicals which are designed to hold the dirt in suspension until it can be rinsed away. These chemicals tend to raise the surface tension of the cleaner. On a microscopic scale, this means that the cleaning agent never actually comes in direct contact with much of the dirt. The other important thing to remember is that you will not be able to clean off water soluble dirt very well if the parts have a film of oils, waxes and resins on them. You cannot remove oxidations if they are covered by dirt and oils. It is therefore necessary to clean the parts in several types of cleaning agents to do a complete job.
A typical cleaning procedure would go like this:
The first cleaning step would be to run the parts thru a degreaser such as trichloroethylene (a replacement for carbon tetrachloride). With the oils removed from the parts you can now remove the water soluble materials with a solution of dish washing detergent and a tablespoon of fabric softner (The softner reduces the surface tension.)

This is followed by another cleaning in the degreaser to make sure all of the soap film is removed. Now you have a really clean part and you can now remove metallic oxidation on the parts. This is done with a very weak solution of a dry acid cleaner such as Sparex #2. (Such cleaners can be found at a hobby shop that sells electroplating supplies for jewelry making. Ask for a cleaner "for pickling, cleaning and removing surface oxidation, scale and incrustation from non-ferrous and precious metals".) Use one tenth the amount of acid recommended and use it at room temperature. After cleaning the parts, run them thru at least two changes of clean water to make sure you get out all of the acid. After the parts have thoroughly dried, give them a thin coat of brushing lacquer to retard further oxidation. (The acid used in the manner described will not cause any noticeable skin irritation as long as it is washed off within two or three minutes. It will not react noticeably with the parts to be cleaned until the cleaner is turned on. This gives you plenty of time to transfer parts from one solution to the other.)

All this might seem like a lot of trouble but I assure you it is not. Each cleaning step takes only about 30 seconds in the cleaner. I have seven 400 ml. glass beakers (thin plastic containers are OK also) with the various cleaning agents and rinse water in them. These containers are floated in the ultrasonic cleaner tank so you do not have to clean the tank after each step. The parts to be cleaned can be placed in a small mesh nylon bag for easy removal from the solutions. In this manner you can run several hundred nuts, screws, thumbscrews, tube contacts, switch points and the like thru the process in much less than a half hour. The cleaning solutions can be saved so that you can be ready to begin cleaning at a moments notice. After mastering the process, I doubt seriously if you will ever want to revert to the use of 'elbow grease'.

Additional ideas on cleaning.
If parts have paint on them that you want to remove, TSP (Tri Sodium Phosphate) works very well in an ultrasonic cleaner. It is available at most paint stores and it is also used as a water softener. On hard rubber panels such as are on the Radiola RC, the TSP does a very effective job of removing the brownish rubber oxidation on the surface. You do not have to use the ultrasonic cleaner,... just 'Paint on' a fairly strong solution with the finest bristle brush you have. Then rinse it off completely with a kitchen sink sprayer.

Ceramic and glass parts can be cleaned very well in an ultrasonic cleaner. If you have un-glazed ceramic parts such as rheostat bases, these can be made to look brand new. After going thru the usual cleaning steps, add an additional step of bleaching the part in household bleach.

It has been suggested to me that I try 'Denson' for cleaning bakelite and plastic parts. This is a solution for cleaning false teeth. It is made by L&R. If you are lucky, your family dentist will know of this product and help you get some.

Let me know what results you get if you decide to try ultrasonic cleaning. I'll be glad to correspond with you on the subject.

Robert Losier, 318 E. Houston St.
Monroe, North Carolina 28110

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**Breaker Corporation Acquires Hallicrafters Division of Wilcox**

Breaker Corporation of Arlington, Texas, has acquired the Hallicrafters Communications Equipment division of Wilcox Electric, a Northrup subsidiary located in Kansas City. Breaker is a manufacturer of citizen's-band antennas and accessories, formed a year ago.

Breaker has acquired all assets, engineering drawings, patents, and products of Hallicrafters, including industrial two-way, Amateur, and para-military communications equipment. The acquisition will put Hallicrafters back into the CB business which it abandoned five years ago.

Hallicrafters reportedly will introduce five new radios by mid-March, and will move into new facilities in the Kansas City area.
WOODY COOK (Greenwood, Ind.) attended an antique show and found a Brandes headset for only $6. Other items in the collection include a 1920 ½ kw. spark set and a 1921 Zenith receiver built by CRL of Chicago.

BASIL ABBOTT (Mechanicsville, Va.) found some real choice items at a recent estate sale: rare IP-500, early microphones and even a copy of "Radio Enters The Home" pub. by RCA in 1922.

KEN CONRAD (Akron, N.Y.) always does well at farm auctions--this time he found a Scott All-Wave Hi-Fidelity receiver plus enough parts to build an AK No. 3945 breadboard.

LARRY FIDLER (No. Miami Bch. Florida) has a Philco Mod. 70 Grandfather clock radio and a RCA 33 complete with Mod. 100A speaker. At a Local Goodwill store he found a pair of Western Electric 509W headphones for $1.

FRANK PAGANO (Brooklyn, N.Y.) writes he is spending more time with railroad interests but still picks up radio items such as a rare 1927 Leutz Catalog. He tells us there is a law pending making it necessary for all glass reproductions to bear the word "Replica".

ED TAYLOR (Indianapolis, Ind.) came up with the find of the year at a flea market: a deForest RJ-5 unit! At the AMA Conference (Canaanclagua) he was lucky enough to find a spherical Audion for use in the RJ-5...

Mel Comer (Amore, Pa.) got into an old building that was loaded with old gear stored there since 1925. He loaded up his car with old tubes such as 6C-1162 in original boxes, couple Westinghouse WR-21's, etc. An interesting item was a Type 230-A Vocatone receiver made by John Firth.

WILL JENESY (Davenport, Neb.) also attended an auction and came back with all kinds of goodies including some old cardboard radio advertisements. Will is now the proud owner of a deForest OT-3 (same auction) and is now looking for a deForest MC-1 or MC-2 transmitter.

DAVID PECKHAM (Breesport, N.Y.) added some nice items to his tube collection including a Weagnet valve, WR-21, Audiotron with good filament and an interesting photocell made in Germany.

HARRY WILLIAMS (Pleasant Hill, Mo.) is one of the few collectors lucky enough to find a Baby Emerson receiver complete with rare Multi-valve tube plus an Echophone Commercial EC-1 and a Radiola III with balanced amplifier.

ROB O'DONNELL (Amnville, PA.) recently found an unusual Western Electric 3-A receiver. The set uses four 215-A tubes.

CLARENCE FERREY (Hamilton, Mont.) has a Crosley Pup that sure won't require much restoration as it was found in the original carton. Other items for W7KE include Crosley 51-A amp. and 52-SD plus a Magnavox R-3 horn.

FIN STEWART (Sydney, Australia) added a Loewe "2 in 1" tube and a selection of Japanese Cymatron tubes: UX-201A thru UX-281 including a UX-112B which is identical to a UX-112A except it is a rectifier! Fin has been swapping tubes with various European museums. Equipment: he now has a Kennedy 110 in operation.

GEORGE HAGGERT (Wheaton, Ill.) acquired a very rare Wm. B. Duck Type "G" receiver (tuber) and a Type "GA" Control (Detector and 2 stages audio) at a Museum auction. An unusual receiver with honeycomb coils mounted on front panel. Anyone have info on this set? Looks like 1919-1920 vintage.

WALTER LEHMERT (Minneapolis, Minn.) is a collector of all kinds of insulators: antenna, feed-thru, beehive and lightning arresters. He would like to hear from other collectors of insulators. His address is: 5209 Minnehaha Blvd., Minneapolis, Minn. 55424.

JOHN STOKES (Auckland, New Zealand) has been corresponding with other tube collectors. He plans to visit Fin Stewart in Australia sometime in January having not been to Australia since 1954.

FELLOWS: Please send me your material as soon as you receive this Bulletin. We have a very early deadline for this column and I don't want to leave anyone out!
On February 3rd, 1921, Philip Schwartz and I formed a partnership which eventually became known as PHILMORE MFG. CO. The company received incorporation approval in 1925.

At the beginning of our operation we specialized in the sale of radio parts such as binding posts, contact points, switch stops, sliders, switches, variometers, variocouplers, rheostats, sockets, jacks, condensers, galena crystals and cat's whiskers. In addition, we assembled a small variety of items. The metal parts were obtained from screw machine manufacturers. In time we started into the radio kit business and eventually featured a line of completely assembled crystal and small tube sets.

To keep abreast of the popularity of radio and the demand for our products, we had to seek larger quarters to manufacture other new units added to our line such as phono-oscillators, code practice sets, small AC-DC receivers, transmitter and amplifier kits and other popular items.

Due to the "bank holidays" and the general depression that affected all business in this country during the early 30's, we decided in 1933 to establish a plant in Paris, France.

At this location we manufactured and assembled five tube table models and AC-DC console receivers. This operation lasted until 1937 when we were compelled to dismantle the plant and rush back to this country because of the pending war. Fortunately, we were able to continue operation since we had continued to maintain our New York plant.

In 1948, Philmore was selected by RCA to manufacture the popular RCA 31 tube Television kit. Eventually we manufactured the set completely assembled (both table and console models). This operation continued until 1957.

In recent years, Philmore like other radio and television manufacturers have felt the competition from Japan. We therefore have many of our products made to our specifications by reliable factories in Japan. It is pleasing to know that so many of my early products are now collector items.

M. L. Granat
Founder, Philmore Mfg. Co.
TIMES SQUARE TO LONG ISLAND
A 21,000 Mile Circuit -- ??Say Again??

by D. K. deNeuf

In late 1928 Admiral Byrd’'s Antarctic Expedition vessel was the "Eleanor Boiling". The ships only contact with the US was through the shortwave radiotelegraph station WHD, owned and operated by the New York Times, on the top of the building at Times Square, New York City.

Veteran radioman Dick Hilferty W5TOS recalls he was at the time a member of the WHD operating staff. As to the Boiling’s communication with WHD, Dick says..."the whole thing, in retrospect, seems utterly impossible, working a long haul circuit to the Antarctic - 10,500 miles away - from Times Square which suffered from an almost deafening radio noise level generated through nearly thousands of contacts opening and closing in animated electric signboards, plus neon lights buzzing, pinball machines clicking, etc., etc., especially under the archaic state of the radio art at that time -- self oscillators for transmitters, and regen receivers!"

And hereby hangs an interesting tale. In addition to radio reception right at Times Square, a second operator at Bellaire on Long Island also copies the Boiling’s signal for diversity and back-stopping. Dick, (who later became Chief Engineer of Press Wireless and was for 40 years) says..."if I missed a word or two when copying the press messages from the Boiling because of a "fade" I would phone the guy at Bellaire to see if he copied OK so I could patch up my copy. One night I phoned the fellow at Bellaire but kept getting a busy signal. I soon guessed he must have left his telephone receiver 'off the hook'. At the next opportunity I requested the operator in the Antarctic to "tell Bellaire to hang up his phone". He promptly complied at the end of the next press message paragraph. Bellaire was slightly astounded to suddenly hear himself being called by the ship 10,500 miles away near the South Pole asking him to replace his telephone receiver. A minute later I had Bellaire on the phone."

