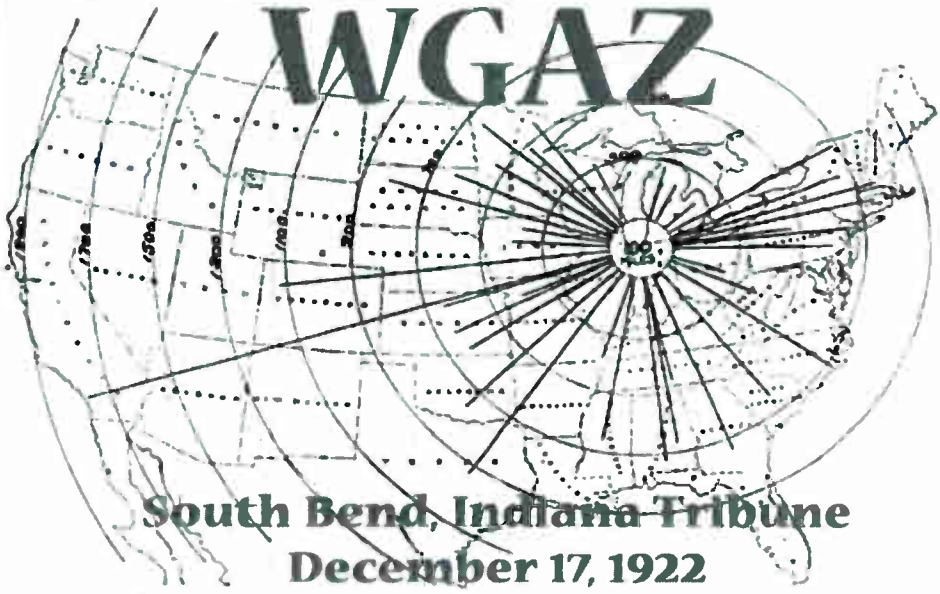
The Indiana Historical Radio Society

BULLETIN

Volume 48 Summer 2019 Number 2

MAP SHOWING RANGE OF TRIBUNE'S RADIOPHONE



Gentlemen – Were you on the air last night? I heard a fox trot come through clearly, and an announcement stating that it was station WGA-. I lost one letter, but heard that it was The South Bend Tribune. Am anxious to know whether this is right as I have been having good luck with my CR5 Grebe. Am keeping a log and would like to check you as O. K.
T.M. Nirapon, Los Angeles, California

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

The Indiana Historical Radio Society Bulletin

In this issue: WGAZ, South Bend, was established in 1922. The cover picture is from the South Bend Tribune, December 17, 1922. The Tribune is promoting (boasting) the success of WGAZ with a graphic of distances reached by the 100watt station.

The Tribune took pride in a station that was assembled by local amateurs and fans of radio. It should be noted that the Tribune's station grew, changed its call and frequency, and became the anchor station for Norte Dame sports. Page 3.

Steve Ewbank tells us about his repair of his Channel Master 6506 beginning on page 9.

Ed Dupart, on page 13, describes the problems and repair of receivers with a corrosion called "Silver Migration".

The Indiana Historical Radio Society Will meet at the Cool Creek Nature Center, Carmel August 10, 2019. Page 12.

THE SOUTH BEND TRIBUNE RADIOPHONE BROADCASTING STATION

WGAZ

PROGRAM

Thursday, Jan. 4, 7:00 P. M.

ELTON CREPEAU, Baritone.
GLADYS MINARDOW, Pianist.

1—Prelude in C Sharp Minor ..... Rachmaninoff
Miss Minardow

2—L'Amour ..... Phelps
Mr. Crepeau.

3—Polonnaise in A Flat Minor ..... Chopin
Miss Minardow.

4—How I Love a Summer's Day ..... Roates
Mr. Crepeau.

5—Lotturno ..... Greig
Miss Minardow.

6—Oh, Heart of Mine ..Galloway
Mr. Crepeau.

AFTERNOON PROGRAM
Thursday, 5:30 to 6:00 o'clock
Latest released Victor records
Played by courtesy of
GEORGE H. WHEELOCK & CO.

The South Bend Tribune
January 4, 1923

We look forward to an IHRS Fall Meet, October 12th, at Springwood Park, Richmond. As the final meet of the year we have a pitch in lunch with IHRS providing the sandwich makings. Following lunch we will have our annual election of officers, voting for President, Vice President, Secretary, and Treasurer positions. The Indiana Historical Radio Society has been an active and vibrant organization for forty-eight years. This has been possible by a lengthy list of members who provided time and energy to maintain a high level of camaraderie with four meetings a year. Times have changed for many organizations like the IHRS. We need new energy and ideas to take our organization into the future. Seriously consider volunteering your name as an IHRS officer candidate. The current officers are listed on page 19. If you have questions about officer responsibilities call one of the listed.

