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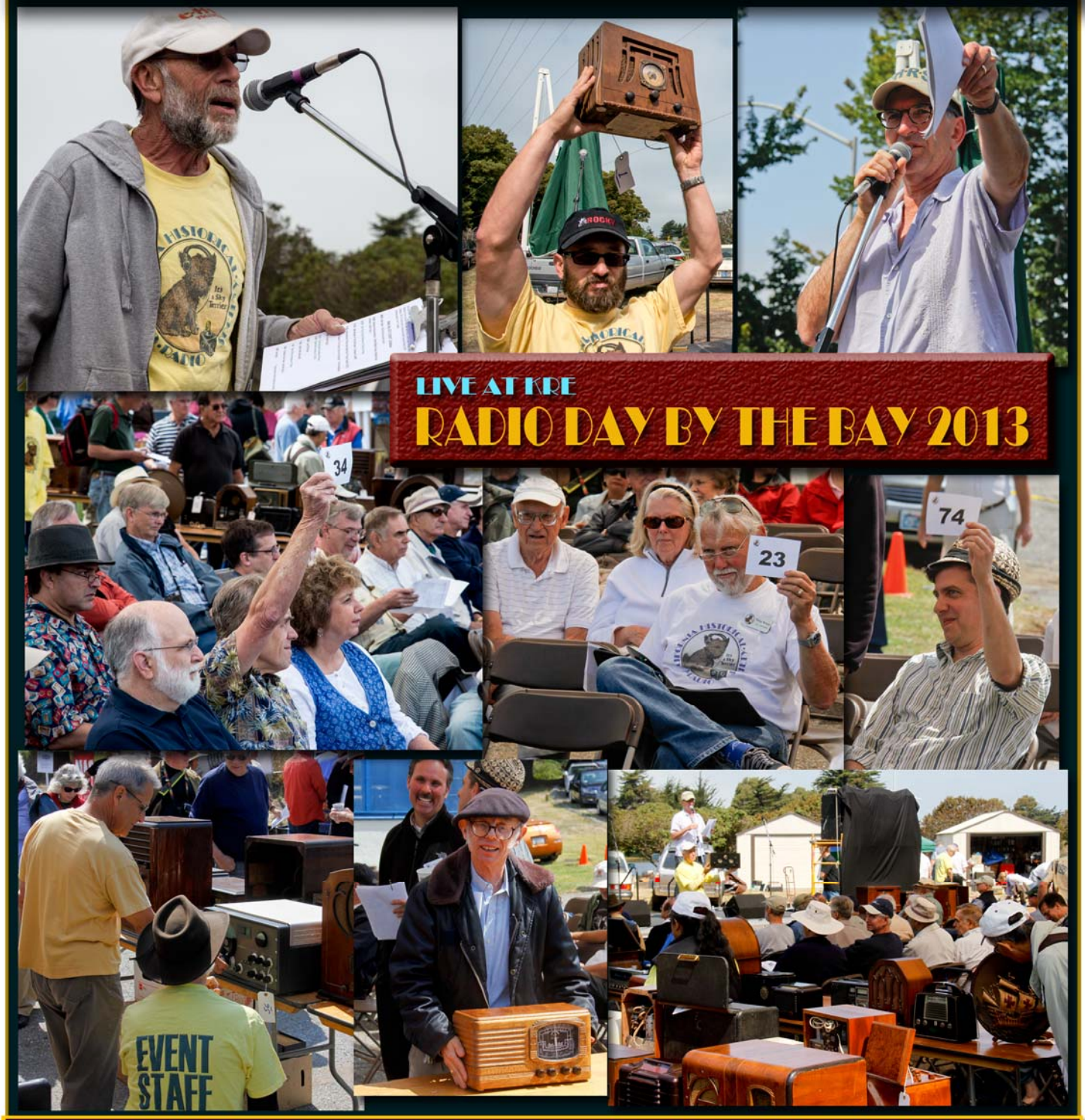
Journal of the

CALIFORNIA HISTORICAL RADIO SOCIETY



FOR THE RESTORATION AND PRESERVATION OF EARLY RADIO

FROM THE BIRTHPLACE OF BROADCASTING

California Historical Radio Society

HOME OF THE BAY AREA RADIO MUSEUM & HALL OF FAME

The California Historical Radio Society (CHRS), is a non-profit educational corporation chartered in the State of California. CHRS was formed in 1974 to promote the restoration and preservation of early radio and broadcasting. Our goal is to enable the exchange of ideas and information on the history of radio, particularly in the West, with emphasis on collecting, preserving, and displaying early equipment, literature, and programs. Yearly membership is $30.

CHRS Museum at Historic KRE

CHRS is fortunate to occupy and restore the historic KRE radio station building located at 601 Ashby Avenue in Berkeley, CA. The KRE station an important landmark in S.F. Bay Area radio history. Originally constructed in 1937, the KRE station was one of the first facilities built specifically for broadcasting in California. The KRE site has been transmitting AM radio signals for over 70 years and still operates today as KVTO. In 1972, it was the location for scenes featuring "Wolfman Jack" and Richard Dreyfuss in the George Lucas film, "American Graffiti." The restoration of the station plus creation of a museum and educational center gives us an environment to share our knowledge and love of radio. It enables us to create an appreciation and understanding for a new generation of antique radio collectors and historians.