It is generally accepted that the shortwave distance between two points is a straight line. It's not always so in telecommunications!

INDIANA GROUP TO HOLD AUCTION
FOR AUBURN MUSEUM

April 24th 10:00 A.M.

Members of A.W.A. are cordially invited to attend and take part in the Indiana Historical Radio Society Spring Meet and fund raising antique radio auction to be held at the AUBURN-CORD-DUESENBERG MUSEUM in Auburn, Indiana on April 24, 1976. Auburn is a few miles north of Ft. Wayne on I-69.

Directors of the A-C-D Museum have offered a 20 by 40 foot room on the 2nd floor for a display in keeping with the purpose and intent of both organizations. The theme of "Golden Age of Entertainment" has been suggested. A goal of $2500 has been set by the Committee to provide show cases and furnishings.

The A-C-D Museum houses one of the world's finest collection of classic and antique automobiles. It was opened during the summer of 1974 and registered over 165,000 visitors during the first year of operation. There is a door charge of $2 and a lower rate for group meetings. It is open every day and evening of the year except Christmas. This is the second Museum Project for the Indians Group. Lots of luck on a worthy project!
OLD TIME TRANSMITTER AT W5DPM
Pair '45s P.P. - TPTG
Another fine restoration of one of George Grammer's masterpieces has been accomplished by W5DPM, Wes Chatelier of Baton Rouge, La. It is taken from the November, 1930 QST and is an example of real collecting persistence and the generosity of fellow hams.
The two Cardwells came from New Jersey, Eby binding posts from California, #32 wire for the grid coil from Maryland and the 2½ tubes from Doc.W56IX and were last tested in 1933!
Other parts: metal sockets, beehive insulators, Sangamo condensers, etc., came from various parts of the globe and tubing, baseboard, etc. from the local junk boxes.
Note the Jefferson power transformer in the photo -- it came out of retirement from a dark corner in the original 5DPM in the early thirties. When dusted off, a contented hum emerges as the key is pounded. Wes has had the transmitter on the air for many QSO's and a Novice way up in Iowa confessed, "I don't understand your rig!"
A few weeks ago, the Baton Rouge Radio Club were treated to a taste of "how it used to be ...." Excitement ran high as Wes brought in the CW signals on an old SW-3 and the push-pull '45s did their stuff (thing).

UK-210 IN HARTLEY AT K4J0
Another old time entry in the A.W.A. Old Tyme Transmitter Contests is this self-excited job built by Ellicott Valentine (E4J0) of Preaktown, N.C. He calls his 210 Hartley set a 1931 xmr and the restored National SW-3 a 1936 model. It placed 5th in the 1975 Contest.
The transmitter was built using the articles in the AWA OTE as a guide and operated at an input of only 7 watts. Rigidly mounted parts made by Hammerlund, Sangamo and National provided the stability that gave a clean keying and solid DC note.
Some surviving SW-3's are in mint condition but Val says that his was a complete "basket" case. With great patience and care he cleaned it and collected authentic parts to put it in operation. It is equipped with proper steatite insulated RF chokes and resistors, proper shields and National coupling transformer. Performance says Val was "PB".
Now that the 1976 OT Xmr Contest is over -- have you sent in your score?

OLD TIME TRANSMITTER
Members interested in old time transmitter operation will find an article in the April issue of "HAM RADIO" titled DEPRESSION STYLE - 1929 TRANSMITTER by Bill Orr, W6SAI. If you are using a pre-war II xmr -- write W2BGN. We're particularly interested in transmitters made before 1930.
Editor's Comment: It has been a practice in recent years to restrict material in the Bulletin to 3 pages. This article is an exception. AERA is proud to be able to print the first serious historical research on the development of the All-Metal tube. The Author made numerous field trips (and interviews) in order to obtain first-hand reliable information. Memberly attending the 1975 Conference had the opportunity of seeing his original documentation. Don't let the title of the article deceive you for he tells about other tube development including the Nuvistor.--B.K.

Although orphaned shortly after birth when, conceived by one company, she was raised by another, this spunky little tube not only survived but lived to make history. Her birth ushered in the modern age of tube technology when the umbilical cord binding her to the Incandescent Lamp heritage was severed. History positioned her arrival mid-way between the birth of the vacuum tube and its incipient decline. The announcement of her birth sparked more publicity and controversy than any prior or subsequent tube. It is ironic that the very technology that occasioned her birth and cured her childhood ills was ultimately to cause her demise.

Unfortunately, this "depression baby" after a history-making childhood, a dedicated adult life, and distinguished service in World War II was all but forgotten in later life. It is only fitting that, in her old age and before death of her species, this "plain Jane" of the tube world, long neglected by collectors and historians alike, be restored to her rightful place in history and be given some of the recognition denied her throughout her adult life.

The all-metal tube made its debut forty years ago last September. It was originally conceived as an unique selling point to mark the return of General Electric Company to the radio-receiver and receiving-tube fields after an absence of five and half years. G.E. timed its re-entry for the fall of '35 when it planned to unveil its new receiver line featuring its 'eternal' all-metal receiving tube.

The G.E. engineers developed the idea of the all-metal tube, which was to be unbased and wired directly into the sets, and planned to make it so durable that it would last the life of the receiver. Although they had initiated and perfected most of the early manufacturing techniques, G.E. was unable, because of its long absence from this field, to produce the all-metal tubes economically and on time. Consequently, they turned over the manufacturing job to RCA on October 9th, 1934.

To place the above remarks in perspective, it is necessary to go back to the late twenties when radio's big four: RCA, G.E., Westinghouse and A.T. & T. (Western Electric), engaged in some hard-nosed negotiations designed, for economic reasons, to prevent needless duplication of research and manufacturing efforts and to avoid unnecessary competition.

As a result of these negotiations: the RCA Radiotron Company was formed as of January 1st, 1930 and the G.E. Harrison, N.J. Lamp Works was turned over to RCA at this time. RCA agreed to limit its research development and manufacturing efforts to radio receivers and receiving tubes. G.E. and Westinghouse agreed to confine their efforts to radio transmitters, transmitting tubes and to the application of vacuum tubes to industrial uses.

In May, 1930, the government brought suit against RCA claiming these agreements constituted a 'Restriction of Trade.' The suit dragged on until November 21st, 1932 when, the now famous 'Consent Decree' was handed down. This decree permitted the concerned companies, after a lapse of two and a half years, to engage in competition in all fields as of May 21st, 1933.

In the interim, G.E. had dismantled its radio-receiver and receiving-tube engineering departments at Schenectady and the personnel from these departments sought work elsewhere. At this time Messrs. J.C. Warner, B.J. Thompson and G.M. Rose joined RCA at Harrison.

In preparation for its resumption of activities, it was necessary for G.E. to reorganize these departments. This it did as of January 1st, 1933 and Mr. C.F. Metcalf was appointed to head the new Vacuum Tube Engineering Department. He was joined shortly thereafter by Mr. J.M. Cage and Messrs. J.E. Beggs in April and by R.J. Bondley in November. These are the men who, together with W.C. White, were responsible for the all-metal receiving tube.

In January '33, at the first meeting of the newly formed departments, the determination was made to develop something radically
novel if they were to have a marketing edge in the competitive receiver field upon their return in '35.

During the first few months of '33 they did considerable research on the electron-beam tube and on small glass tubes for high-frequency use. In April, Mr. Metcalf had built a sample receiving tube with a copper anode forming part of the container similar to the water-cooled transmitting tubes of the day and to the recently released British Catkin tube.

Nolte was specifically directed to investigate this matter. By May 25, 1932, he had built, exhausted and tested the first all-metal tube (tin-can shell as anode, two refrigerator seals for filament wire feed-through, a coated ribbon filament and a copper seal-off tube lined inside with solder).

During the next few months a number of similar tin-can tubes were completed and tested. These were followed by a series of copper-can tubes. Although many difficulties were experienced with these tubes, none were

(A) Catkin tubes (B) MG tubes (C) Bullet stem header (D) Early metal tube header (E) Glass button considered to be of fundamental nature.

Between January and June '33, the G.E. engineers found the solution to the remaining major technical problems that had previously prevented them from producing a practical and economical all-metal tube. In rapid success: Thyatron controlled welding was successfully investigated and Ferroco, an alloy with the same coefficient of expansion as 'Ad' glass, was developed. The 'eyelet seal' for low current tubes and the 'pedestal seal' for high current tubes were perfected. Although much work still remained to be done before a practical and economical all-metal tube could be produced, the goal was in sight.

When the members of the Vacuum Tube Engineering Department met in July, it was only natural, in the light of recent events, that the subject of an 'all-metal' receiving tube should be discussed. In August, pursuing an idea he initiated at the July meeting, Mr. Beggs completed the design of the first all-metal receiving tube. On September 7th, he successfully built, exhausted, tested and demonstrated the first steel-shell model of this design. The design of this first tube was
so well conceived that it served as a model for the design of other tube types.

The designs of these early tubes, virtually unchanged, were the designs used by RCA when they went into production almost two years later. Mr. J. E. Beggs truly deserves great credit for the many novel and ingenious developments which made the all-metal receiving tube a success.

Messrs. White and Metcalf were most favorably impressed with the demonstration of the first sample all-metal tube and agreed it was most promising. Mr. R. J. Bondley joined the group in November and was assigned the task of finding practical solutions to the manufacturing problems of the new tubes. During the course of the next year he made many highly significant contributions to this new technology, either by initiating new methods or perfecting existing ones, especially in the field of welding. By January '34 G.E. was firmly committed to the use of the all-metal tube in their receiver development program.

In April '34, G.E. made two apparently contradictory moves. Messrs. Metcalf, Beggs and Bondley were sent to Ohio to work under the direction of Mr. Pritchard. Their job was to ready G.E.'s Incandescent Lamp Factory at Nela Park, Cleveland, for the production of metal tubes in quantity. G.E. then entered into negotiations with RCA to have them take over the manufacture of the all-metal tubes! The first move was probably made to give them a lever in the negotiations and also to protect themselves should the negotiations with RCA fail.

In May, Mr. H. F. Mayer completed development on the pencil-rectifier tube and built several successful samples. This work led directly to the development of the unique designed 5Z4 power rectifier. By July '34, Nela Park completed the first batch of all-metal tube prototypes. Throughout the summer the top-secret negotiations between G.E. and RCA continued and were known only to the upper administrative echelon in each company.

The proposed permanent component aspect of the new metal tubes must have been one of the stumbling blocks in these negotiations because, G.E. in September, decided to use terminal boards to accommodate the tube leads.

Finally, on October 9th, 1934, a contract between G.E. and RCA was signed. As a result of this RCA assumed the full responsibility for the manufacture of the first all-metal receiving tubes. Two days later at their Nela Park plant, G.E. released their plans, designs and samples of the all-metal tubes to Mr. J. C. Warner of RCA. On October 23rd, RCA announced its plan to base the metal tubes with their newly developed "octal base".

Plans were made immediately to equip "Factory #1" at Harrison, N.J. for the manufacture of the metal tubes. A section of the factory was boarded off and all activities carried out in utmost secrecy. RCA assigned men from their Engineering Research and Production Departments to this project together with advisors from G.E. By the end of November the machinery was setup and ready to operate. The first working samples were produced in early December. George "Wally" Crawford was in charge of the metal tube production. Fortunately, he kept a personal diary giving an almost daily history of the trials and initial successes encountered in the manufacture of the first production of metal tubes.