Fred Prohl, Bulletin Editor July 2019

NORTHERN INDIANA RADIO CLUB TO OPERATE TRIBUNE STATION

July 2, 1922—South Bend Tribune

"After many tests, all of which have proved highly satisfactory. The Tribune radiophone broadcasting station WGAZ will offer its first program to-morrow evening at 7:30" . . . "The Northern Indiana Radio club extends its thanks to Clem Portman and the Radio Shop for the excellent work done in the installation of the transmitting unit." . . . "The biggest feature of the station is that it is being operated by the Northern Indiana Radio club, and that the members of the club are entirely in charge of the broadcasting."

The Northern Indiana Radio club had it beginning only a few weeks earlier when the South Bend Tribune newspaper, dated June 6, 1922, invited readers to apply for membership. "Noting the lack of a central organization in which all questions of interest to radio enthusiasts may be taken up, The Tribune has taken upon itself the responsibility of forming and sponsoring a club for radio fans, regardless of whether they own outfits *(radio sets)* or not. There will be no dues or fees of any kind levied upon members. The only requirement for membership will be the filling out and mailing of the coupon at the bottom of this page."

Northern Indiana Radio Club.

APPLICATION FOR MEMBERSHIP.

Name .....

Address .....

.....

Age ..... **Do you own a set?** .....

What kind .....

Write name and address plainly and mail to

RADIO EDITOR, SOUTH BEND TRIBUNE,

South Bend, Ind.

The Radio Shop provided the transmitting equipment for WGAZ.

Clarification of reason for organizing the Northern Indiana Radio club was attempted by the Tribune with the following: "There can be only one way of getting behind the radio movement and helping the perfection of home radio, and that is by learning about it as much as possible. Of course, many books are now on the market and many more in the presses, all describing radio in some way, but the real way of learning and the most interesting way of finding out about it is to join the Northern Indiana Radio club." (*June 12, 1922*)

The intent of the Northern Indiana Radio club was to encourage construction of radios in the home and present group discussions on purchased sets. The Tribune called on the South Bend Radio association to advise and assist in building the transmitting equipment for WGAZ.

Tribune—March 13, 1922 "The South Bend Radio association was formerly the St. Joe Valley Radio association. It now has a membership of 35, and is affiliated with the American Radio Relay league."

Current Tribune newspaper reports hint that the South Bend Radio association saw the North Indiana Radio club as competition for the amateur group.
The Radio Shop, a store in South Bend, managed by Clem Portman, provided the transmitting equipment for the Tribune's station.

July 3, 1922 "Marking the turning point for radio broadcasting in South Bend WGAZ, The Tribune's broadcasting station gives its first program this evening at 7:30 o'clock."

"First in the field of regular newspaper broadcasting as it was first in the installation of a receiving outfit and first in the incorporation of a radio department as a regular daily feature The Tribune is ahead of others in that has done something which no other news-

WGAZ STARTS BROADCASTING 7:30 TO-NIGHT

TRIBUNE'S RADIOPHONE IS FIRST IN LOCAL NEWS FIELD

HAS STRONG PROGRAM

Station Is Looked Forwared to As Factor in the Musical Progress of South Bend

July 3, 1922
South Bend Tribune

paper has done before. The broadcasting is to be under the direct supervision of the members of the Northern Indiana Radio club. This will be the first newspaper radiophone station anywhere to be conducted by the amateurs. This feature is one of the many surprises which the Northern Indiana Radio Club has in store for its members."

"The transmitting apparatus, considered the best in this section, was made for the club by the Radio Shop. It is a Hartley circuit employing one 50 watt tube as oscillator and one 50 watt tube as a modulator. It has a radiation of three and a quarter amperes on a 360 meter wave length, and is exceptionally clear in tone."

Tribune—December 17, 1922

"Few of the many radio fans in South Bend realize that their own radio transmitting station, WGAZ, has been heard from coast to coast and from Alabama to northern Minnesota. Few realize that letters have been received by the Radio Editor telling of the reception of radiophone concerts from the Tribune's station in cities as far distant as Los Angeles, Calif. . . . " Most of the letters are of a very enthusiastic nature, and it is safe to say that WGAZ has thousands of friends scattered all over the country, and that the name of South Bend is being brought to them in a very attractive and very agreeable manner." "It is also safe to say, that with the record distance achieved, no other station of the same power, 100 watts, can boast the diversity of uses to which WGAZ has been put, nor the distances covered."

