The Jersey Broadcaster

NEWSLETTER OF THE NEW JERSEY ANTIQUE RADIO CLUB

September 2004 Volume 10 Issue 9

MEETING/ ACTIVITY NOTES

MEETING NOTICE

DATE/LOCATION CHANGE

This month's meeting will be moved to InfoAge for a tailgate swapmeet and picnic on Saturday, September 11th. The official time is 9AM to 1PM, but we're pretty liberal on both ends. Bring your own food, grill, something to swap and something to entertain the kids with - its a family affair. You'll get a chance to see what progress we've made and perhaps be inspired to become a more involved InfoAge volunteer. A map and directions are included in the *Broadcaster*. The rain date is Sunday, but call Phil Vourtsis at 732-446-2427 if the weather looks questionable.

Reported by Marv Beeferman

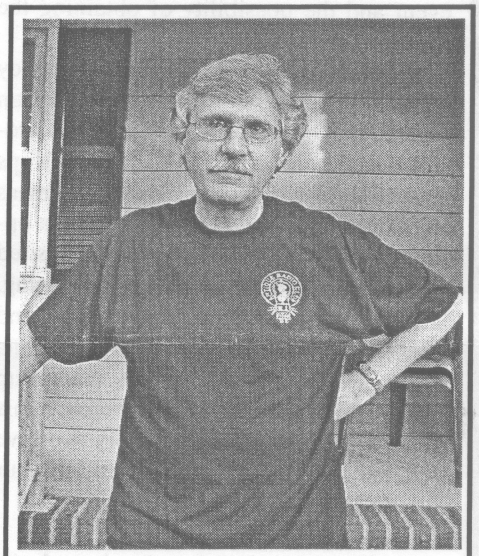
The August NJARC meeting opened with a first-rate travelogue produced by Phil Vourtsis on his recent European vacation, which included a pre-Olympic trip to Greece. Although his itinerary was quite hectic, Phil did manage to do some radio shopping in a Greek flea market "which seemed to go on for miles." Phil said he did come across a few interesting candidates for purchase, but prices were relatively high. He did finally settle on a very nice Horney-Phon (no comments, please) Bakelite set which was both collectable and portable. But his careful wrapping to avoid travel damage was reversed by an over-zealous customs inspector who probably grew up on transistors and printed circuit boards and couldn't figure out what those funny looking glass things were.

August was also show-and-tell month and here's a short commentary to go along with the pictures:

• **Steve Goulart** showed a Bing Crosby 1948 "Junior Juke" found in Collingswood. Although a toy replica of a jukebox, it has a 4" speaker, plays 12" records and is quite colorful with its marbleized plastics. It was manufactured by both the Lindstrom Corporation and the Ideal Novelty and Toy Company and originally priced at $30. The jukebox was offered in the auction later in the evening.

• Many collectors seek out items from their childhood to bring back some of the nostalgia of the past; for **Steve Calandra**, it was a miniature Panasonic phonograph. Steve also talked about a unique 1960s AMI 33-1/3 turntable/amplifier combination with speculation that it might have been, with its canteen speakers, a trade show juke box demonstrator.

• **Darren Hoffman** displayed a Wollensak T-1700 tape recorder seldom found in working condition. It was a 12-volt, vibrator-driven version of its AC cousin and was meant to be used to listen to reel-to-reel tapes in an automobile. As an aside, Steve told a story of getting lost on the roads of Brooklyn and, purely by chance, finding the recorder's service manual in a "going out of business" Hi-Fi store. (Knowing Brooklyn, I'll bet the store is still there.)



What makes this gentleman appear so dapper and handsome - could it be his NJARC club tee shirt?

• **Russ Weiss** talked about a beautiful 1935 Fisk AWA (Amalgamated Wireless Company of Asia) Radiolette "Empire State" or "Skyscraper" radio which he bought on e-bay and which arrived safely from Australia. Sir Ernest Fisk pioneered the radio industry in Australia, and was responsible for many of its technical advances and achievements. An interesting point about the radio was that it had no "on-off" switch - you just plugged it in. Russ explained that the seller told him that in the 30s, electricity was usually found in only one room in an Australian home.

• **Dave Snellman's** theme was "keep looking - the bargains are still out there." Examples included Bucher's "Practical Wireless Telegraphy" (1917-1921) which he obtained at a library book sale for $1 and a 1927 ARRL Radio Amateur's Handbook which included a DeForest "Radio Apparatus Catalog" pressed between its covers. Dave also showed a sought after Sony CRF1 "true" communications receiver. The radio listed for $1395 in 1982 and sells for between $500 and $700 on ebay...Dave got it for $100 at a Baltimore hamfest.

