

## The Indiana Historical Radio Society Bulletin July 2016



On the cover: The cover of this issue was cropped from a post card of Mary Pickford on a movie set. The top of the card is titled "Mary Pickford, Pickford—Fairbanks Studios, Hollywood" The reverse of the card offers "Mary Pickford—-speaking by radiophone with her studio at Hollywood, thirty miles distant." The "radiophone" receiver is a file box size crystal radio—taking liberty with "speaking", "listening" is more correct—unless there is a boom mike connected to a close by transmitter.

#### In this issue:

- Take note of the request for candidates for IHRS office during 2017 on the facing page.
- Despite a bumpy start the 2016 IHRS Spring Meet was well attended.
  Our apologies for the inconvenience some may have experienced
  with the loss of our advertised venue. Pages 4 and 5 provide a sample of the events offered during the Spring meet.
- Page 6! It is time to focus on Cool Creek. The next IHRS Swap Meet!
- Fred Prohl reminisces about his radio search while traveling, page 7.
- The Spring Meet Old Equipment Contest did not fail to show rare and unusual radio equipment. See pages 11, 12, 13, and 24.
- Ed Dupart writes of his experience in constructing a transistor radio using vintage Raytheon transistors, pages 14-19.

See you at Cool Creek! Fred Prohl, Editor for the IHRS Bulletin

## "Request for candidates for office in the Indiana Historical Radio Society."

To: All members of the Indiana Historical Radio Society From: Officers of the Indiana Historical Radio Society

The IHRS will have an election of officers at the Fall Meet at Riley Park, Greenfield, October 1. All positions are open for nominations.

Dave Mantor has decided to not to run for the President's position in 2017. So as of this date we have one declared opening, that is the position of President.

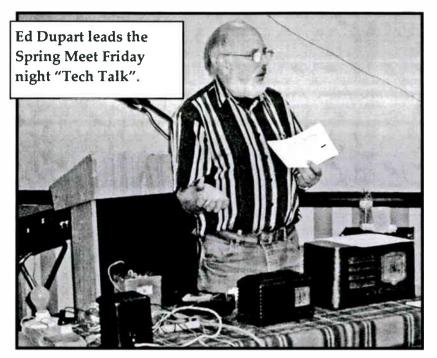
We ask that you consider your involvement in the IHRS and encourage you to take a leadership role.

Contact any one of us to convey your interest or to ask questions regarding the responsibilities of an officer in the IHRS. Officer contact information is on page 23 of this Bulletin.



Now on YouTube! "A Thirty Year Restoration" Of a 1940 Delco R-1177

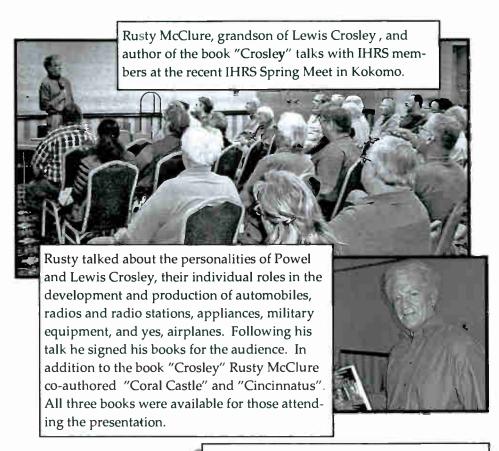
A Bill Morris video of his 1985 to 2015 radio experience.



Prepared with two AC/DC radios, isolation transformers, meters, a series lamp load, and considerable experience, Ed Dupart talks about working with "Hot Chassis" radios.

The Bulletin editor's notes on Ed's talk include the following:

- Many radios built in the 1940's, 50' and into the 1960's were designed to operate without a power transformer.
- A power transformer isolates the AC input from the radio's chassis.
   Without the transformer, the chassis is connected directly to one of the AC input lines, creating a shock hazard.
- Frequently the ground side of the AC line was switched on or off for radio operation—leaving the radio chassis "hot" even when the radio is off.
- An isolation transformer is a must for the workbench when troubleshooting AC/DC radios with grounded test equipment. Even with the isolation transformer the shock hazard is still there.
- Some AC/DC circuits use a floating ground. Floating ground circuits use a capacitor/resistor combination from the floating ground to the chassis to complete the tuning circuit. A floating ground does not remove the possible shock hazard.
- When troubleshooting a plugged in radio, switched on or off, work with only one hand. (Sit on the other.) Electron flow from one hand to the other is deadly!