The *December 17th* article in the

RADIO STATION WGAZ WINS FAME FOR CITY

TRIBUNE'S BROADCASTS HEARD ALL OVER THE COUNTRY

MANY LETTERS RECEIVED

Coast to Coast, Alabama to Minnesota is Record for Low Powered Radiophone Transmitter Made Here

THE SOUTH BEND TRIBUNE RADIOPHONE
BROADCASTING STATION

W G A Z

PROGRAM

Thursday, August 10, 7:00 P. M.

Program Given by Courtesy of ELBEL BROS.

1—Juba Dance ..... *Dett*
DUO-ART REPRODUCING PIANO
Percy Grainger

2—Sonata, Opus 27, No. 2 (Moonlight) ..... *Beethoven*
Josef Hofmann

3—Minuet in A ..... *Boccherini*
Harold Bauer

4—Ballade—Op. 23 ..... *Chopin*
Leopold Godowski

5—Marche Militaire ..... *Schubert*
Ethel Leginska

6—Etude (Butterfly) ..... *Chopin*
Ignace Jan Paderewski

AFTERNOON PROGRAM.
Friday, August 11, 2 to 3 p. m.
Latest Victor records and Duo-Art music rolls.
By courtesy of Elbel Bros.

Tribune included the following accolades received from listeners:

♦ Dear O. M. (*Old Man*) Your concert heard here very QSA (*speech or music very loud*). Tone clear, wave length 360 meters (*approximately 830 KHz*), character, steady. QRM, none (*static or atmospheric interference*). QRN, none (*other station interference*).
L. W. Bishop, Massachusetts.

♦ Gentlemen, I heard your station for the first time while you were testing, and enjoyed the concert thoroughly. I would appreciate getting your schedule very much. J. C. Butler, Greenville North Carolina

♦ Radio Editor – I am listening in on your test concert while I write this letter. I have so far heard six numbers, and will say your modulation is very good. Your signals come through fine and you are very easy to tune in. I am using a regenerative set with two stages of audio and a detector. I judge from the way your signals come in that you will very easily hit the thousand mile mark. Some distance for 100 watts. J. W. Mancel, Milwaukee, Wisconsin

♦ WGAZ South Bend Ind. Gentlemen – Were you on the air last night? I heard a fox trot come through clearly, and an announcement stating that it was station WGA-. I lost one letter, but heard that it was The South Bend Tribune. Am anxious to know whether this is right as I have been having good luck with my CR5 Grebe. Am keeping a log and would like to check you as O. K. T.M. Nirapon, Los Angeles, California

♦ Gentlemen – WGAZ test program is being received very QSA and clear on one tube of ordinary regenerative home made outfit. Glad to report the satisfactory reception of your signals. Best 73
R. C. McSherry, Dayton, Ohio

♦ I heard your announcement asking for letters when you signed off. You came in good. Tone clear, not much whistling. I use a home made receiver and have detector only. What wave length are you using? R. Hall, Wadena, Minnesota

♦ Just to let you know that I picked up your station last night and heard you sign off. Please let me know how many watts you are using. You came in fine. I would also appreciate your broadcasting schedule. I am using a one bulb home made set. C. H. Hewitt, Southern Pines, North Carolina

♦ In response to your request for reports on your program. I was getting WGAZ last night. I tuned in with a detector and one step. The music and voice were very clear and loud, especially the voice. R. R. Cecil, Lincoln, Nebraska

♦ When I tuned in to your carrier wave I thought you were one of the big stations much nearer than you are. Your program and signals came in QSA. Modulation and tone very good. Received you on short wave regenerator and one step audio. You are certainly getting out in good shape. A. H. Jones, Buffalo Creek, Colorado

♦ Gentlemen. Wish to advise that your test program came through very good last night. I am using only one UV201 bulb and two variometers and consider the reception excellent. J. A. Hert, Round Brook, New Jersey."

Continuing with the December 17, 1922 Tribune article: "Perhaps a description of The Tribune's transmitting unit would be acceptable at this time. The unit is a 100 watt composite radiophone and C. W. transmitter, wired after the Hartley circuit. One 50 watt power tube is used as an oscillator, sending out the carrier wave, the other as a modulator. No external or internal speech amplification is used, although experiments have been carried on with a small speech amplifier. The modulation of the transmitted signal is said to be excellent, and the tuning of its wave very sharp. Many amateurs whose sets are selective enough can 'tune out' WGAZ's carrier wave in South Bend. The transmitter unit is home made, and was built by C. B. Stelle, chief engineer of the Indiana & Michigan Electric Company."

Searching beyond the December 17, 1922 article in The South Bend Tribune and into 1923 results in considerable change for WGAZ.

There is a period time when WGAZ is not transmitting. The Radio Shop, the business that provided the equipment and expertise for the station's transmitter closes and there is no longer any reference to the Northern Indiana Radio club. And in September 1923, a local company, the Electric Appliance and Service Co., Inc announced operation of station WGAZ.