Contact us:

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www.CaliforniaHistoricalRadio.com

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COLUMNS

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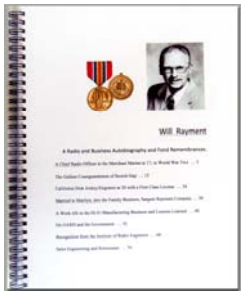
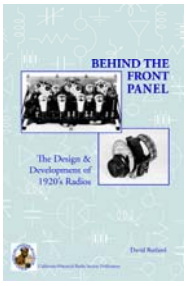
Our Latest CHRS Publications



Will Rayment with Bart Lee has authored an autobiography of his life from WWII Chief Radio Operator in the Merchant Marine through Sargent Rayment Company and the California Radio and HiFi Industry through the 20th Century. Highly informative piece of San Francisco Bay Area history.

Buy at www.cafepress.com/chrsinprint/.



Behind the Front Panel: The Design and Development of 1920's Radio by David Rutland has been re mastered by Richard Watts for CHRS. With emphasis on radio technology, Rutland describes the development of 1920s tubes and radio circuitry designs by De Forest, Marconi, and other inventors and manufacturers. A classic!

Available soon at Amazon.

From the Editor

Once again I've had the pleasure of working with such generous and capable contributors. I want to thank Tom Nelson, John Staples, Bart Lee, Amnon Fisher, John Schneider, David Jackson, Dale Tucker, Scott Scheidt, and Steve Kushman. I'm sure you will find their excellent articles informative and educational.

I received a lot of positive feedback regarding the wood cabinet refinishing article and plan to provide similar in-depth articles in future issues. I welcome your thoughts about the journal. Let me know if you would like to contribute an article for a future issue.

Richard Watts, jrchrs@comcast.net ◊

From The President

by Steve Kushman

CHRS' HOME AT KRE - As you know the new owner of KVTO has decided not to sell the KRE property to CHRS. What does this mean for CHRS? Most importantly, we will be safe at KRE through the end of the year. And, the new owner Pham Radio Communications has asked us to submit a new License to Occupy, which will secure our place for the foreseeable future. This is all good, but... Because CHRS has transitioned from a parking lot swap meet group to a legitimate Museum with valuable artifacts and archives, we need a permanent home. It is very comfortable being in our historic little radio station building but it can't be ours. So, we may have to compromise history and move to a more practical location although not historical. We will continue as usual at KRE, but CHRS is actively searching for a permanent location. We still need your donations and pledges to secure a new home for CHRS. You can make this happen. Our dream location is in the Central Bay Area. Our dream building is historic, single story, 6,000 to 12,000 or more square feet and is secure. Our dream parking lot will fit at least 100 cars. Our new CHRS Museum is out there. Keep your eyes open and stand by.

RADIO DAY WRAP UP - Once again, the California Historical Radio Society and its Bay Area Radio Museum and Radio Hall Of Fame have hosted another very successful "Radio Day By The Bay: LIVE! at KRE". The 2013 event this past July 20th was the best ever. Speaking of the best, CHRS wishes to thank KCBS' Morning News anchor, Stan Bunger who did a terrific job for the second year as Radio Day's Master of Ceremonies. And, thanks to KGO's Evening News Anchor Peter Finch for doing an outstanding job as guest auctioneer of antique radios. Also thanks to CHRS Chairman Mike Adams for auctioning the enormous last segment. The covers of this Journal are full of pictures

CHRS/BARM's annual fund raising event continues to grow in attendance and revenue and this year was no exception. Including staff, performers and guests, our attendance was over 435 people. Our gross for the day was $26,560 and after expenses CHRS netted a tidy $18,877! That is almost $4000 more than our 2012 net. Not bad for a day's work. And what a day's work it was. We are grateful to our dedicated volunteers, some who arrived at 6 in the morning and stayed until 6 that evening. Our volunteers are one of the most important parts of our success and it takes an army of them to make this busy event run so smoothly.

Another important part of Radio Day's success is the Broadcast Legends segment featuring a performance of the Old Time Players. Legend and Hall of Famer Ken Ackerman introduced the segment with a short origin of the Legends. The 1948 newscast featured guest newscaster KGO-TV 5 PM News anchor Cheryl Jennings along with Legends Vice President Peter Cleaveland. This day the audience was treated to "The Origin of the Lone Ranger," a radio play first broadcast in 1948. The players included Mike Bennett, Matt Elmore, Bob Safford, Peter Cleaveland, Bruce Jenett and yours truly. Foley and recorded sound effects were by Bob Brown and Dennis Brown. The show was lots of fun and the audience, some who have never seen a radio play, really enjoyed it. CHRS values the Legends participation. Radio Day would be incomplete without them.

Legend and Hall of Famer Ben Fong-Torres was busy on Radio Day. Ben announced the 2013 Class of the Bay Area Radio Hall Of Fame and was interviewed by Cheryl Jennings as part of the CHRS/BARM Living History Project. Cheryl also interviewed Hall of Famers Stan Burford, Terry McGovern and Rosie Allen. The interviews were recorded in the 1950 KRE control room and televised in the upstairs conference room where guests watched live.

It all was live, including the KSAN reunion. Kenny Wardell, who did a great job of PR for Radio Day, was able to pull together a very special group of people who were part of the Jive 95 era. Bonnie Simmons, Wes 'Scoop' Nisker, Terry McGovern, Richard Gossett, Jim Draper, Ben Fong-Torres and Kenny Wardell told some wonderful inside stories about their time at KSAN-FM when the Jive 95 ruled the local airwaves.