It is a fine tribute to the skill, patience and perseverance of these men that were able to successfully meet their deadlines. By March '35, they were ready to send a large number of each tube type to the G.E. Receiver Plant in Bridgewater, Conn. for testing in their new receivers scheduled to be released in the fall.

On April 1st, 1935, G.E. and RCA unveilled their revolutionary all-metal receiving tube at the Annual I.R.E. Show in New York City. Their big secret had been apparently well kept. Although the "grapevine" had leaked some vague rumors the vacuum tube and radio receiver manufacturers were totally unprepared for this bombshell. There was good reason for their panic since by this late date they were already committed to their fall line. The all-out publicity of the next few months was effective. By the end of June, over twenty-five companies had joined the metal tube bandwagon and more were to follow. The announcement of the metal tube sparked reams of coverage in the literature of the day some of which was controversial or negative.

Many of the smaller manufacturing companies could not afford to compete in the metal tube market because of the expensive equipment required. During the course of the next year a number of these companies developed MG (Metal-Glass) tubes to solve their problems. These were tubular glass-shell tubes with close fitting aluminum shields crimped over the base and were painted black to resemble metal tubes. Although somewhat larger and different in shape, these tubes were widely accepted as metal tubes.

After the fanfare that preceded the coming of the metal tubes their arrival in the early fall of '35 was anti-climactic. Nine tubes were released in the original set of tubes. By June of '36, more new tubes were added to this list. The metal tubes were here to stay. Improved manufacturing techniques permitted RCA to lower the selling price by an average of 20% at the end of the first year. As background for the next stage in the all metal tube history it is necessary to retrace our steps slightly.

In late '33 or early '34, rumors reached RCA about the wonderful all-metal receiving tube that G.E. had developed. This caused some concern at RCA and set the wheels in motion for a total effort to develop a tube that could be competitive with the all-metal tube.
Early in '33, as a prelude to this work, Mr. George M. Rose of the Tube Research and Development Department, having just completed the developmental work on the 'Acron' tube with B.J. Thompson, decided to follow-up on an idea he had for improving the glass vacuum tube. He felt he could eliminate the 'Parallel-Flat-Press' method of exhaust tube and lead-wire sealing in the base of the glass tube by arranging the lead-wires in a circle with the exhaust tube at the center and pressing the glass 'button shape' at right angles to the lead-wires and exhaust tubes. This required only an eighth of an inch or so of glass to be in contact with each lead-wire in the seal permitting the lead-wires to be made considerably shorter. The circular arrangement of the wires also allowed for better spacing. Both of these improvements increased the high frequency capabilities and enabled the tube to be made much smaller. This later became known as the 'Glass-Button-Stem'.

All-metal tubes produced by G.E. at Nela Park, Cleveland in July, 1934 and turned over to RCA on October 9th, 1934.

In April of '33 he built a few samples to 'show the engineers it could be done'. The first samples used soft lead-wires. Shortly after this he made another batch of the 'glass-button-stems' using heavy gage wires so that the lead-wires might double as 'pins'. A few of these samples were exhausted after a small tubular glass shell had been sealed to the outer rim of the button-stem. These latter samples were the direct forerunner of the miniature glass tubes which would not make their appearance for another seven or eight years! The only difference between them was that the miniature tubes were top exhausted permitting the 'pin-ring' to be made slightly smaller. This idea was then filed for future use.

When work was started to develop a tube to compete with G.E.'s metal tube, the 'glass-button-stem' was resurrected. A small tube was designed to take advantage of the new stem and it was sealed with a tubular round-topped glass shell (less than an inch in diameter and two inches long). A special close fitting brass shield was made to cover the glass envelope and the tube was then fitted with a six-prong bakelite base.

To further capitalize on the compactness of the 'bullet tube', it was decided to design a special base. Mr. T.M. Schraeder developed the 'octal base' equipped with a special orientating key. The final version of the 'bullet tube' was fitted with a close-fitting aluminum shield crimped over the base. At the completion of this project, Mr. E.W. Ritter informed George Rose that he was satisfied that the bullet tube was the answer to G.E.'s metal tube and that it would be put into production if the need arose. At this time the rank and file were still unaware of the GE-RCA negotiations relative to the metal tube. Although the 'bullet tube' never went into production it is most significant. It was the first of the MG (Metal Glass) tubes. The first tube to use the 'glass button stem' and the first tube to use the 'octal base'. All of these points played an important roll in RCA’s contributions to the all-metal tube.

In May '34 Wally Crawford, unaware of the existing GE-RCA negotiations, was sent to England to study the manufacturing processes involved in the production of the British Catkin tube. When he returned home in June he brought with him a large quantity of these tubes. The Engineering and Research Departments at Harrison made a thorough analysis of these tubes. In July, George Rose designed a special 'glass button stem' and succeeded in building an RCA-Catkin which was considerably smaller than the British version and which could be truly called an all-metal tube. Again, apparently nothing ever came of this investigation. However, the evidence seems to indicate that the idea for the perforated metal shell used by RCA in the
original 524's was copied directly from the design of the British Catkin tube.

In the late summer or early fall of '36 the glass button stem was again recalled from obscurity. This time it was to come to the rescue of the metal tube. This recall came as a result of a cost-analysis meeting held at Harrison to examine the production costs of the metal tube. The relatively high cost of the metal tube header (the structural base of tube) was discussed at length. At this meeting George Rose indicated that he was reasonably certain that the glass button stem could be adapted to the metal tube header. This would eliminate the need for the Fernico eyelets, glass beads, and copper rings then used to seal the lead-wire and result in a consequent reduction in cost. Mr. Rose was directed to investigate this matter immediately. In February '36, a patent was obtained for the application of the glass button stem to the metal tube header. During the remainder of the year over one hundred thousand metal tubes with the new glass button stem header were manufactured and subjected to rigorous laboratory and field tests. The test results were most successful and plans were made to place them in production. Messrs. J.C. and E.W. Ritter confided to George Rose that the glass button stem had saved the metal tube by reducing the header cost from 7-1/2 to 2-1/2 cents. The first tube with the new header was released in March 1937.

The advent of the single-ended tube late in '36 marked the last of the pre-WWII metal tube major changes. The 'S' tube series enabled all the grid leads in multi-grid tubes to exit through the base of the tube. This was accomplished by special shielding and, except in very special cases, eliminated the need for top-grid cap tubes.

Only two of the conventional type metal tubes were registered by RCA during the War and another half-dozen after the War. During the late forties and throughout the fifties, the metal tubes were gradually replaced by the miniature tube family in new equipment. Starting in the late fifties and throughout the sixties, and early seventies at an increasing rate, the miniature tubes suffered the same fate at the hands of the transistor. The Compactron made its appearance in the early sixties and after putting up a valiant fight over a decade it also is fighting a losing battle with the transistor and the latest arrival on the scene -- the integrated circuit.

The rugged all-metal tube did not give up without a struggle. Shortly after WWII George Rose was given the task of developing an efficient UHF tube. The metal 'pencil' tube resulted from this development work. This pencil tube replaced the temperamentally 'light-house' tube and enjoyed great popularity for a number of years particularly in aviation communication. In the mid-fifties when it was evident that the transistor was making headway, Mr. Rose was assigned the task of developing a tube to compete with the transistor. In 1960, the last and smallest of all-metal receiving tubes appeared. Christened the 'navistor', it was a direct descendant of the 'pencil' tube and was credited with saving the RCA Color TV receiver. Its days are also numbered and its demise will mark the end of an era in the history of radio communication.

NEXT ISSUE OF OTB:
All-metal tubes a Collector's item?
Identifying the original All-Metal receiving tubes. Dating pre-WW II metal tubes.

HOUCK AWARD

The Awards Committee wishes again to remind members that it is time for nominations for the 1976 Houck Awards. The primary award is for historical documentation in the field of radio communication. This can be in the form of written history or historical personages or events recorded on tape or other aural recordings. Special significance attached to history which but for the action of the author might have been lost.

A collectors award is given for collection and preservation of equipment or documents in AWA's field of interest which have special significance especially to historians of the future.

Nominations for both historical and collectors awards may be made by any AWA member. Such nominations should include as much information relating to the nominee as possible to aid the Awards Committee in making the recommendations. Nominations should be sent not later than May 15, 1976 to the Awards Chairman: Robert Morris RD #1, 60 Sunset Lake Rd., Sparta, New Jersey 07871

EDWIN HOWARD ARMSTRONG

Do you listen to one of the many FM stations on the nationwide Educational Network ? If so, you may have heard a program dedicated to Maj. Armstrong on his birthday (Dec. 16). A fair amount of the material for this nationwide broadcast was supplied by A.W.A.

9ZN

Old time radio amateurs may be interested in knowing that R.H.C. Matthews, ex-9ZN is now retired and living in Mexico. Your Secretary has been corresponding with "Natty" off-and-on for several years. He is still very much interested in radio and regrets that being a U.S. citizen he cannot readily obtain an amateur license.
The Collector

GREBE LOW-WAVE RECEIVER

Showing front view of CR-18 with 200-meter coil, intake and auxiliary coil for 19, 26, 30 and 80 meter bands

Features of the
Grebe CR-18 Low Wave Receiver

1. The CR-18 employs a coupled regenerative circuit adapted for reception of frequencies between 1500 and 30,000 kilocycles (10-200 meters).

2. Antenna coupling coil of novel design provides variable electro-magnetic coupling between antenna and grid circuit, producing a high transfer of energy without affecting the wavelength calibration. This also makes possible the use of harmonic tuning to increase the signal strength, gives greater selectivity through high-wave local stations and reduces interference and induction noise.

3. Losses in the entire circuit are reduced to a minimum by proper placing of the elements. Inductance coils are mounted on supports, far removed from operator’s body and metal objects, thus eliminating capacity effects and attendant losses.

4. Plug in coils, enable rapid change to be made from one frequency band to another and are so designed that maximum signal strength is obtained. An isolated grid terminal lowers the minimum capacity, and insured correct insertion of the coil.

5. Grebe S-L-F (Straight Line Frequency) Condensers with small minimum capacity insures ease of tuning and maximum signal strength.

6. Beat frequency control which consists of a specially designed variable air condenser with a very small capacityvariation, insure precise tuning to within a fraction of a kilocycle.

7. Plate Circuit designed to give smooth control of regeneration without affecting wavelength calibration and tuning. Oscillating point practically constant over entire tuning range. A non-inductive resistance prevents unstable action and dead spots.

8. Cushion sockets eliminate all vibration and microphonic noises detrimental to the reception of ultra-radio frequencies.

The CR-18 is the latest of a long line of amateur receivers, starting in 1900 with the now historical loose coupler, combined with electrolytic crystal detectors. The vacuum tube outfits, “tuners and amplifiers,” which followed, employed circuits and design features which were distinctively Grebe. During the World’s War, we find Grebe apparatus on U.S. war vessels and in the naval service of many of the allies. In 1918, the famous “CR” series started with the CR-1.

The CR-3 was a short-wave inductively coupled regenerative tuner, with a wavelength range of 150-1200 meters.

