

# SOUND WAVES

## VRPS Spring 2017



### *From the President*

Greetings!!...the year is young... and yet so much has happened. Let me try to catch you up as some of you may or may not be aware of recent changes in our VRPS lives. First, please welcome aboard our new treasurer, and board director, Dave Seymour. Dave has a passion for old radios and has quite the creative talent to restore radios and speakers. Dave was asked, and then accepted, the role of treasurer in the wake of the resignation of long-time treasurer and board member, Bill Jewell. No, Bill is not going anywhere; he just has some time constraint issues associated with work and family and

felt he needed a break from his treasurer duties. Frankly, I am not sure why he thought he needed a break. After all, he has only been the treasurer twice and only for about 10 years the last go round!! Seriously, Bill has been a wonderful asset to the organization, to the Board, and to me personally. His willingness to answer random questions from me would be enough to qualify him for an undetermined number of medals!!

Another change I am happy to announce. We have signed a contract with a new convention hotel. Yep, after 17 years at the Hampton Inn and Suites in Mesquite, we finally reached the inevitable conclusion that, with rising rates, we could no longer afford the Hampton. Thus, we began a serious look at what else might be available to us in the metroplex. We have very stringent needs...especially because we like to do auctions as a way of making our conventions self-sustainable. I will not bore you with the details, but suffice to say, we looked at comparable facilities in the mid-cities, Duncanville, and Plano. After several directors viewed the hotels and discussed the pros and cons of each facility, there was a strong consensus that the Plano facilities, the Comfort Inn and Suites of Plano East (located near Park and Hwy 75), was really going to give us long term opportunities at a reasonable cost. Elsewhere in this issue you will read more details as to the transition from Mesquite to Plano. I really believe you will like these facilities, and I encourage you to begin booking reservations now for our 43rd convention in

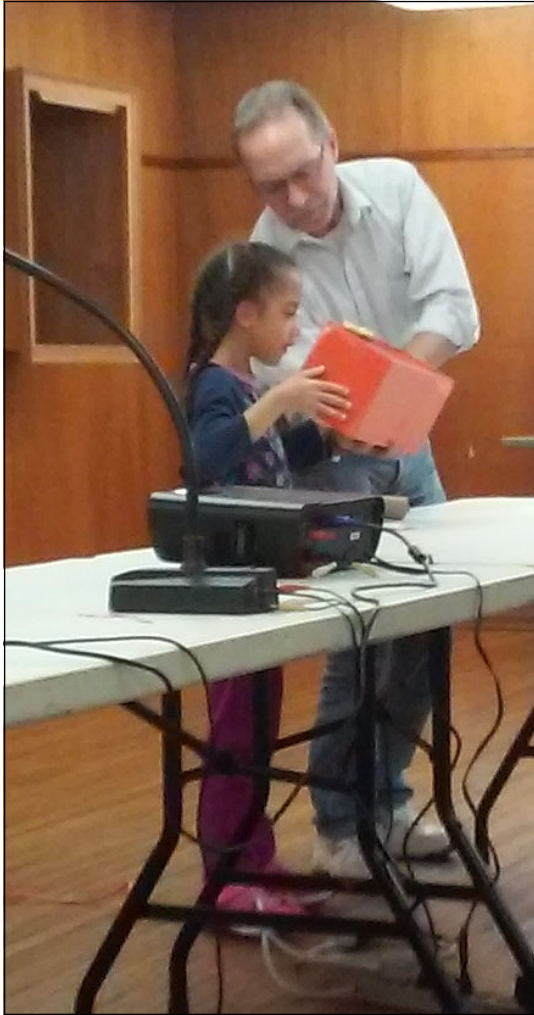


## Notes from the January 21, 2017 Meeting

Randy James opened our meeting, reminding us of our upcoming meetings and our spring auction – to be held in March. Larry Lindsey introduced our meeting co-presenters, Kurt Ehrlich and Eric Kirst. They discussed the history of the invention and development of the phonograph and the industry that brought it into our world. Kurt discussed the fact that Thomas Edison was credited with the invention of the phonograph, by virtue of being issued a patent dating the invention to December 6, 1877. His first recording was of “Mary Had a Little Lamb”. (However, he did not create the first recordings of sound, as pointed out later by Eric Kirst). His invention was inspired by efforts to develop a telegraph repeater device. He envisioned a number of uses for the phonograph ..... letter writing; books for the blind; elocution training; music; music boxes; dolls; clocks; alarms; teaching; telephone repeaters. Edison phonograph cylinders were difficult to manufacture and were not very durable. By about 1929 cylinder records were no longer produced, as disc records took over the marketplace. However, there were machines made for recording dictations on a cylinder that could be shaved smooth a few times and re-used by stenographers. Late in the 1800’s Edison shifted his interest into developing the light bulb, but his company eventually made flat-disc phonographs and records, using vertical motions to cut the grooves. This resulted in the requirement for Edison records to be very thick so they wouldn’t warp and wobble making the sound louder and softer. Others invented a floating needle scheme to prevent this problem, notably Alexander G. Bell and Charles Tainter.