We also had contributions from Sarnoff Library director **Alex Magoun** (dog collar radio), **Jerry Dowgin** (1965 Micronics "Ruby" transistor radio), **Ray Facinelli** (Panasonic RF2200 radio), **Rob Flory** (infrared receiver), **Marty Friedman** (6H6 metal dual diode), **Rich Skoba**

THE JERSEY BROADCASTER is the newsletter of the New Jersey Antique Radio Club (NJARC) which is dedicated to preserving the history and enhancing the knowledge of radio and related disciplines. Dues are $20 per year and meetings are held the second Friday of each month.

The Editor or NJARC is not liable for any other use of the contents of this publication.

(1915 Murdock condenser) and your editor (1916 Sears "NAA" loose coupler).

Thanks to the determination of vice president Richard Lee, club T-shirts are again available. If you're not distracted by the handsome hunk modeling it, they really look great...black with an embroidered gold logo (nothing on the back), 50% cotton/50% poly and in all sizes. Cost is $15 and well worth it (the club is just about breaking even on these). The future may also hold sweat shirts and jackets, but for the present, the shirts will be available at meetings and swapmeets. If its hard for you to make these events or you just can't wait to show the club colors, call Richard at 845-359-3809 and he might be able to work out something.

In closing, I would like to say a few words about a comment regarding the club's slumber habits that appeared on the NJARC Reflector. Basically, it seems we were taken to task for being asleep at the wheel while a prime location opened up as a potential meeting place and museum. The former AT&T radiotelephone site in Ocean Gate, New Jersey closed down a few years ago...we were well aware of this event and the possibility of obtaining the site was considered.

Ocean gate was a high-frequency (shortwave) radio transmitting station owned and operated by AT&T. It provided telephone communications to ships at sea (high-seas service) and to overseas locations. In fact, one of our members operated WOO for many years and I visited him some months before the final closing. Indeed, the building is clean, large and comfortable and overlooks a large antenna display. The NJARC salutes the group that's trying to restore and promote this great piece of New Jersey history and give them our full support, but it just wasn't our cup of tea. Here's why:

- Public access and location is undesirable - it is southeast of Toms River, basically well off the beaten track and the closest major road is Route 9 which is tough to travel on a Friday night (especially in the summer). This compares to the Sarnoff Library and InfoAge where access is relatively easy for both members and the public. Indeed, there is serious consideration of running a water taxi up and down the Shark River with a stop at InfoAge!
- Security and upkeep (including heating and cooling) is questionable.
- Although probably interesting to us techno-geeks, the theme is narrow and sterile to most of the general population. "Hey kids - let's drive down to Oceangate where we can tour a museum dedicated to high-seas and overseas radio telephony and long-distance telephonic communications! And if we get bored, we could always watch the sun set over the antenna field." How could this possibly compare to the depth and name recognition of Marconi, Camp Evans and Sarnoff?
- InfoAge came with a ready-made museum - **The Broadcaster's Hall of Fame**.

I could go on, but it's time for a nice cup of chamomile tea and a short snooze. Hope there's nothing else I loose while in dreamland.

(**Correction:** In the August newsletter, I attributed the Dover swapmeet advertising to Ray Chase...it was really Joe Bentrovato who did such a great job.)

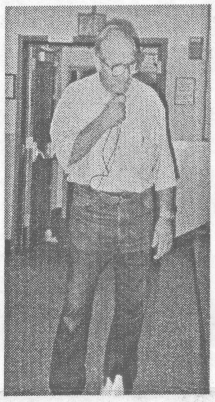
INFOAGE UPDATE
By Ray Chase

On August 26th, we learned that the final Army signature has been affixed to the deed and 17 acres of Camp Evans have been officially transferred to Wall Township for lease to InfoAge. This includes the Diana site and the two cottages. Although its great news, it also means that the responsibilities of the InfoAge volunteers have become more demanding and we all will be looked upon for more support. It's been a long haul and there is still a ways to go, but we've made significant progress since former NJARC president Tony Flanagan's vision more than 10 years ago. Many thanks to all who have actively worked on the buildings or supported this effort and helped it come to fruition.

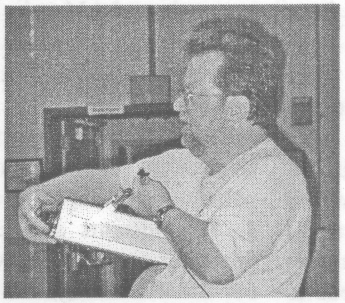
Now for an update. The cottages are now connected to the sewer lines and the lines are awaiting testing. The Army has no further work to perform on the cottages, and they now belong to InfoAge. The Marconi hotel is hooked up to the

(Continued on page 4)