The CR-5 was the first single circuit receiver and had a wavelength range of 150-3000 meters, with only two tuning adjustments.

The CR-8, a short-wave regenerative receiver, was identical with the CR-3, but incorporated a vacuum tube unit. The wavelength range was 150-1000 meters. CR-13 was the first receiver to tune as low as 80 meters, and effectively make use of tuned radio frequency amplification at this low wavelength.

That the “CR” series was the beginning of a new era in the design of radio apparatus is proven by the fact that we find in each new type one or more features still used by many leading radio manufacturers today. It was in this series that the now famous tapered grip dial, tangent wheel vernier, general use of Bakelite molding, shielding automatic filament control and many other features, now standard, had their inception.

The operation of our amateur and experimental station under the call-letters 2XZ and 2XE for the past fifteen years has made it possible for this organization to keep in touch with amateur requirements and enables us to test in a practical way the theories and experimental work done in our laboratory. The CR-18 is therefore the result of many laboratory experiments and new ideas checked in a practical way and finally designed to operate efficiently under practical working conditions.

Price, Receiver (with Antenna Coil).................$90.00
Price, Additional Set of Coils.........................10.00

(10, 20, 30 and 200 Meters)

Both old time amateur and collectors are seeking the Grebe CR-18 receiver since it is an early “Classic” -- one of the first commercial shortwave receivers. The set had a short life in 1927-28 and died a quick death with the advent of the screen-grid tube [UX-222] and the small efficient sets made in aluminum cabinets such as the Silver-Marshall "Around-the-World-Four". Coils also became much smaller and were of the tube-base variety. Speaking of coils...the coils for the CR-18 are more difficult to find than the set!
QUE: In checking the circuits of some very early one-tube receivers (WWI vintage) I find an ammeter in the filament circuit instead of a voltmeter. I have always supposed the filament voltage was more important?

ANS: If the filaments of all tubes of a given type were exactly the same, either an ammeter or a voltmeter could be used. Manufacturing variations in the filaments in early tubes were such that it was more important to maintain a rated current than a voltage. This was particularly true of tungsten filaments. The UV-200 and UV-201 were rated at 1 ampere at 4 to 5 volts.

When better production methods were developed, uniform filaments could be produced; oxide-coated and thoriated filaments came into use. Of course when multi-tube sets were introduced it became desirable to apply the same voltage to all tubes.

The UV-201-A, originally advertised in January, 1923 was rated at 2.25 amperes at 5 volts filament. This enabled manufacturers to shift from current control to voltage control with the concomitant reduction of wiring complications and cost. The home set builder followed suit.

QUE: Tube collectors identify certain de Forest spherical Audions as having a "Hudson" filament. Does this make the tube more valuable? What is it?

ANS: The "Hudson" filament consisted at first of a tungsten filament with a tantalum wire wrapped around the arch of the filament. This construction is shown in the accompanying photograph. It was the subject of a patent application filed by Walter G. Hudson on February 19, 1914. The patent, U.S. Patent No. 1,190,412, was issued to the Radio Telephone and Telegraph Co. on July 11, 1916. Hudson had sold the rights to de Forest before the patent was issued, so it was issued to one of the companies controlled by deForest.

The Hudson filament came about as follows. H.W. Candless, who made early Audions for de Forest, used tantalum filaments because tantalum was a better emitter than tungsten. However, tantalum had a tendency to warp when in use, sometimes to the point where it would touch the grid thus making the Audion useless.

Remarkable closeup of a wire-wound Hudson filament. The large zig-zag wire is of course the grid -- the plate is not seen. The two wire-wound arched filaments can be seen in upper center of the picture. Each arch is made up of dozens of closely wound tantalum wire coiled around the almost invisible tungsten filament.

According to Candless, he conceived the idea of wrapping the arch of a tungsten filament with a spiral of fine tantalum wire so as to get the emission from the tantalum. This is the subject of the Hudson patent.

Such a wrapping was difficult and time consuming to apply, although filaments so made operated very well. Hudson, who was a chemist, supplied Candless with paste which consisted of powered tantalum mixed with organic binder. A dab of this paste was applied to the arch of each tungsten filament.

I have received reports of Audions with good filaments which contain particles of some black material loose in the bulb. It is possible that the bond between the Hudson paste and the tungsten filament gave way after repeated heating and cooling and the hardened

(Cont. on next page)
paste broke off and became loose in
the bulb.

The monetary "value" of any antique
is what someone is willing to pay for
it. I do not consider the value of an
Audion with a pasted Hudson filament
to be any different from that of one
with a tantalum or tungsten filament,
other things being equal. Since fewer
of the wrapped type Hudson filament
were made, they might be considered
more valuable.

The "fair price" is the price agreed
upon by a seller who is willing, but
not forced, to sell and the buyer who
is willing, but not forced, to buy.
This applies to both types of Hudson
filament Audions. Fewer wrapped types
were made -- but fewer pasted types
have survived intact...

FILAMENTS IN SERIES

Although common in AC-DC sets
of the 1930's, collectors may al-
so find filaments in series (in-
stead of parallel) in some early
AC receivers of the late 20's.
With the advent of AC operation
(1927-29) several companies were
caught with an inventory of bat-
tery receiving parts. A quick
and easy way to use these parts (and
tubes) was to use DC on the fila-
ments which were hooked up in
series...and presto! -- you had an
"All-Electric" set...

An example of this was a ver-

ison of the Radiola 32 -- our old
Friend the RCA superhet with
catacombs and 199's. The Model 32
was powered by two UX-281 recti-
fiers which supplied DC filament
on all 199's (in series) as well
as the "B" supply and power for
the UX-210 AF output. The 210
had a separate AC filament wind-
ing.

Another interesting example was
a Federal receiver made in 1928
which used 201-As. This set had
a Raytheon "BA" (high current)
rectifier tube for power in all
circuits including the filaments.
"C" bias was obtained by voltage
drop across one or more filaments.
Heavy wire wound RF chokes were
placed in the filament leads of the
AF amplifier to prevent oscilla-
tion [feedback] from the
other stages...real tricky.

Series filaments on battery
type tubes was short-lived since
the 226 and 227 AC tubes soon
gained great popularity. B.K.
OLD TYME HAM ADS

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

RULES FOR ADS:
1. Material must be over 25 years old and related to radio or electricity.
2. Ad MUST be written on separate sheet of paper -- not part of letter. For acknowledgment send S.A.S.E.
3. Give full address, Zip number and call letters (if any).
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 ad if OVER 7 lines including address.
7. Only ONE ad per member per issue.
8. All ads must be received 6 weeks prior to mailing date. (See deadline dates on this page.)
9. Mail to: Antique Wireless Assn. Main St, Holcomb, N.Y. 14469

SELL/TRADE: AK 4066 like new, Radiola III & amp.; Pilot 3" TV, Daven res. comp. amp., with tubes, Used tubes: 205B, 6EL6T, 10CF, 6V, 657, 6H2, 6BY, 12NE, 601, Meyers NACs etc. David Varnum, W4WNC, 1115 W. 4th Ave., R6 #3, Belleville, Ill. 62221

WANTED: Cabinet for Kennedy XV, knob for Zenith 4R (2nd from left) and UX2100 or CX340 tubes. Art Harrison, 1021 Falcon Dr., Columbia, Missouri 65201

WANTED: Picture literature for Philco Model 20 and Model 70 radios. Also good Model 90 Philco radio. Joe Morinelli, 901 Fairfax Rd., Drexel Hill, Penna. 19026

WANTED: #1 & #2 of Tyne's Vacuum Tube Saga, QST's for 1916 & 1917 misc. issues to complete set. Also want early tubes for collection. Have complete QST's from Sept. 1921 thru Dec. 1949 for trade. Mike Feener, W8HLLZ, 3227 Andria St., Sarasota, Florida 33580

TRADE: 1919 Wm. B. Duck catalog for info, photos, manuals, etc. for RCA TV Model RR-359. Want pre-war TV's especially TRK-9 or 12. Dave Cleland, Box 183, Reinholds, Penna. 17569

FOR SALE: "Vertrod" vertical window antenna kit, circa 1940, new and in original box. $19.95 each postpaid. Charles Day, 30 Sagamore Drive, South Dartmouth, Mass. 02748


SPRING house cleaning sale--some radios, many small items, S.A.S.E. for list. Alan Smith, 6712 Bisby Lake Ave., San Diego, Calif. 92119

WANTED: Complete knob set for Model 70 Philco Grandfather clock radio and Radiola 33. Also, speaker for Philco 70. Larry Flegle, 25 N.E. 185th Terrace, N. Miami Beach, Florida 33179


WANTED: Info on any radio made by Hickok Electric and distributed by Bath Longoria Radiophone Corp. S. Schneider, 6648 Commonwealth, Parma Hights, Ohio. 44130

WANTED: Everyday Model 2 speaker enclosure (dark, die cast aluminum) with or without speaker. Tom Wright, Box 5033, Huntsville, Ala. 35805

WANTED: Cab. for Ped. DX 58, photo of Clapp-Bastham baby Emerson chassis, loop for DeForest DI2, Multivalve tube, Rider Manuals, old microphones, early radio magazines & books, ARRL Handbooks prior '45. J.R. Doak, 45 Allen Dr., Woodstock, N.Y. 12498

DEADLINE FOR OT ADS

Jan. 15 ------ March issue
Apr. 15 ------ June issue
July 15 ------ Sept. issue
Oct. 15 ------ Dec. issue

WANTED: Paragon RA-10-DA2, Operadio portable, Scott Philharmonic, Magnavox audio amp, Kennedy 281 parts, Federal 61, Pitts, Mesco, Weitmore Savage catalog, Cash or Trade. Richard Wolven, 2614 Reno Road, Castleton, N.Y. 12033
WANT: Old radio magazines, books, catalogs, call books, handbooks, instruction manuals, battery receivers, parts, transmitters, etc. Will pay cash or trade if you prefer. Erv Rasmussen, WQYPM, 164 Lowell St., Redwood, Calif. 94062 (415-368-2558)

FOR SALE: breadboards for restoring AK and building old-time equipment. Available rough sanded or finished. Order by set no., dimension or circuit description. SASE for info, price. Ralph Williams, WA3SNR, 371 King of Prussia Rd., Wayne, Penna. 19087

SELL/swap: 1936 Nat'l l-10 w/6 pr. coils (needs shaft) $25. SM-3 w/HEPS $60. Lafayette 6 tube 2 dial 2 pr. coils $25. N.Y. Coil Co. spark coil (works) $25. J. Wasiewicz, W2DQC, 229 Sarles Lane, Pleasantville, N.Y. 10570

WANTED: Hopewell antenna insulators. Also information about manufacturers. Welt Lehner, 5209 Miramar Blvd., Elmira, Minn. 55424

WANTED: W.E. 4B Super parts, set. Need front panel, name plate, tube sockets, cabinet and other parts. Trade or cash. Ross Smith, 1133 Strong, Elkhart, Ind. 46514

WANTED: Dial head and control cables for Philips Transistor car radios Mod. 5, 10, or 11 (circa 1931-33). Looks like small cathedral set. Also buying complete early car radios with cable type control. Gary Miceneck, 226 Henry Avenue, Manchester, Mo. 63011

