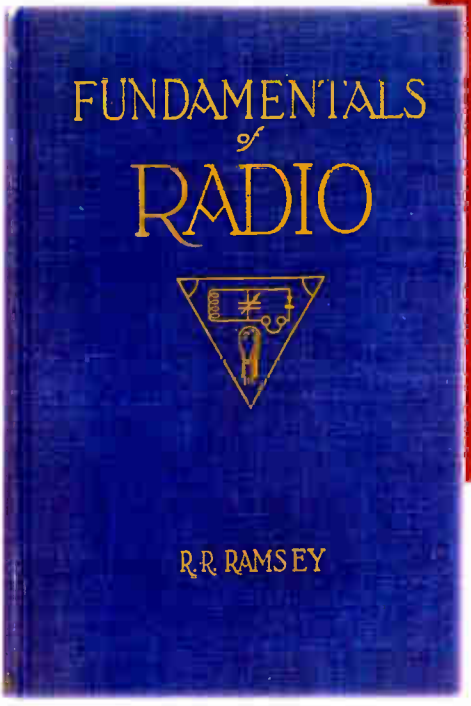
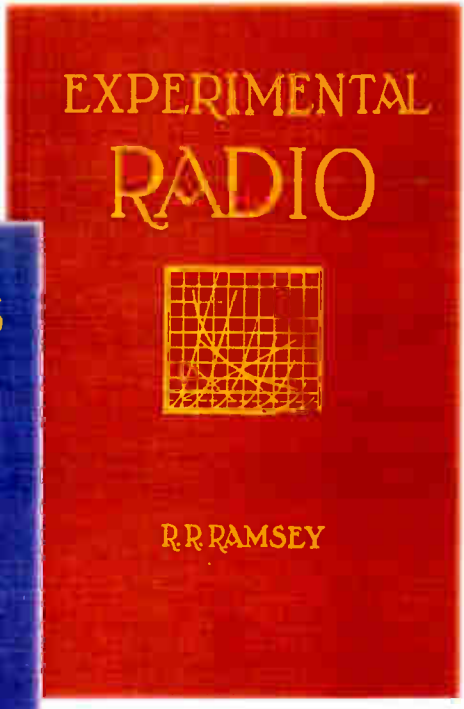
The Indiana Historical Radio Society

BULLETIN

Volume 45 December 2016 Number 4

Indiana University Physics Professor Dr. Rolla R. Ramsey
page 3





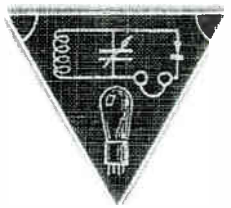
The **BULLETIN**
A PUBLICATON OF THE INDIANA HISTORICAL RADIO SOCIETY.
CELEBRATING FORTY-FIVE YEARS OF DOCUMENTING EARLY RADIO

The Indiana Historical Radio Society Bulletin
December 2016

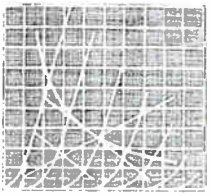
On the cover: The front covers of Professor Rolla Ramsey's 1935 edition of his two textbooks., "Experimental Radio" and "Fundamentals of Radio".

The books represent a culmination of Dr. Ramsey's work as a Physics Professor at Indiana University in the early 1900's.

Fundamentals of Radio cover art—based on figure 1, chapter 9, "Detectors"



Experimental Radio cover art—based "Power output and voltage gain of class A audio amplifiers" graph, experiment 66.



In this issue:

- The textbooks of Rolla R. Ramsey, Fundamentals of Radio and Experimental Radio. This article, beginning on page 3, is a brief description of Dr. Rolla Ramsey's career related to early radio at Indiana University.
- Ed Dupart describes another of his DIY transistor radios in his "Two Transistor Treasure Chest Radio" article, page 12 of this Bulletin. Once you have admired his Treasure Chest box construction and appreciated his circuit assembly, spend time mentally signal tracing the reflexed superhet circuit—a fun challenge!
- Locating Cunningham and Radiotron Tubes statuettes of radio personalities becomes an antique shop challenge with George and Edna Clemans' article on page 16. The number of personalities and promotional information regarding the plaster figures is a mystery yet to be solved.
- Bob Pote offers the "how to" with his packaging of filter capacitors in "Fabricating Your Own Multisection Tubular Electrolytics", page 18. In this article Bob is restoring a Knight Kit Span Master receiver.
- Page 22 announces the first IHRS meet of 2017— we return to Lawrence Park.
- "The Zenith 6S-254 Kit" article, page 24, is written by Ed Dupart. "Ed" the only real name in the article!

Fred Prohl, Editor for the IHRS Bulletin

Rolla R. Ramsey
"Experimental Radio"
and "Fundamentals of Radio"

by Fred Prohl

Experimental Radio

"These experiments have been collected from various sources during the past five years and have been given to my students in radio in condensed mimeograph form. Several of these experiments have been devised by the author. A large number have been taken from the various texts on radio telegraphy and telephony. . . . Some experiments, methods of test and practical directions for the construction of apparatus have been inserted for those who have not had college physics or who do not have access to regular physical apparatus." R. R. Ramsey, December, 1922[1]

Dr. Ramsey's first edition of "Experimental Radio" precedes the first edition of "Fundamentals of Radio" by seven years. The 1922 first edition of "Experimental Radio" contains 117 experiments ranging from "Testing Dry Cells", to "Series Resonance", "Construct a Resistance Coupled Amplifier", "Radio Telephone Transmitter"; "Plate Modulation", and "Types of Receivers". There are four editions of "Experimental Radio". New editions revised procedures and added new experiments. The second edition included suggestions for the construction of simple radio laboratory apparatus.

Professor Ramsey, in his preface to the third edition of "Experimental Radio", states that his early mimeographed editions were published primarily for his own students. He goes on to explain that the reception by radio public, college, commercial and amateur was such that it was necessary to get out an edition that was no longer mimeographed but printed in textbook form. "The third edition has been enlarged and revised in order to keep up with the rapid changes in radio." His fourth edition, August 1937, contains 137 experiments. "Since the publication of the third edition the A and B battery has been discarded and rectified alternating current is now in most sets. In this edition the experiments and figures have been changed so that power supplies can be used in most of the experiments."

In his edition prefaces to "Experimental Radio" Professor Ramsey states that his book on radio experiments is not intended to be a textbook on radio theory,

but simply practical steps to support the theory. If you have an opportunity to read "Experimental Radio" you will find that in the experiments Professor Ramsey includes considerable practical theory. The book can stand alone as a Radio Experiment and Theory reference.

Professor Ramsey references thirty-four familiar sources for his "Experimental Radio" (in addition to his own material). Familiar names such as Chaffee (vacuum tubes), Ghiardi (radio physics), Henny (principles of radio), Loomis (radio theory), Morecroft (experimental radio engineering), Sterling (electricity and magnatism), Terman (measurements in radio) and several radio periodicals including QST. Following each experiment Professor Ramsey identifies the source of the experiment with book title and page number.

Fundamentals of Radio

"In the Fundamentals of Radio I have endeavored to give the basic theory of radio as it is exemplified in modern practice. Perhaps if the fundamentals were limited in number to two, they might be given as the resonant, or wave meter circuit and the three electrode-vacuum tube. This book will found to be largely based on these two conceptions." R. R. Ramsey, September, 1929[2]

The first edition textbook, "Fundamentals of Radio" was published in 1929 by Rolla R. Ramsey, Professor of Physics, Indiana University. A second edition was published in 1935. Both editions, as well as his "Experimental Radio" texts, were self-published by Ramsey Publishing Company, Bloomington, Indiana.

As his statement of intent indicates in the forward for "Fundamentals of Radio", Professor Ramsey clearly explains the basic theory of radio. The theory of radio is presented with the necessary algebraic and trigonometric relationships associated with the technology. Calculus is held to a minimum in his theoretical descriptions. The text is an excellent engineering technology book. In his 426 page 1935 second edition text, Professor Ramsey includes 31 chapters related to radio theory. An overview of chapter topics include AC/DC theory, resistance, capacitance, inductance, radio waves, vacuum tubes, aerials, instrumentation, receivers, and audio amplification. The 1935 edition updates the text with the changing technology to include multi-electrode

tubes and the classifications of oscillators and amplifiers. Professor Ramsey does, in the 1935 edition, keep the older radio technologies, such as spark transmission, and transmission by the ether (using a water wave analogy). The "Fundamentals of Radio" index has questions regarding the material discussed in each chapter.

"Dr. Ramsey was a native of Morning Sun, Ohio and a graduate of Oxford, Ohion High School. He attended Miami University at Oxford and then Indiana University, receiving his bachelor's degree in 1895." . . . . . "While a student at I.U. he played on the varsity football team and remained an ardent fan."[3] "He was the author of two books and 80 articles on radio and electronics."[4]

Rolla Ramsey's first position at Indiana University was in 1894 as a student assistant in the Physics Department. The Physics Department was in the process of relocating to another building, Kirkwood Hall. Rolla was to be paid $15.00 per month to assist with the installation of equipment.