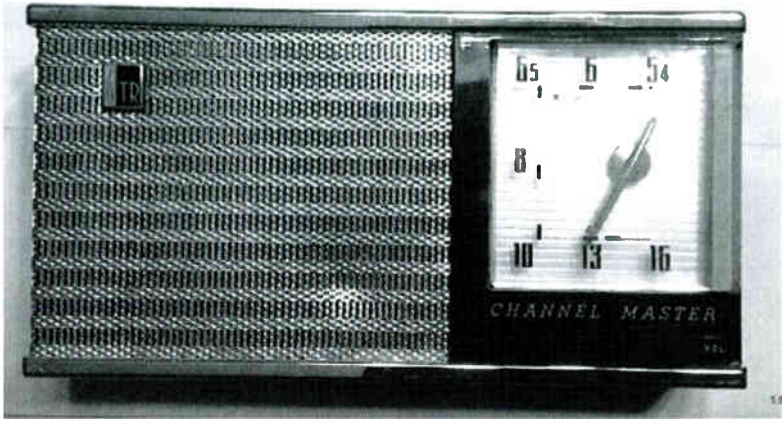
WGAZ (World's Greatest Automotive Zone) became WSBT (W South Bend Tribune) and operated at 1350Kc during the 1930's. WSBT AM currently operates at 960 KHz and is the flagship for Notre Dame sports.

Fred Prohl, July 2019

The South Bend Tribune, 1922 -1924 was accessed through newspapers.com.

The Electric Appliance and Service Company replaced the Radio Shop in providing radio expertise and transmitting equipment for WGAZ.

Fixing my Channel Master 6506 by Steve Ewbank



After hearing Ed Dupart talk about his transistor radios a few years back, I decided to start buying some so I could have the fun of repairing a radio without the headache of finding a place to put it once it was done. Most of the transistor radios I had bought had the same problems—bad volume controls, corroded battery terminals, and bad electrolytic caps. Then I picked up a well-worn Channel Master 6506 at an antique shop in Peru. It turned out to have an unexpected issue once I started working on it.

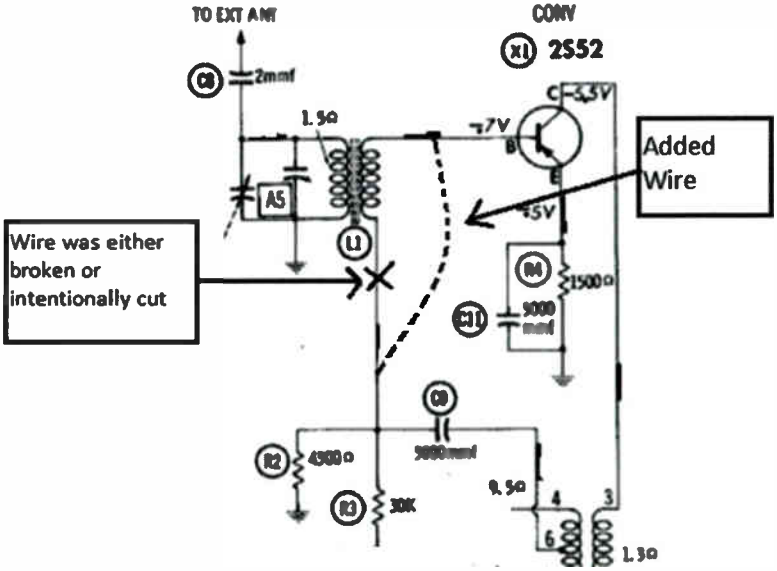
When I first put batteries into the radio, I was delighted to find out it was totally silent. I would have something to fix! After replacing the electrolytic caps the local station came in very strong, but most of the dial picked up nothing. I tried an alignment, but it made no difference.

The next step was to look for something loose or broken, and it did not take long to find a disconnected wire from the ferrite antenna. I assumed the wire was broken, but it the end was straight like it had been cut. Then I looked at the traces but couldn't find any place it would have been connected to.

Finally after looking at the schematic, I figured out where the wire should go. However, there was already a different wire tacked on in that location (the other end went to the base of a transistor). I removed the added wire and reconnected the ferrite antenna lead. Bingo! The radio picked up Can-

ada and Nashville at night like it should.

