SOUND *WAVES*

Vintage Radio and Phonograph Society, Inc. April 2007

From the President.....

Jim Sargent

Having been writing this column for so many years, you would think I would run out of things to write about. Well, the good news is that ain't so! We are an active organization with many involved members who love what they are doing. There is always something going on. Our meetings are well attended, but in case you are not in the habit of making the trek to Irving the 3rd Saturday of each month, let me assure you our meetings are exciting, informative, and well planned. Mike Grimes does an outstanding job of putting together speakers and topics that will interest the attendees. I am still getting comments from those who attended the January and February meetings. In January, Mike McCarty gave an excellent presentation on the internal workings of the vacuum tube and the purpose of each of the components stuffed inside that vacuum envelope. A month later, Jerry Merryman led us through the development of the first portable transistor calculator in the early 60's. Jerry was the lead engineer working for Texas Instruments…yep, the same TI where the first transistor radio was developed 10 years earlier. Another of our members, Paul Davis, was on that team. Several years ago, he recounted his recollections of that project at one of our convention banquets. I tell you all of that to remind you …and me…that we have a vast pool of talented and informed members who have a lot to share regarding the development and operational aspects of radio and electronics. We may know of your hidden secret or talent…but in many, cases we do not. Offer your services to Mike Grimes to present a topic at a future meeting. All of us will benefit from what you share.

Of course there was no speaker or presenter for the March meeting…if fact, there was no March meeting. Instead, we held our annual Spring auction in Grapevine. This has been a tradition since the early days of the organization. Beautiful weather is not always a part of Spring time here in north Texas, but it was for this years auction. As usual, we had a full house of fine radios and accessories cross the auction block. Very few passed. Thanks to those who came and those who worked to make it a success. Total sales were in excess of $13,600 for the 300 plus items offered. See you in April for another fine meeting. The subject will be a favorite of mine, Mr. Edison. Good hunting.

Passing of a long time friend

by Jim Sargent

Sadly, I must report the untimely passing of a collector friend, Dwayne Steck, on February 15. Dwayne led a very interesting life, a collector of many things, his home was a virtual museum. But that was not the really interesting thing about Dwayne. His vocation was that of ride operator. He could be found running carnival rides at the State Fair or Stock Shows throughout Texas and as far north as Minnesota. He and his wife, Beverly, had done that for many years. Prior to that they ran a Dallas institution, Penny Whistle Park. I will miss our visits and conversations.

Crosley Ventures Beyond Radio

By George Potter

Powel Crosley, Jr. was well known for his ventures into radios, automobiles, 500,000 watt WLW broadcast station, an airplane (the Crosley Flea), and a baseball team. Not too long ago, Dave Crocker of Antique Radio Classified (ARC) wrote an article and listed all the known ventures Powel Crosley had at one time or the other dabbled in. Like any other entrepreneur, someone was always approaching him with a great idea, but no assets to front a new product.

While Crosley was on vacation in sunny Florida one year, he came into possession of an orange and grapefruit grove. The grove comprised approximately 80 acres of highly productive fruit trees with some of the finest fruit in the area.

The grove was not large enough to warrant or justify a comprehensive marketing plan. So marketing planners within Crosley Radio Corporation designed a distinctive logo entitled "Crosley Groves", with a splash of a familiar lightning bolt horizontally imposed through the title. An additional logo was designed for the wood crates the fruit would be shipped in, along with the tissue paper used to wrap each fruit. This logo consisted of a large "C" with an angled red lightning bolt. This was done in a circular fashion and titled: "Grown and packed by Crosley Groves, Dunedin, Florida, natural color". (See photo #1– gold color 4-page flyer from the Crosley Groves).

Powel Crosley decided to ship his fruit north, direct to the home and within 24 hours after receiving your order! His reception from the previous year season was so enthusiastic, that he decided to go into the venture on a larger scale.

Prices for the fruit were set at: Family crate grapefruit- $2.75, oranges-$3.25, family crate mixed-$3.00 or a Family crate of small oranges-$2.75. Now before we get excited, a crate consisted of 4-5 bushels! (See photo #2 - an original order blank for the Crosley Groves fruit that was inserted into the flyer).

All the ordered fruit was shipped Express Prepaid. Canada, Rocky Mountain States and the far west had additional express charges.