In 1897 Rolla Ramsey completed his A.M. degree in physics with a thesis titled "Molecular Weight and Electrolytic Resistance". In the summer of 1898 he left Bloomington to teach at Westminster College in Wilmington, Pennsylvania for a year, In January of 1898 he married Clara Smith of Bloomington. Rolla returned to Indiana University the following summer as acting instructor in the Physics Department. Physics Department student enrollment was 114 for the fall term. The Physics Department theme for the year of 1898 was "Electromagnetic Waves". It was shown through Physics Club presentations that Rolla had an early interest in wireless communications.

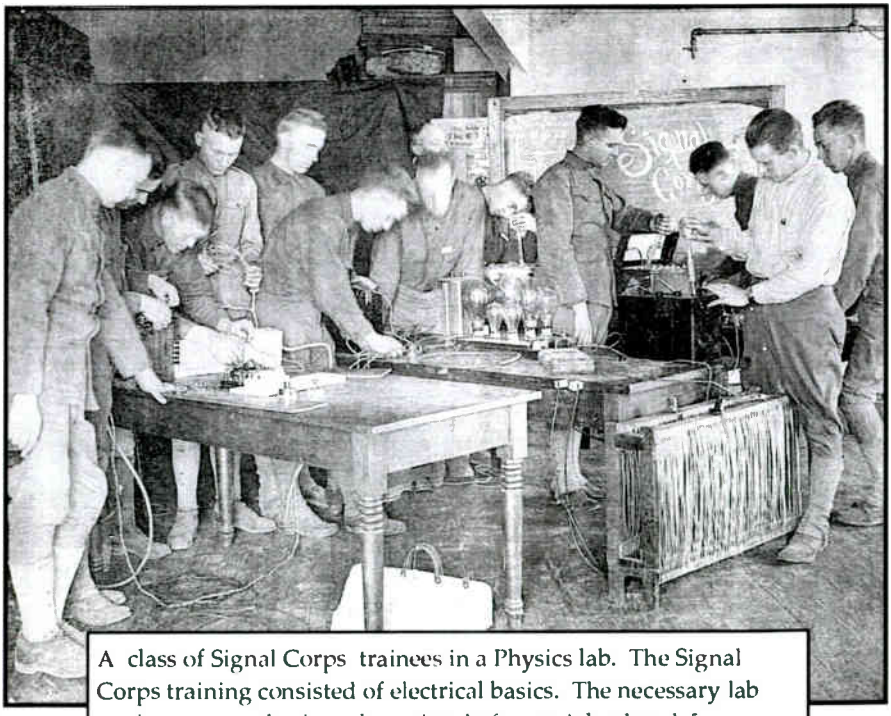
In 1900 Rolla Ramsey left Bloomington for Cornell to work on his PhD. Following his completion

Professor Rolla R. Ramsey
From the 1917 Indiana University yearbook, the Arbutus.

of the PhD at Cornell in 1901 he first taught a Westminster College, Pennsylvania, and then at the University of Missouri in Columbia. He returned to Indiana University in 1903 and was appointed Assistant Professor of Physics. He shared the course load with the Physics Department head for a salary of $1000 a year. He is reported to be energetic and well liked around campus. Apparently the University heavily relied on the Physics Department's faculty to supervise installation and maintenance of the campus electrical power equipment. It is recorded in letters and memos that throughout his 41 years on campus he stored a large quantity of motors and power equipment.

During the school year of 1912-1913 Rolla Ramsey traveled to Europe for advance studies. The record states that his course in applied electricity and dynamo machinery was discontinued during that time and resumed when he returned in September 1913.

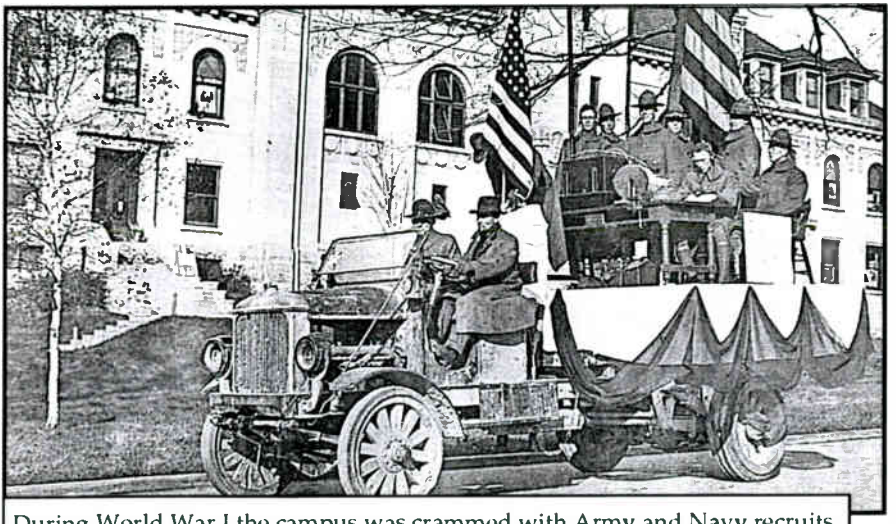
World War One brought attention and changes to Indiana University and the Physics Department. In 1917 the War Department ordered Indiana to train Signal Corp men. Indiana University had a quota of students to complete this training with courses begin-



A class of Signal Corps trainees in a Physics lab. The Signal Corps training consisted of electrical basics. The necessary lab equipment was basic and consisted of material at hand. [5]

ning in October 1917. The task, of course, fell on the Physics Department. The department first offered two courses comprising of telegraphy, telephony and radio. The courses were given to young men in the selective draft but not yet called. Success in the first class, telegraphy, was meeting the government requirement to send and receive 10 per words per minute in International Morse Code. This usually required five to eight weeks of practice. A military officer directed the telegraphy classes with IU staff assisting. The initial quota for IU was 200 men. The advanced class started at the same time. The Physics Department

"The training of the mass of men called to the colors for signal duty overwhelmed the capacity of the Signal School at Fort Leavenworth. Thus, in May 1917 the Corps established additional mobilization and training camps at Little Silver, New Jersey (Camp Alfred Vail); Leon Springs, Texas (Camp Samuel F. B. Morse); and the Presidio of Monterey, California. In 1918 the Signal Corps transferred its activities at Camp Morse and Fort Leavenworth to Camp Meade, Maryland, where it had earlier opened a radio school in December 1917. In addition, many of the nation's colleges and universities offered technical training for prospective Signal Corps personnel."[6]



During World War I the campus was crammed with Army and Navy recruits chosen for specialized instruction, including over 1,000 who studied radio communications under IU physicist R. R. Ramsey. This pioneering effort was celebrated in a 1918 campus parade. The man at the table has headphones. On and below the table is what appears to be wireless equipment. The sign says "Induction Coil 200000 Volts Good for 5000 Miles"[7]

Radiomen in training in the Science Hall. "They are getting a crash course in Light, Electricity and Magnetism to prepare them to understand how to work and maintain their radio sets under battle conditions."[5]

Chairman, Arthur Foley, presented the lectures for the advanced class and Rolla Ramsey handled the lab work. The sixty lectures and forty hours of lab work included circuits, telegraphy, alternating current, inductance, frequency, and the related equipment. The record notes that Rolla, with an increased interest in radio, worked on his experiments for the military radio course in the winter. It was necessary for him to wear his coat because his physics lab was unheated to reserve coal for industrial use.

In July of 1918 the Physics Department received word from the War Department that they would be training sixty-eight lectures in experimental electricity to 500 men for radio work. Company A of the U. S. Training Detachment Radio School arrived the first of September. Company B consisting of 98 people arrived the same day and began studies in radio operations and special electrical work. It was necessary with this number of trainees, and more expected, that the small Physics Department staff grow to twenty-five. Instructional assistance came from IU professors, instructors, assistants, former assistants, and local Bloomington people along with other universities to staff the department.

The November 11, 1918 armi-

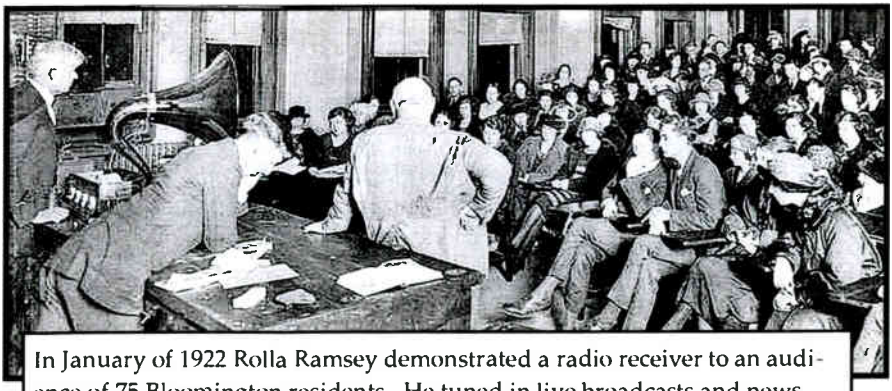
stice ended the war and quickly brought an end to the Signal Corps Radio training program.

When Rolla Ramsey published his 1922 edition of "Experimental Radio" his text introduction referenced five years of collected experiments. His experiments were in mimeograph form and publishing them in textbook form was a necessary step. A conclusion can be made that these experiments began with the 1917 Signal Corps course preparation.