The live early jazz music by the Joyful Noise Jazz Band and Paul Black's combo work from the KRE control room, playing vintage 78s provided some nice old time tunes for the day. Paul 'Lobster' Wells presented the Sheila Rene Backstage collection to Len Shapiro, new Executive Director of the Bay Area Radio Museum. Terry McGovern spoke about his role in American Graffiti. Butch McDonald was presented with the CHRS Volunteer of the Year award. There was a gigantic flea market of electronics, tasty food and our spectacular antique radio auction. Guests thoroughly enjoyed spending time in the Radio Hall Of Fame, CHRS Museum and our center devoted to radio, radio history and broadcasting. All who attended had a swell time. See you on Radio Day By The Bay - July 19th, 2014!

It's time to renew. Send back your forms, dues and donations or renew on line with PayPal. Do it Now!

Please enjoy this Journal. I always encourage you to contact me directly with your questions, ideas and comments. I am available at kushseal@flash.net or (415) 203-2747.

Best Regards, *Steve* ◊

CHRS Central Valley Chapter News

by Scott Scheidt

The CHRS Central Valley Chapter 15th annual swap meet held at the Stanislaus County Fairgrounds on October 5th was well attended. There were many sellers offering a wide variety of treasures and bargains. Several radios donated by chapter club members were raffled.






The weekly radio electronics class and workshop as well as the monthly cabinet restoration class continue to be popular with members.

The annual Central Valley Chapter radio restoration contest is in progress with many entrees; judging results and awards will be presented at the Central Valley Chapter December holiday dinner.

Please visit us at http://www.cvantiqueradio.com/ .

◊

CHRS Sacramento Chapter News

by Dale Tucker

The Sacramento Chapter of CHRS is the successor to the Sacramento Antique Radio Club which was founded approximately 25 years ago. The Chapter currently has about 25 members who reside throughout the Sacramento region. Bob Moore hosts a monthly meeting in Shingle Springs for members that is open to the interested public who may wish to find assistance in repairing/restoring their sets.

Come join us at our events – fans of classic radios are always welcome!

◊

Pearl Harbor Day at KRE

by Dr. Tom Nelson, W6EO

While working at KRE in the fall of 1940, I had no idea that one of the most eventful and emotionally draining days of my life was coming soon.

Tom Nelson circa 1940.

During 1935 and 1936 while in grade school, I developed an interest in electronics. I soon graduated from the building of crystal sets to two and three tube regenerative receivers. Through these, I discovered the world of "ham radio." Finding the "Radio Amateurs Handbook (ARRL)" in the local library increased my knowledge. In high school my father drove me from Bakersfield to the FCC office in the Federal Building in Los Angeles where I took the test for an amateur radio license. I passed the 13 word per minute Morse code test and the written examination thus becoming a licensed amateur radio operator. Soon I was "on the air" with my first station: a 6L6 crystal oscillator for the transmitter, a 40 meter vertical antenna and a 3 tube regenerative receiver soon to be up graded with more elaborate equipment.

I graduated from high school in 1940. Much of the summer of 1940 was spent studying for a commercial radio operator license. I started my freshman year at the University of California Berkeley (UCB) in the fall of 1940 with a major in electrical engineering. As soon as I felt comfortable with this new academic environment and my ability to perform well in it, I went to the FCC offices in San Francisco and took and passed the examination for a First Class Radiotelephone License which gave me the authority to operate a broadcast station. Soon thereafter, I phoned Don Hambly, the on-site manager of KRE. I told him that I was a student at UCB, had a first class phone license and was looking for a weekend job. He said come right down and see me. After starting the interview, I showed him that blue sheet of paper which was my brand new, never before used, first class phone license. I still remember very well his emphatic response; "am I glad to see you!" A few minutes later, he offered me a job as a weekend engineer with the understanding that I would work both Saturday and Sunday shifts. I thought the pay he offered was GREAT even after a deduction required by the union to allow me to work as a non-member. The pay certainly was much above what many of my classmates were making doing such things as washing dishes and serving hamburgers in one of the places along Telegraph Ave. I was 18 years old at the time.

An aside here, as I want to say a little about Don Hambly. He was my first real boss. I was lucky that he was such an understanding person. He gave great responsibility and trust to me although I was a young and inexperienced employee. I was to shut down the station and lockup the building at midnight on Saturday nights and open up again before 6AM the following mornings. I never felt he had any doubt of my technical ability to operate the station.

Although, during the time I worked for KRE, I never had a major technical problem with the radio frequency side of the system, Don had made it clear that I was free to make changes and repairs as I thought necessary. I did so infrequently with changes or repairs to various components of the audio circuits in the control room and studio. I occasionally would come to the station during off duty times when he began to teach me about the economics of running a broadcast station. Early after my employment, he told me about KRE's interesting history going back to the very beginning of broadcast radio. He especially told me about the "haywire", breadboard equipment when the station was owned and

located at the First Congregational Church of Berkeley. The Church sold KRE to new owners but with KRE having a continuing obligation to the Church to broadcast its Sunday morning service. Thus one of my duties during the Sunday morning shift was to assure the proper working of the landline connection to the Church and to keep its minister happy with our end of these broadcasts. It was with this change of ownership that KRE had moved to the location at the foot of Ashby Ave with its antenna sitting in a salt water lagoon. I learned much about broadcast radio as experienced in a small, low power station – information not to be gained by my studies at the University.

The KRE facility as it looked when Dr. Nelson worked there.