Emile Berliner invented the flat-disc phonograph, which performed much better than cylinders and made possible production of great numbers of records made from a master. He based his development on earlier experimental work analyzing sound, done by recording and by making graphic traces on paper or smoked glass. A Frenchman, Scott de Martinville, was the first person to capture sound. In 1857, he patented the phonautograph, a device that, like the phonograph, funneled sound waves through a horn. The traces were made using the sound pressure waves to laterally move a sharp stylus. Because these recordings of sound patterns were for scientific study of the nature of sound, they were never intended to be “played back”. Recently, scientists have used optical methods to scan some of these old “records” and have played them back. They can be heard by following an internet search of OLD BUT NOT THE OLDEST EDISON VOICE RECORDING. Berliner’s lateral recording method proved to be much superior to Edison’s vertical (hill-and-dale) recording method. Many improvements came along, resulting in the Victor Talking Machine,

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## Notes from the February 18, 2017 meeting

Our meeting was held in the Garden and Arts facility. Dave Seymour was introduced as our new Treasurer and board member – taking the handoff of a long-time job well done from member Bill Jewell. We were reminded of the upcoming Spring Auction in March. Also, we learned of the big change this year for our annual November convention. After 17 years at the Hampton in Mesquite, we will be moving to the Plano-East Comfort Inn & Suites, 700 Central Parkway East (behind Denny's in Plano). Reservations can be made now.

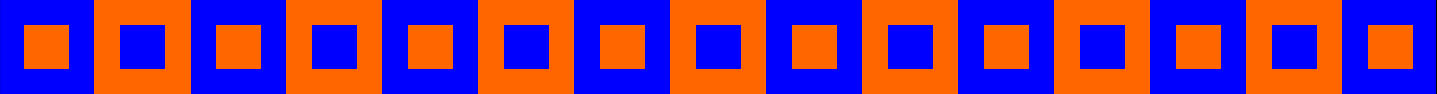
Our program director Larry Lindsey introduced our meeting theme, which was for members to show-and-tell items one-at-a-time and repeat if time allowed (it didn't). Following is a list of presenters and the items they brought for discussion:

- Billy Smith – a large Hi-Fi output transformer and a built-from-scratch amplifier and pre-amp.
- Dave Seymour – a multiple-voltage power source kit for battery sets; a 1938 Wells-Gardner radio with a new disc drive made from a plastic binder. Also an ACME dipole speaker with original finish.
- Randy James – a Van de Graaff generator from Frey Scientific, about 2 feet high, which he demonstrated making big sparks to his fingers and arm.
- Jimmie Conner – a Grundig Model 1070 (ca. 1958) multi-band radio made for export to the U.S. (It has the 640/1240 Conelrad marks) It has a tuning bar, instead of a tuning eye.
- Eric Reutelhuber – a Dahlberg pillow-speaker radio bought by his Mom at an estate sale for \$50.00. The dimes in it were from the 1950's. It plays 15 minutes for each dime. It's pre-1955 (no Conelrad marks).
- Kurt Ehrlich - Showed a "gold" record, the first to win the RIAA award, being "Catch A Falling Star" by Perry Como in 1958. He also showed some Tone phonograph needles.
- Joe Strickland – a 1946 SCOTT with modern FM band, noise clipper and separate I.F.'s for the AM and FM bands. It sold new for \$1200.00 in a cabinet. They made about 10,000 during '46 and '47, warehoused them, then cased and released them as they were ordered. They offered a separate remote-wired record player. It has a copper-plated steel cable to drive the dial, push-pull 6L6 output tubes, a 30 cycle to 15kc response, temperature compensation instead of AFC with a VR tube in the power supply. He gutted all bathtub caps and replaced most resistors.
- George Potter – Said he had counted windmills during his travels. He saw an Aermotor sign, advertizing one of the most common windmills to generate electricity before the REA (Rural Electrification Administration). He said there were over 1300 windmill companies, Wincharger being

## ***From the President (cont.)***

November. We need to make a good impression our first year, so let's book'um soon. A new location will dictate some other subtle changes in our convention...but we will cover those in future forums. 2017 is starting off with a bang and really shows no sign of slowing down. See you at a meeting soon.

—Jim Sargent



## ***Notes from the January 21, 2017 Meeting (cont.)***

the Graphophone and many other sources of phonographs. Over time, the technology advanced to bring us "Hi-Fi" long-playing 33-1/3 RPM stereo records and their supporting amplifier and speaker systems. The RCA 45 RPM players and records became popular for single and two-tune releases - later with finer grooves and more selections per record. These products were their answer to Columbia's development of the "Microgroove" record.