I don't know if this was a repair where the repairman didn't notice the antenna wire was broken, or if it was an intentional mod. I have included a schematic showing the original mod that was done. Maybe someone could offer their opinion at the next meet. Anyway, I was surprised that anyone would even work on it. In my time, transistor radios were so inexpensive that they would have been pitched if they broke. *Steve Ewbank*



2019—VINTAGE RADIO ACTIVITY—2019

Indiana Historical Radio Society
indianahistoricalradio.org
August 10—Cool Creek Park, Carmel
See page 12 of this Bulletin
October 12 Springwood Park, Richmond

ARCI—Antique Radio Club of Illinois antique-radios.org
October 6, Swap Meet, American Legion Hall,
Carol Stream, IL

MARC—Michigan Antique Radio Club
michiganantiqueradio.org

CORA Central Ohio Antique Radio Association
coara.org

SPARK Society for the Preservation of Antique Radio Knowledge See sparkantiqueradio.com
for monthly
meetings

CARS—Cincinnati Antique Radio Society
cincinnati –antique-radio.org

PARS—Pittsburg Antique Radio Society
pittantiqueradios.org
October 26th, Fall Radio Clinic and Contest
Brentwood, PA

MSARC - Mid-South Antique Radio Collectors

AWA Antique Wireless Association
www.antiquewireless.org
Antique Wireless Association Annual Convention
August 13 to August 17, 2019, Henrietta, NY

Saturday, August 10 - The Indiana Historical Radio Society will meet at Cool Creek Park, 2000 East 151st Street, Carmel, Indiana for a 2019 Summer Meet

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:

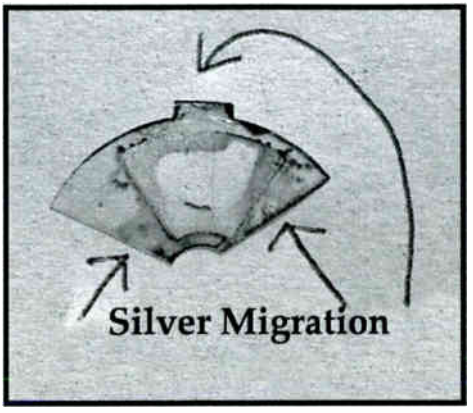
7:00 AM—meet setup.
8:00 AM the IHRS Summer meet begins. Popular Vote Contest set-up.
10:00 AM Vote for your favorite radio in each of the contest categories.
10:15 AM contest results and announcements.

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 2019 Summer Meet
Popular Vote
Contest category: Open to all radio and radio related equipment

Silver Migration by Edward Dupart

January 30, 2019



Awhile back I picked up a Zenith transoceanic 6A40 that was very clean inside and the cabinet just needed cleaning and the price was right. When I got it home and plugged it in it sounded like a thunderstorm with lots of loud crackling. I knew at once it had a bad IF transformer due to silver migration. Anytime I hear about silver migration, I think of bad IF transformers. For those that aren't familiar with the term silver migration it is the movement of silver across an insulator and creates a short. There a lot of people out there that have heard the term silver migration and immediately think of bad IF transformers, but really don't understand what's going on inside that transformer. And there are those that are new to collecting old radios and should know more about it. So I'm going to attempt a simple explanation of what's going on inside those transformers.

Silver migration was a common problem to GE (General Electric) and Zenith radios of the 1950's and early 1960's. Anytime someone brought in a GE radio into the shop, I could almost automatically assume it had bad IF transformers without even plugging it in. It became a game to see if I was right or not. The owners of the shop kept a good supply of inexpensive Japanese replacement IF transformers in stock, and it were by far cheaper to replace the transformer, rather than try to repair the old transformer. The Japanese transformers worked superbly. Other brands were afflicted with this problem too, but not to the extent that GE and Zenith experienced it. Recently I repaired a 1955 Motorola with a bad IF transformer that had the silver migration problem, but I simply replaced the transformer, it was quicker and easier. Silver migration is also a problem in other areas of electronics dealing with printed circuit boards and IC's

(integrated circuits), but I won't say much about them.

So, what's inside an IF transformer and what does an IF stage do for a radio? The IF stage increases the gain of the radio, which in turn increases the sensitivity of the radio and the IF stage is set at a specific frequency, usually 455 kHz which maintains a constant Q, which means the bandwidth stays the same. For AM radio it is 10 kHz, +/- 5 kHz. This eliminates the problem TRF receivers had where their selectivity changes across the dial allowing a powerful station to bleed into a neighboring station, making it impossible to listen to the weaker neighboring station. In my area our local station at 1230 kHz makes it difficult to listen to WOWO at 1190 kHz when using a TRF or crystal radio. There are ways to reduce this problem, but not in this article. So, the IF stage gives the radio good selectivity and gain.

The IF transformer typically consists of two resonant circuits, consisting of a capacitor and a coil, mounted on one coil form and fairly close to each other to allow for transformer action, where AC (RF) voltages will transfer from one winding to the other. Most early IF transformers have two variable compression capacitors located at the top of the IF transformer housing, commonly called an IF can, with two holes to allow for adjusting the capacitors to the specified IF frequency. These early IF transformer were pretty reliable and the alignment didn't drift much, if at all. I have worked on many old radios and I would touch up the alignment and it is amazing how many were still in perfect alignment.