When first employed, I was on with an announcer and assigned to the Saturday evening and night shift and the first shift on Sundays. However, much of the world was at war (WW II) and the draft was in full force in the United States. I had only been at KRE for about four months, when the announcer who was on with me was drafted. Don Hambly called me in and asked if I would like to be the announcer as well as the engineer. I must have hesitated a little because he offered a pay increase. To me the amount offered seemed unbelievable because my paid work in high school had been mowing lawns and washing and polishing cars. I would now make enough to pay much of my college expenses and mostly relieve my parents of the need to support me. Even though, I no longer would have time to study on the job, I accepted the offer. A fun part of the new responsibilities was inheriting the "Clam Bake," a call-in Saturday night Jazz program where I was now the disc jockey. I had a room full of 78 rpm jazz and popular song records stacked about 5 or 6 shelves high to pull from and 2 phones at the operating position with calls coming in mostly from the East Bay and across the Bay down the peninsula from San Francisco to San Jose. KRE was known at that time for its "News on the Hour every Hour" which, of course, meant using what spare time was still available reviewing, selecting and cutting teletype tapes and putting together a program for the next hourly slot.


Don Hambly, KRE Station and Program Manager.
A Rotary photo probably from the 1950s or early 1960s.

The Sunday morning routine was to unlock and open the building, start warming the transmitter (the crystal oven ran continuously of course), arrange the studio microphones for the piano and singers and preacher for the on-site foreign languages church programs to occupy most of the morning until 11:00 AM when I fed in the program originating at the First Congregational Church. Promptly at 6AM, I started transmitting and with a quick look at the meters gave the required FCC opening spiel announcing the station's call letters, frequency and location. I then started with a newscast of the night's events and then waved to the church group assembled in the studio to begin with their service. My activities at that point were mostly limited to mixing and adjusting the input from the several microphones, logging the transmitter meter readings as required by the FCC and preparing for the next news broadcast.

Sunday morning of December 7, 1941 started seemingly as usual, however a few minutes into the first church service, the alarm bells of the two teletype machines began ringing followed by a terrific clatter as teletype tapes began rolling out in a steady stream. I rushed out to the hallway where the teletypes were located and could hardly believe what I was reading: Our ships in Pearl Harbor were under attack by dive bombers, ships were sinking and Schofield Barracks was being bombed and shot at by Japanese planes. I rushed back into the Control Room where I had a radio on which I could listen to KPO but heard nothing from them about an attack on Pearl Harbor. My thought was that this could be some sort of hoax but I quickly decided that it would be impossible for someone to put false information on both the United

EXTRA!

WAR!

San Francisco Chronicle

THE CITY'S ONLY HOME-OWNED NEWSPAPER

SAN FRANCISCO, MONDAY, DECEMBER 8, 1941

DAILY 5 CENTS, SUNDAY 10 CENTS

BATTLE FOR HAWAII!

U. S. Fleet Attacks Japanese Off Oahu; Guam Bombed!

Hawaii Governor Reports Heavy Casualties, Second Wave of Planes Coming

Censorship

Bulletins

The Time

FDR Orders Army, Navy To Strike Back; He'll Talk to Congress Today

Press and Associated Press lines. I called Don Hambly at home (probably still asleep on Sunday morning) and told him what was on the teletypes and that I had decided I should make a news announcement but that I was listening to KPO where I heard nothing about the situation. He said as soon as KPO was on with it, I should immediately announce the news. Almost immediately thereafter KPO and I at KRE were announcing the attack, the names of ships that were sinking and all the other dreadful events of the early part of that morning. I cancelled all the church programs that were scheduled for the rest of the morning, told the church people what was happening and closed the studio. As I was announcing these events (almost blow by blow) as the news continued to come in, I could not help but realize and think of the wives, mothers, fathers and close friends and loved ones of our service men in Hawaii. I knew as these loved one were listening to me, they would be hoping I would not be naming a particular ship or military facility but of course I did for most. As the many years have gone by since that terrible day, I realize that Sunday morning was one of the most stressful times of my life.

When I had finished my shift that day, I went back to the dormitory where I lived on campus. My roommate, who was also a ham (W6SSH), was listening to the short wave communication's receiver we kept in our room. The amateur radio bands were practically dead. However, while listening across the short wave spectrum, we heard an "SOS" though we were clearly above the maritime frequencies used by commercial ships. We immediately called the Coast Guard and reported what we were hearing and the frequency.

I continued as a broadcast engineer and announcer while a student at "Cal" but as a ham I was off the air for the duration of the war. On finishing engineering studies, I left KRE and later moved over to San Francisco to continue my education – now in medicine. During subsequent years in the army and as a physician and pediatrician, I have had a number of stressful times on hospital wards and in emergency rooms but Pearl Harbor Day at KRE was as stressful as any.

'73 Tom Nelson,W6EO still "on the air."

Dr. Tom Nelson left broadcast radio when at U.C. Berkeley in his senior year, he changed from an EE Major to one in Medical Sciences. He subsequently studied at the U.C. Medical School and then on to a career in Medicine. These days he remains an active ham with a special interest in antenna and transmission line design. ◊

Allen B. Du Mont — First With The Finest

by Richard Watts

In the next article, John Staples documents his restoration of a DuMont Royal Sovereign television – a very iconic set from a highly innovative company at an interesting time. To more fully appreciate it, this article offers background of Allen B. Du Mont, his Du Mont Laboratories, and its impact on early television leading to the development of this set. The sources for this article are primarily from Bergmann[1] and Weinstein.[5]

Fig. 1: Allen B. Du Mont.

Allen Dumont was described as a very nice gentleman who was somewhat shy. His primary interest was as a scientist/engineer and in the development of technical innovation in which he wanted to be the first with the finest. In many ways he achieved this.