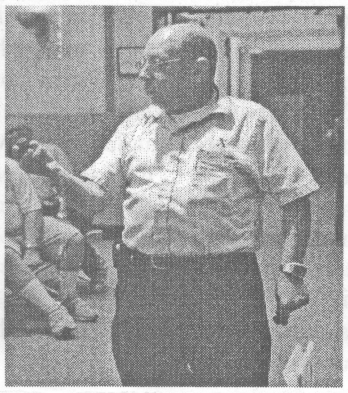
SHOW-AND-TELL



Ray Facinelli



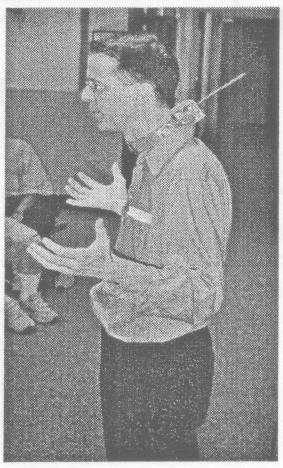
Dave Snellman



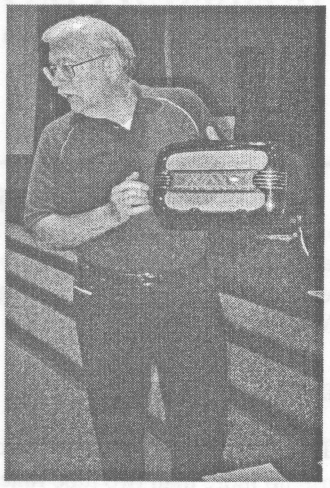
Marty Friedman

Rob Flory

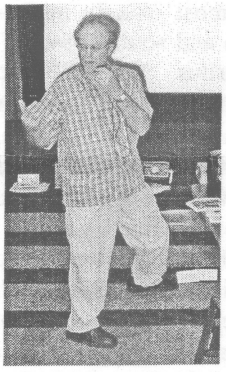
Jerry Dowgin



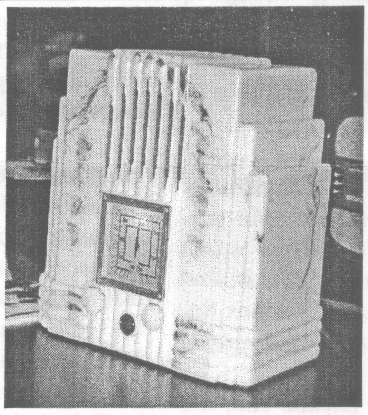
Alex Magoun

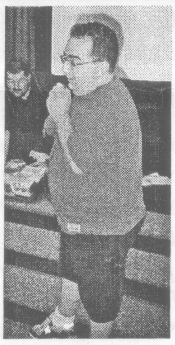


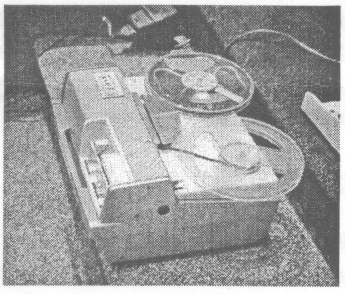
Phil Vourtsis



Russ Weiss







Darren Hoffman

Steve Calandra

Al Klase auctioning Steve Goulart's "Junior Juke"

(Update continued)

sewer line and the Army has committed to remove all asbestos and complete the electronic work on the new heating plant. The copper gutters and down spouts have been replaced and new sump pumps have been installed; not expected but welcome. Fred Carl has personally abated all the mold and the hotel nears completion. Sewers have been connected to the Library (or L building) behind the hotel. The section where the Broadcaster's Hall of Fame collection is stored is in good shape and needs no remediation. The rest of the building needs to have its sheet rock removed and this will be our task.

NJARC 20004 HOMBREW CONTEST ANNOUNCED

By Al Klase

The 2004 homebrew AM **radio receiver** contest will be judged at the November meeting. Once again, the objective is to preserve the tradition of building your own AM **radio receiver**.

Category 1 - Primitive

- The signal path of the radio receiver may use no more than two tube functions.
- Solid-state diodes may be used for detection as in a crystal set or reflex circuit.
- Transistors or integrated circuits may be used only in the power supply. Any convenient power supply may be used and may contain additional vacuum tubes.

Category 2 - Beginner

- Same rules as Category 1.
- Contestant has never before made a serious attempt at building a radio from scratch.

Category 3 - Open

- Any recently constructed homebrew radio.

Category 4 - Vintage Reproduction

- Faithful reproduction of 1920-1939 homebrew radios.

General Contest Rules:

1. The contest is open to NJARC members only and AM radio receivers only.
2. Entries are limited to "scratch-built" radios as opposed to kits or modified production sets.
3. Entries must have been recently constructed by the contestant, and must be capable of receiving at least one AM station.
4. Contestants should be prepared to demonstrate their creations at the November 2004 meeting, and say a few words about the design and construction of their radio.
5. The membership in attendance will vote for the best entries in each category.