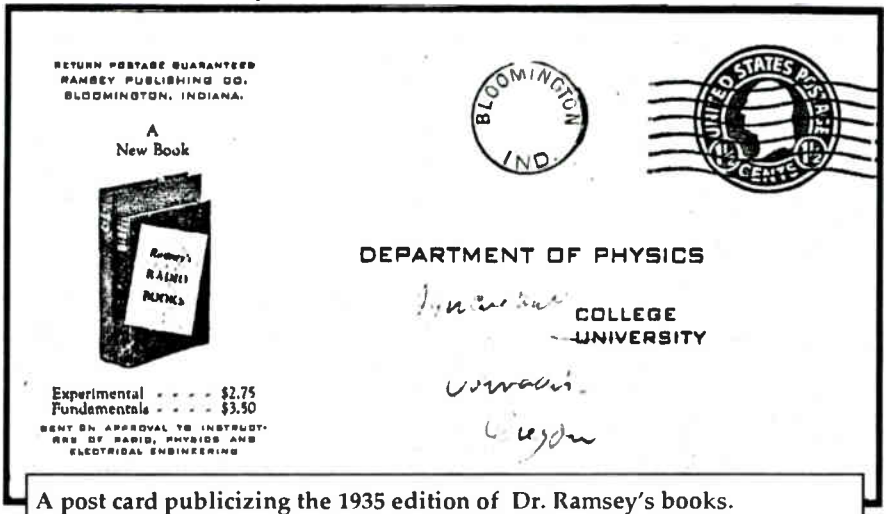
Radio Telegraphy and Telephony continued to be a two credit course taught by Rolla Ramsey for the duration of his career at Indiana University.

In 1922 he was asked by IU President Bryan to find out what is necessary to establish a radio transmitting station on campus. Professor Ramsey had licensed IU for amateur use in about 1920, call 9YAG. Establishment of a commercial station proved to be an expense the University would not approve. Requests for an IU AM station continued over the years but due to expense and local radio stations objections it wasn't until 1950 that WFIU, an FM station, was approved.

"Early in the century, Dr. Ramsey predicted the development of television. In 1927, working with one of his students, he successfully sent a television image from a transmitter to a receiver at the other end of the I.U. Physics hall." Professor Ramsey included an experiment with a scanning disk television in his 1935 edition of "Experimental Radio". In the 1935 edition of "Fundamentals of Radio" he gives the theory of the scanning disk and introduces the



In January of 1922 Rolla Ramsey demonstrated a radio receiver to an audience of 75 Bloomington residents. He tuned in live broadcasts and news reports from the east coast. Professor Ramsey is on the far left.
Indiana University Arbutus, 1922



A post card publicizing the 1935 edition of Dr. Ramsey's books.
The card was sent to Agricultural College, Corvallis, Oregon.
In 1923 the college in Corvallis licensed KFDT radio, and changed to KOAC in 1925. KOAC became the leading Public Radio station in Oregon. The College is now Oregon State University

iconoscope.

In April 1929, Rolla Ramsey was approved for a summer salary from the Waterman Foundation for a leave to complete his book, "Fundamentals of Radio". He spent the summer of that year completing the textbook, writing primarily from his summer home in Pentwater, Michigan. He finished and self-published the text in late 1929.

In 1938, Professor Ramsey, at the age of 65 and having served on the Physics Department staff since 1903, was made acting head of the department. Department head, Arthur Foley, retired, leaving the position open. The record notes that the Physics Department letterhead states "Rolla R. Ramsey, Professor and Acting Head of Department".

Rolla taught his last class at Indiana University in June of 1942. He had reached the mandatory retirement age but wanted to continue teaching. In the same year he retired he taught physics to 300 students at Wabash College in Crawfordsville, Indiana. In his retirement, Dr. Ramsey did work for the U. S. government on Wright aviation technique during WWII.

On June 11, 1955, Dr. Ramsey died at his home in Bloomington, Indiana at the age of 83.

Fred Prohl Nov 2016

References:
1. "Experimental Radio" R. R. Ramsey
2. "Fundamentals of Radio" R. R. Ramsey
3. "Retired I. U. Scientist" Bloomington (IN) Herald-Telephone, June 13, 1955
4. "Dr. Rolla Ramsey" The New York Times, June 13, 1955
5. Indiana University Archives, provided by Matt Pierce, Senior Lecturer, Indiana University, advisor to K9IU, IU's Amateur Radio Club
6. "Getting the message through: a branch history of the U.S. Army Signal Corps" Raines, Rebecca Robbins, 1952 - Center of Military History"
7. "WWI Armistice Parade", Indiana University Library Photo Archives
8. Unless otherwise noted the history of Dr. R. R. Ramsey at Indiana University was found in "History of Physics at Indiana University, vol I (2009) & II (2013), Gebhard, Mark, Lulu Enterprises, Raleigh, NC
9. "Indiana University, Midwestern Pioneer" vol II & III, Thomas D. Clark, Indiana University Press

Fundamentals of Radio and Experimental Radio, were an antique shop find several years ago. The books sparked an interest for me simply because all books about radio spark an interest. Interest in these two text books, written by Indiana University professor R. R. Ramsey, became more than just a spark with the realization that the Physics Department at I.U. was actively involved with radio theory and instruction in the early 1900's. The reference "History of Physics at Indiana University" volumes I and II, by Mark W. Gebhard, made the task of gathering material about Dr. Ramsey much easier. Mr. Gebhard provides insight into the growing pains of what is now a major university as well as life in Bloomington and the Nation during this growth. "History of Physics at Indiana University" is an interesting read. Mark Gebhard has a third and final volume in the works. *Fred Prohl December 2016*

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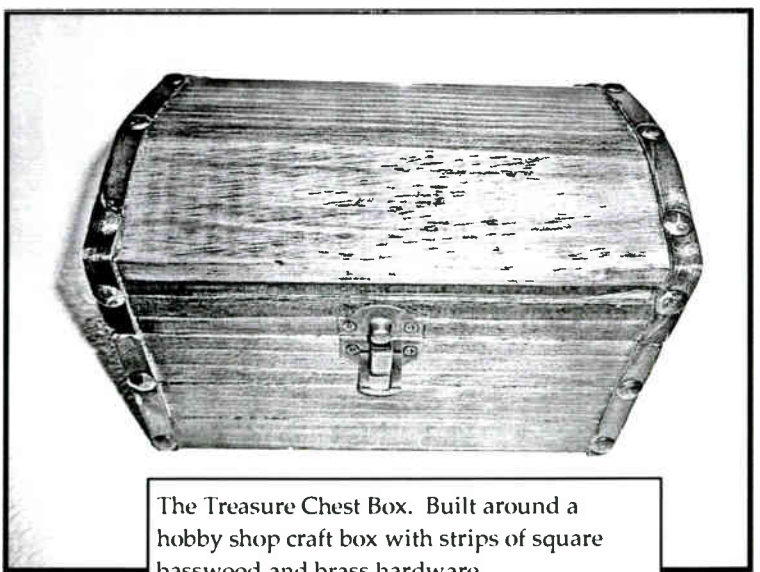
Two Transistor Treasure Chest Radio

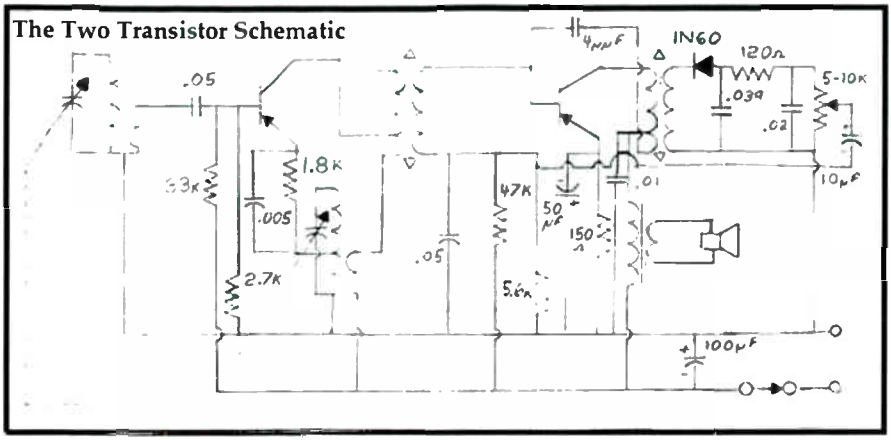
by Edward Dupart

The IHRS decided to have a contest for a DIY (Do it Yourself) two transistor radio using transistors from the 1950's to the early 1960's. I'm the type that likes to get the most from the least, so I settled on building a two-transistor superhet. Over the years I have seen circuits for a one transistor superhet, which was a converter stage feeding into one IF transformer and then into a diode detector and then I have seen variations of that where they added a transistor for audio amplification. I have never built either one so I decided now was the time to do it, but I added reflexing. The first transistor would be a typical converter stage followed by a second transistor that would be both and IF amplifier and an audio amplifier. Now to create it.