Donation Auctions are an event at a radio meet that many members look forward to. Projects and treasures can be purchased at a reasonable price, with the proceeds going to the IHRS. Usually not seen is all the effort that goes in to setting up the auction. The loading, hauling, storing, loading and hauling again with a final setup on site was done by Dave Mantor and Don Yost, with the assistance of Ed Dupart and J. D. Leach.

Michael Feldt and Dave Mantor auctioning donated equipment.

## Saturday, August 13 - the Indiana Historical Radio Society 2016 Summer Meet. Cool Creek Park, 2000 East 151st Street, Carmel, Indiana

There is space for indoor and outdoor Swap N Sell setup. Tables are available indoors. General admission is free. Swap N Sell set-up in the building and parking lot is \$10 for IHRS members, \$15 for non-members.

Complimentary doughnuts and Danish, coffee and soda will be provided.

#### Schedule of activity:

7:00 AM—set up for Swap N Sell 8:00 AM the IHRS Summer meet begins. Set up entries for the contest.

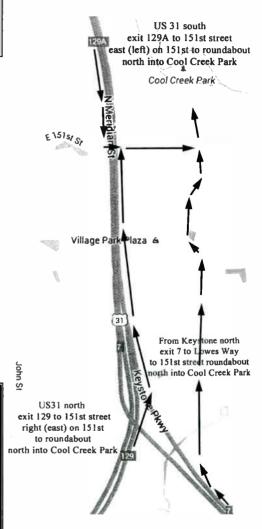
10:00 AM Vote for your favorite radio in each of the contest categories.

10:15 AM contest results and announcements.

Cool Creek Park, Carmel. is located east of US31 and north of 151st Street. From US31 go east on 151st Street to a round-about. The Cool Creek Park entrance is the street north out of the round-about.

## The 2016 Summer Meet Popular Vote Contest categories:

category 1 – A 6" X 10" Tube radio (maximum radio base is 6 inches by 10 inches) category 2 – Open to all radio and radio related equipment



Contact information: Michael Feldt feldtm@msn.com 317-844-0635

### LEMCO and Mary Pickford by Fred Prohl

For a number of years my job required travel to Northern California. The trips frequently included a weekend stay. This was a time when air travel was very different from now. On one occasion I purchased a horn speaker at an antique show in the Oakland area the same day I was to fly home. No problem, I packed the base in my book bag and carried the horn on board. The flight attendants had fun teasing me about my hearing aid and suggested I store it on the floor by my feet. Try that today!

I did have some schedule flexibility, so planning the trip when there was a radio swap meet suited me,

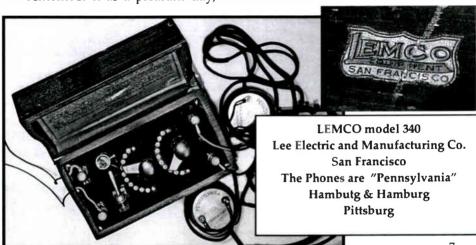
The LEMCO crystal radio came from a weekend California Historical Radio Society swap meet. This was in the late 1970's, shortly after CHRS was formed. I remember it as a pleasant day, a



Mary Pickford (1892–1979) was a Canadian motion picture actress, producer, and writer. During the silent film era she became one of the first great celebrities of the cinema and a popular icon known to the public as "America's Sweetheart".

parking lot swap meet, and friendly CHRS members.

The post card pictured on the cover of this issue was purchased at an antique shop in Pleasanton.



#### Pickford & LEMCO continued

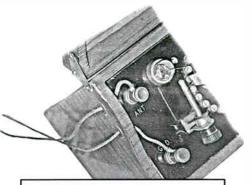
So what's the Pickford/LEMCO connection? Very little—the post-card pictures Mary Pickford listening to a radio that looks very much like the California manufactured LEMCO. The 3x5 card file style box crystal radio can also be found with the name "Excello" (Sterling Radio) and "U. C." (UC Battery MFG). ("Crystal Clear" M. L. Sievers)

The LEMCO is nicely made with triangle hinges and ports for antenna, ground and head phones. However, standard headphone tips will not fit through the port.