TUNE IN TUINUCÚ

By Marv Beeferman

Jerry and Marsha Simkin are avid collectors of sheet music with a radio theme. They recently showed me one of their latest acquisitions, a piece called "Tune in Tuinucú (And Get it on Your Radio)" by Frank H. Jones and Harry M. Taylor. A short summary on the back of the sheet music described the origin of the signal, radio station 6KW in Tuinucú, Cuba. I thought it would make the basis for an interesting article and I didn't have to look far for references. A search through Jerry's extensive radio memorabilia produced a wonderful little booklet which both served as a description of the station and a "Certificate for Long Distance Radiophone Reception" which was sent to AM DXers.

"When you hear the cuckoo-coo, it's station 6-K-W,

Means you've left the states and you are listening in on Tuinucú,

The cuckoo lives on Bacardi and some how that appeals to me,

And when feeling dry, I wish that I, were cuckoo just like he."

From the song "Tune in Tuinucú"
by Frank H. Jones

Station 6KW began experimental work at 50 watts in September 1922. In March 1923, power was increased to 100 watts and its inaugural program was broadcast on March 9th, 1923 at a frequency of 338 kHz. Before long, its signal had reached every state in the US as well as Canada, Mexico, the Bahamas, Bermuda, Honduras, San Salvador, Costa Rica, Panama, Columbia, South America, Haiti, Santo Domingo and Puerto Rico. At 500 watts, 6KW could be heard clearly at Pilot Station, Alaska - a distance of 4,700 miles from Tuinucú

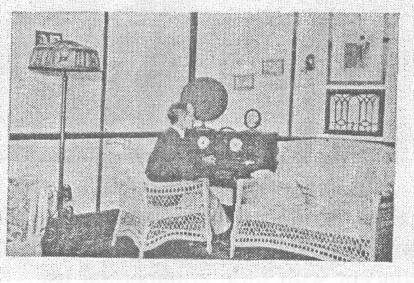
The station was the home of the Tuinucú Sugar Company, at that time one of the most modern sugar mills in Cuba. It was located almost exactly midway between the north and south coasts of Cuba near Sancti-Spiritus. The mill processed some 4,000 tons of sugar cane per day, turning it into raw sugar and shipping it to refineries in various parts of the world.

Tuinucú 6KW was one of the first radio stations to adopt a distinctive sound which was broadcast between programs to confirm identification. It sounded a Cuckoo call from a cuckoo clock and announced "When you hear the coo of the cuckoo, you are in tune with Tuinucú." It shared the Cuban airwaves with PWX, 2BY and 2LS Havana (400, 315 and 275 kHz), 7SR Elia (300 kHz) and 7BY Ciego De Avila (360 kHz).

The transmitter was designed and built by its operator Frank H. Jones (who also wrote the words to the song). The station was constructed from General Electric parts with two UV-203 oscillators, two UV-203 modulators and one UV-203 amplifier. Normally, the filaments were run

at 9.5 volts and the plates were driven from a DC generator at 1,000 volts. This produced an antenna current of 3.5 to 4.5 amps. With the filaments running at full voltage and 1200 volts on the plates, output could run as high as 6 amps. An additional three UV-203's, individually selectable, served as power amplifiers with the 100 watt set as a master oscillator.

The antenna was a 6-wire cage, 5 feet in diameter, 200 feet long and 125 feet high with a six wire rat-tail cage lead-in. A counterpoise, 35 feet above the ground, covered an area 400 feet long and 250 feet wide. Two steel masts, 115 and 125 feet high and 300 feet apart supported the system.