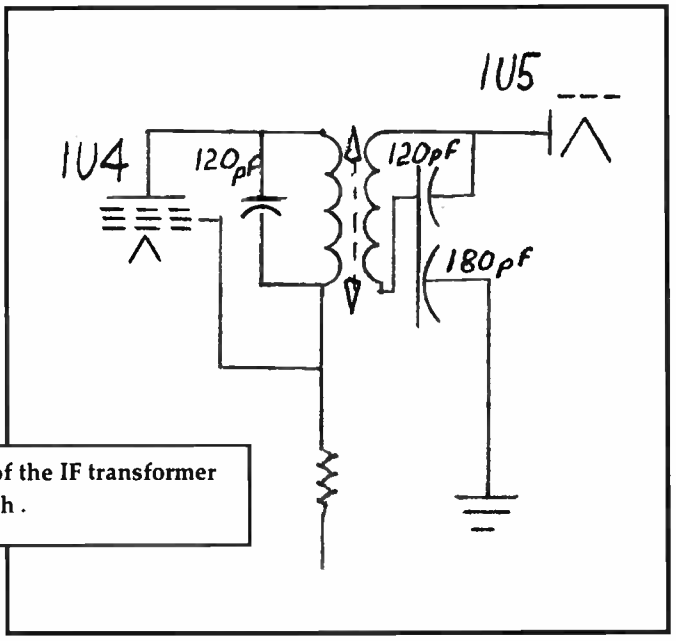
The early IF transformers were rather large and were as big as the tubes they were next to and the manufacturers wanted to reduce the size so they could make the radios smaller. The variable compression capacitors took up quite a bit of space, so if they could get rid of those then they could shrink the size of the IF transformer. In a tuned circuit either the coil or the capacitance can be adjusted to change the resonant frequency, so what they settled on was to make the transformer permeability tuned with adjustable ferrite iron slugs that would go up and own inside the coil form, one slug for each coil. The capacitors used were fixed and could be ceramic or molded mica. Some of the newer transformers the capacitors were sandwiched in the plastic bottom

housing and were prone to breaking down and this is what I remember GE using. Permeability tuned IF transformers resulted in highly efficient, smaller transformers, just look inside a transistor radio.

Zenith's permeability tuned IF transformers used in the later Zenith transoceanic's and table radios used a circular piece of mica with silver plated on both sides to create two to three fixed capacitors. These are the transformers that have the silver migration problems. I used to think that metals were fixed and if they were plated on something it would stay there, but I was wrong. Silver likes to creep and go places, especially if it is subject to high humidity and voltages. This process is called metallic electromigration and is an ionic process. There are three stages to what is happening: 1. Oxidation or dissolution at the anode, 2. Migration through or across the insulator, 3. Reduction or deposition. The positive charge at the anode combined with moisture (humidity) will cause the silver to ionize and its reduction will cause brownish staining at the anode. The silver ions that make it to the cathode will deposit silver there and produce dendrites that look like branches of a bush or tree and filaments that look like needles.[1] It is this buildup of filaments and dendrites that eventually make it to the anode and create a short and cause the crackling sound in the radio. What amazes me is these dendrites and filaments will go through the insulator and across it, but the moisture will create low resistance paths for this to happen.

One of the reasons silver is used is because it is inexpensive, but the silver migration is a real problem. One way to halt or reduce this migration is to add Palladium (Pd) to the silver, which increases the cost.[2] I don't know for sure, but I don't think they added Pd to the silver in IF transformers. If anybody knows for sure let me know.

Let's take a look at the schematic of the IF transformer in the Zenith and determine what is the anode and what is the cathode. B+ goes to the lower end of the primary winding and the top end of the primary winding goes to the plate and is around 80 volts on both. So I would consider the positive potential to be the anode. The secondary has two capacitors, the upper one is for resonating with the secondary at 455 kHz and the bottom capacitor is a bypass capacitor to filter unwanted RF to ground. This grounded side of the



Schematic of the IF transformer in the Zenith .

capacitor would be the cathode. Unfortunately I didn't take a picture of the whole capacitor just the plate side of the capacitor that was definitely bad. At the time I didn't even think about writing anything about this and by the time I did I had the radio already back together and working. So we can take a look at the plate capacitor and the brownish stain is very evident going to the next capacitor that was at ground potential and to the screw that held everything together. I tried to scrape off the staining and to no avail; it was through the mica. I was hoping that I could scrape it off and make the capacitor work again, but no way. The secondary winding capacitors have no major voltage potentials to speak of and so I didn't see any dendrites, filaments or staining. I checked it with a capacitor checker and an ohmmeter and it checked out fine.