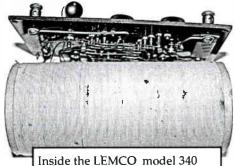
The instructions in the LEMCO lid include how to connect the crystal radio headphones, antenna and ground.

Below is the portion of the instructions that describe how to tune a station using the two multi-contact switches and cat-whisker.

Fred - June 2016



The LEMCO model 340 Crystal Receiver has antenna, ground, and phone ports on the sides of the box.



Inside the LEMCO model 340 showing the tapped coil circuit.

# LEMCO RADIO TELEPHONE CRYSTAL SET NO. 340 INSTRUCTIONS FOR OPERATING THIS RECEIVING SET

The set is equipped with two switches. On the left is the front circuit switch, which should be adjusted to the wave length if the incoming signals. On the right is the detector circuit switch which should be adjusted until signals are heard loudest, or may be used to advantage in tuning out undesirable interference. Turning the switch knobs to the right increases the wave length. To hear radio signals or music, place receivers on ears and set the ground circuit switch about mid-way on the contacts, set the detector switch a few points to the right, then adjust the crystal detector by sliding the "catwhisker" over the crystal in detector cup until a sensitive point is located and signals are heard. Adjust the switches again and continue to explore crystal with the "cat-whisker" until signals are heard loudest.

With the average size antenna (100 feet in length) this set will respond to wave lengths up to 900 meters.



#### SIMPLIFY YOUR SET!

Increase Your Range—Improve Your Control-Hook Up a

#### TRIPLE DUTY TUNER

Insist on Lemco Products from your supply dealer; if he hasn't them we'll forward prepaid on receipt of purchase price.

No. 100. Broadcast No. 100. Broadcast Tuner list (less dials) ......\$7.50 With Bakelite dials (as illustrated).\$8.70 No. 340. Crystal Set (as illustrated).\$7:50 Circulars with diagrams for simple regenerative, Flewelling. radio frequency and other circuits sent on



DEALERS and JOBBERS Write for Attractive Proposition

LEE ELECTRIC & MFG. CO. San Francisco, Cal. 220 Eighth St.

Radio News (June 1924), p. 1863



Radio News (Nov. 1924), p. 766

## - 2016 Regional Vintage Radio -

#### Indiana Historical Radio Society (IHRS)

August 13—Smmer Meet, Cool Creek Park, Carmel October 1—Fall Foliage Meet Greenfield Riley Park indianahistoricalradio.org

Mid-South Antique Radio Club (MSARC)

Meet information contact: <a href="mailto:layvinrad@twc.com">layvinrad@twc.com</a>

#### Antique Radio Club of Illinois (ARCI)

www.antique-radios.org

July 29 – July 31 RADIOFEST Medinah Shriners, 550 Shriners Drive, Addison, IL

Michigan Antique Radio Club (MARC)
www.michiganantiqueradio.org

Cincinnati Antique Radio Society (CARS)

Info. at 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)

information at pittantiqueradios.org

#### **AWA-Antique Wireless Association**

August 17—August 20 2016 Annual Convention RIT Inn & Conference Center, Henrietta, NY <a href="www.antiquewireless.org">www.antiquewireless.org</a>

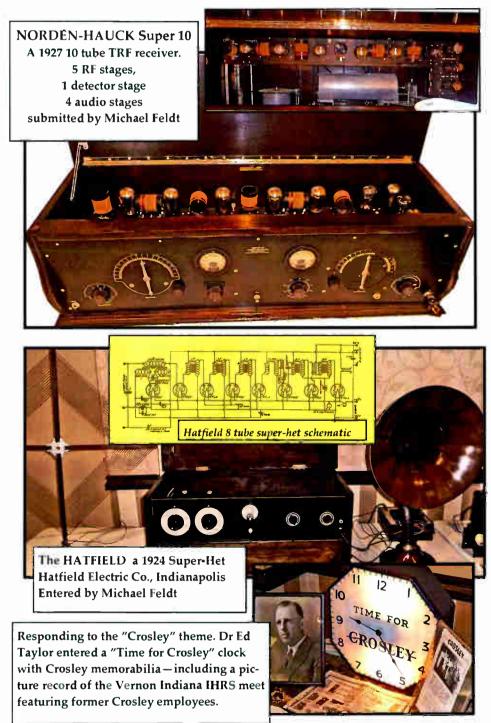
## Renew your membership now!