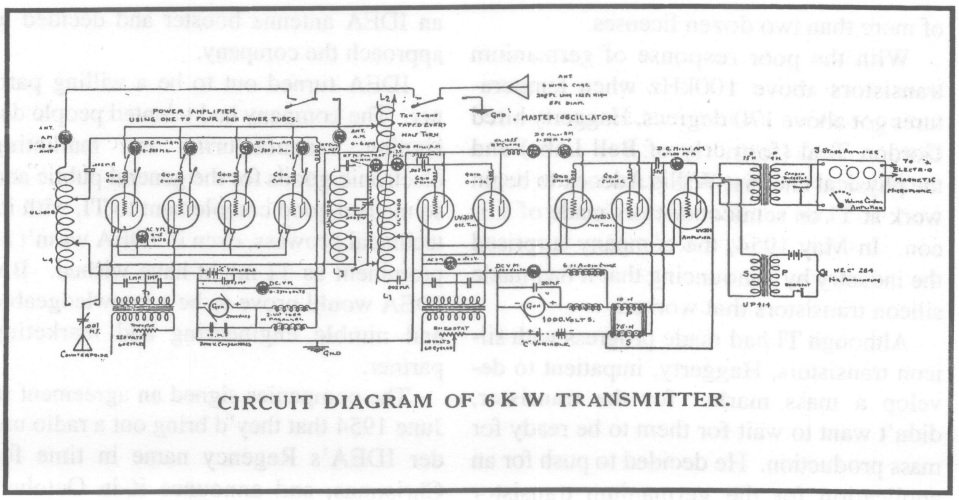


6KW's builder and operator - Frank H. Jones

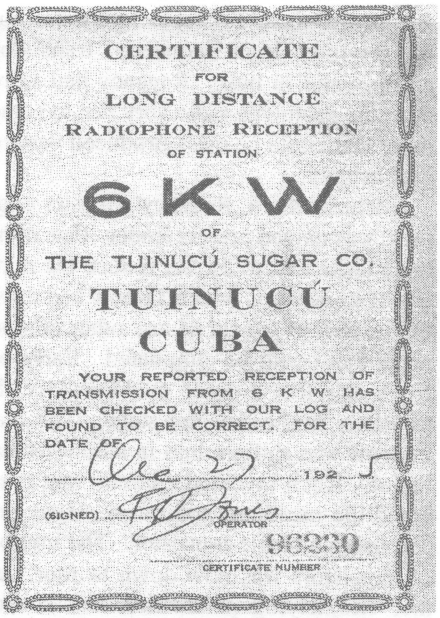
In the studio, Western Electric type 284-W microphones were used for speech and phonograph music. For orchestra broadcasts, a special low output microphone was boosted through a 3-stage AF amplifier and then fed to the 50 watt input amplifier of the transmitter. For transmitting piano music, "a device of the station's own design" was installed in the piano and gave "true piano reproduction with no echoes or running together of the tones."

You could buy a recording of "Tune in Tuinucú" on Columbia records (with the Spanish dance selection "Manzanillo" on the other side) for $1.00 or a piano roll for $1.50. You might want to keep an eye out for these during your e-bay searches. (Also, look for the EKKO verification stamps - they would be perfect for topping off Jerry and Marsha's collection.) The sheet music was available at 20 cents and a full orchestration was free with no broadcasting license charge.

6KW was typical of the many early "industry based" stations found throughout the world. With their demise, much of the romance of radio was lost.



CIRCUIT DIAGRAM OF 6 K W TRANSMITTER.



CERTIFICATE
FOR
LONG DISTANCE
RADIOPHONE RECEPTION
OF STATION
6 K W
OF
THE TUINUCÚ SUGAR CO.
TUINUCÚ
CUBA
YOUR REPORTED RECEPTION OF TRANSMISSION FROM 6 K W HAS BEEN CHECKED WITH OUR LOG AND FOUND TO BE CORRECT, FOR THE DATE OF
Dec 27 192 5
(SIGNED) F. D. Jones
OPERATOR
96230
CERTIFICATE NUMBER

THE REGENCY TR1 - FIRST TRANSISTOR RADIO

Edited by Marv Beeferman

A wonderful article by Robert J. Simcoe appeared in the Fall 2004 issue of "Invention and Technology." It traced the development of the Regency TR1 transistor radio and included some very interesting insight into the development of the radio and the two companies that brought its technology into being. With the technical information filtered out, we're left with a great techno-drama...Ed.

Fifty years ago, two small companies, working together, unveiled the world's first transistor radio. Called the Regency TR1, it introduced the revolutionary technology of the transistor to the general public, and it began the spread of all the miniaturized, battery-operated electronic devices that surround us today.

The companies were Texas Instruments and Industrial Development Engineering Associates. TI made instrumentation for the oil industry and locating devices for the Navy; IDEA mainly built home TV antenna boosters, many carrying the Sears Silvertone brand name. TI wanted to grow from a $20 million company into a $200 million one and IDEA wanted to get into new product areas.

Texas Instruments started work on a pocket radio in the spring of 1954, but the seeds of the idea had been planted three years earlier. In 1951, TI's vice president Pat Haggerty licensed the new technology of the transistor from Bell Laboratories. He had the vision to see that the little solid-state device would eventually replace the millions of vacuum tubes that were at the heart of the fast-growing electronics industry. By 1954, he was eager to get in at the start by establishing a high-volume, high-profile consumer market before anyone else. He chose the portable AM radio.

In 1950, Bell's process for creating transistors held promise, but it was so difficult to control that only one in 20 devices worked. Their Executives figured that the technology would develop much faster if a lot more people got involved so, in 1951, they decided to license it to anyone interested for $25,000. Haggerty paid the fee and Texas Instruments became one

of more than two dozen licenses.

With the poor response of germanium transistors above 100kHz when temperatures got above 170 degrees, Haggerty hired Gordon Teal (formerly of Bell Labs) and the physical chemist Willis Adcock to begin work at TI on semiconductors made of silicon. In May 1954, the company surprised the industry by announcing that it had made silicon transistors that worked.