Does anyone in the realm of radio collectors out there, have one of the original small wooden crates or perhaps the distinctive tissue paper wrapper that was covering the fruit? If you do, I would appreciate an e-mail or photo or you can send it digital via e-mail. We can then share it in a future article on the interesting ventures Powel Crosley delved into over the years. My e-mail address is: DeForest22@verizon.net

Photo #1: Shown is an original gold color 4-page flyer from the Crosley Groves.

Photo #2: Typical order blank for the fruit which was inserted into the flyer.

2007 MONTHLY MEETING PROGRAMS

MEETINGS BEGIN AT 2 PM AFTER THE MONTHLY SWAPMEETS AT THE SENTER EAST BUILDING IN IRVING (UNLESS STATED OTHERWISE)

APRIL 21

Perhaps the most inventive scientist/engineer of all times, Thomas Edison will be honored as the subject of this month's program**. The man and his inventions: Edison Part I.** We will review his life in Part One-Modern Marvels; Edison Tech followed by a "show and tell" of anything Edison. Please bring your "artifacts" of collected items to share.

MAY 19

Spring "tailgate" swap meet.... starts officially at 7:00 AM(but we all know it will start much earlier, probably at daybreak) at the Senter East Building, Irving. There is no regular meeting.

JUNE 16

In preparation for our July Repair Session Workshop, we will have a discussion of electronic restoration projects as well as tips and techniques. Members of our club will present several different approaches. New and old members should find this interesting.

JULY 21

Annual Radio and Phonograph Repair Session. Starts at 9 AM at the **Senter East Building, Irving.**

There will not be an afternoon program. Again, his year we will offer free appraisals to the public of their vintage radios and phonographs. Please get the word out. 9am to 3pm.

AUGUST 18

Summer "tailgate" swap meet.... starts at 7am at the **Senter East Building, Irving.**

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 will need volunteers in organizing other programs, so consider presenting a program yourself. Call me anytime or send me an email.

Mike Grimes eMail: k5mlg@verizon.net

972-384-1133 (home)

972-898-7251 (cell)

Biography of Ed Janssen

Growing up on the farm in Nebraska, my first recollection of radio is of listening to the old programs on the family's Coronado 1070-A wood table radio. My parents previously had 32 volt service using a battery of cells in the basement, kept charged by a Delco power plant. This was before the R.E.A. reached them.

Like many boys at the time, I built a crystal set, then a one-tube set and used a 50 foot aerial strung in the trees near the house. My workshop was a converted chicken house from which my mother would call me at bedtime, as I was reluctant to stop experimenting. For supplies I would pester the local radio shops, one time even netting a new crystal radio! Also my best friend and I would scrounge junk yards and scrap heaps for goodies, once even finding a Philco 70 cathedral. Once I spent real hard-earned money and bought a new red Regency TR-1 which I listened to with the ear phone while on the John Deere GP Tractor.

While earning a B.S. degree from the University of Nebraska college of Agriculture, I was the radio operator for my Air Force ROTC class. Though I didn't go further as a Ham, I did get a novice license during my college days.

Having received a commission in the U.S. Air Force, I spent time in Illinois, Texas, France, and Germany as a vehicle maintenance officer. My European tour provided my best find - my future wife Lois, whose father was also in the Air Force. We married in July, 1969 and have a daughter, Cynthia, and a son, Charles.

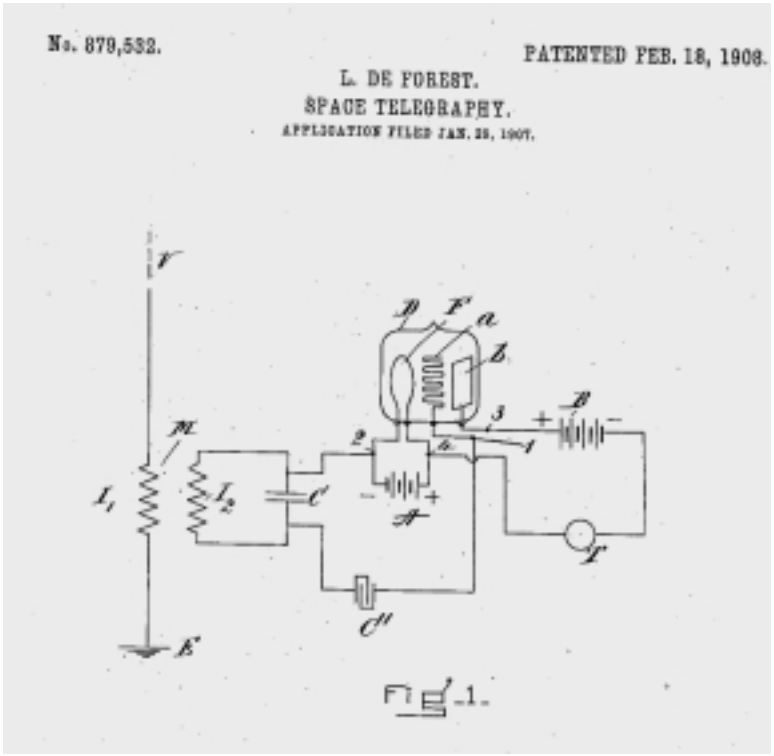
Though I once collected old cars, (I still have a few), I've always been interested in radios. I still own the original crystal radios, one-tube set, Coronado, Philco and Regency listed above but now collect mostly cathedrals of which I have about 250-300.