If the date on your mailing envelope for this issue of the Indiana Historical Radio Society Bulletin is 12/15 or earlier, it is time to renew your membership. Send your check payable to the *Indiana Historical Radio Society* in the amount of \$15.00 per year. Send your payment to:

Don Yost, IHRS, 3814 E 400 N, Windfall, IN 46076.

Include your current mailing address, if not on your check, and your email address, if you have one. Membership questions? Contact Don at dirsir@netscape.com or call him at (765) 945-7014.

### **IHRS 2016 Spring Meet Contest**



## Old Equipment Contest IHRS Spring Meet





Left—A rare "MOON' horn speaker, submitted by Ed Dupart.
Right— Horn speakers entered by Tom Adelsperger. The collection included two Rola speakers and a hard to find Indiana made Starr, Richmond.





On the left, in the Open category, Tom Williams entered a GE "Coffee Pot" clock radio.
On the right Tom Willims presented a Crosley 2 band receiver.
Fred Prohl submitted a Crosley 58TC.



## Raytheon 3 Transistor Radio, Ed Dupart

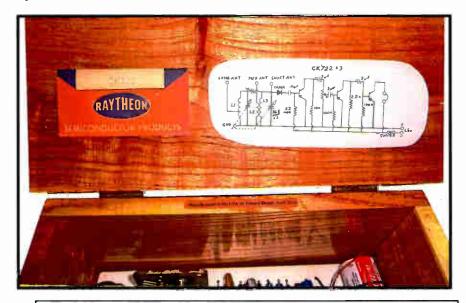


Responding to the IHRS challenge to build a vintage transistor radio, Ed Dupart constructed multiple versions of transistorized receivers. Two versions were on display at the IHRS Spring meet. Featured in this issue of the "Bulletin" is a three transistor circuit using the CK722, a very early Raytheon transistor. Pictured on this and the following page is the "3 Vintage Raytheon Transistors Radio" or "The Chinaberry Project". (The Article begins on page 13.)

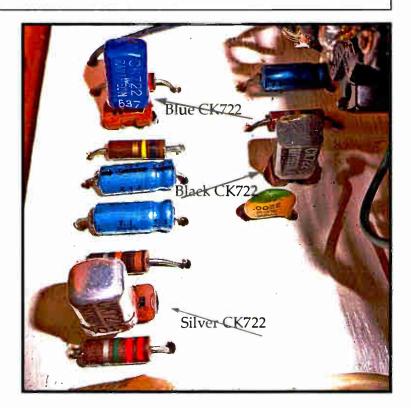




## Raytheon 3 Transistor Radio, Ed Dupart



Operating on a single "C" cell battery, this version of a vintage transistor receiver drives vintage headphones with considerable volume.



## The Raytheon 3 Transistor Radio by Edward Dupart

For many of us the Popular Electronics magazines were a source of entertainment and education and we couldn't wait for the next month's issue. The local drugstore down the street in Detroit, complete with a soda fountain, was my source for magazines and I knew when to check for the latest issue of Popular Electronics.

The January 1960 issue had a one transistor radio that used a 2N217 transistor, a 1N54A diode and a long, 7 1/4", ferrite rod loop antenna and I wanted to build it. The 2N217 is the same as the 2N109, which I had. The 1N54A was a special high back resistance diode that I couldn't obtain at that time so I had to use the time tested 1N34A. Forget the long ferrite bar, I had to use an adjustable Miller high O coil that a lot of us would like to have now. I put the little radio together in a plastic box. I adjusted the coil to tune in my stations. It worked good and I could run it along a wall and find the electrical wiring because it would act as an antenna and the station would get loud when near the electrical wiring. While it worked quite well in Detroit and it was neat to have and I could sneak it into school, it just didn't have that long ferrite bar I wanted to experiment with.

In the late 1960's I had to make room, so I gave a neighbor, who was into electronics, all my Popular Electronics, but I always wished I had kept that January 1960 issue. Not that I needed it for the circuit, because I had it memorized and made several radios after that with basically the same circuit, I just wanted it, because I wanted it. So since the 1980's the search was on and it wasn't until 2015 I found that January 1960 issue along with almost a complete set of Popular Electronics from about 1956 to about 1964 at an estate sale in Michigan. Now I'm happy.