SELL: Western-Union self-winding clock. Send SASE for info on this and old technical books for sale. Walter Jackson, W5ZYA, 909 N.E. 1th, Grand Prairie, Texas 75050

FOR SALE: 25 Xerox copies of Powell Crosley's "Simplicity of Radio", the famous 80 page blue book of radio for only $3.50. All profits contributed to ANA Museum Fund. GordonEkland, 6518 Gunpowder Lane, Prospect, Ky. 40059

FOR SALE: Blank bakelite panels, books, magazines, etc. Send SASE. Want: 1938 Hallicrafter spkr for $15, 2 lid thumb screws & binding post for Kennedy 220, Ronald Mclellan, 604 Darby Rd., Havertown, Penna. 19083

TRADE: Crosley ACE V one-tube receiver with UV-201A and Brandes phones for Crosley crystal receiver Mod. 1 as shown page 907, Nov. 1922 Radio News. Write: Clarence Filley, W7KE, 1109 S. 2nd St., Hamilton, Montana 59840


WANTED: cabinet for ACE (Crosley) 3D. Sell -- send SASE for list of antique radios for sale. Al Jochem, 2047 College Ave., Quincy, Ill 62301

WANTED: Aerola Sr. box, Kennedy XV, swap large quenched gap for other spark components. Need oscillation TX. David Spence, 203 ANL, Argonne, Ill. 60039

WANTED: old meters before 1930 -- any kind-pocket, wood, metal, panel or switchboard. Condition not important. Please state make, model, etc. Have no equip. to swap. L.W. Cartwright, 10863 Northfield Square, Cupertino, Calif. 95014

FOR SALE: several hundred WWII surplus and WE tubes from 1935-50 era. SASE for list. Howard Hinkley, 155 West Main St., Amsterdam, N.Y. 12010

NEED: Awater-Kent Model 226 table set -- with "Beehive" cabinet. Willing to trade older battery sets. Dave Eiler, 14 Freedom Dr. Collinsville, Conn. 06022

NEED: 1st, 5th, 6th and 8th Editions of ARRL Handbook to complete collection. Also need early Radio and R/J. Send SASE for large list of early publications/books for sale. Jim Fisk, W6DTY, Main St., Greenville, New Hampshire 03048

NEED: 2 shield can 3½ dia. aud. driver trans #4460, tube shields, knobs, escutcheons & bottom chassis plate for 1940 AM Scott Philharmonic #16937 dial strip or copy for Scott AM5. New dials for '37 Scott Phil & other dial strips. George Harris, 3212 36th St., Lubbock, Tex. 79413

WANTED: 4½ plate enclosed variable condenser Murdock, Clapp-Bastham or Chelsea. Have few 1915 to 1926 radio brochures or catalogs to sell or trade. Willis Otto, W0DC, 2009 West 10th St., Davenport, Iowa 52804

WANTED: RCA Radiola VII & IX, RCA Radiola Grand. E.E. Hite, 107 Hillcrest Drive, Clemson, S.C. 29631

FOR SALE: Xerox copies UTTB Vol 1, #4 thru Vol. 6 #4, original $3 or x 4 format sold in sets only $17. Fessenden Brant Rock photos wanted to borrow or copy; will swap copies of other photos. Alan Douglas, Box 225, Pocasset, Mass. 02559

WANTED: National AAS receiver, working or junker to restore my own. Sell "Electronics" magazines 1936 into 1940. John Nagle, KH7J, 12330 Lawyers, Herndon, Virginia 22070

WANTED: Good 6G5 plus 6AF's and 6F7's tubes having external shield, 6D-11 to UX socket adapter. Stan Gross, 2266 St. Paul Blvd., Rochester, N.Y. 14617

WANTED: Please -- (2) anti-capacity lever type switches for W.E. Audion Control SE 17/1. 1/4 pole D.T. Federal, cover for Test buzzer on TP-500 and binding posts for TP-500. F.W. Cloat, W7AHK, 30806 N.E. Timmen Road, Ridgefield, Wash. 98642

FOR SWAP: AK Model 19 in fair shape. Also two large relay telegraphs. Write: Joe Duray, 1336 Vermont, N.W., Washington, D.C. 20005

WANTED: a Taylor T-21 (six prong isolantite base version of 6AG) and a round Bilecke crystal holder. Wes Chatellier, W5DPM, 1950 Chevelle Dr., Baton Rouge, La. 70806


WANTED: World's Record Super 8, 9 & 10 and any pre-1930 nonchrome Scott radios. Will buy or swap AK breadboard, Crosley Pup etc. New surplus 86c's $1.50. Write: J.C. Halser, 2430 So. Howell Ave., Milwaukee, Wisconsin 53207

WANTED: Inst. book or copy or info for Radiola R3 1923. Postage refunded: 1921 and earlier QST: ARRL Handbook Ed. #1, 2, 3, 4. Have some later for trade. Write: G. Lewis, W70VP, 85041 Sarvis Berry Lane, Eugene, Oregon 97405

TRADE: Radiola 106 spkr and W1 X-ray tube. Need pattern for Radiola Grand spkr grill, knobs for Crosley Super Tri-dyn regular and dial scale for Philco 650 AC set (will buy junk set with good dial) C.E. Clutter, 109 S. 1st E., Richmond, Utah 84333

TRADE: "Authorized Freed-Eisemann Radio Dealer" metal sign. Trade for Zenith display items or Pontiac metal sign with red Indian head. Don Knotts, 3158 N.E. Azalea, Hillsboro, Oregon 97123

RIDERS: Rider's Perpetual Trouble Shooter's Manual, Volumes I, II, III, IV, and V, un-abridged; also early 1 & 2 tube battery sets. Maury Stevers, 612 E. Winter Dr., Phoenix, Arizona 85020

FOR TRADE: AK display sign- 3 folding panels, all wood in mint condition. Want AK breadboard, Federal, DeForest, Kennedy, Grebe, Tuba or other quality set. Send SASE for sale list. Jack Bacon, 264 Xerxes Ave. N., Minneapolis, Minn. 55405

WANTED: Riders #3 and 12, Radiola III AFT, both AFT for Fada neutrondyne Mod. 175-A, AFT for Chelsea Super 5, Write: L.F. Bebbook, 8095 Centre Lane, East Amherst, N.Y. 14051

FOR SALE: Original folders for Mohawk one dial radios 1926-27. $1.00 plus SASE. Alvin Heckard, ND #1, Box 88, Lewiston, Penna. 17044

FOR SALE: Collection of old radios, books, magazines & tubes. Prefer to sell entire collection to one buyer. Write: Mrs. George C. Starry, 612 James St., Latrobe, Penna. 15650

SELL/TRADE: Radios, tubes, spkr's, pts, SASE for list. Want: Pfennstiel Mod. 5C, De Forest responder, Name brand loose-coupler, AK Mod. R spkr, Crosley Thumbscrews, Brass headphones, 8x20" panel in black & reddish-orange marbledized pattern. Mike White, 115 Countryview Dr., Naperville, Ill. 60540

WANTED: QSTs - Volume 1 through Volume 30 (1946) David Kline, W7JVN, 5637 Hening Ave., Springfield, Va. 22151

SELL: AK310 chassis $20 plus ship, less tubes. Need knobs for black-dial type Zenith & Mohawk 8-7, manuals for Radiola 20 & Solar cap. analyzer CS, schematics for Miraco Super 6 and Philco 4 (not 4C) Greg Farmer, 3839 Reservoir Blvd., Columbia Hts., Minn. 55421


SNAP: Kennedy 26L/521, Grebe CR-9, MU-1 and other early sets. Want Collins 75A-4 receiver above Serial #3500. Mike Chatfield, Rte. 2, Box 291, Belton, Mo., 64012 (816-331-3944)

FOR SALE & trade: Have (8) new boxed Cunningham 26's @ $3.50 ea. ppa. Need Pilot Wasp Junker panel and chassis will buy or trade. Geo. Haaske, 1932 E. Indiana St., Wheaton, Ill. 60187

SELL/swap/buy: Have available Nat. SW-3 and Pilot Super Wasp with coils plus Crosley Triadyn, all excellent. Want Grebe revrs in any condition & Grebe parts of any kind. C. Byrnes, 1402 Ocean Blvd., Shell Beach, Calif. 93449

WANTED: Federal RF xfrmr, Grebe CR-9 cabinet, RCA 1923-28 Serv. Manuals, Crosley XJ on-off sw, pot & knob for RCA AR, bake-lite panels, Magnavox AC-2 APT, Aerola Sr. cabinet, junk WE 7A amp for name plates. Walt Sanders, 15 Todd, Terre Haute, Ind. 47803

SWAP: Kennedy 281, Radiola III, De Forest Interpanel, Crosley Pup, Radiola Sr. Aerola Sr. Grebe CR-9, WD-11 tubes, Riders-4-6-7-8 & 10. SASE please. Robert Lane, 2301 Independence Ave., Kansas City, Mo. 64124

WANTED: Complete receiver (hand held type) for old W.E. as called "Candlestick" telephone used in the 1920's thru 1930's. State price. J.C. Kugler, 7 Brookside Dr., Fort Washington, N.Y. 11050

SELL: Operational parts of replica of my 1915 amateur station shown on p. 6, Sept. 1971 AWA OTR. Send SASE for description. Prefer local pickup or you pay packing & shipping costs. Andy Shafer, W7TE, 315 N. Adams St., New Carlisle, Ohio 45344


BLANK BAKE-LITE panels cut to size, 1/8 to 1/2" thick. Fabrication and engraving services available. S.A.S.E. for pricing sheet. Norman Parsons, 22 Forest St., Bradford, Conn. 06040

WANTED: AK breadboards, Pilot AC Super-Wasp and National SW-3 with coils. Please write: Leslie Bebock, W1FAT, R.F.D., Camden, Maine 04034

WANTED: Panel & varnished knob for AK coupled circuit tuner and other AK bread-board parts. Trade E.I. Catalog #19 for Wm. B. Duck #14 catalog. Sell Stewart Warner #300, AK #10 853 and Crosley #1122. Glen Angle, K7TAM, Clear Lake, S. Dak. 57726


100th Anniversary of Alexander Graham Bell’s Invention of the Telephone

As noted in the last CTE, A.W.A. will celebrate this year the invention of the telephone (1876 - 1976) with a historical display in the new museum under the guidance of Harry Lott assisted by Richard Walters and Ross Smith. The exhibit will include two very rare Bell telephones on loan from the Smithsonian Institution. Of popular appeal will be a 1905 telephone circuit within the building which visitors may talk to one another by first cranking a magneto ringer.

STATION WVFP IS BEING RESTORED

Some old timers may recognize this call sign as that if the WTI Joint Army-Navy Harbor Control and Defense Command Post at Ft. Moultrie, S.C. The restoration is part of the National Park Service Bicentennial Program covering the history of Ft. Moultrie from the Revolution until its abandonment as a military installation in 1947. Many items have been acquired but still urgently needed are Hammarlund receivers (BG-779, BC-794, SCR-214, and SCR-794), and Collins transmitters B-22 or 32 RA with keys and handsets. Any help in locating these items will be greatly appreciated. Please contact Lee Wallace, National Park Service, 5256 Fort Royal Rd., Springfield, Virginia 22151 (AC 703-321-8160)

NEWS BULLETIN

The giant has fallen — RCA is closing its Harrison Plant and will phase out all tube production before the end of the year!!