Allen Balcom Du Mont (figure 1) was born on January 29, 1901, in Brooklyn, New York. When Allen was eleven, he was stricken with poliomyelitis and spent almost a year in bed. His father bought him a crystal radio set. By the time he returned to school, he had studied the principles of radio and had built a receiving and transmitting set. After his family moved to Montclair, New Jersey in 1914, he continued his interest in radio. When he was fifteen, he earned a license as a ship's wireless operator and for the next seven summers served on passenger ships that took him around the world. During this time, he met and became good friends with another young shipboard operator, David Sarnoff who later became head of RCA.

After graduating with a degree from Rensselaer Polytechnic Institute in 1924, he went to work for the Westinghouse Lamp Company, where he worked his way up to become engineer in charge of production. By the time he left the company four years later, his efforts had helped raise the daily production of radio tubes from 500 to 50,000.

Fig. 2: Lee De Forest with Allen Du Mont circa 1954.

In 1928 he left Westinghouse and became chief engineer of the De Forest Radio Company where he worked on the development of television, helped build the first transmitter to broadcast sight and sound simultaneously, and helped boost tube production to 30,000 per day. Although he advanced to vice president in charge of production, he was unable to interest the company in the superior potential of the cathode ray tube (CRT) over the mechanical whirling disk that was then the prevailing technique for scanning pictures. At that time, CRTs were costly, unreliable, limited in size with the largest being only five inches in diameter, and good for only a hundred hours or so.

Fig. 3: Early Du Mont CRT circa 1932.
From IEEE.

In 1931, Dr. Du Mont resigned from De Forest Radio Company. Interestingly later on Lee De Forest became a consulting engineer to Du Mont Laboratories, remaining with them for many years (figure 2). With only $1,000 in capital, Dr. Du Mont started his own laboratory in the basement of his home in Upper Montclair, where he began developing an improved cathode ray tube (figure 3). He only had four employees: a glass blower, a chemist, and two technicians. In their initial efforts, they tried hundreds of experimental glass envelopes, fluorescent coatings and electron guns. Eventually, a practical CRT emerged that would last for several thousand hours, utilizing an electron lens for focusing instead of inert gas.

Fig. 4: Front panel from an Du Mont oscillograph (circa early 1940s).
In the CHRS collection.

One of his first successful products was the cathode ray oscillograph (figure 4) which was used, among other things, to measure the compression in diesel engines, the pitch of musical notes, and

the strength and resiliency of metal. In the first year, gross income from sales was $70. During this time, Dr. Du Mont supported himself and his family by as an expert witness in patent litigation trials. In 1932, Dr. Du Mont began a connection with the Army Signal Corps, cooperating in the development of the devices to aid communications. The cathode ray oscilloscope was the device that made radar practical. When the government asked him not to file for a patent because of radar's sensitive security ramifications, he patriotically refrained, passing up the opportunity for vast wealth as the owner of radar.

Fig. 5: The old pickle factory converted to the new Du Mont Laboratories. From earlytelevision.org.

When his business outgrew his basement, he moved the operation to a store front with soaped-up windows, where he successfully manufactured tubes as he continued his television experimentation. In 1935, he incorporated as Allen B. Du Mont Laboratories, Inc., and his sales continued to grow. In 1937 Dr. Du Mont sold the patent rights to David Sarnoff and RCA for the "magic eye" tuning eye tube (e.g., the 6E5) for $19,750. The funds were used to purchase a converted pickle factory in Passaic, New Jersey that became the Du Mont Laboratories tube and electronics manufacturing facility plus research lab (figure 5).

Fig. 6: A 1938 Du Mont 180, the first commercial all-electronic television. From earlytelevision.org.

In 1938, months before RCA introduced their first television, Du Mont had the distinction of being the first company to market a commercial, all-electronic home television receiver, the model 180 (figure 6) that sold for $325. They made two models and manufactured about one hundred units per week. The model 180 had a 14 inch picture tube where RCA was offering only 7 inch sets. Du Mont also built a few 20 inch sets after teaching Corning Glass how to manufacture the envelopes. Du Mont was a primary source of CRTs to other television manufactures. Du Mont also manufactured television studio broadcast equipment.

At the same time, Dr. Du Mont wanted to provide content for purchasers of his televisions. In early 1939, Dr. Du Mont received a license to broadcast experimentally in New York City. Du Mont's W2XWV was assigned to channel 1 where they shared time with NBC who was also using channel 1. At that time, broadcasting was very limited. In New York, only three experimental stations were broadcasting: Du Mont, RCA through its subsidiary NBC, and CBS.

To cover losses related to television manufacturing, and to begin to develop his broadcast capability, Dr. Du Mont decided to sell an equity stake to Paramount Pictures. To do this, Du Mont changed its stock structure to provide "A" and "B" classes of common stock. Each would have three board positions. Paramount purchased 14,000 shares of "B" stock at $1 per share and also loaned Du Mont $36,000 more. Paramount had three more options and purchased another 56,000 shares of "B" stock plus providing additional loans totaling $73,423. As a result, Paramount became 26 percent owner of Du Mont, and with its significant holdings of "B" stock, occupied three board positions including Secretary, Treasurer, and Assistant Treasurer giving them considerable power in corporate decision making. Dr. Du Mont believed Paramount would be an advantageous partner as a source of program material; however, this did not materialize. Dr. Du Mont would come to regret his arrangement with Paramount.

Fig. 7: Dr. Thomas Goldsmith, Vice President and Director of Research.

One of his early recruits was Dr. Thomas T. Goldsmith (figure 7), an expert electrical engineer and innovator, who remained at Dr. Du Mont's side from then on, serving as vice president and director of research. Since they had pioneered the company together, he was the closest person in the organization to Dr. Du Mont. In 1939, the National Television Systems Committee (NTSC) was formed to study and set broadcast standards for the industry. Dr. Goldsmith was chairman of the committee and actively involved in experimentation. The committee set standards for synchronization between the transmitter and receiver, and raised the resolution from 414 to 525 lines. Dr. Goldsmith was very influential in arriving at these standards.