Now that I have my January 1960 Popular Electronics magazine next to me. I decided to build that one transistor radio. My junk box contained several loopsticks and lo and behold there was one with a 7 1/4" ferrite bar from a tube radio that pretty much matched the hand wound coil in the January 1960 Pop Electronics' article. As far as transistors go, I have lots of them, so I decided to try several vintage transistors and the first one I picked is a high quality GE transistor that looks just like a 2N107 with the pinched top but is actually a high speed GE PNP germanium transistor. Luckily, I have a 1N54A diode and all the rest of the parts. So I put it together and it worked quite well. It picked up the local station without an external antenna and with that loop antenna it was quite directional. I decided to compare the 1N54A with other diodes and it

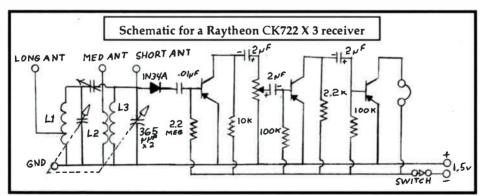
#### The Raytheon 3 Transistor Radio -continued

didn't work any better than a 1N34A. So I tried a 1N110 diode from a 1950's computer circuit board that used tubes. I have found this diode to work very well in crystal radios and I think it worked better than the 1N34A and the 1N54A so I left the 1N110 in the circuit. My one transistor radio is now complete and works very well on 1½ volts and is still on a breadboard.

Surely I can improve on this circuit so why not add an additional transistor for audio amplification and I did. That really increased the volume and would drive a speaker in a quiet room

antenna and a variometer for antenna matching I was able to pick up at night, Nashville, Chicago, Louisville, Cleveland and a few others. Not bad for a simple circuit, but I'm not through.

Most people reading this will remember the first hobbyist transistor introduced by Raytheon, the CK722 in 1952 and were hearing aid transistor CK718 rejects. They didn't meet the specs for the hearing aid but were good enough for a lot of simple circuits and they became an overnight success. I had several of them and I really liked the pretty blue ones. I built a lot of circuits with them, but they were-



and on 1½ volts! I wondered what would happen if I added a third transistor. So I added a third transistor and now it's really loud and I needed to add a volume control, which I did and a 100K pot worked well. All three transistors were the same late 50's GE computer transistors. With an outside

n't as good as the RCA 2N109. The CK722 came in three colors. The black one was used from 1952 to 1955 and the pretty blue one was introduced in 1955 and the silver one was introduced in the late 1950's. Most of the date codes I see for the silver one is 1960. 1964 was maybe the last year of production

for the CK722.¹-- (Jack Ward www.ck722museum.com) I always wanted to put these three variations of the CK722 in a circuit and I now have the ideal circuit to do it with

I replaced the high quality GE transistors with the Raytheon units and what I discovered was that the CK722 is very noisy compared to the high quality GE units I used previously and the gain was very poor for the earliest black CK722. The newest 1960 silver CK722 was the noisiest one but had the highest gain and so it worked best as the first transistor. The blue 1956 CK722 was middle of the road on gain and so it became the middle transistor and the 1955 black CK722 became the last transistor and was the one to drive the headphones. After switching around the transistors getting the radio to work the best as possible, it still wasn't comparable to the GE transistors, so I did some engineering. I changed the biasing and load resistors and worked on it one stage at a time. Increasing the 220K bias resistor for the noisy silver CK722 to 2.2 Meg and increasing the load resistor to 10 K quieted the transistor down quite a bit. Decreasing the bias resistor on the older blue and black CK722's to 100K increased the gain tremendously and the 2.2K load resistor gave the blue CK722 a clear sound. It now plays as well as the

high quality GE transistors, but is still noisy compared to the GE transistors, but is now acceptable. I initially used a 100K volume control, which worked nicely, but a 5K to 500K will work as well. I used a 500K control because it had an on/ off switch on it, but the control doesn't have a nice even feel when adjusting the volume. There is a lot of control at the bottom and the top ends of the control, so a lower value would be better, but I didn't have a lower value with a switch in a vintage style. I stayed with 11/2 volts so as not to put any undue stress on the old transistors, especially the 1955 black CK722. Even with only 11/2 volts and only drawing 3mA it has amazing volume.