This incredible announcement was made in Mid-January. RCA, once the world’s largest tube manufacturer, currently makes 30% of domestic needs, G.E. and Sylvania make 25% with other smaller companies making the difference. RCA will PURCHASE tubes from these companies for replacement purposes. What would Dave Sarnoff say to this??

NEW YORK — The RCA Corp. says it will close its tube manufacturing plant in Harrison, N.J., on July 30 and lay off 1,100 employees.
ASSOCIATION NEWS

COMING EVENTS
ANTIQUE WIRELESS ASSOCIATION

A.W.A. APRIL MEETING
April 10, Locust Lodge, Ionia, N.Y.

A.W.A. WEST COAST MEETING
Apr. 24, Foothill College
Los Gatos, California

A.W.A. MAY MEETING
May 1, Bennett's, Kirkville, N.Y.

A.W.A. MUSEUM OPENS
May 2, East Bloomfield, N.Y.

R.A.R.A. HAMFEST
May 22, Rochester, N.Y.

A.W.A. SOUTHERN MEET
July 10, Winston-Salem, N.C.

A.R.R.L. NATIONAL CONVENTION
July 17, Denver, Colorado

ATLANTIC DIVISION CONVENTION
July 24, Philadelphia, Penna.

NATIONAL HISTORICAL CONFERENCE
OCT. 1-2 CANANDAIGUA, N.Y.

A.W.A. MUSEUM CLOSES
Oct. 31, East Bloomfield, N.Y.

ANNUAL MEETING AND DINNER
Nov. 6 (Location to be announced)

New Equipment
in A.W.A. MUSEUM

BOOKS: WA2ZPE, W2BIZ, W2KG
W7JY, W2IEE, K2CFL

POWER SUPPLY: Fin Stewart

RECORDINGS: W3EFX, W2EMX, W2AY

GAY Ewing

HISTORICAL TAPES: Howard

Schrader

TUBES: W2BIZ, WA2RHW, W2UG, W2GK,
L. Peckham, H. Schrader

RECEIVERS: W2UTH, W2IEE, W2EMX,
W8ECZR

MISC.: W2YL, W2BIZ, W2UG, W2GK,
W2UHR, K2CFL, WA2RHW, W3EFX,
W2IEE, Frank Keiper, Yates Hoag,
Charles Day, Bob Flanagan

KEYS: W2PZH, W2BIZ

THE MUSEUM

ACADEMY MUSEUM East Bloomfield, N.Y.

WHAT YOUR CONTRIBUTION IS DOING

Each contribution to the A.W.A. Museum Fund has been added to a permanent bank account to perpetuate operation of YOUR Museum.

In the short time it has been open, thousands have found their way to East Bloomfield: tourists, students, senior citizens, engineering groups and radio clubs. The Museum has loaned historical exhibits to other public museums and contributed material for nationwide educational FM broadcasts. The building has been seen on television and has been described in several publications. This would not have been possible without YOUR support ----

-- a big THANKS !

KODACHROME TRANSPARENCIES

A.W.A. HISTORICAL MUSEUM

Is it difficult to visit AWA Museum ?
--- or have you been there and wished you had 35 mm. Kodachrome slides of the various exhibits ? It is now possible to buy 23 slides plus detail description of each exhibit (per slide) for $11.50. The 23 scenes include exterior view, exhibits in Armstrong Room, telegraph instruments and keys, early broadcast receivers, the 1925 store, commercial ship installation with quench gap transmitters, early amateur stations including 1 kw spark set and 1922 W2AN. Send check for $11.50 plus $.50 postage to: Al Crum, 16 Costar St., Rochester, N.Y. 14608
The NATIONAL AGS receiver was recently described in the November issue of "CQ" magazine by Bill Orr, W5SAI. Do you own an AGS? --- if you do, you’re lucky for it is estimated only 200 to 400 were made and most were placed into commercial service. The set which was designed by Jim Milten, W1HRX and other engineers of the National Company, represents a breakthrough in modern communication design. Developed and announced during the depression (1933) it had limited sale ($180.00!!!) but it established a precedent in receiver design and laid the groundwork for the famous HRD which was to follow.

It was one of the first to have a stage of tuned AF and to use an improved crystal filter. The well detailed and illustrated story of this classic receiver in CQ magazine is one of a series currently being written by Bill. There are many excellent pictures plus a circuit diagram. W5SAI searched for years before his location one. It now has a prominent place in the shack.

A.W.A. is also the lucky possessor of such a receiver -- a gift from Russ Worthy. A copy of Orr’s article may be obtained by sending $1 to: CQ Magazine, 14 Vandervanter Ave., Port Washington, L.I., N.Y. 11050

To the fortunate amateur who can select his station equipment without regard to cost, as well as to the commercial operator to whom nothing less than the best is adequate, to these the National AGS is an overwhelming choice. For in the evolution of this remarkable receiver, there has been no omission of even the slightest detail of design or of craftsmanship that the combined experience of National and Government Engineers showed desirable.

For the performance of the AGS is as unique as its convenience. Such details as Tuned R. F. Preselection — for high Image Suppression, Signal-to-Noise Ratio, and Weak Signal Response — and such conveniences as Automatic Volume Control and strictly Single Control Tuning are too universally valued to require comment on this page. But the equally important, and almost innumerable small refinements that make this receiver so outstanding, become obvious only upon actual operation under adverse conditions.

Whether a prospective customer or not, we cordially invite you to inspect the AGS at your dealers. And if you cannot conveniently do this we shall be glad to send a copy of our booklet "The National AGS Communications Type Short Wave Superheterodyne," containing fifteen pages of concise technical information on design and operation for high performance.

**Outstanding Features**

- Tuned R. F. stage preceding first detector. (Image suppression — improved signal-to-noise ratio — improved "weak signal" response.)
- Electron coupled oscillators.
- No frequency drift — air padded oscillators.
- Air dielectric tuning condensers in I. F. amplifier.
- Single dial straight frequency line tuning (270°).
- Calibration curves and station chart on panel.

- Extremely rigid mechanical construction from very heavy aluminum plate.
- Relay rack or table mounting (panel size 8¼” x 19”).
- Frequency range 1500 to 20,000 kc. Band spread coils available.
- Heterodyne oscillator for c. w. reception.
- A. C. or battery operation.
- Panel switch for phones or speaker.
- Mechanical filter for single signal reception (in AGS-X).
Detail How Japanese Won In U.S. Consumer Field

By LLOYD SCHWARTZ

WASHINGTON (FNS) — A government in-depth study suggests that the Japanese strongly dominate the U.S. consumer electronics market because they beat domestic manufacturers at their own game.

The Commerce Department study attributes what happened to U.S. producers of TV sets, radios, hi-fi equipment and tape and record players to Japanese product selectivity, innovative marketing and technology transfer, in addition to price.

The study warns that the case history could be duplicated in such currently growing markets as digital watches, citizens band radios and video recording equipment.

"In appraising the inroads that Japan has made in the U.S. consumer electronics market," says the Commerce Department study, "it is a temptation to attribute them to lower prices that made it possible to drive certain U.S.-made products off the market.

"The Japanese first entered the U.S. market with products that U.S. manufacturers were not emphasizing, and created a market for them."

In effect, it is suggested, the Japanese hit the domestic producers where they were most vulnerable — in the area of small low-priced transistor radios and tape recorders, small screen TV receivers and low-price compact stereo systems. With these products, Japan developed the market and expanded its product lines on a highly competitive basis, first expanding its production base to achieve "economies of scale," and then moving aggressively into the export market, the report noted.

In the meantime, the U.S. consumer electronics industry was concentrating on big-ticket items: "Radios were large. Tape recorders were relatively large. Phonographs were either consoles or comparatively cheap portables for the youth market. TV receivers were mainly large screen models during the earlier years. Hi-fi equipment evolved from the professional broadcast and sound equipment fields, and was manufactured by small companies for a small 'class' market."

The Commerce Department reports this concentration on big-ticket items probably resulted partly because U.S. traditional distribution structures and merchandising outlets were not well-suited to such items as the small, relatively inexpensive Japanese products.

Assured Market

So when the Japanese invaded the U.S. market with small radios, recorders and players, small screen TV and compact stereo systems, they assured themselves large-scale distribution by placing their merchandise in non-traditional outlets — drug and variety stores, small appliance dealers and discount chains.

"During this penetration of the U.S. consumer electronics market," the report continues, "U.S. domestic manufacturers were unable to manufacture some products competitively in the United States, and either went to the Far East for production, or abandoned the market to Japanese and other Far Eastern producers. This contributed to building the Japanese production base and their strong competitive position."
In the process, the Japanese effectively developed the U.S. market, established a reputation for quality and service and expanded and upgraded product lines. The result, it is said, is that by 1974 the U.S. industry had lost 42 per cent of the domestic consumer electronics market.

It adds: "The bulk of the domestic market share that the U.S. industry has retained is color TV sets, and this, too, is threatened with further erosion by both import penetration and foreign ownership."

The report cites a 1974 Massachusetts Institute of Technology study which projected that reduced costs of producing Japanese color TV sets may be great enough by 1980 to lead to "serious U.S. market penetration."

In offering this solemn and statistically detailed case history of the striking fall of the U.S. consumer electronics industry, the Commerce Department zeros in on the factors that led to the rise and decline. It summarizes postwar chronology this way:

- As the industry grew, as a consequence of competitive pressures and rising-wage problems in the United States, it was found desirable to take advantage of the lower labor costs in the Far East, principally in Japan.
- In the process, U.S. technology was transferred overseas, and offshore manufacturing accelerated the Far East nations along the production learning curve.
- Japan, recognizing the potential competitive advantage that this conveyed, moved to develop its own production base, using its own domestic market at first.
- Simultaneously, Japan established government-industry relationships and legislative frameworks to support the development of exporting and foreign marketing systems.
- As a result, Japan began to achieve a competitive edge in the U.S. domestic market, and the resulting sales volume strengthened its production base and capital and marketing position.
- U.S. manufacturers, feeling the competition, were compelled to move still more of their production offshore.

This created the present U.S.-owned operations in Taiwan and Mexico, and was aided by Item 807 U.S. Tariff Schedule provisions that effectively reduce the duty U.S. manufacturers pay on products they partially manufacture overseas.

In the body of the report, the six factors the domestic consumer electronics industry rates as important to its competitive viability are analyzed in detail.

These are, in order of estimated importance, production costs, performance and reliability, marketing tactics and strategy, management policy, government policy and institutional factors.

The analysis suggests that this ordering "is more or less correct, and that it is indeed these factors account for the history recorded here."

The 30-page study, called The U.S. Consumer Electronics Industry, is available at 80 cents a copy from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402, and also from many Commerce Department district offices.
On Review

EDWARD "TED" ROGERS

Ted Rogers was born in Toronto in 1900. He started as a radio amateur and made the call ZBF famous. Among his successes was being the first Canadian station heard across the Atlantic during the A.R.L. 1921 Transatlantic Tests.