You are probably wondering why I had a picture of just part of the capacitor. Most people that repair these transformers rip out the entire mica capacitor and I thought I would try something different. Since the secondary side checked good, why not leave it in the transformer and just cut out the bad section? That is what I did. I took a pair of scissors and chop-chop the bad section was gone.

The way the Zenith transformer is made is that fairly round pads are part of the terminals that go through the bottom of the transformer where the wires are connected. The round pads make contact and sit on top of the silver pad that's is on the mica insulator, one pad for the bottom and one pad for the top. A screw goes through the middle of this sandwich and keeps it altogether ensuring a good connection between the round pad and the silver mica plating. The resonant capacitors are about 120pf and the bypass capacitor is about 180pf and that's about what I measured on the two goods one I had that went back in the radio. Since I cut out the old capacitor I had a choice, cut out the two round pads or put a piece of paper or plastic between the pads. I used plastic, because it won't deteriorate with high humidity. The plastic did form a new capacitor of about 40pf and the radio did work, but wasn't very sensitive and the plate winding would not align, which I already knew, but I was experimenting. What I needed was another 80pf. I didn't have the closest value of 82pf, but I did have a 68pf and the radio played much better with that. The plate winding started to align, but the slug was at one end as far as it would go, so I knew I still needed another 20pf, which I did have. I put that in parallel with the 68pf capacitor, which gave me about 88pf and that was good enough and the plate winding aligned real well and the radio worked great. My new capacitor was not in the IF can, but under the chassis.

There are various ways of fixing a bad IF transformer with silver migration. Some cut out the round pads and put the new capacitors inside the can; some install the capacitors under the chassis. Some put compression trimmers underneath and can align the radio with the ferrite slugs and the adjustable compression capacitors. And there was my method, which worked quite nicely. *Ed Dupart January 2019*

References:

Metallic Electromigration Phenomena by Simeon J. Krumbein AMP Incorporated, Harrisburg, Pennsylvania 17105 pg. 6

Silver Migration-The Mechanisms and Effects on Thick Film Conductors by Kim Vu San Jose State University pg. 19

Silver Migration-The Mechanisms and Effects on Thick Film Conductors by Kim Vu San Jose State University pg. 9

Metallic Electromigration Phenomena by Simeon J. Krumbein

AMP Incorporated, Harrisburg, Pennsylvania 17105 pg. 5 & 9

For those that want to see the chemistry behind silver migration.[3]

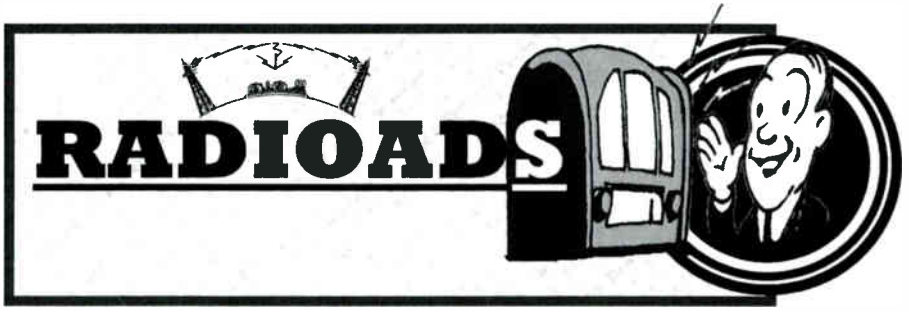
Ag Ag^+ silver ionized as a result of water (humidity)

H_2O $H^+ + OH^-$ hydrogen migrates to the cathode and is released as a gas.

$Ag^+ + OH^-$ AgOH which is colloidal precipitate and is unstable and it decomposes to form Ag_2OH which deposits a dark deposit around the anode.

$2\ AgOH \quad Ag_2O + H_2O$

$Ag_2O + H_2O \quad 2\ AgOH \quad 2\ Ag^+ + 2OH^-$ A hydrate reaction takes place. At this point Kim Vu doesn't state the silver ions (Ag^+) go to the cathode, but I believe they do and they form the dendrites and filaments. Simeon J. Krumbein says they do and to see more about this visit his work.[4]



Submit your "FREE TO CURRENT MEMBER" RadioAd by the 15th of February, May, August, or November in time for the Bulletin issue that follows. Unless otherwise requested, RadioAds will run two consecutive issues.

For Sale: Kennedy 26—$125.00 Needs restoration. Radio is complete and restorable. Controls are on the side. Will email pictures. Will assist with delivery in Marion and Johnson Counties, Indiana Fred Prohl, (317) 736 1228 or fprohl@gmail.com

Regretfully the editor misplaced (lost) a RadioAd scheduled for this issue of the Bulletin. Please resend and we will email the ad with the next Radio Activity announcement.