At this point the radio has been breadboarded so it is now time to construct a cabinet and mount the parts on some kind of chassis. My brother in Texas gave me some Chinaberry wood that he has been using to make rocking chairs and other furniture pieces out of and it has an awesome grain and color to it, so I decided to make a simple cabinet from the Chinaberry wood. Out came the table saw, router and the drill press. The Chinaberry is a unique wood to work with, easy to drill and also easy to chip on the corners when hand sanding, but it cuts easy with little burring/ chipping with the table saw. The grain is very open and difficult to

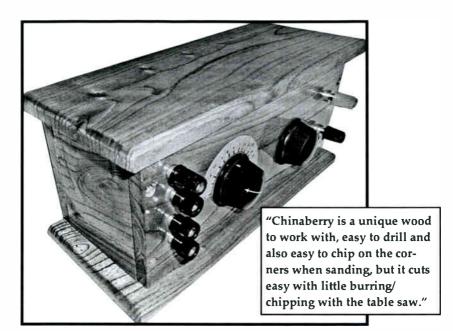
#### The Raytheon 3 Transistor Radio -continued

sand really smooth so finishing it requires a wood filler or lots of coats of what ever one uses and in my case it was lacquer. My brother uses thick polyurethane as a filler and saves Chinaberry sawdust that he mixes with wood glue and uses that as a wood filler. After a couple of hours I had the cabinet cut out and I used brass screws that were recessed to hold it together.

I took the front panel back in to the radio shop. Now to plan out where the variable capacitor, volume control and the circuit board will all go. I used the Hobby Lobby 1/8 " basswood for the circuit board and I painted it white after I sanded it. On a piece of paper I laid out where all the parts will go in pencil and I taped it to the circuit board and then I used a drill press to drill all the holes. The paper was removed and I inserted all the parts and soldered it. I mounted the board to the bottom of the variable capacitor and the variable was mounted to the front panel with screws attached to the front of the variable capacitor. I recessed all the mounting holes for the variable capacitor so the screws wouldn't interfere with the knobs. I put 4 binding posts on the left side of the cabinet for the ground and the three antenna connections and two binding posts were put on the right side of the cabinet for the headphones. This gave the radio an older appearance and the two antique knobs I used enhanced that older appearance. All the parts I used were vintage parts and so the circuit board definitely has that 1950's to early 1960's look.

Not much was said about the Chinaberry wood, but it is a tree that was introduced into the US around 1830 from the Himalayas and was an ornamental tree. The tree is now considered a junk tree in Texas because its fruit is poisonous and its leaves give off a musky smell, but the wood is gorgeous and they do make pesticides from it.

Now a little bit about the frontend circuitry of this radio. I didn't have a single gang 365- pf capacitor, but I did have a dual 365-pf capacitor and that's what I used. So now Ladded a second coil and created a bandpass tuner, which greatly increases the selectivity, but also decreases the sensitivity. If this radio were to be used in a big city with lots of close by stations this would be the antenna connection to use because it would separate the stations better, so this would be a long antenna connection. I added 10 turns of #22 wire on the ferrite loopstick antenna to make another possible antenna connection, what I call a medium



length antenna. There is a direct connection to the junction of the diode and variable capacitor for a short antenna. Attaching a ground to this radio also helps in its reception.

Should someone want to build this radio, you will find the audio coupling capacitors are not critical. The .01mfd capacitor between the diode and the first transistor can vary from a .01mfd to a 10mfd capacitor. The 2mfd electrolytics can vary from 1 to 10mfd. The larger values will give better bass response, but is barely noticeable especially with a small speaker. I used the 2mfd capacitors because I have several of them, they are vintage and in a pretty blue package. The base bias resistors are typically around 220K and it is a good starting point if one is experimenting

with biasing. A word of caution here; If the base bias resistor is too low in value it can cause too much collector current to flow and can burn up your transistor. Using a current meter would be helpful. Notice that I didn't go any lower than 100K. The bias circuit used in this radio is called "Simple base bias" and is prone to thermal runaway, but is a high gain circuit that uses a minimum of parts. At 1½ volts thermal runaway is not a problem and so it is widely seen in circuits with a low voltage.