Two IF transformers, an oscillator coil, variable capacitor, loopstick antenna, volume control, AF output transformer and a speaker would be the major components I would have to come up with. Vintage transistors are not a problem, because I have been collecting/saving them since the late 1950's. A Jewel 4 transistor radio was sitting near my bench and it had a raggedy red leatherette cabinet that I had been playing around with. This was/is a fairly common radio from about 1960 that was from the New York area that used GE transistors with the pinched top that looked like the common 2N107. Except they weren't painted and were a better quality than the 2N107 and I'm guessing they were surplus transistors Jewel obtained from GE. For a four tran-



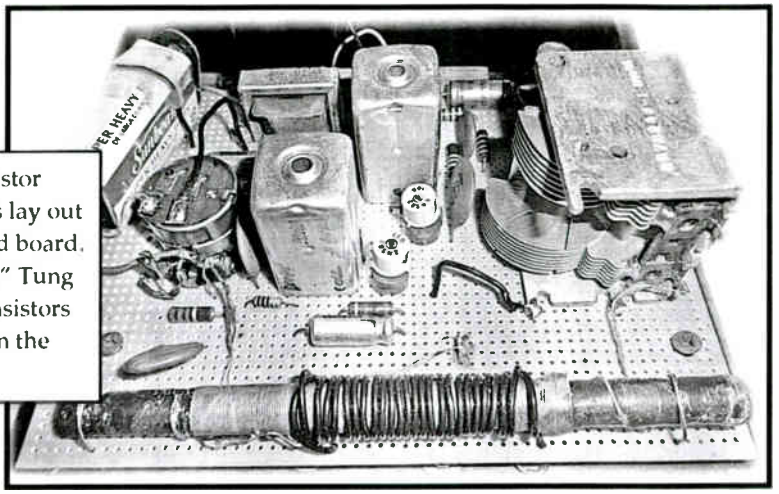
The Treasure Chest Box. Built around a hobby shop craft box with strips of square basswood and brass hardware.



sistor radio, it worked quite well, so it became my front-end parts supply. Before it became a parts radio, I drew the schematic, the entire schematic of the radio and labeled the leads of all IF transformers and the oscillator coil. I have never seen the schematic of this particular Jewel and I did try looking it up to no avail, so eventually I will publish the schematic for others to use. So my front-end circuit for my two transistor radio is really the Jewel circuit.

The variable capacitor on the Jewel used a split, knurled shaft and one half was missing, so I raided the variable capacitor from a common leatherette GE P765 that was the exact same size, but rotated in the opposite direction. The maximum and minimum capacities were opposite, but since I have to make a dial this was no big deal.

My second stage is the IF reflexed with AF stage and I looked through a number of early transistor radio schematics that used reflexing to get ideas from. Reflexing has been around since the 1920's and it works quite well and gets the most from one tube or transistor and when tubes and transistors were quite expensive the circuit became popular. The circuit I came up with is similar to a number of superhet transistor radios that used a reflexed IF stage that also served as a first audio amplifier that was not designed to drive a speaker. My circuit had to drive a speaker so I had to lower the emitter resistor to 150 ohms so that the transistor could pass enough current to get enough power to drive a speaker. The base bias resistors were adjusted to allow the transistor to pass enough current and not cause distortion, but not too much current where it would burn up the transistor. A number of audio output transformers



The two transistor Superhet parts lay out on a perforated board. The two "Blue" Tung Sol 2N582 transistors are centered on the board.

were tried and I found one that matched the impedance of my reflexed stage and gave pretty good volume. Better than average filtering was used after the second detector diode and I made sure I had enough bypass capacitors to prevent oscillation, which is a problem with reflex circuits. All this was on a breadboard, so it looked like a hairy mess, but it worked and was about as loud as a two transistor TRF reflexed Boy's Radio that most radio collectors are familiar with.

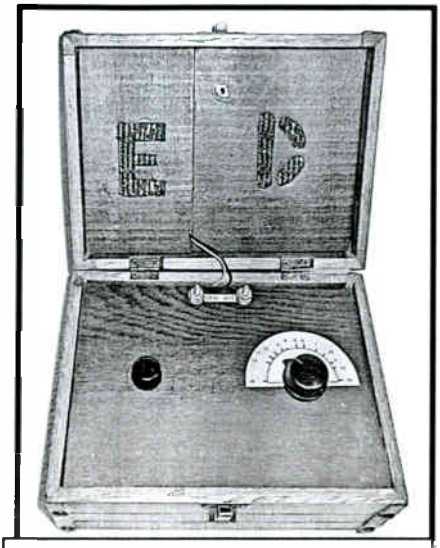
Tung Sol made a high quality transistor and in the late 50's to early 60's they painted them a beautiful sky blue and I liked them! So, this radio got a pair of Tung Sol 2N582's that are capable of operating up to 8mHz. I tried a 2N381 that is primarily an audio transistor, but can operate up to 1mHz in the IF/AF stage and while I gained a little in volume, I lost a little in sensitivity, so I stayed with the 2N582.

I used a protoboard, the one with all the little holes that became popular in the late 50's and are still popular today to build my radio on. It took careful planning to get it so the wires underneath aren't crossing each other, much like if I were designing a printed circuit board and I do this on a piece of paper first. Once the layout was designed, I started mounting the parts, the big ones first, the IF transformers, variable capacitor and the volume control and a spot was left for the audio output transformer. I knew what kind of cabinet I was going to use, so I spaced the variable capacitor and the volume control to fit the cabinet as well as using the right size proto-

board. Once the circuit was constructed I tried it out and it worked!

The cabinet I used is a treasure chest box I got from Hobby Lobby. It looks like it is made from basswood and is a very light, almost white looking wood. I also purchased a number of square/rectangular pieces of basswood with 1/8" to ¼" thickness. The speaker grill used the 1/8" thick wood and the front panel used the ¼" thick wood. The speaker grill and the front panel were drilled and cut out, then sanded and painted flat black. A glue stick was used to mount the grille cloth and the dial. The dial was made using Microsoft Word. The cabinet was sanded and stained. I tried several stains in a inconspicuous area to see which one I wanted to use and I settled on a colonial stain that had some red in it and when applied to the basswood it turned a nice brown. Then I lacquered and wet sanded it between coats. Before I did all this I removed all the brass hardware, now I have to put it all back on, but it looks really good.

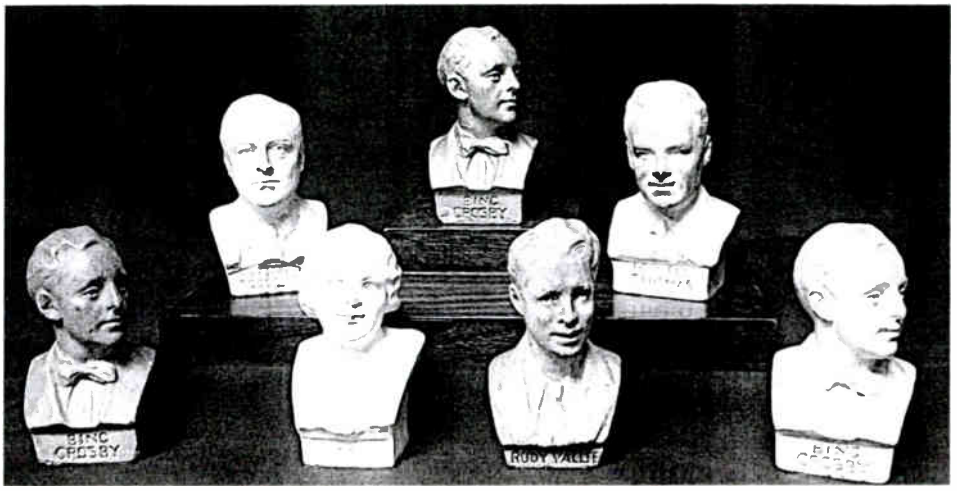
Performance wise, it's not much better than a two transistor Boy's Radio with the TRF reflexed circuit, but my two transistor superhet has selectivity even on a strong station, something the Boy's Radio doesn't have on strong stations where the strong station can bleed over to nearby stations. The Boy's Radio is a little louder, but both transistors amplify audio, whereas in my circuit, I only have one transistor amplifying audio. Like the Boy's Radio, the volume is not very good on weaker stations so I did put an earphone jack on my radio and so I am able to use comfortable modern day headphones and it sounds quite good with the headphones. It really needs a third audio transistor dedicated to driving a speaker and the reflexed stage devoted to just voltage amplification. Overall, I'm satisfied with it and it looks nice and my wife likes it. *Ed, May 2016*



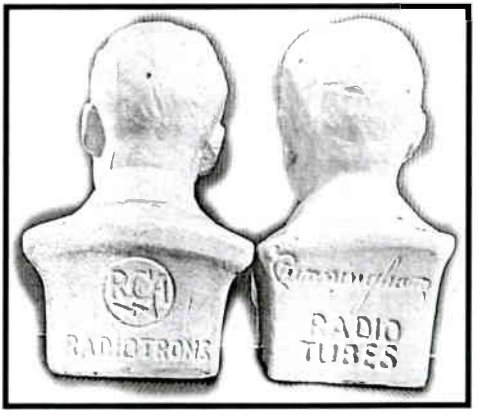
The speaker is mounted in the lid of the two transistor Treasure Chest receiver. The dial numbers were created in Microsoft Word.