Having joined VRPS about 16 years ago I've enjoyed the club, and several others I've joined, very much. At present I handle the silent auctions and try to help out in other ways while Lois helps at the registration tables. See you at the next event and happy collecting.

Notes from the January 20, 2007 Meeting

President Jim Sargent conducted our meeting, which was attended by about 22 people. He announced our schedule of events for this new year, including our upcoming Annual Spring Auction. He mentioned, too, that the Houston annual spring event was coming up soon and that he and several other members were planning to attend. Jim also mentioned that he will be auctioning off some of his collection sometime in May.

Program director Mike Grimes introduced our program presenter, VRPS member Mike McCarty. Mike gave a talk "How Vacuum Tubes Work and Function". He began by reviewing the early history of vacuum tube development, starting with the light bulb as the original building block. Edison had noted that an electric current would pass from the heated filament of a light bulb to another, isolated, conductor (electrode) within the glass envelope. This phenomenon seemed to be only of passing interest to him, but not to others. Mike described the phenomenon as equivalent to an electron "gas" cloud boiling off the heated atoms at the surface of the hot filament. The current flow (by convection, in the opposite direction of electron flow) could be observed by placing a positive voltage on the isolated electrode, which has become known as the "plate" electrode. Because current would flow in only one direction, an Englishman named Fleming patented it for use in radio as a detector, known as the Fleming Valve. (Here it might be said that the English term for a vacuum tube, i.e. "valve" makes better sense and is more descriptive than "tube" - and it only uses one more letter). The Fleming valve became the first vacuum tube. Then DeForest discovered that a third electrode could be used to influence the flow of electrons between the filament and "plate". In fact, it could be used to make a device that amplifies a signal applied to it. The change in signal voltage can result in a much larger change in voltage on the plate, when the vacuum tube is employed in the proper circuit. Following is an excerpt (Figure 1) from the front page of DeForest's patent, scanned by the US Patent Office. This was his amplifying circuit. Note the precedent-setting designations "A" for the A battery, and "B" for the B battery. The DeForest vacuum tube was called a "triode" - a combination of the prefix "tri", for three, and the "ode" part of electrode. Following this naming scheme, the term "diode" applies to the Fleming valve, and has always been used for any two-electrode device that conducts better one way that the other. Mike explained the history of further developments beyond the original triode up to the later pentagrid converter (heptode) and beam power tubes. But the triode itself was extremely useful and revolutionized radio. Its ability to amplify is due to a property called "mu" or the Greek letter ?. If we look in tube manuals, we find the mu value in the data for the tube. This value is the change-of-plate-voltage vs. change-of-grid-voltage with the plate current held constant. This means that if we insert a load resistance in the plate circuit to a power source (B+), we can expect the plate voltage to vary with grid voltage - more so for a tube that has a greater mu value. With proper choices of load and supply, we can make an amplifier. But, as Mike explained, the triode has its problems. Because it can amplify, it can also oscillate, if there is feedback from the plate back to the grid. The natural capacitance between plate and grid gives rise to the circuit breaking into oscillation from the coupling of the plate signal feeding back to the grid. Because of this the early radios based on triodes required the introduction of "neutralization" or "unilateralization" schemes to prevent oscillations. (If you really want an oscillator, you can put tuned circuits in the plate and grid circuits and rely on the natural coupling to provide the feedback.) Neutralization sacrificed amplification by putting negative feedback or damping in the circuit. Mike illustrated how the answer to the problem was the introduction of another grid in the tube, between the "control grid" and the plate. This grid has a voltage applied, similar to that on the plate, so that it accelerates the electrons, or at least does not repel or


No. 879,532. PATENTED FEB. 18, 1908.