2019 Officers	Responsibilities
Alex Whitaker President 2927 South East Street Indianapolis, Indiana 46225 317-787-2854 ehscott@sbcglobal.net	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	Dues, financial, and address change. Please notify immediately of change of address.
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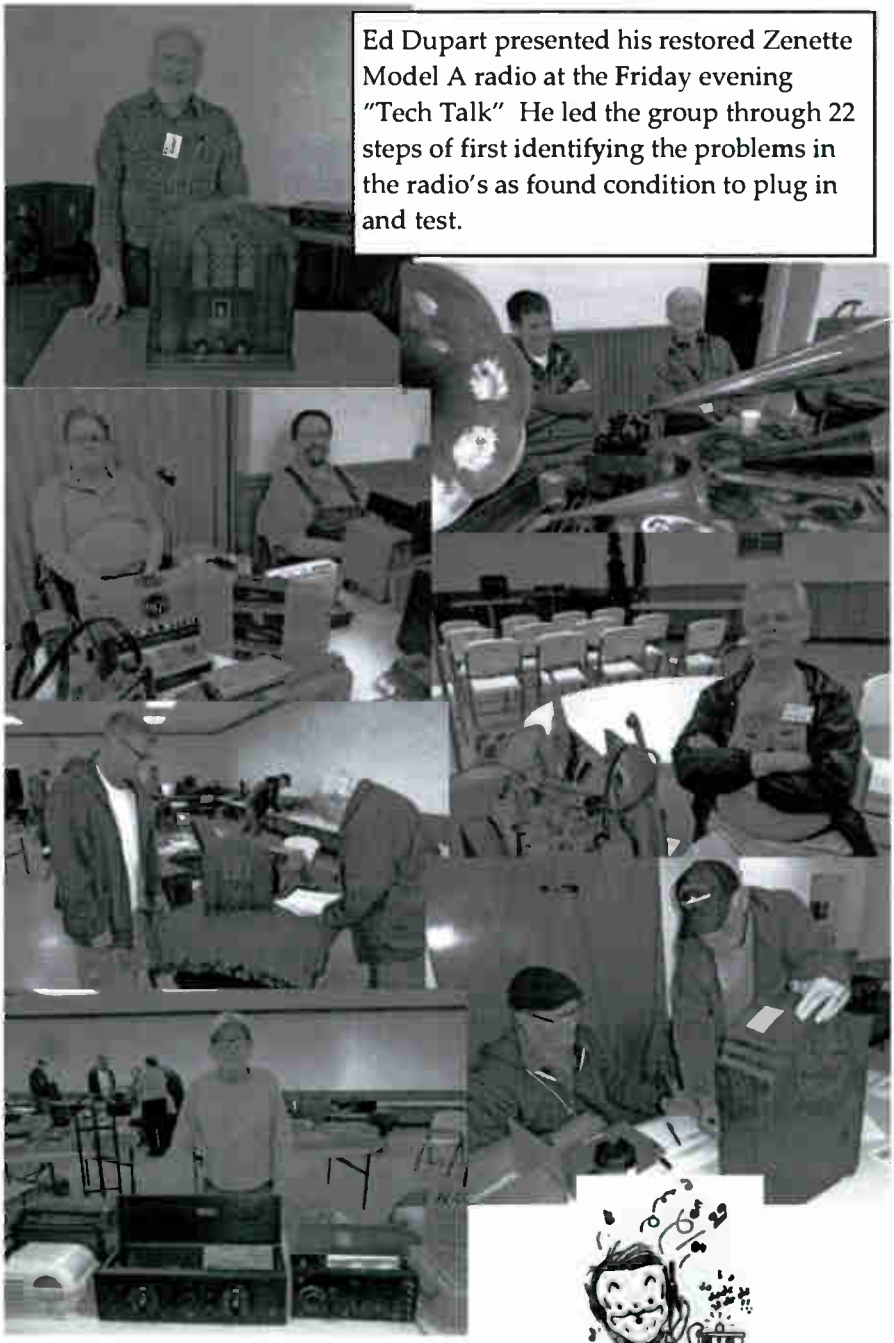
Dr. Ed Taylor, Historian 1790 East 54th St. Apt 112 Indianapolis, IN 46220 (317) 259-4842	Indiana Historical Radio Society Historical Documentation

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. when requesting information. Send applications for membership and renewals to Don Yost, our treasurer as noted above.

The BULLETIN
A publication of the Indiana Historical Radio Society
Forty-seven years of documenting early radio.

Around the room at the 2019 IHRS Spring Meet in Kokomo



Ed Dupart presented his restored Zenette Model A radio at the Friday evening "Tech Talk" He led the group through 22 steps of first identifying the problems in the radio's as found condition to plug in and test.