Radio Stars Statuettes, Radiotron – Cunningham Tubes

by George and Edna Clemans



At the last IHRS meeting (*October 2015*) at Greenfield, Dr. Ed Taylor passed along to us four small plaster statuettes of early radio stars. When combined with our collection we now have a total of seven (pictured). On the back of each is advertising for either RCA or Cunningham radio tubes. In spite of extensive searches on line, we have been able to find out virtually nothing about them. One of them has been stamped with the company name of Whitehead and Hoag which is well known among collectors for making political buttons and other novelties. But that is about all that we have been able to learn. So we thought maybe other IHRS members might be able to help out. If you have any of these statuettes, particularly of stars we don't yet have, or if you know anything about their origins perhaps you might share your information with the rest of us. Possibly we could generate a more nearly complete list of all of them. Good hunting! *George and Edna, December 2016*

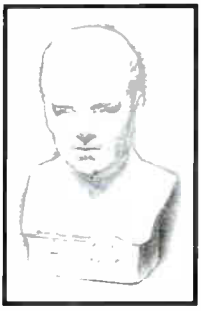


The RCA "Radiotrons" figure on the left is Lowell Thomas.
The "Cunningham" Radio Tubes is Herbert Hoover

Radio Stars Statuettes

Left : **Franklin D. Roosevelt**— 32nd President of the United States, 1933—1945.
Kate Smith—began her radio career in 1931 Best known for her singing of "God Bless America".
Right: **Rudy Vallee**— A singer, bandleader and teenage heart throb . He started performing on radio in 1928. *The Clemans' collection.*

Left: **Bing Crosby**—From 1931 to 1954 Crosby was a leader in record sales, radio ratings, and motion pictures.
Right: **Lowell Thomas**—In 1930, he became a broadcaster with the CBS Radio network, delivering a nightly news and commentary program.
The Clemans' collection.



Left: **Morton Downey**— A popular singer with a high tenor voice, he began making national radio broadcasts in 1930. after opening his own nightclub. *(posted on ebay)*
Right: **Herbert Hoover**—served as the 31st President of the United States from 1929 to 1933.
the Fred Prohl collection.

It appears, based on the popularity dates of the above celebrities, these statuettes were made available from 1932 to 1942. Could a buyer walk in a store, purchase a Cunningham tube, and be given an interesting premium?
In the early 1930's Cunningham Radio Tubes had a Celebrity Puzzle premium. Many of the above personalities, usually in pairs, were featured on the puzzle. (Check ebay) Other names on the puzzles were Walter Whitman, Jack Pearl, and Jessica Dragonette. More than likely these celebrities all had a similar contract with Cunningham/Radiotron to use their name and profile. There is a good possibility celebrities featured on the puzzles are waiting to be found as a statuette. Do you have Cunningham/Radiotron statuettes, or have seen 1930's magazine ads for the premium? Let us know. *Editor*

Fabricating Your Own Multisection Tubular Electrolytics

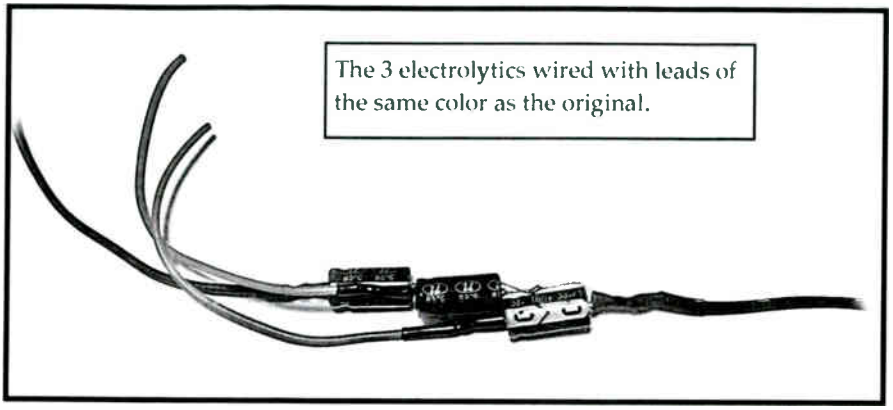
by Bob Pote

The Knight Kit "Span Master"
A 4-Band Shortwave Receiver

I recently acquired a Knight Kit "Span Master" radio from Ebay to compliment my other Knight Kit sets, an "Ocean Hopper" and a "Space Spanner". After receiving the set and checking it out against the schematic, I plugged it in and was immediately greeted by a loud hum, indicating to me a defective electrolytic. The defective capacitor was a three section unit, 30MFD - Red, 30MFD - Red, 20MFD + Blue, with the black wire being the common negative. This particular capacitor mounts under the chassis. Since I didn't have any three section caps in my parts box and not wanting to mount three separate capacitors under the chassis I decided to try mounting all three capacitors into a short piece of PVC pipe. The original electrolytic measured 2 1/2" long by ¾" diameter, so hopping into my car, I went to Menards and checked out various sizes of PVC pipe.

I purchased two lengths, one was ¾" ID X 5' and the other was 1" ID X 5'. After getting home and experimenting around I decided that the ¾" ID section would allow me to stuff all three capacitors inside with a little room to spare. After cutting the pipe to the 2 1/2" length I tried fitting it in the "Span Master's" chassis.

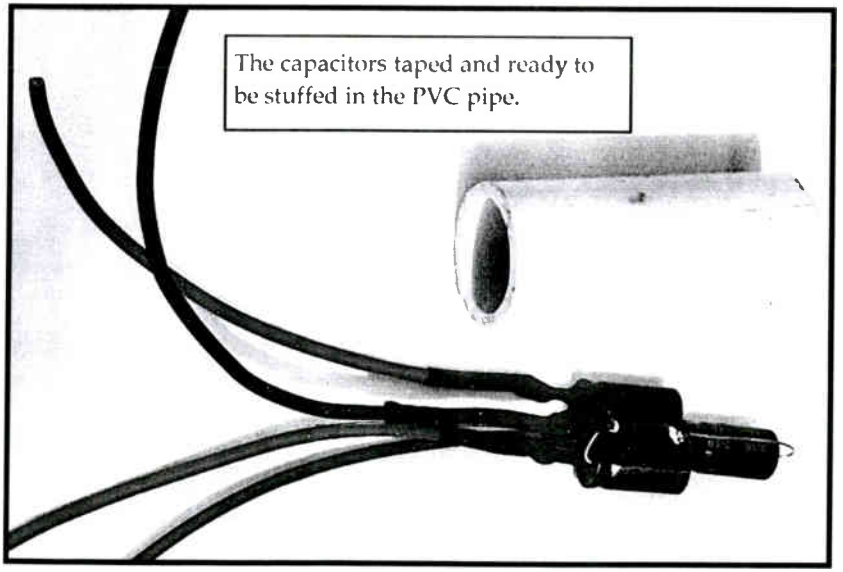
It fit quite well with a little room to spare. Next I sanded both ends of the cut pipe to remove loose plastic from cutting, and then wiped it with acetone to remove all the manufacturer's markings that were on the exterior of the pipe. After setting the cut piece aside I dug out three small electrolytics, these were two 30 MFD 160V radial leads and one 20



The 3 electrolytics wired with leads of the same color as the original.

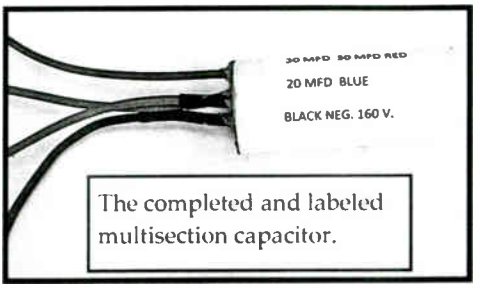
MFD 160V axial lead. I really like to use radial lead capacitors for this applications as it makes it easier to join all the negative leads together and then stuffing the whole assembly into the PVC pipe, but had to to use what I had on hand.

When wiring the capacitors I join all the negative leads together then solder a black wire to one end using heat shrink to insulate the wire from the three positive sections, I do the same with the positive leads using red wire for both 30 MFD sections and blue wire for the 20 MFD section. It is best to try to stagger the capacitors from each other in order to get the entire assembly to fit into the PVC housing. After installing the capacitor assembly into the housing you should have about 1/8" to ¼" of space at each end. What I do next is lightly clamp the whole assembly



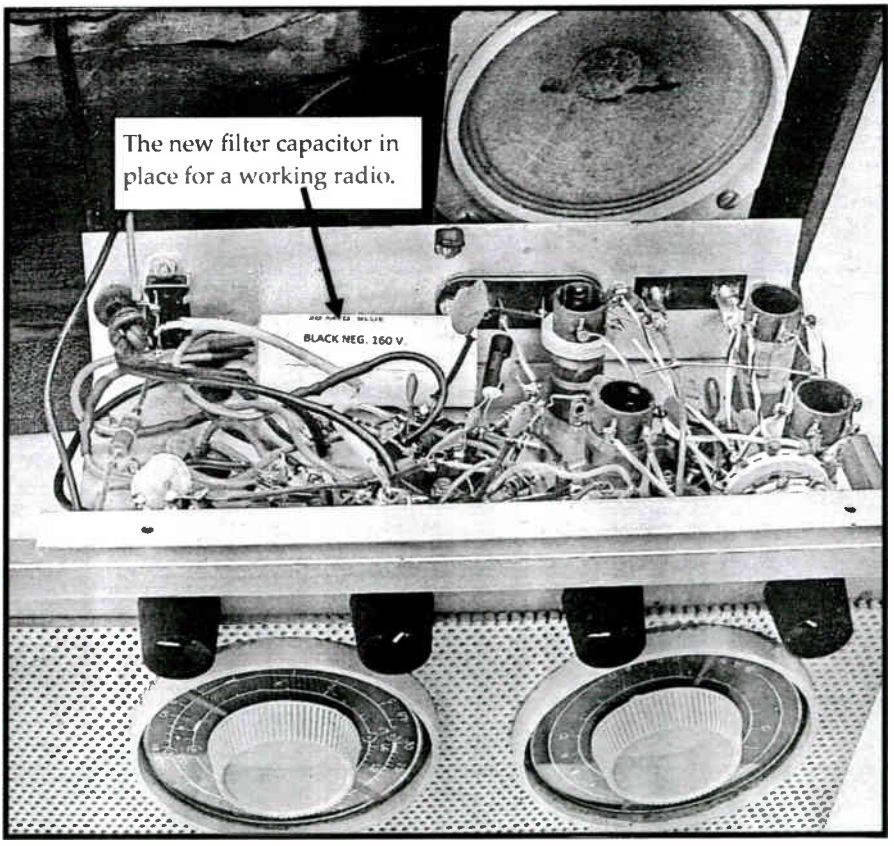
The capacitors taped and ready to be stuffed in the PVC pipe.

in the vise, mix a small amount of Bondo Body Filler and fill the one end first using a popsicle stick as an applicator. When it hardens I flip the capacitor over and repeat the procedure. After the electrolytic was done I typed up a label to put on the body of the capacitor indicating the capacitance and voltage information. You can spray paint the capacitor if you want a more professional look.