In 1925 he founded the Standard Radio Manufacturing Co. which later became Rogers Majestic (1929). It was during these years he developed one of the first A.C. receivers which made his name familiar to all Canadians and even to many Americans.

In time he formed his own broadcast station which was equally well known: CFRB. Ted had an untimely death in 1939, but the story doesn’t end here.

His son of the same name took over and is active as his father was in the broadcast field. The complete story of this famous father-son team was written in the Canadian Vintage Wireless Assn. journal THE CAT’S WHISKER, December, 1975. Great copy! AWA members interested in joining CWA or obtaining a copy of their paper should write Sid Prior, 102 Parkhurst Elvd., Toronto (M4G 2R5), Ontario, Canada.

HISTORICAL DOCUMENTATION

The latest S.O.W.P. PORT ’O CALLS represents one of the finest publications documenting communication radio history in print. We now know why the AWA Houck Award Committee selected SOWP Editor as their 1975 candidate. (Note: This publication is only available to SOWP members; however, there is a complete set of SOWP material in the AWA Library.)

TRANS-ATLANTIC CABLE HISTORY

by Don de Neuf, WALSFM
(October, 1975, Proceedings of Radio Club of America)

A very brief and concise history of undersea Atlantic Cables -- from the first cables (1857) to present day operation. Don also mentions Pacific and South American cable systems and their operation. Tremendous amount of history and technical information in two pages. (Note: RCA Proceedings only to members.)

CROSLEY

by Johnnie Anderson

The story of Powell Crosley Jr. (1886-1961) and the Crosley Radio Corp. was originally programmed by Jack Gray and later by John Bruning and Elmer Schubert -- but it took Johnnie Anderson to place it in print which he did in the December ’75 issue of the Indiana Historical Radio Society Bulletin.

The article consists of a brief biography on Crosley and then tells of the company and its station WILW -- all of which is of interest to the radio historian and collector.

Address for I.H.R.S. is:
245 N. Oakland Avenue
Indianapolis, Ind. 46201

COLLECTORS GUIDE TO ROMANCE

(p. 79, IEEE Spectrum, October, 1975)

A list of American electrical museums and associated subjects ranging from glass insulators to trolley cars. The list is in alphabetical order with address and brief description of contents. Radio museums, both public and private dominate. Some minor discrepancies were noted but overall it is a valuable reference for radio historian and collector.
GOOD READING

MOSFET CIRCUIT GUIDEBOOK
100 Tested Circuits
by Rufus Turner
Collectors and old timers who have not been exposed to solid-state circuitry will find this book of great value since MOSFET circuitry is somewhat similar to that of a vacuum tube. An example is replacing WD-11s in a Radiola III with Mosfets (see OTB, June '75, p.6).
The book describes and shows the circuits for BC and SW receivers, test equipment, audio amps and even a low power transmitter.
Book No. ISBN 0-8306-4796-1
Paperback @ $4.95

21 SIMPLE TRANSISTOR RADIOS
from crystal sets to superhets
by R.H. Warring
This book is devoted to simple solid-state receivers with many familiar circuits to the old timer -- in fact, they even tell how to build a reflex set!
Unlike the MOSFET book described above, this book deals with all kinds of diodes and transistors. Both beginners and old timers will find the two books good companions.
Paperback @ $3.95

HANDBOOK OF 1001 PRACTICAL CIRCUITS
by Ken Sessions
If you are really interested in solid-state circuitry -- this book is the answer with over 600 pages and 1001 schematics...everything from VHF repeater to garage door openers!
There is very little technical info -- just the circuit with brief description of components. With the low cost of present day (including surplus) transistors and IC's -- one can have a great time building all kinds of electronic gadgets -- and converting old tube sets so they will operate on a 9 volt battery!
Book No. ISBN 0-8306-4800-3
Soft cover @ $9.95

These three books may be purchased through normal channels or direct from the publisher:
TAB BOOKS, Blue Ridge Summit, Penna. 17214

EDWARD WESTON
Pioneer in Electrical Development
by Dexter Deeley
The December, 1971 OTB (12-3-11) made note of Weston's death at the age of 92 years. He was the son of Weston Sr., who died in 1936 at 86 years.
The senior Weston founded the Weston Electrical Instrument Company in 1888 after a series of business ventures in other fields -- primarily electro-plating and dynamo manufacturing. The fascinating story of this early pioneer is well documented in the December, 1975 issue of ARCA "Antique Radio Gazette". (Copy may be obtained from Bill Denk, 81 Steeplechase Rd., Devon, Penna. 19333)

THE PHILLIPS CODE
Commercial and amateur operators (end of course Morse telegraphers) will be interested in a new edition of the PHILLIPS CODE recently published by H.E. West with introduction by E. Stuart Davis.
The code is abbreviated English which enabled landline telegraphers to send and receive at a much higher speed. The book includes a short biography on its founder, Walter Polk Phillips plus a brief history of its origin.
A hard-to-find addition for your library. Send $5.50 to H.E. West, Box 152, Orland Park, Ill. 60462

PIONEERS OF RADIO
Elihu Thomson & Edwin Houston
Few are aware that Thomson & Houston of early electric motor fame (General Electric was formed around their company) were experimenting with "radio waves" as early as 1871. Using spark coils, they were able to detect spark radiation from the first to the sixth floor of a building. Their experiments were debated in several Journals of the period. See page 26, Dec. '75 issue of Radio & Electronic magazine.

(Charles Day)

THE WORLD RADIO NEWS
Did you see the writeup on the Association's Museum in the February issue of WORLD RADIO NEWS? Nice copy for A.W.A.
TELEGRAPHPHONE
THE HISTORY OF RECORDING
by Robert Angus
(“Modern Recording” magazine, page 16, December/January 1976 issue)

I ran into this article quite by accident since I am not a subscriber to MODERN RECORDING. It’s a relatively new magazine and should become a good seller since it is far superior to most hi-fi/recording publications -- nice format, good pictures and easily readable articles covering tape recorders, recording techniques, hi-fi systems and related subjects.

What caught my eye was a lengthy article titled "History of Recording" and a quick glance at an illustration told me that at least I had found the information I had been seeking for many years -- a Telephraphone! -- the grandaddy of all wire and tape recorders.

The article, the second in a series, tells about a gentleman named Charles Dexter Rood.

Mr. Rood was born on a farm in Ludlow, Mass., in 1840. His career might have served as the prototype for a Horatio Alger novel. After a series of fast moving business ventures he climaxd his career by founding the well known Hamilton Watch Company which made him a millionaire.

About this time (1905) he heard about a marvelous new business machine which could do everything Edison’s dictaphone could do for a fraction of the price -- the TELEGRAPHONE manufactured by the American Telephraphone Company.

Rood purchased controlling interest in the company and the events that followed are difficult to describe-- in fact, unbelievable!

As you may have guessed by now --- the Telephraphone was a wire recorder invented and manufactured under Vladimir Poulsen’s patents (yes, the same Danish inventor who developed the Poulsen arc).

For some reason, not fully explained, Rood did everything in his power to SUPPRESS development and SALE of this electronic wonder which in turn held back later development of the modern wire and tape recorder by almost 30 years! Result: a Telephraphone is considered a prize collector’s item since VERY few were manufactured.

Do you want to see one? Visit the A.W.A. Museum where there are two different 1910 models on display -- gifts from Kenesawer Poly Tech.

Members interested in the Telephraphone or history of early recording may obtain copies of the magazine by writing to: MODERN RECORDING, 15 Columbus Circle, New York, N.Y. 10023 ($1.50 per copy)

SCHRADER COLLECTION

This year the A.W.A. Museum will have a special display of very rare television camera and picture tubes donated by Howard Schrader (Princeton Junction, N.J.), well known vacuum tube historian and collector.

The display will become a permanent part of the museum and will bear the donor’s name. It consists mostly of early iconoscope and kinescope tubes developed personally by Zworykin. In addition, there will be a rare Farnsworth dissector tube and the latest Plumbicon, a gift from WWX. Much thought will have to be given as to how to display the tubes effectively.

We believe the Schrader exhibit will be the only public historical TV tube display of its kind in the country. A.W.A. is much in debt to Howard.

RARE RECORDINGS

Rex Matlack (W3EX) recently donated two rare embossed aluminum records to the Museum. The records are of a broadcast over WJZ, Dec. 27, 1934 and consist of an interview with Charles Appar. Appar intercepted code messages from Station WSL (Sayville, L.I.) and was instrumental in breaking up a German Spy Ring.

The station (WSL) was transmitting cryptic messages to enemy submarines concerning American shipping during WWI. The secret messages were recorded and deciphered on Edison cylinder records made by Appar. The event made headlines 60 years ago!

The original cylinder records were played back during the 1934 broadcast interview. Not only are the aluminum records (1934) of great historical value but they also may be the only recordings of a WWI era transmitter!
The Museum has longed wanted a DeForest Unit Panel receiver but had little hope since it was difficult to find one complete. The Association has a dozen miscellaneous panels of which several are dupes. It was a lost cause.

Then one day last October Ken Conrad [W2IIE] stopped at the Museum and asked for help -- he wanted someone to assist him in carrying some material from his car. You guessed it--there was a beautiful 15 Unit Panel set waiting in the trunk along with a mint Federal 61!

The set was complete with 15 original panels and accessories including "VI" Audions. Ken had restored the set after purchasing it from Bob O'Neil.

---and what is a DeForest Unit Panel set?

The September, 1919 DeForest Catalog fully describes a 15 unit job and lesser combinations for one could buy individual panels and make up any number of combinations with the simplest being a 3 panel receiver consisting of a coil, variable condenser and crystal detector. Then progressively, the experimenter could add more coils, a vacuum tube detector and audio stages. Each square panel represents an individual component: coil, socket, condenser, switch, rheostat, etc.

The set at the Museum consists of a regenerative detector with 3 Honeycomb coils followed by 2 stages of audio. Of particular interest is the "grid-leak and variable grid condenser" panel mounted next to the "honeycomb coil" panel. The white disc is the grid-leak whose resistance is determined by a "pencilmark". We question the need for a variable "stopping" condenser. A fixed one would serve the purpose.

A view from the rear shows the wiring from panel to panel with the only component on the baseboard being the AFT's.

Why is this set so rare?

Three reasons: it is DeForest, the year (1919-1920) and the difficulty in finding the various panels. We may have good news for collectors. Ralph Williams is in the process of reproducing blank panels. Finding DeForest parts to mount on the panels is another story however -- lots of luck!
AUTHENTIC "B" BATTERIES

While attending the A.W.A. FALL MEET in Rhode Island I saw an early battery set using 201-As in operation. Much to my surprise, the "B" supply was obtained from two old RAY-O-VAC batteries which I am sure were at least 40 if not 50 years old.

I immediately suspected a false power supply hidden somewhere. "Not so," said Charles Day, the owner. He then proceeded to show me how the outside cardboard container on RAY-O-VAC batteries could be easily removed like a box cover -- and behold -- inside were 30 new flashlight batteries neatly soldered in series! Seems this trick is only possible with RAY-O-VAC batteries. Eveready and Burgess just don't come apart that easy...try it.