By 1941 there were an estimated 7,000 sets in the U.S., mostly in the New York area. About 1,500 were manufactured by Du Mont, a few were GE and Philco receivers, but the majority was from RCA. Nationally there were seven experimental stations operating, three in New York City. The FCC granted authorization of commercial television in July 1941, but little progress was made prior to World War II. During the war, Du Mont focused its resources in improving and manufacturing radar for the military. It also was assigned to teach other manufactures to make CRTs, oscillographs, electronic navigation equipment, and radar units. Du Mont continued sporadic broadcasts from W2XMV with films related to the war effort, emergency training, and other public service programs.

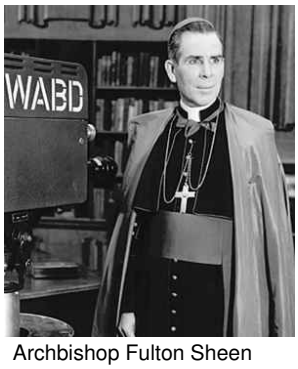
In 1945, Du Mont was granted a license to operate in Washington D.C. It was the first station to operate in the nation's capital. The FCC stopped by frequently to learn about the new medium leading Dr. Goldsmith to say that the station "was a training ground for the FCC." By 1946 Du Mont's station in New York became WABD named from Allen B. Du Mont's initials; and the station in Washington D.C. became WTTG named from Dr. Thomas T. Goldsmith's initials. AT&T provided a coaxial cable linking the two and the first network television show was sent over the cable on April 15, 1946. NBC didn't have a televised network broadcast until 1947.

In many ways, television broadcasting began as an extension of radio. Many radio shows and personalities successfully transitioned to television. Radio station network affiliates became the foundation for CBS, NBC and for ABC who had purchased the NBC Red network. However, Du Mont did not have the benefit of radio networking and programming expertise or resources. Consequently, Du Mont had to build a network and develop programming expertise from scratch. Dr. Du Mont tended to hire from within and did not take advantage of hiring experienced radio professionals which created a much steeper learning curve.


Fig. 8: Ted Bergmann, Director of Broadcasting.

Under the leadership of Ted Bergmann (figure 8) who rose through the sales ranks and, in 1952, became the Director of Broadcasting and head of the network. Du Mont did build their expertise and developed popular and commercially successful programming. The shows included: *Cavalcade of Stars*, *The Ernie Kovacs Show*, *Ted Mack Amateur Hour*, Archbishop Fulton Sheen's *Life is Worth Living*, *The Honeymooners*, *Captain Video*, Mory Amsterdam, Arthur Murray, and *The Goldbergs* to name a few. Archbishop Sheen was on at the same time as, and the only show to win audience from, the enormously popular Milton Berle show. Du Mont was the first to offer sports coverage; baseball, basketball, wrestling, boxing, and even Yankee football. They were also the first to offer daytime programming which proved to be very popular and was copied by the other networks.

By 1948 there were 108 stations in operation throughout the country. There were forty one-station cities, eleven two-station cities, eight three-station cities, and only four cities with four or more stations. In most markets, stations were not dedicated to a particular network and were able to negotiate programming from any of the four networks. The FCC was flooded with thousands of new license requests and realized that the 13 channel VHF spectrum would be inadequate to accommodate expansion. So, in 1948 the FCC froze applications for new licenses while it restructured technical and allocation standards. The freeze lasted until the middle of 1952. During those years no new licenses were approved.



Archbishop Fulton Sheen


The Honeymooners

"I, Edward Norton, Ranger Third Class in the Captain Video Space Academy do solemnly pledge to obey my mommy and daddy, be kind to dumb animals and old ladies in outer space, not to tease my little brothers and sisters and to brush my teeth twice a day and drink milk after every meal."


Captain Video

The lifeblood of any network is the ability to get stations to provide time-slots for its programming; the more stations providing network programming means greater market coverage and audience attraction. With greater viewership, a network is able to attract more lucrative advertising and sponsorship, which in turn will provide the resources to improve the quality of shows and attract and retain the most talented celebrated performers. Coming full circle, popular highly-rated shows receive better time-slots from more stations, and on and on. This positive feedback loop drives a network to grow and achieve the scale to become increasingly dominate. This was the case primarily for CBS and NBC. ABC and Du Mont vied for third, but after the 1953 FCC approval of ABC's merger with United Paramount Theaters, ABC was provided with an infusion of capital enabling it to gain a much more solid footing making it a solid third.

Further, CBS, NBC, and ABC were able to leverage the dynamics of their radio networks. They already had long standing relationships with top advertisers and sponsors. They had popular radio programming that could be transitioned to television bringing along its loyal audience. They received preferential service by talent agencies and could offer more lucrative package deals to performers by combining radio and television opportunities. They had stronger relationships with television station owners and could influence their allocation of program time-slots by bundling their programming of top rated shows with lesser rated shows to get a better prime time lineup. And income from the very profitable radio networks provided a cash stream that could be used to subsidize the enormous capital investment required for television. In this regard, CBS, NBC, and to a lesser extent ABC had a distinct advantage over Du Mont.