What started out as a simple one transistor radio wound up being a bit more complicated, but also performs a whole lot better. The Chinaberry cabinet makes it a showpiece. *Ed, April* 2016

## Radio Activity - Spring Meet 2016







Picture credits for this issue of the Bulletin,: Ed Dupart, Michael Feldt and Fred Prohl

## Golden age of radio gone, but collecting is going strong

Kent radio I talked him into buying it. I was into the modern gadgets, but was schooled in old vacuum tubes so I knew as old radio when I spotted one. Eventually

started going to antique mall looking for more of this ol equipment." In the past 30 years, Sand

has been buying an

swapping antique radio

Onlything is, he's accumulate

more radios than he's give

At one time there were 394 radio manufacturers in the U.S. According to members of The Radio Attac antique radio club in Alabama, there are an estimated 4,500 collectors of those vintage radios in 50. radio collector clubs nationwide. An estimated 800 reside in Ohio

One of those collectors.

Bob Sands of Fairfield, Ohio. has been at this fun vet committee hobby the past 30 yeers. Radios in his home. some nearly 95 years old, range in pance from \$1,000 and up. A stroll through any

Above: Montgomery Word

away. And, with the blessing his wife, Sue, he has many these pristine pieces (mo from the 1930s) in the livi and family room. "I had 300 at one time, but gut rid of a lot of them," he say

It's tough finding them in go condition. Too many people 1 them in the attic, not knowing the

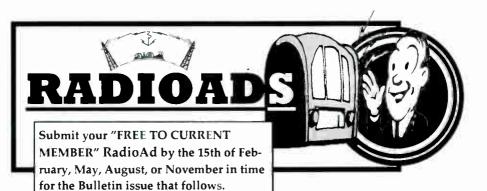
The June 20, 2016 issue of the Antique Week has a feature article on collecting vintage radio. Interviewed for the article was IHRS member Bob Sands. The article, written by Doug Graves, includes a brief history of radio, collecting radio, and frequent reference with pictures to Bob's large collection of vintage radio. Most libraries will have back copies of the Antique Week.

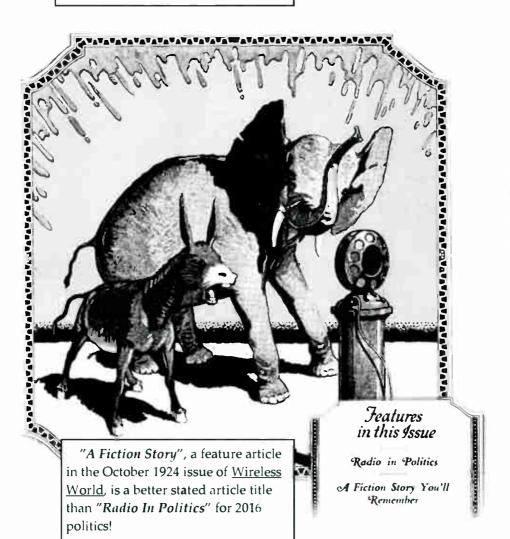
#### EMAIL?

Is your email address current on the IHRS contact list? Periodically the Society officers communicate with IHRS members by way of email-meeting notices and area vintage radio sales are the most frequent messages.

For member privacy emails from IHRS are sent as a blind copy. Your address should be the only address you see on the email.

If you have recently changed your email address or would like to add your email to the IHRS contact list, send it to inhistradio@gmail.com







#### 2016 Officers

#### Responsibilities

David Mantor President

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Fairmount, Indiana 46928

(765) 618-8342 before 7pm Indiana time email dmjmantor@gmail.com

Activities, business, administration, & publicity

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

<u>Dues</u>, financial, and address change. Please notify

immediately of change of address.

Alex Whitaker, Secretary 2927 South East Street Indianapolis, IN 46225 Record and publish IHRS business meeting minutes.

317-787-2854 ehscott@sbcglobal.net

Fred Prohl, Editor 615 Wren Drive Franklin, IN 46131 News articles, radio ads, photos for Bulletin publication Maintain indianahistorical radio.org

(317) 736-1228 email inhistradio@gmail.com

Dr. Ed Taylor, Historian

245 North Oakland Avenue Indianapolis, Indiana 46201-3360 (317) 638-1641 Donations & scrapbook material

Bulletin Deadlines: News, Articles & Radio Ads, 2/15, 5/15, 8/15, 11/15

IHRS Web site address: www.indianahistoricalradio.org

The INDIANA HISTORICAL RADIO SOCIETY is a non-profit organization founded in 1971. Annual membership dues of \$15.00 includes the quarterly IHRS "BULLETIN." Radio-Ads are free to all members. Please include an S.A.S.E.



Bob Pote set up this display of early Crosley battery radios at the IHRS 2016 Spring Meet. His collection received first place in the open category.