The completed and labeled multisection capacitor.

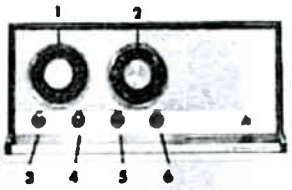
After I completed the capacitor I installed it under the chassis of my "Span Master". After soldering all my connections and double checking my work, I was rewarded with



The new filter capacitor in place for a working radio.

the sound of voices coming through the loudspeaker, minus the hum. I have used this procedure on several Hallicrafters S series receivers. If you are familiar with the S-38 series you know that they utilize a four section electrolytic requiring 1" ID pipe for that application. The PVC pipe I use comes in 5 ft. lengths allowing you to make quite a few electrolytics.

Bob Pote, October 2016



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4 Regeneration—may be set for voice or code.

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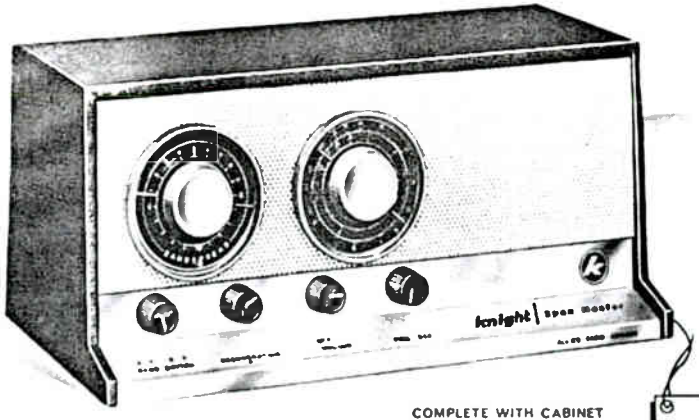

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IHRS Winter Meeting – Lawrence Park Community Center, Lawrence, Indiana - Saturday March 4, 2017
Meet at the Lawrence Park Community Center, 5301 N Franklin Road, Lawrence (North East Indianapolis)

The Lawrence Park Community Center is located just outside the North East segment of I465, Indianapolis. Exit I465 at 56th Street East or Pendleton Pike (US36) East. From 56th Street turn South on Franklin Road to the Community Center – From Pendleton Pike turn North to the Community Center.

The IHRS Winter Meet is a **Swap N Sell indoor meet**. The doors to the Center will open at 8:00 AM for setup and Swap N Sell.

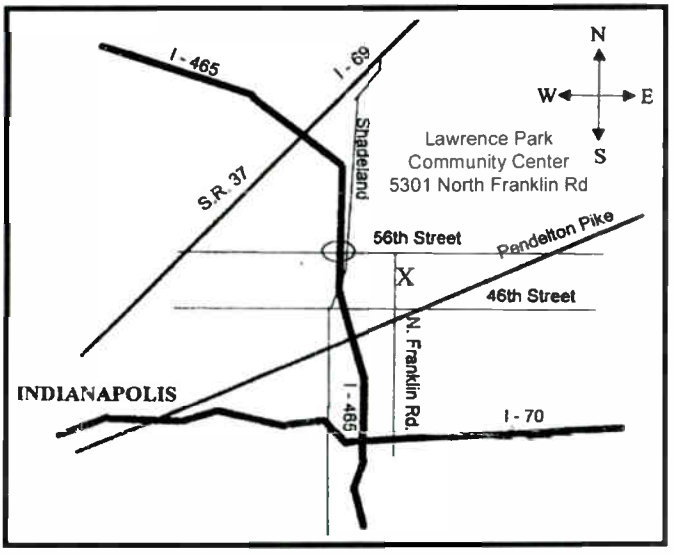
Old Equipment "Popular Vote" Contest is open to all entries of vintage radio and radio related equipment. Tables for the display of vintage/ unique electronic equipment will be available.

CONTEST CATEGORIES:

1. 1950's Tube Radio
2. Open to all Radios

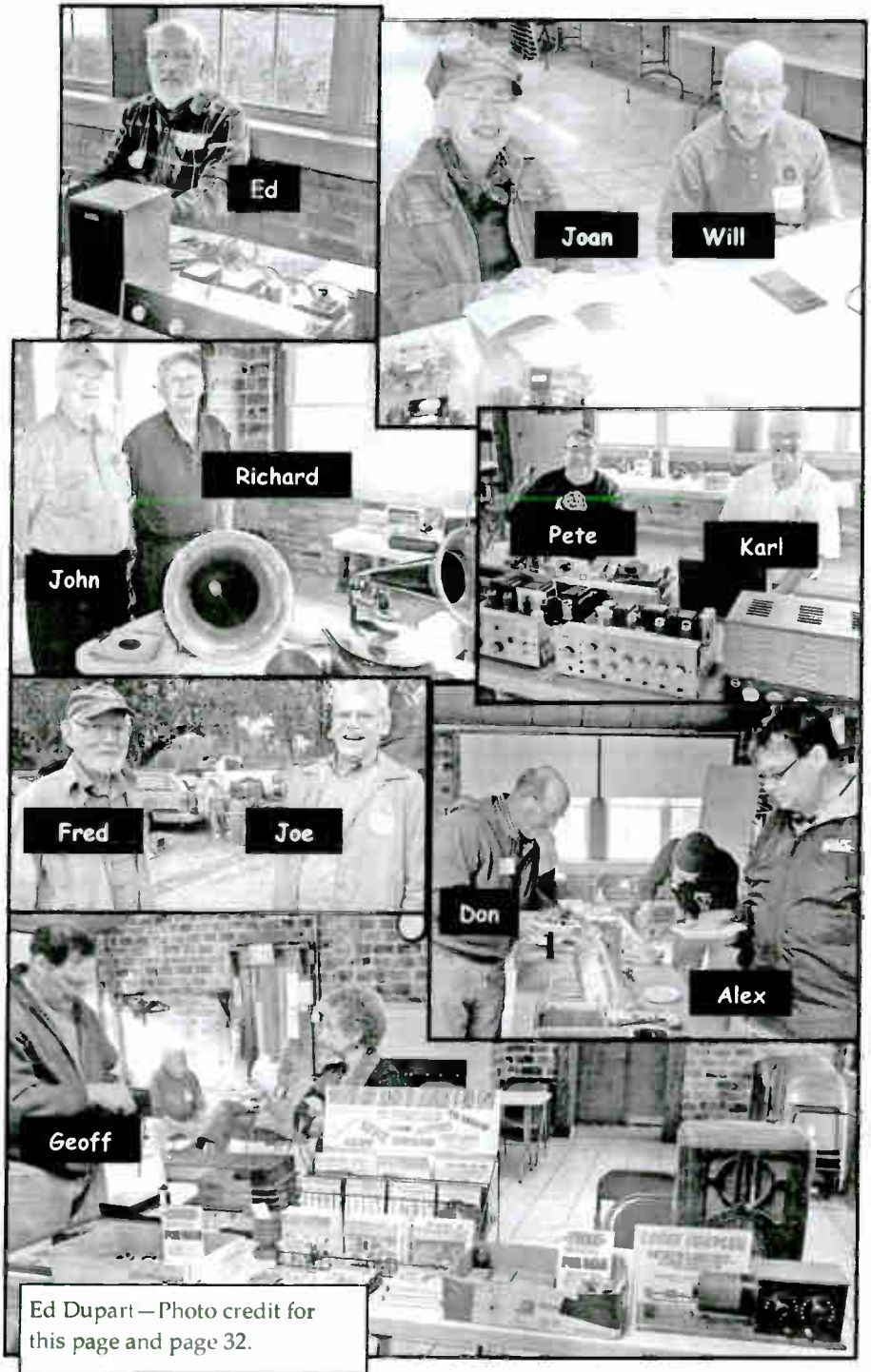
Registration fees: Admission to the Vintage Radio Meet is free. Swap table rental: IHRS members - $10.00 for each table; non-IHRS members – $15.00 for each table. Tables are rectangular.