Du Mont was further hampered by the FCC spectrum restructure in 1952 at that ended the freeze. For Du Mont the number of stations per market was crucial and they desperately needed FCC to allocate at least four stations in each market to enable each network to have a primary affiliate. FCC recognized that number of VHF channels would not accommodate licensing and public demand, especially with the elimination of VHF channel 1, so they opted to allocate 70 additional channels in the UHF band. Stations assigned to the UHF band were at a distinct disadvantage if they were in a market where competing stations occupied VHF channels as many views did not have UHF receivers and were reluctant to purchase UHF converters if alternative programming was available on VHF. Dr. Du Mont, Dr. Goldsmith and Ted Bergmann beseeched the FCC to de-intermix VHF and UHF in each market so that a market would either be all VHF or all UHF putting each station on an equal footing with its competitors. However, FCC left the allocations intermixed in part from effective lobbying by the other networks who would benefit from the disparity. The result was as predicted by Dr. Du Mont, UHF stations in intermixed markets struggled and often failed. Consequently there was not effective station coverage for each network in each market, a distinct disadvantage for Du Mont. Dr. Goldsmith recounted that a few years later when the FCC, finally realizing the problems this created, asked him to lead a committee to "straighten this mess out"; he declined telling them "it's too late now — live with it."

The Du Mont network was relegated to fourth. Du Mont had no choice but to compete based on price. According to Ted Bergmann, for the most part Du Mont became the home of cheap programs; they promoted themselves as the "Best Buy in American Television." They devised innovative sales and advertising strategies to make their programming more cost effective and attractive to advertisers, some approaches becoming standard practice for commercial television. The Du Mont network was not a financially self-sustaining part of the company; from 1948 to 1955 it realized $45 million in revenue with a loss of $18 million. It had to be subsidized through the profits of the television and electronics manufacturing divisions plus occasional stock offerings.

Du Mont Laboratories continued to be technically innovative. Du Mont was highly dependent on delayed television however the quality of kinescope programs was increasingly unacceptable. Groucho Marx once quipped that "kin" means "relatives" and "escope" means "unable to recognize" so with kinescope you're unable to recognize your relatives. Dumont developed the Electronicam which was a 35mm film camera mounted with and synchronized with a TV camera to record broadcasts. This provided much higher quality recording than the kinescope and enabled quality delayed distribution shows nationwide at a lower cost until the advent of video tape in 1956 made it obsolete.

During this time, RCA was actively developing a color television system. A principal reason was its patents were about to expire on current technology and they needed a new set of patents. RCA had developed a projection set utilizing three CRTs – red, blue, and green – focused toward a single screen. In Du Mont Laboratories, Dr. Goldsmith developed for the first time a single tube capable of display all three colors. The prototype utilized a vertically slotted shadow mask similar to the approach later adopted by Sony for the Trinitron. According to Ted Bergmann, Dr. Du Mont invited General Sarnoff to see the new tube. He arrived with about twelve of his scientific staff and was given a very convincing

demonstration. Later in the parking lot as they were leaving, General Sarnoff was seen vigorously waving his finger and berating his minions; a moment enormously enjoyed by Dr. Du Mont. Du Mont licensed a version of the new color CRT to RCA which became the industry standard.

By 1955 it was clear that financially the Du Mont Network could not continue. ABC proposed a merger that was acceptable to Dr. Du Mont. When presented to the Du Mont board, the Paramount board members blocked the merger and called for an extended study by Booz, Allen & Hamilton to provide an opinion. The several-month study supported the merger but, by then, the merger was off the table. This was typical behavior for Paramount. By all accounts, Paramount was a thorn in Du Mont's side. They continually worked against Du Mont management nitpicking expenditures, blocking investment initiatives, and derailing efforts to secure loans seeming to thwart progress at every opportunity. Neither Dr. Du Mont or others in Du Mont senior management truly understood Paramount's negativity or intent. According to Ted Bergmann, it appeared as if they were "basically dedicated to the destruction of television."

This was the final nail. Through a series of events Dr. Du Mont was soon forced to yield control of the network and the company. Stations were sold and the network was spun off as a separate entity and renamed Metromedia Broadcasting; remnants of this network later became the bases for the next fourth network, Fox Broadcasting. Ted Bergmann continued in television sales, scriptwriting, as a producer, and as production manager for shows including Three's Company. Du Mont television manufacturing was sold to Emerson, and the remaining electronics manufacturing and research laboratory were sold to Fairchild. Dr. Du Mont with Dr. Goldsmith went to Fairchild where he served as a manager and technical advisor until his death in 1965 at age 64.

Fig. 9: 1951 ad for the Royal Sovereign.
Image from the Duke University Library.

The Royal Sovereign television (figures 9 and 10) was only offered in 1951 and 1952, at the peak of Du Mont Laboratories success. It was the largest set available and the first to offer a 30" picture tube. It was very expensive at $1,800, the same price as a brand-new showroom-fresh Chevrolet Bel Air. For the day, the set was the epitome of excellence, technical performance, and was a clear statement of Dr. Du Mont's vision of being the . . .

first with the finest.

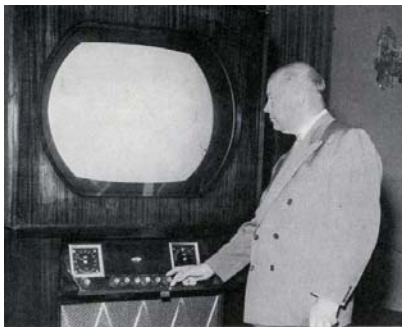


Fig. 10: Dr. Du Mont with a Royal Sovereign prototype.
Image from earlytelevision.org.