Although TI had made progress with silicon transistors, Haggerty, impatient to develop a mass market for the transistor, didn't want to wait for them to be ready for mass production. He decided to push for an application for the germanium transistor where high temperature operation wouldn't be necessary. He was confident that manufacturing costs could be brought down fast if volume was high enough, and he believed that anything TI learned making germanium transistors would later help it with silicon ones.

In the late spring of 1954, Haggerty committed $2 million to a crash program to produce a portable transistor radio that would sell for about $50, considerably more than a portable tube radio but not unrealistic for a glamorous high-tech novelty. He set up an engineering team under Paul Davis, who had experience designing radios, to produce a prototype design that would be passed along to manufacturing and marketing partners yet to be found. Despite the fact that Davis had to pull together a team and start with no designs, no specifications, no coils or transformers suitable for transistor use, and no transistors that had been used at these frequencies, a working prototype was delivered to Pat Haggerty in about four days.

Although the radio design was straightforward, one major innovation was required. Roger Webster, one of the first members of the Davis team, made a fundamentally new design for the intermediate-frequency transformer. He both miniaturized the transformer and adapted it to specific characteristics of the transistor. His work became standard for transistor circuits.

The first design used eight transistors...too many for a radio that would sell for only $50, but it would allow the company to show potential partners a working device. But partners were few and far between including some of the most major radio manufacturers in the United States. Then, Haggerty noticed a magazine ad for an IDEA antenna booster and decided to approach the company.

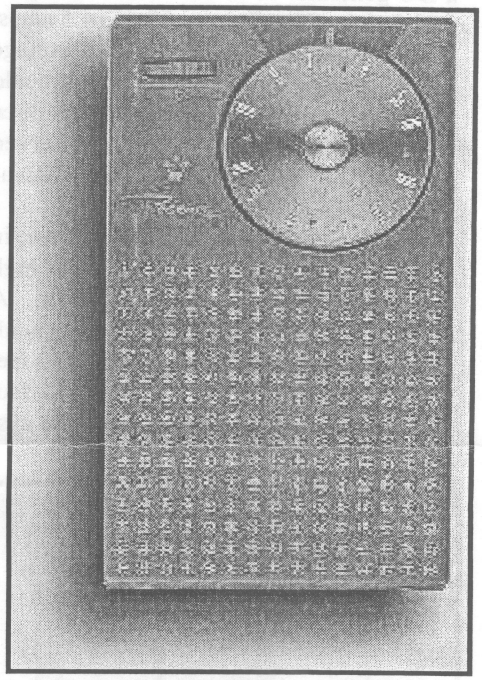
IDEA turned out to be a willing partner. The company had talented people designing, manufacturing and marketing electronic goods for the general public and so made a good complement to TI, with its technical prowess, even if IDEA wasn't as prominent as TI might have wished. But IDEA would prove to be a knowledgeable and nimble engineering and marketing partner.

The companies signed an agreement in June 1954 that they'd bring out a radio under IDEA's Regency name in time for Christmas, and announce it in October. But before then, TI had to figure out how to produce high-frequency transistors cheaply and in bulk. Regency had to reduce the prototype radio very fast to something that could be mass-produced very inexpensively.

Richard Koch, Regency's master engineer, was named project leader. One of his main tasks was to further reduce the number of transistors, which TI now had down to six, and to get rid of any other components that could be eliminated. Early on, Koch saw that a diode could replace the transistor at the detector stage. The only tradeoff was a slight loss in amplification. In July, Koch invented a circuit that combined the oscillator and mixer stages into one using a single transistor. The number of transistors was now down to four, further simplifying production and cutting costs, and the transistor that was eliminated was one that was especially hard to make from germanium, because of its high-frequency requirements.

Regency now placed an initial order with TI for 100,000 sets of four transistors. The price tag was $10 per set - even though transistors cost $10 to $15 apiece. TI color-coded the transistors and individually selected the ones in each set to make sure that together they'd provide enough amplification. Less than 10% of the transistors TI was painstakingly producing turned out to be usable, yet the company was going to have to increase its volume dramatically.

Regency engaged a Chicago design firm, Painter, Teague, and Petertil, to come up with a plastic case that could fit into a shirt pocket. Victor Petertil offered several concepts for a box 3 x 5 x 1-1/4" (the pocket would not be a small one). The final product was ready just barely in time to meet an October 31 contract deadline.



Finding parts small enough to fit together inside the case wasn't easy. The printed circuit board was still a fairly new concept with little commercial use. The two-stage variable tuning capacitor, made by the Radio Condenser Company, was so small that the manufacturer felt the need to add a set screw for adjusting its shaft. Chicago Telephone Supply, which provided the volume-control dial, didn't have one that was small enough and also had a switch, so Regency molded a cam onto the dial to make it turn the radio on and off. The 2-3/4" Jensen speaker was the smallest that anyone had ever produced. The coils and transformers had to be specially designed and hand-built for the TI prototype; Regency then worked with the Vokar Corporation to redesign the transformers so that they could be mass-produced.