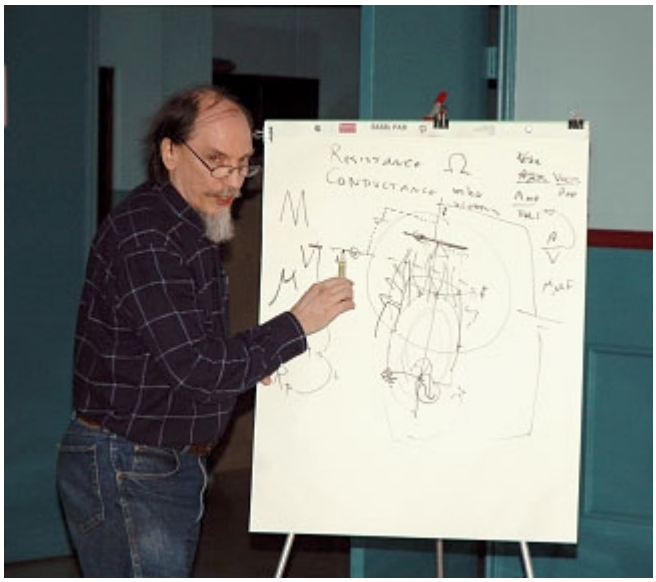
L. DE FOREST.

SPACE TELEGRAPHY.

APPLICATION FILED JAN. 29, 1907.

FIG. 1.

impede them. This grid shields, or "screens" the control grid from feedback from the plate (it acts as a bypass capacitance from the plate to a virtual signal ground). Naturally, the new grid was given the name "screen grid". The introduction of this grid created the "tetrode", a four-electrode tube (examples are types 24A and 32). Tetrodes made possible much higher amplification of signals for each stage, requiring fewer tubes to make a highly sensitive radio. The new screen-grid radios were great performers.



Mike led us through the history of the next development - the "pentode". With higher powers and voltages, the performance of tubes was limited by the physical phenomenon of so-called secondary emission of electrons from the plate. The very fast electrons accelerated by the plate voltage would strike the plate with enough energy to knock one or more electrons from the atoms of the plate back into the space between the screen grid and the plate, creating a "space charge". Those electrons repel the like-charged ones arriving from the cathode and act to limit the available electron flow. Someone decided that another grid could be used to collect these electrons and dispose of them, improving tube performance. This was indeed the case, and then we had another electrode, creating the "pentode". The new grid suppressed the effect of the space charge and so became known as the "suppressor-grid". So that it can collect as many secondary electrons as possible, it is normally connected to the cathode of the tube - sometimes by a permanent jumper inside the tube. Because of the way the pentode vacuum tube controls the electron flow - "shepherding" the electrons the way it does - it performs quite differently from the triode. It will handle a much wider range of signals because of its linear performance. For the pentode, instead of its performance-index being the term ? , the term Gm is more appropriate. Gm is the ratio between the plate current change and the grid-to-cathode voltage change with the plate-to-cathode voltage held constant. If we place a resistance in the plate circuit, we can expect a change in grid voltage to change the current through that resistance, causing a plate voltage change. The overall result is much more linear than for a triode amplifier. The pentode is inherently more predictable and consistent in performance and gain from one tube to another (of the same type). The pentode became the mainstay of high-gain amplifiers for r.f. and i.f. signals. Tube types 57, 6C6, 12AU6, 12SH7 are examples.

Naturally, it was always a goal to save the cost to produce a radio and improve performance. When automatic volume control (AVC) became a feature, special versions of the pentode used varied pitch of the grid wires to result in a "variable ?" that provided good AVC performance without adding tubes. Examples are: 58, 6D6 12SK7, 12BA6

Another "ode" in Mike's tale is the heptode, or pentagrid converter. This tube contains electrodes that provide the functions of the superhet local oscillator, AVC, the mixing (or first detector) function and high amplification of the input signal. The 6A7, 6A8, 12SA7, 12BE6 are examples. (Author's note: The 7A7 is an example of an octode - it has one more independent grid for use in alternate mixer/oscillator circuit designs.)

Applications existed for handling higher powered audio and RF signals. For these needs, larger and larger cathodes provided the needed increase in available electrons; also, the performance of the pentode was desirable in designing low-distortion amplifiers with inherent high gain. For these higher powers, making the plates heavier helped dissipate the heat. The problem became one of keeping the screen grid from overheating. Aligning the screen-grid wires with the control-grid keeps electrons from overheating the screen grid by minimizing the density where the screen grid wires are located in the stream. A special tube version termed the "beam power tube" was developed. These tubes have special electrodes that keep the electrons in a contained beam that avoids the screen-grid and hits only the rugged plate structure. Most all of the later radios used this type of tube. Examples are: 6L6, 50L6, 50B5.