Eric Kirst entertained us with his Victor "M" table model, external horn phonograph, playing a 1902 record.

Author's Note: Very early in my Engineering career, I recall using a Dictaphone machine to record a letter or report to be transcribed and typewritten (reluctantly) by a secretary. I had never seen an Edison cylinder record before. I have since seen several of these machines in antique malls.

Bill McKeown

## ***Notes from the February 18, 2017 Meeting (cont.)***

one of them, there is a windmill museum in Amarillo and a coffee-table book having every manufacturer covered.

- Caitlyn Zaleski, (Walt's daughter) - a 1952 Philco Transitone model 53-562 AM/SW radio made in the fall of '52. She has about 20 radios in her collection, some 65 years old. She pointed out the features on her radio, such as the I.F. cans, bandswitch at the rear, and the 5 tubes, while referring to the schematic diagram. She is a very young collector (age 7 years), so her dad has to bring her to the meetings.
- Ed Janssen – an unusual farm set having a vibrator-type power supply and a dynamic speaker.
- Mike Grimes – told us about an interesting museum in Kilgore (about 2 hours East of Dallas). It is located in an old Chevrolet auto dealership building and contains relics of radio and TV broadcast stations, including a mobile TV van from KRLD. The artifacts were originally located in an Irving museum. The entrance fee is \$4.00. Mike suggested we think about a field trip or carpool arrangement to visit this museum.

Bill McKeown



## Radio Detective Mystery The Case of the Phuddling Philco By Mike McCarty

Some months ago, a club member called me with a request to give him some telephone help with trouble shooting a radio which had interesting symptoms. This was a Philco 116X code 122 chassis. The service literature may be found in Rider's Perpetual Volume 6-12 through 14, or at <http://www.nostalgiaair.org/> by clicking on Resources -> Philco Radio & Television Corp. -> 116-X (Code 122). In order to see all the parts list, you'll also need to look at model 116-B (Code 121). The schematic looks more daunting than it really is. This is a multi band radio, and much of the complexity is simple switching of coils.

The club member is an experienced radio repairer, who has several successful repairs under his belt, but found this set a challenge. He had done a reasonably full repair already. That is, he had replaced all electrolytic capacitors, all paper capacitors, and all out of tolerance resistors with modern equivalents. Normally, this results in a working radio, but not in this case. The symptom was "all tubes light, no reception". His first trouble shooting technique was to measure all voltages, which were within normal tolerance.

This was a case for the Radio Detective!

He had also already done some preliminary trouble shooting using the technique of signal injection. Injecting an audio signal into the volume control resulted in good sound volume, so the presumption was that the audio frequency stages of the set were operational, and there was some residual fault in the radio frequency portion of the set. This radio has a radio frequency (RF) amplifier, a conversion stage with separate local oscillator and mixer (called the first detector DET), and two stages of intermediate frequency (IF) amplification, followed by a detector (2nd DET) and the audio frequency (AF) amplifier stages. The symptoms could be caused by a fault in the RF amplifier stage, the mixer or oscillator, either of the IF amplifiers, or the detector.

Adjusting his signal generator to create a modulated signal at the IF and applying it to the detector (2nd DET), he verified that the detector was doing its job. Injecting at the grid of the second IF amplifier showed that it was working. Gradually, he worked his way back to the control grid of the RF amplifier, and showed that the signal made its way all the way to the speaker, verifying that the RF amplifier, mixer, and both IF amplifiers were functioning. Applying the signal to the antenna terminal resulted in no output, however, so he suspected some problem with the antenna circuitry, or perhaps the band switch. Doing resistance checks however, turned up no problems. So, this was the first mystery. At this point, he gave me a call.

The solution to this little mystery was actually quite simple. A quick look at the schematic showed component (1) Wave Trap. The purpose of a wave trap is to prevent the output of the IF amplifier from making its way back through the antenna and re entering the IF amplifier. As anyone who has turned the gain up too high on a public address amplifier is aware, when the output from an amplifier gets back into the input, one gets an oscillator. The wave trap was simply doing its job, and explaining this to the club member clarified this confusion.

It did not, however, explain why the regular radio stations were not being received.

Since the RF amplifier, mixer (as an amplifier, not a

mixer), IF amplifier, and detector stages all worked, this made me suspicious of the mixer (as an actual mixer) or local oscillator. I suggested that he tune to a strong local station, which he did by looking only at the tuning scale, since there was no reception. We computed the frequency for the local oscillator, and set his signal generator to this frequency, in unmodulated mode. Using a 0.1 uF isolation capacitor on the output of the generator, he connected it to the cathode of the mixer, where the local oscillator signal is connected. Immediately, the station came in!