Perhaps the most vexing problem was finding a supplier of miniature electrolytic capacitors. A Nashville company named International Electronics, Inc., was persuaded to set up a small assembly line to turn them out. The electrolyte formulation was tailored by Alan M. Holiday, a chemistry professor at Peabody College in Nashville. The very thin aluminum foil was imported from Germany.

The earliest capacitors had the foil and paste in a wax-coated paper tube. Unfortunately, the tube was too porous and allowed the water in the electrolyte paste to

evaporate, so, as most restorers know, the capacitors tended to dry out and fail, sometimes within six months. Soon they were housed in a distinctive white ceramic cylinder sealed with epoxy, but seal disintegration and limited leakage still resulted in early failure. Capacitors became such a headache in the TR1 that with the development of the TR6, only two electrolytics, sealed in aluminum, were used.

The TR1 was launched on October 18, 1954 with 1,500 radios. Raytheon, Bulova, General Electric, Emerson and RCA all scrambled to produce competing products, and they announced them throughout 1955. Over the next year or so, 100,000 TR1s were produced.

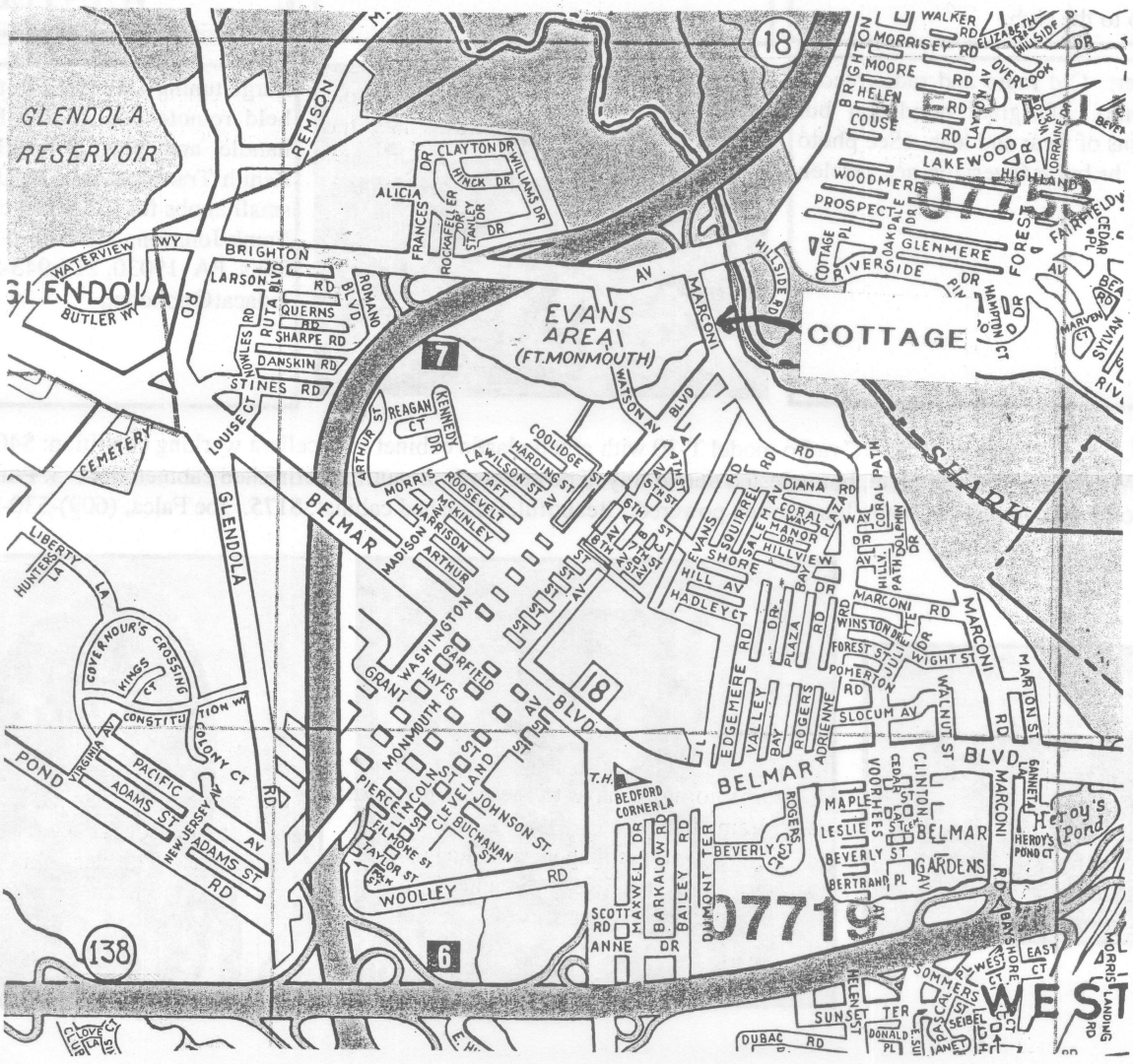
Within a few years, both TI and IDEA gave up on consumer transistor radios. Texas Instruments went on to great success, becoming a power-house of the semiconductor industry. Regency followed the TR1 with a succession of radios, the TR1G, TR4, TR5 and others. Along the way, the company sold its radio patents and resistor devision to TI, and by 1961 Regency had given up on AM radios in favor of commercial and citizen- band ones. Today, IDEA/Regency is RELM Wireless, a maker of two-way radios.