Author's Notes:

Mike has written a very well-crafted discussion explaining the performance properties of vacuum tubes and the meaning of the terms Mu and Gm, with simple equations. Look for a version of it - "Mikes Make on Mu (and Gm)" - to appear on our VRPS.org website.

For additional information, the front section of RCA tube manuals contains a good discussion of tube functions.

It's interesting to speculate what path electronics, radio and communications would have followed if semiconductor "solid-state" instead of "hollow-state" technology had progressed first. The field-effect transistor was first invented in 1929, but it didn't work nearly as well as the already existing vacuum tubes, wouldn't tolerate much voltage and was deemed to be useless, from a practical viewpoint . So it was abandoned.

It still seems intuitive that an electric current should be able to flow through a solid and not through a vacuum! Somewhere along the way, though, we might have needed the cathode-ray tube for oscilloscopes and TV.

Bill McKeown

Notes From The February 17, 2007 Meeting

'By Mike Grimes

The meeting digressed somewhat this month from the usual topics of vacuum tube radios, history, and development. We called upon club member Jerry Merryman to relate his experiences in early development of the hand-held (pocket), four function calculator. Many of the innovators of the latter half of the twentieth century are beginning to fade from view. We were privileged to have Jerry present his experience.

Jerry went to work for Texas Instruments (TI) in 1963 with a wealth of knowledge gained from experience and an inquisitive mind. Texas Instruments is a local, modern electronics company known to cultivate innovation and development.

Not unlike the Regency TR-1 radio, which filled a need by TI to find application for the new transistor, the hand-held calculator was seen as an application for the newly invented integrated circuit (IC). Upon realizing how this application might benefit TI, a team was formed by the late Jack Kilby, Nobel Prize winner, to make it happen. A team of about three engineers and technical members comprised the core group, code named Cal Tech. Merryman was assigned the electronic innards, memory and central processor.

After many false starts, problems had to be solved around *Input, Memory, Processor*, and *Output* and made small. Also it had to be power efficient. Merryman came up with the design for the "shift register" which simplified the storage function such that *input* data could be taken in, minipulated by processor and generate an *output*. Also the numbers had to be in binary code, manipulated with the decimal in the right place. Merryman then devised the logic code, which simplified number functions and made them easier to be processed. Because of the number of wires required to interconnect the logic and memory, the integrated circuit was ideal for this application. The requirements were done; now it was up to the IC group to design and build the necessary IC chips (integrated circuit silicon). It turned out that four chips were required to meet the design requirements. And they made it happen.

A colleague, James Van Tassel, worked the *input*: keyboard, that turned out to be the familiar one today. The *output* could not be CRT, LED, LCD, or neon, as they had not been developed to the extent as today. They were either not bright enough or consumed too much power for battery operation. So Kilby developed a thermal printing technique, which used a low power printing head to burn images into heat-sensitive paper. With a battery capable of delivering the needed current for sufficient time, all the pieces were in place.

Merryman discussed and presented circuit designs required for the project to be successful. For its day, it was an incredibly complex project. "Although hand-held calculators have come a long, long way since then, the Cal Tech team's architecture is still the gist of all such devices." The design has the Kilby-Merryman-Van Tassel patent number 3,819,921.

The design worked and was soon turned over to Canon for manufacture. The ubiquitous hand-held calculator is now in the hands of anyone with a need... at about $5.00 or less.

Our thanks go to Jerry Merryman for sharing his experience.


THE INTERNATIONAL
Calculator Collector

The Beginning

Issue No. 1 of "The International Calculator Collector" had a feature on CalTech with a photograph on the front cover.

"The International Calculator Collector" was the journal of the International Association of Calculator Collectors, which is sadly no longer in operation.

BIOGRAPHY
of
Cleo Cherryholmes

Maybe it's in the genes! I can remember my grandfather telling about the radio he built in the early days – the first one in town. The part that impressed me was that one didn't buy parts (at least some of them). The stories of winding wire around a paper container from the kitchen and making a resistor by marking a line on a piece of cardboard with a lead pencil were always remembered. In later years, when the term resistance was meaningful, I asked him how a radio builder knew how heavy to make the pencil line. His response was that was no problem, just turn on the set and make the pencil mark heavier or erase some of it until the radio worked the best! My grandmother's memories were of those evenings when radio brought the family closer together – you sometimes sat side by side for long periods of time so two of you could each listen to one of the earphones on the headset.