Meet contacts: Fred Prohl, 317-736-1228 and Ed Taylor, 317-638-1641



2017 IHRS membership cards will be mailed the last week in December 2016. Don Yost, IHRS Treasurer

Greenfield 2016

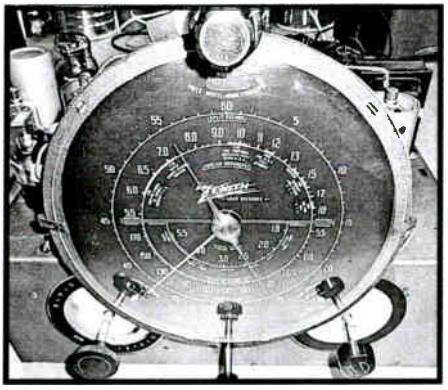


Ed Dupart—Photo credit for this page and page 32.

The Zenith 6S-254 Kit

by Edward Dupart

This is an interesting story of a radio that got passed around. All names are fictional, except mine of course, but the story is true.



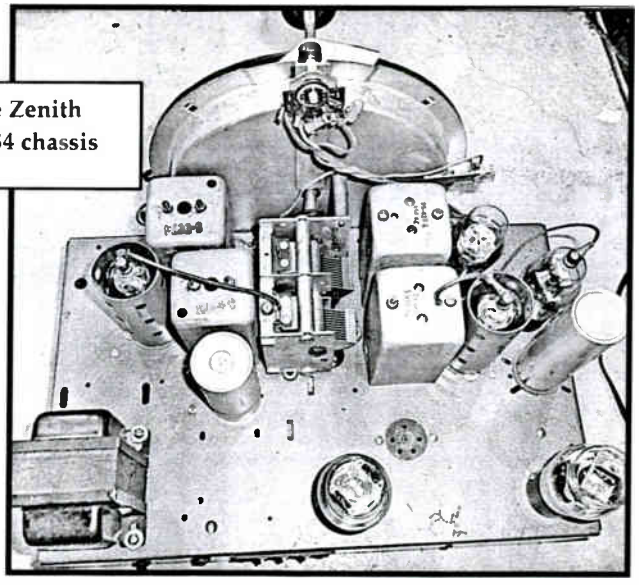
Joe has a Zenith 6S-254 that he wanted restored so he took it to Shmoe's radio shop. Shmoe had it for seven months and Joe wanted it back. Joe probably figured if he can't fix it in seven months he will never fix it, so he picked it up. Joe discovered that all the paper capacitors, mica capacitors and the electrolytics have been removed and the only parts given back to him were the mica capacitors. I'm sure Joe wasn't happy so he took it to Mike's to be fixed. Mike took a look at it and said, "No way!" but I do know John might try and put it back together. John took a look at it and said, "Sure, I'll take a look at it." John knowing I have been building radios since I was ten gave me a call and asked if I would take a look at it. We discussed it over the phone and it sounded like a Zenith 6S-229 and looking at the schematic, it looked like a straightforward six-tube radio. I then asked him if the coils, trimmer capacitors and the variable capacitor have been messed with and John said, "No." I told him I would look at it and I told him I would consider it a 1937 Zenith radio kit, partially put together.

Why would someone take all the capacitors out of a radio to be restored at the same time raises questions? I have actually run across bitter TV repairmen back in the 1960's doing such a thing because of a squabble with a customer, but I don't think that is the case with this radio. All of the components were carefully unsoldered with no detectable damage anywhere. Someone in a rage would just rip them out. I'm guessing he used a digital camera and took lots of pictures of the underneath of that chassis and figured he could put it all back together by using the pictures. I take lots of pictures for the same reason, but I still only change one or two capacitors at a time and I still write/draw a roadmap where the parts

go. That way it reduces the chances of an error and I've been known to make a few. If the radio was working to begin with albeit poorly, I like to try out the radio after a capacitor or two have been changed, which reassures me that I didn't goof up. That's my take on why he chopped out all those capacitors. Maybe you have better idea and if so, let me know.

It was a blustery late November Saturday morning with winds up to 30 mph and the snow coming down in a horizontal direction. It was almost 70 the day before and the cold front coming through on Saturday morning was a nasty one. Fortunately the roads were still warm and the snow didn't accumulate on the roads, just on the grass and was only up to 3" in places, but mostly around one inch. I was running late and so I picked up a couple of sub sandwiches and finally got to John's about 11:15 and we ate lunch first while watching the snow come down horizontally. That wind was horrible.

After lunch I dove into the Zenith and inspected what was left of it and made sure the IF transformers, coils and trimmer capacitors were in place. If they had been missing I would have said, "No way!" I'm good, but I'm not stupid. Replacing all the capacitors didn't seem like a big deal to me as long as I have a schematic. Unfortunately, I forgot my camera, because I really wanted to take a picture of the bottom of that chassis to show how empty it looked with



The Zenith 6S-254 chassis

about 75% of the parts missing, including a resistor or two. It sure looked bare.

Most radio collectors probably have a radio with a gutted chassis that they would like to put back together, so one of the reasons I'm writing this is to show the collector the logic I used in restoring this Zenith.

My first step is to get the power supply working. John had tested the tubes; at least it wasn't stripped of its tubes, and noticed it has a 5Y3 instead of the 5Y4 that originally came with the set. I checked the filament wiring and it had been wired for the 5Y3. The 5Y3 and the 5Y4 are almost identical with the 5Y3 being capable of handling another 40 ma of current and both tubes draw 2 amps of filament current. So I left the 5Y3 in place. The 5Y3 uses pins 2 and 8 for the filament and the 5Y4 uses pins 7 and 8 for the filament and that's the only wiring difference between the two tubes. I replaced the power cord and the filter capacitors and now it's time to try out the power supply. After plugging in the speaker and plugging in the power cord and turning it on, we found we had voltage and the field coil was good. With no load the B+ voltage was high, which is what I expected, but everything was running cool and the power transformer is good and all the filaments/heaters and pilot lights lit up. Onto the next stage.

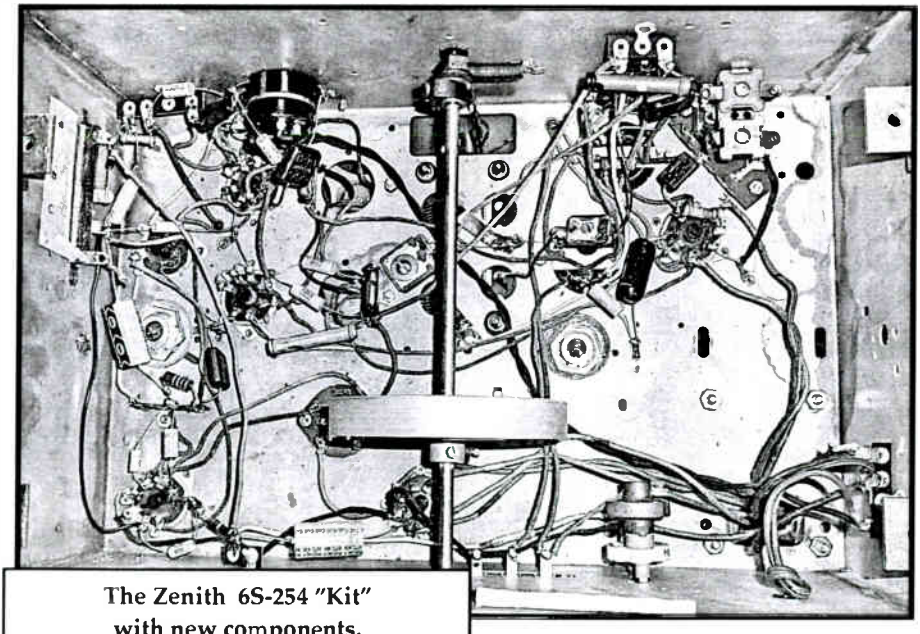
Now it's time to wire up the two audio stages. Remember earlier I said it looked like a 6S-229? Well, I wired up the audio section like a 6S-229, minus the tone control circuit and we powered it up and it worked, but when I tried to wire up the tone control circuit was when I noticed there was a difference. The difference between the 6S-229 and the 6S-254 is in the tone control circuit; otherwise the two chassis are identical. Fortunately, John has the original Zenith manual and we were both glad he has it, because that told me where the mica capacitors went. With all new capacitors in the audio circuits, the tone control circuit wired up, it was time to try out the AF amplifier, again. We plugged it in, measured the voltages, which are now lower and that is a good sign and then I put my finger on the high end of the volume control and we got that wonderful 60 Hz buzz and so we knew it was working.

The AVC and 2nd detector stage were next and this was when I discovered a missing resistor. John went through his resistors and we cherry picked a 390k resis-

tor and put it in. We didn't do any further testing, but instead went onto the next stage.

The IF and converter stages were the next and the last stages to wire up. There were several by-pass capacitors to put in and since the new replacement capacitors are so much smaller that the originals, it made it easier to put them in better spots under that chassis. We plugged it in and no reception. Why this was done I don't know, but someone put a wire from the mixer terminal to the oscillator terminal on the variable capacitor and upon removing that wire we did get a couple of stations, not loud and slightly distorted, but it was working. At this point I could tell John was real happy, but we had more work to do.