Although the TR1 was rushed out under intense self-imposed time pressure, its execution was superb. Even the radio's case has a classic simplicity and stands the test of time. Although the radio didn't sell in the millions, it was quite a hit. But more so, it helped initiate the transistor revolution.

DIRECTIONS TO INFOAGE

(The following directions are from the south, but they are easily adapted to any other direction):

Take the Garden State Parkway NORTH to EXIT 98. Bear to the right and take the exit for Route 138 EAST (Route 195 becomes 138 when it passes over the parkway). Continue on 138 and take the Route 18 NORTH exit. Continue on Route 18 and take EXIT 7 (Camp Evans Area) which will put you on Marconi Road heading east. Continue about 1/8 mile and the cottages are on the left (opposite the Marconi Hotel).



CONNECTIONS

Free exposure for buyers and sellers! Unless requested otherwise, each ad will run for two months in both the *Jersey Broadcaster* and the Delaware Valley *Oscillator.* All buying and selling transactions are the responsibility of the parties involved.

FOR SALE

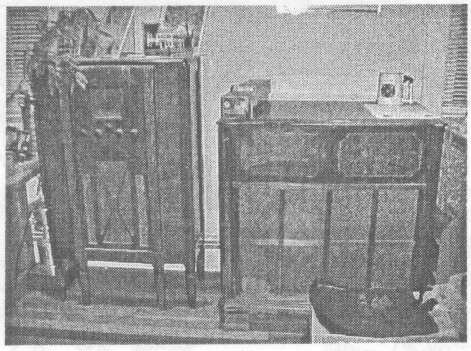
Check out NJARC's capacitor program for those most commonly needed replacements. Contact John Ruccolo at any club meeting or call him at home (609)-426-4568 to find out what's available. All proceeds go to the club.

Non-member: Old radio and radio/record player combo. Original condition but showing signs of wear and tear. (See photo to right.) hr.burns@verizon.net (Helen Burns).

The NJARC tube program offers clean, tested, boxed tubes at very reasonable prices with availability at any club meeting (no dealers, please...not for resale). Proceeds go to the club. Of course, donations of radio-type tubes in any condition are welcome. See Gary D'Amico at the next meeting.

National NC100 ASD with manual. Has been re-capped, needs alignment, $55. Jack Winans, 609-882-9296, WA2LGE @aol.com.

Non-member: Brunswick Panatrope console, late 30s, nice veneer but rather plain and boxy, AM/SW/78 turntable, storage space for records, usual amount of scratches, reasonable. Contact John Ruccolo at 609-426-4568 for phone number.



Spring cleaning sale: Shortwave radios - Hallicrafters SX99 $100, SX130 $120, SX-43 $130, Lafayette HA225 $70, BC348 $65, Heathkit G4-1680 $65.
Test equipment - HP 400D AC voltmeters, 1mV to 300V full scale, 4MHz bandwith, great for measuring gain in broadcast band radios, audio work, etc., good operating condition, $10. Measurements grid dip meter with book, $50. Tube testers, distortion analyzers, spectrum analyzer, scopes, etc. available - ask. Near recent (1980s?) stereo equipment receivers, tuners, turntables, $10 each (working).
Parts available: Tek465, Philips 3052 and various other HP and Tek equipment. Steve Goulart, 732-219-6963, sgoulart@att.com

WANTED

Large tuning knob for Pilot TV-37, handheld remote control for Fisher RK-20, handle and plastic bezel for military Zenith Transoceanic 520/URR, large and small knobs for RCA 110 cathedral radio. Frank Johnson, 530 Elford Road, Fairless Hills, PA 19030, 215-943-8295, fadacat@aol.com.

FOR SALE: 1. Capehart table BC radio model T-30 with green plastic cabinet in excellent working condition: $40. 2. Emerson table BC/SW model R-156 complete, but untested due to frayed power cord. Beautiful, refinished cabinet: $60. 3. Philco cathedral BC radio model 20 complete but only hums when powered. Beautiful, refinished cabinet: $175. Joe Falca, (609)-530-3208.