I grew up in Crawfordsville, Iowa, a small town of 300 people in a farming community. Radio for me in those days was centered around listening to Jack Armstrong and Capt. Midnight after school. Our first family radio was a Crosley Showbox which my parents bought used for $6 in 1930. It has a special place in my collection as does the other family radios. My first big opportunity to become interested in radio came during WW2 when our community would have a scrap metal drive. The area would respond by bringing in hundreds of old plows, discs, tractors, engines and all sorts of scrap iron. With all of this came old radios, I guess people didn't want to miss the chance to clean out the shed and barn. The organizers were not quite sure what to do with the radios so they were thrown in a pile off to the side. When asked, the response was sure — take all the tubes, cabinets, parts and whatever you want. Just leave the transformers — maybe there might be some copper that could be salvaged! It was like having a radio store and parts supply just 3 blocks from home and free- the move was on. All went well until the question came up – "what are you going to do with all that stuff?" At the time a good response wasn't available, but before long I found a project in the back of a science book on how to build a radio. A search of my accumulation provided every

part that was needed for a regenerative receiver. The tuning capacitor, variable coupled coil, 99 tube & socket, etc. Fortunately, all the parts looked exactly like the ones in the article – a factor which made construction possible for a novice.

Crawfordsville wasn't exactly at the center of a highly populated area. The closest radio station was 60 to 80 miles away putting out a whopping 2 to 3 hundred watts and there wasn't a tree anywhere close to use in stringing up a 100 ft antenna. The fact that the set received two or three stations seemed amazing at the time. When the family would travel to where a station was close by I remember taking my radio, batteries and all, and tuning in. With a one or two foot long antenna, one could walk down the street and listen to the radio at the same time – WOW!!

Radio interest seemed to fade with the completion of high school and change to a college environment. After finishing school, I went to work as an engineer at a new plant which Sylvania was building in Iowa. Its product of all things was receiving tubes (this was the modernized term for radio tubes). Production during '50 and '60 was TV oriented but hundreds of thousands of the miniature AA5's were produced annually. This plant produced all of the company's industrial and military products including the subminiature tube line.

With the diminishing demand for receiving tubes a transfer was made in 1969 to the Picture Tube Division in Ohio. Corporate changes in ownership from Sylvania to GTE to Philips occurred through the years as well as association with the product lines of Sylvania, Magnavox, Philco, and Philips.

In the late '80's, two dentist friends entered the picture. The first was a collector of antiques who found a radio which both he and my wife thought I should have - so an AK Kiel table was acquired. The other friend had bought several neat old radios and wanted help in getting them to work. So began the quest for old radios, totally ignoring the well founded advice "don't buy everything you see". Visits were made to a little auction barn in northeast Ohio where there was an assistant auctioneer named Estes and one trip to Harris Auctions in Iowa where the purchases almost wouldn't go in the van. By retirement time there was a basement full of radios.

With both our children settled in the Dallas area and a move to a warmer climate long at the top of my wife's list of things to do, the move to Sachse, TX was made. The relocation may not have changed the opportunities to acquire radios, but the chance to join and become a part of a great organization of people, like the VRPS whose interest and dedication is to radio collecting and preserving radio history, has been fantastic!

Pictures from the Spring Auction 2007

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Also, this sale will be conducted live via internet, www.NAALive.com
Items are available for viewing now at www.sargentauction.com

Sargent Auction Service will be offering for sale radio and related items from several consigned collections, including the fine private collection of Mr. Keith McManus. Because of needs beyond his control, Mr. McManus has decided to sell his excellent collection of 20+ years. This collection consists primarily of battery and early electric sets, of which many have been cosmetically restored. Included is one of the finest original examples of a Blue Neutrowound radio. Includes horns, speakers, tubes, Zenith Transoceanics and other portables, Collins 75-A4, DeForest F-5 and D-12, Radiola 26 portable with home battery box, etc. Additionally, numerous cathedral and tombstone radios will be offered. Most items will be sold without reserve.

Auction items will be available for viewing on location beginning at 8 am, May 5 or now at www.sargentauction.com . Contact us for information concerning internet bidding , either live or proxy at Jim@sargentauction.com

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