A CLEANER

Bob O'Neil tells of a method he uses to clean old radio cabinets and panels without damaging the original finish. He mixes in EQUAL parts:

Boiled linseed oil
Turpentine (gum)
Vinegar

The solution is rubbed on the surface to be cleaned with a cloth or fine steel wool keeping the surface WET at all times. Bob says it is a safe mixture and does not harm the original finish.

PLASTIC MOLDS

REPRODUCING MOLDED PARTS

The article in the last QST aroused much interest -- and here is another approach from Serge Krauss. The Dow-Corning Corp. publishes a brochure describing several easy steps how to make various radio parts (knobs, dials, sockets, etc.) Write for their brochure on "Easy Steps on Making Molded Parts using Silastic" -- Bulletin 61-265

DOW CORNING CORPORATION
Midland, Michigan 48640

IDENTIFYING TUBES WITH FAINT MARKINGS

One of the easiest methods to make out tube numbers marked on the glass envelope is of course to blow your breath on the glass. This method is short-lived and calls for a lot of puffing!

A method used by Jim Dantes is to place the tube in the deep freeze unit of a refrigerator. The numbers can be easily seen when a slight film has formed on the glass.

Ralph Williams finds dusting the tube with a fine powder will frequently bring out the letters.

Bro. Pat Dowd ran into problems identifying tubes with numbers on a dirty metal base. After much experimenting Pat came up with a cleaning method that is almost foolproof -- providing of course the numbers haven't been removed:

A. Insert base of tube in solution of INSTANT DIP silver cleaner (can be purchased at most hardware or cleaning supply houses) and rotate tube gently for one or two minutes.

B. Remove from INSTANT DIP and rinse with regular water and allow to drip dry completely. Do not wipe until thoroughly dry.

C. When dry, rub gently with a soft cloth.

D. Some of the tube pins may need a little extra cleaning with steel wool or light emery paper.

E. Mask glass portion of tube and spray base and pins with CRYSTAL CLEAR (#1301) Krylon Acrylic spray coating for long lasting protection.

The "Instant Dip" works excellent on nickel, copper and aluminum bases such as Elmac. Trying to clean a base by rubbing off dirt only removes the number and other identifying marks.
### Discontinued Codes

**WESTERN ELECTRIC ELECTRON TUBES**

<table>
<thead>
<tr>
<th>DISCONTINUED CODE</th>
<th>TYPE</th>
<th>REPLACING CODE</th>
<th>DISCONTINUED CODE</th>
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Tube collectors will find this inactive list of Western Electric tubes (Discontinued Code) of interest for it is really a list of ANTIQUE W.E. tubes. One could go even further and say that many of the "Replacing Codes" were also antique for some were obsolete well over 30 years ago. W.E. tubes are considered to be the elite in a tube collection for they were used (and sold) only in commercial and broadcast equipment.

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**New Multi-Color Radio Frequency Chart**

A new multi-color chart showing all United States radio frequency allocations has been prepared by the United States Department of Commerce's Office of Telecommunications in cooperation with the President's Office of Telecommunications Policy. This detailed chart will assist broadcasting stations, Department of Defense installations, sea-going vessels, ham radio operators, telecommunications researchers, or anyone developing new telecommunications services.

Copies of the 3½ x 4½-foot wall chart are available for $1.35 each from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402.
One of the first popular tuning circuits for tube detector was designed by John Reinartz [1Q8] and published in June, 1921 QST with an improved version in the March, 1922 issue. Thousands of amateurs (and broadcast listeners) built Reinartz tuners with the low-loss spider web coil as noted in the above photograph. The beginner would use only a single tube detector or make it a two tube set by adding a stage of audio. Experimenters used the Reinartz tuner as a stage of tuned RF followed by an untuned detector as seen above. There was no official version -- everyone used available components -- and we have seen at least three different ways of winding the coil. All versions are accepted providing the coil is NOT wound on a coil form, the parts are of 1921-22 vintage and the dials are of the projecting type.
THIRD WEST COAST A.W.A. MEET
Saturday, April 24, 1976
9 A.M. to 5 P.M.
FOOTHILL COLLEGE ELECTRONIC MUSEUM
South El Monte Rd.
LOS GATOS HILLS, CALIFORNIA

MORNING PROGRAM
9 A.M. Registration
Visit Museum and buy/sell swap sale in parking lot
Inspect gear brought in by collectors
Submit entries for Contest
11 A.M. Judging of equipment

NOON: Lunch in Campus Cafeteria (or bring your own)

AFTERNOON PROGRAM
1:15 P.M. "FREED RADIO"
Rare 16 mm. movie made in late 1920's showing manufacturing of Freed receivers in same plant where freshman sets were made

2 P.M. TUBE COLLECTORS SYMPOSIUM
Conducted by Lauren Peckham, Chairman of AWA Tube Committee (Bressport, N.Y.)
GENERAL DISCUSSION ON TUBE COLLECTING AND THEIR VALUE

3 P.M. HISTORICAL EQUIPMENT
Broadcast, Commercial and Amateur.
BOB MERRIAM, Director of New England Wireless Museum (Rhode Island)

4 P.M. RIBBON AWARDS FOR CONTEST WINNERS

If you have registered at a previous Foothill Meet, you will receive in the mail a program with all details on contest, etc. If not, write: Dave Brodie, 315 Cotton St.
Menlo Park, Calif. or phone 415-323-0333
ADVANCE REGISTRATION: $1.50
Deadline for lunch reservation is -- April 12

ATTENTION: If you cannot reach Steve for reservations, call Paul Giganti [415]-593-4723

LETTER TO A.W.A. at HOLCOMB ??
Send S.A.S.E. for prompt reply.

April Meeting
SATURDAY, APRIL 10th
3 P.M. -- ??
LOCUST LODGE, Ionia, N.Y.
3 miles N.W. of Holcomb, N.Y.
on Route 64
--- Swap/sale session
--- Talk on collecting "Radio Boy" books
--- Restoring Crosley receivers
--- SMORGASBORD wide variety of food at 5:00 P.M.
--- Entertainment
Make reservations for dinner before April 3rd with Lincoln Gundall, 69 Boulevard Pkwy., Rochester, N.Y. 14618
Tele. 716-NO3-2085

May Meeting
SATURDAY, MAY 1st
11 A.M. - 5 P.M.
at Floyd Bennett's House
[near Syracuse, N.Y.]
--- Dinner at 12:30 P.M.
--- Swap/sale session
--- Talk on finishing [restoration]
--- Discussion on value of vacuum tubes
--- Entertainment
Please make dinner reservations before April 23 or phone (315) 656-8887

Floyd Bennett
7736 Kirkville Road, N.
Kirkville, New York 13082

Directions: Coming from southern part of state on Rte. 81; look for EAST SYRACUSE EXIT. Bear right leading to 690. Bear left on 441 NORTH EXIT to KIRKVILLE RD., EAST, then right on KIRKVILLE RD. and go to end of it-- about 6 miles. At end of road, turn LEFT, pass Red Barn Restaurant, over thru-way bridge--one mile to Bennett residence. VIA THRUWAY: Get off Exit 34A on 441 south, take Exit 3E to Kirkville Rd. EAST. Go to end of Kirkville Rd., turn LEFT on KIRKVILLE RD., NORTH. Go one mile to Bennett residence.

NEWS NOTE

• A 13-cent stamp commemorating the centennial of Alexander Graham Bell's invention of the telephone will be issued in Boston on March 10, 1976, the date on which 100 years earlier Bell achieved the first intelligible transmission of speech by electrical means. [W2AY]
Andrew D. Ring, 76, Dies; Pioneer in Broadcasting

Andrew D. Ring, 76, founder and retired senior partner of A.D. Ring & Associates, a consulting radio engineering firm, and former assistant chief engineer of the Federal Communications Commission from its formation in 1934 until 1941, died Monday of cancer at Arlington Hospital. He lived on Powhahan Street in Falls Church.

A pioneer in the early days of radio broadcasting, Ring joined the General Electric Co. in Schenectady, N.Y., in 1925. He was instrumental in developing the design of high-power broadcasting apparatus. While with General Electric, he was awarded several basic patents on broadcasting equipment. In 1928 he pioneered in early experiments in television broadcasting.

In 1929 he joined the Federal Radio Commission and in 1934, upon the formation of the Federal Communications Commission, was named its assistant.

D. Lawrence Jaffe, 62, Is Dead; Microwave Technology Pioneer

D. Lawrence Jaffe, an early developer of microwave electronic technology in World War II, died Monday in Kyoto, Japan, where he had been on vacation. He was 62 years old and lived in Boca Raton, Fla., and formerly lived in Great Neck, L.I.

Dr. Jaffe graduated in 1935 from the City College of New York and later received a Ph.D. at Columbia University, where he was associated with Prof. Edwin H. Armstrong, the inventor of the frequency-modulation system used in FM broadcasting.

In World War II he was on the staff of the radiation laboratory of the Massachusetts Institute of Technology, where he did research in microwave components and radar antennas.

Dr. Jaffe retired from Poland in 1970. At his death he was a technical consultant to the Kings Point (L.I.) Merchant Marine radio station, a post which he held until his resignation from the commission in 1941.

Gustav Hertz, Physicist, Nobel Winner, 88, Dies

BERLIN, Oct. 30

Dr. Gustav Hertz, the nuclear physicist who won a Nobel Prize for physics in 1925 and worked for the Soviet Union after World War II, died today. The official East German press agency reported he was 88 years old.

Professor Hertz was regarded as the leader of about 200 German scientists who agreed to aid the Soviet Union when Nazi Germany fell, 1945. The professor had built Germany's cyclotron for smashing the atom and was an authority on the separation of the explosive isotope U-235 from uranium.

Radio-TV Pioneer Dies at 83

PHILADELPHIA — Radio pioneer Isaac "Ike" Levy, a founder of the Columbia Broadcasting System in New York, died yesterday in his Rittenhouse Square apartment. He was 83.

Levy, a lawyer who was graduated from the University of Pennsylvania Law School, bought local radio station WCAU in 1924 in partnership with his dentist brother, Dr. Leon Levy. The Levys were among the founders of the CBS radio network, and WCAU was the first station to join the network.

During Levy's 24 years with WCAU, the station grew from 500 watts to 50,000 watts.

PHILLIP R. MALLORY

INDIANAPOLIS — Phillip Roger Mallory, 90, founder and past president and chairman of P.R. Mallory & Co., died: at his home on Fishers Island, N.Y.

Mr. Mallory founded the company in 1916 in Fort Chester, N.Y. and located it to Indianapolis in 1959. He served as company president from its founding until 1946, and as chairman until 1964.

P.R. Mallory & Co., with 8,000 employees and sales in 1974 of $246.5 million, manufactures electrical and electronic components, batteries, timing devices, motors and metallurgical products for consumer, industrial, and government markets.

John Scott Trotter Dead at 68; Music Director for Bing Crosby

—John Scott Trotter, whose entertainment career spanning a half-century took him from the side of Hal Kemp in the big-band era to Bing Crosby on radio and records and George Gobel on television, died yesterday of cancer at Mt. Sinai Hospital. He was 87 years old.

Mr. Trotter's most remembered musical achievement was that of an arranger of music for Mr. Crosby, an association that lasted 17 years on radio and included recordings that encompassed some of the crooner's best-known songs, such as "White Christmas" and "Swinging on a Star."