This pointed to the local oscillator being at fault, that is, not oscillating. There is one little problem with this theory. The voltage on the cathode of the oscillator is set by the current through the tube, which is controlled by the grid bias. The grid bias comes from it rectifying its own signal. If the local oscillator were not working, there would be no bias. No bias means no limit on the current, which would then be high. High current means high cathode voltage. However, the cathode voltage was supposed to be normal. I suggested a recheck of the voltages on the local oscillator tube.

He disconnected the signal generator, got out his digital multimeter, and put its probe on the cathode of the local oscillator. Immediately, the local station came in loud and clear! When he took the probe off the receiver quit working! Probe on, reception, probe off, no reception!

Leaving the probe on the cathode of the local oscillator, he tuned around the dial, and several local stations came in at the correct locations on the dial! Removing the probe immediately killed reception!

How could measuring a voltage cause the radio to start working?

It appeared that, somehow, putting the meter probe on the cathode of the local oscillator tube caused it to start oscillating, while removing the probe stopped it. I had an idea that this wasn't the case, and wanted to verify my belief that the tube was always working. Normally, I would use an oscilloscope to verify this, but the club member had no oscilloscope. As an alternative, we tuned the problem receiver to a known frequency, and computed the frequency of the local oscillator. Then we tuned another receiver to the computed frequency. We could hear a signal! We verified that the receiver with the problem was the source of the signal by tuning it around a little bit, and verifying that the local oscillator signal moved where we could receive it.

The local oscillator was always operating, and on frequency!

So, how did putting the probe on the cathode of the local oscillator make the receiver work?

We had verified proper operation of all the stages of the radio: RF amplifier, mixer, local oscillator, both IF amplifiers, detector, and all the AF stages. Since each stage was operational separately, why didn't the radio work?

It had to be a problem with the stages not working together, cooperatively, so to speak. In electronics, this is called "coupling". We knew that the mixer was getting a signal from the antenna on its control grid, and that when a proper local oscillator signal was injected from a signal generator into the cathode, it worked. We also knew that the local oscillator was generating a proper signal. The signal the local oscillator was generating was not getting into the mixer. It wasn't "coupled". Somehow, the probe was providing the necessary coupling.

A quick look at the schematic searching for parts connected between the local oscillator and mixer turned up component (40) shown on the schematic as 1,250  $\mu\text{f}$ , in the parts list as "Condenser (.00125 Mfd. Tubular)" which is actually inside a Bakelite Block Condenser. Since this component had already been replaced, I suspected that the new component had been damaged during installation, possibly overheated, and that the meter probe and cable

were proving enough capacitive coupling of the signal for the mixer to work. To check this, I suggested temporarily connecting another capacitor in parallel.

Temporarily placing a known good component in parallel with a suspected bad (especially open) component, sometimes called "bridging", is a commonly used trouble shooting technique. When the new condenser was bridged in, we verified that the radio was functional on all bands. This verified my earlier hunch. The coupling condenser between the local oscillator and mixer was not doing its job. The mysterious behavior was now explained, and the caller knew what needed to be done to complete the repair.

Case solved!

New Convention Hotel—Comfort Inn & Suites Plano, Tx 700 Central Parkway East, Plano, Texas 75074



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# **SOUND WAVES**

## **MONTHLY MEETING PROGRAMS 2017**

NOTE: Programs will be held at various locations in Irving, Texas. Make note of the location as they may change from time to time. Senter East, 228 Chamberlain St.; or Garden and Arts, 906 S Senter Rd. Maps are located on the WEB site, [www.VRPS.org](http://www.VRPS.org) EVENTS page. Programs start at 2pm. unless otherwise noted. Call us on the cell tellie if you get lost: 972-898-7251 or 972-742-8085.

**APRIL 15 — MIKE McCARTY — " INTRODUCTION TO SUPERHETERODYNE THEORY" — GARDEN AND ARTS 2PM**

**MAY 20 —TAILGATE SWAP MEET — GARDEN & ARTS 8am-12noon**

**JUNE 17 — JIM SARGENT — "ARTIFACTS OF THE TELEGRAPH ERA" — SENTER EAST 2PM**

**JULY 15 — REPAIR SESSION — SENTER EAST 8am-12noon**

Programs are subject to change, contingent on scheduling conflicts. As always, your suggestions for programs/content are welcome. If the programs do not fit your needs and you want something different, let me know. I need volunteers to organize other programs, so consider presenting a program yourself.

Call anytime or send an email: **Larry Lindsey email: [pipilindsey@tx.rr.com](mailto:pipilindsey@tx.rr.com) telephone: 817-312-8761..**