I decided that this set probably has twiddleittus and some of you are wondering, "What is twiddleittus?" Some people when they see a screw automatically think that it should be tightened down and the screws in IF transformers, trimmer capacitors on the variable capacitor and trimmer capacitors on the chassis are prime candidates for twiddleittus. Fortunately the IF transformer trimmers weren't tightened down like head-bolts on a car engine, but were way off. After aligning the IF's we picked up lots of stations and the distortion was gone, but the radio was somewhat dead at the top end of the dial so I tried to tweak the antenna/mixer trimmer on the vari-



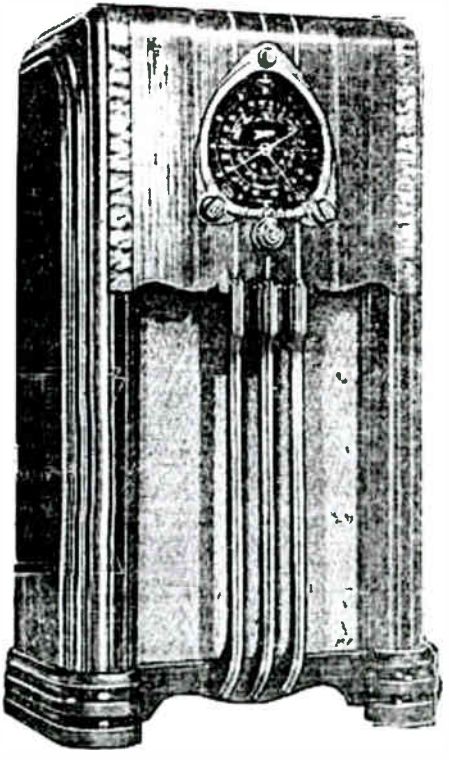
The Zenith 6S-254 "Kit" with new components.

able. This screw was tightened down like a head-bolt on a car engine and after getting it loose I was able to align the top end of the dial and what a difference that made. Now it sounds like a Zenith.

We tried the short-wave and we could get a few stations along with a buzzy dead carrier that would repeat every few MHz and so I started looking around at what could be causing the RFI and I saw an LED ceiling light on. Hey John, turn that LED light bulb off and he did and sure enough the interference was gone. I love the new LED bulbs and I have them all over my house and out in the garage, but some do generate RFI (radio frequency interference). It was 4 PM and time for me to go and I don't like to drive in the dark, especially when it was snowing and while it wasn't a blizzard out there it was still snowing. I left John with a working Zenith 6S-254 for him to finish up, double-check my soldering and touch up the short-wave alignment.

We talked a couple days later and he had been test running the Zenith and one evening he turned it on and it was dead. He checked it out and found no voltage on the plate of the 1st audio amplifier, and was caused by the 1st audio plate resistor opening up, but it was also intermittent. Sometimes it would work and sometimes it wouldn't so he had to change the plate resistor for the 6F5GT. Otherwise the Zenith 6S-254 is done. It only took me four hours to resurrect this radio and John probably has an hour into it, so it took about five hours to rebuild this radio. Not too bad I thought. Hopefully, this will give some of you the courage to resurrect your gutted radio.

Ed, November 2016



A Zenith 6S254 console

- 2017 Regional Vintage Radio -

Indiana Historical Radio Society (IHRS)
March 4—Winter Meet Lawrence Park
May 5-6—Spring Meet Kokomo
August 12—Summer Meet Carmel, Cool Creek
October 14—Fall Foliage Meet Greenfield Riley Park
indianahistoricalradio.org

Mid-South Antique Radio Club (MSARC)
Meet information contact: layvinrad@twc.com

Antique Radio Club of Illinois (ARCI)
February 12 and April 30
American Legion Hall, Carol Stream, IL
www.antique-radios.org

Michigan Antique Radio Club (MARC)
January 28—Vintage Electronics Expo
Costick Center, Farmington Hills, MI
www.michiganantiqueradio.org

Cincinnati Antique Radio Society (CARS)
oltubes@roadrunner.com or Bob Sands 513-858-1755

Dayton Antique Radio Club (SPARK)
Contact - Ed App 937-865-0982

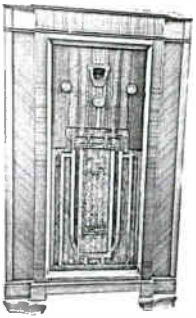
Central Ohio Antique Radio Association (COARA)
Info. at **http://coara.org** for event schedule.

Pittsburg Antique Radio Society (PARS)
April 23 Radio Fest
Center Stage Banquet Hall, Monaca, PA
information at *pittantiqueradios.org*

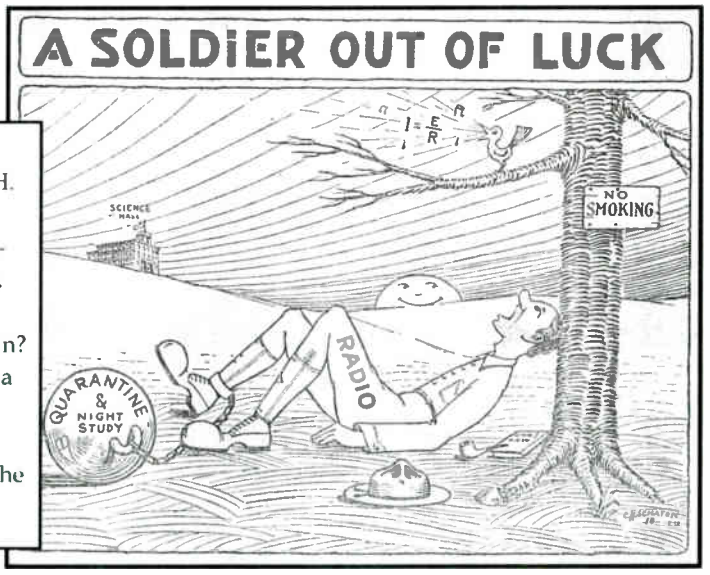
AWA-Antique Wireless Association
www.antiquewireless.org

RADIOADS

Submit your "FREE TO CURRENT MEMBER" RadioAd by the 15th of February, May, August, or November in time for the Bulletin issue that follows.



For Sale Silvertone 1938 model 1725 - $50.00 Please contact John Foell at 260-627-0127 or email John.d.foell@gmail.com or John_D_Foell@raytheon.com and I will give further information. The rado is located in Garrett, IN (near Fort Wayne)



"A Soldier Out Of Luck" Drawn by C. H. Schaten, 1918, I. U. Indiana University Library Photo Archives.

Why the ball and chain? Measles and flu were a problem among the Radio Men, so they were quarantined to the campus.

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Michael Feldt, Vice President 12035 Somerset Way, East Carmel, Indiana 46033 (317) 844-0635 email: feldtm@msn.com	Sites and dates of meets
Don Yost, Treasurer 3814 E 400 N Windfall, Indiana 46076 (765) 945-7014 email: dearsir@netscape.com	Dues, financial, and address change. Please notify immediately of change of address.
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IHRS Web site address: www.indianahistoricalradio.org

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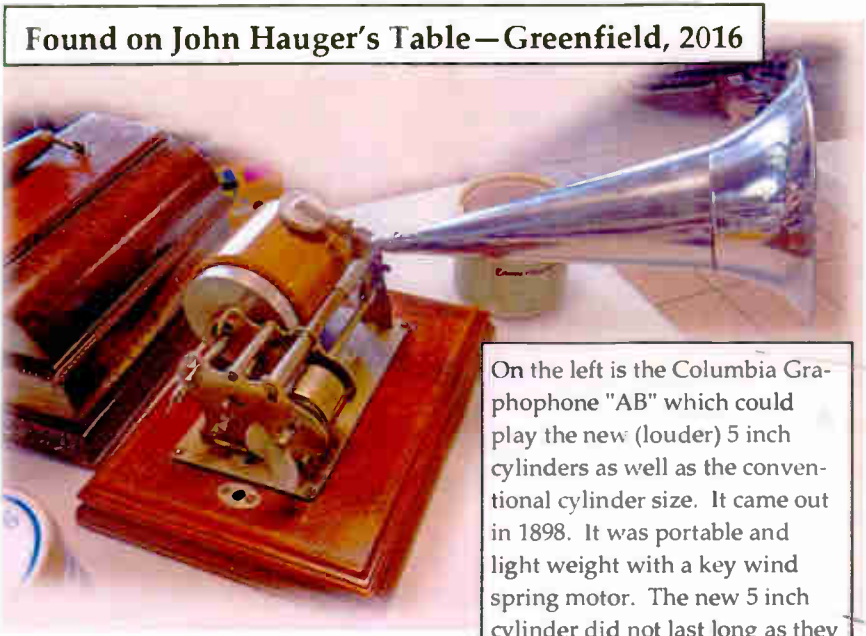
Found on John Hauger's Table—Greenfield, 2016



On the left is the Columbia Graphophone "AB" which could play the new (louder) 5 inch cylinders as well as the conventional cylinder size. It came out in 1898. It was portable and light weight with a key wind spring motor. The new 5 inch cylinder did not last long as they were expensive and very fragile. *John Hauger*

On the right is the Columbia Graphophone "Q" which was a low priced ($5.00) cylinder record player. It was the "economy model" with out a wooden base or cover which was available for an additional $2.50. It appeared in the Sears Robuck Catalog in 1898 and was a very popular seller especially to rural folks for several years. *John Hauger*