References:

1. Bergmann, Ted and Skutch, Ira; THE DU MONT TELEVISION NETWORK: WHAT HAPPENED? A SIGNIFICANT EPISODE IN THE HISTORY OF BROADCASTING; The Scarecrow Press, Inc.; 2002.
2. Bergmann, Ted; *Ted Bergmann Video/Oral Interview* in 10 parts; Archive of American Television; 2004. http://www.emmytvlegends.org/interviews/people/ted-bergmann# ; an interesting perspective of the business of early television.
3. Brittain, James; *Scanning the Past, Allen B. Du Mont: A Pioneer in Electronic Instruments, Radio, and Television*; Proceedings of the IEEE, Volume 85, No. 12, December 1997.
4. Goldsmith, Thomas; *Thomas Goldsmith Video/Oral Interview* (only 5 of 9 parts available); Archive of American Television; 1997; http://www.youtube.com/watch?v=npNfOikMMFA ; an unique perspective of the technology of early television.
5. Weinstein, David; THE FORGOTTEN NETWORK, DU MONT AND THE BIRTH OF AMERICAN TELEVISION; Temple University Press; 2004.

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Restoring the Du Mont Royal Sovereign

by John Staples, W6BM

The 30 inch Du Mont Royal Sovereign is the largest CRT-based monochrome TV receiver ever made and cost $1,800 in then-year dollars; The same year, a Cadillac Coupe deVille sold for $3,962. It was manufactured for less than two years in 1951-52 . The tuner covers the 54-216 MHz range (VHF-TV) continuously and also covers the FM band. The Royal Sovereign cabinet was designed by Herbert Rosengren, who was also a graphic artist.

Steve Kushman admiring the Du Mont Royal Sovereign donated to CHRS.

The Royal Sovereign comprises two sub-chasses, one containing all the RF, video and audio circuitry, the deflection circuits and the power supply for all systems except the deflection system, and a second chassis containing the regulated 20 kV high voltage (HV) power supply and the power supply for the HV plus the deflection circuits on the first chassis. The set uses 45 tubes and a 30 inch 30BP4 metal-cone non-aluminized CRT operating at a 20 kV accelerating potential. Du Mont later issued an update kit of a rectangular 27 inch CRT to replace the original CRT.

A 30 inch Crosley set also hit the market using the Du Mont 30 inch tube, but the electronics was of a different design, using only 33 tubes, including six rectifiers.

Removing the set from its former home in Alameda and loading it to the van.

In October 2004 CHRS heard of an incomplete set in Alameda, California. A hearty crew transferred the set to the KRE site and it sat nonoperational there for several years. When we took a close look at it, we realized that the set arrived without the second chassis containing the low voltage (LV) and HV power supply. Was it worth restoring? Without the complex second chassis, restoration would be challenging. Few are still operational, and if running, this Du Mont would be the centerpiece of the CHRS television collection.

First, the CRT had to be checked to see if it were still alive. The CRT has one getter in the neck to maintain the vacuum, but due to the large enclosed volume and the delicacy of the glass-metal seal, the lifetime of the 30BP4 is limited. Many 30BP4s have already failed because of seal failure. Due to potentially poor vacuum, the cathode lifetime is also limited. Our set already had a brightener on it (a transformer that runs the heater at an elevated voltage), further limiting the CRT lifetime.

The interior showing the 30" CRT and the RF and deflection chassis. The second LV and HV chassis is missing from the bottom of the cabinet.

A test setup was constructed where heater and grid voltages were applied, and an available 6 kV HV power supply provided the accelerating potential. With the ion trap in place, a spot of light appeared on the CRT face, indicating that the tube was operational and that the restoration could continue.

The challenge was to find a replacement for the missing second chassis. No direct replacements were available. One solution is to build a "brute force" 20 kV power supply for the CRT, along with a LV power supply for the deflection circuit. Such a power supply is lethal; this approach was used on many early TVs to the demise of some TV servicemen.

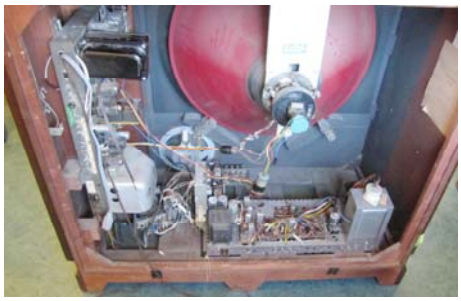
Therefore, a source of limited energy HV had to be found, at least to render the set relatively safe. Building a unit from scratch is a large endeavor. Other monochrome TVs from this vintage did not use a voltage level near 20 kV, nor could provide a current of up to 1 mA without regulation problems.

Color TVs do have a regulated HV power supply of appropriate voltage and current rating. One of our members, Bill Voigt, sacrificed an operational color TV in his collection, an RCA CTC-12 so we could adapt the electronics to provide both the regulated HV and the LV to the deflection circuits on the remaining DRS chassis.

The first restoration task was to completely recap the original chassis and commission the RF, audio and video circuits. All the caps were bad, not a good sign. The chassis is large, heavy and unwieldy, and difficult to remove from the cabinet. Since the tuner it also covers the FM band, local stations provided a convenient signal source to check the quality of the audio.

The RF chassis on a cart behind the cabinet, hooked up for checking its operation.

Once the RF and audio circuits were operational, the chassis was removed from Bill's RCA CTC-12 and adapted to operate with the Royal Sovereign. All tubes except the horizontal deflection, HV rectifier and HV shunt regulator were removed. (The LV power supply uses solid-state rectifiers.) The RCA deflection yoke is retained, to properly load the flyback transformer to produce the required high voltage. The RCA chassis sits on the floor of the cabinet in the space originally occupied by the missing HV chassis, and the AC input power is controlled by a relay operated by the line switch of the Royal Sovereign.



The RCA CTC-12 chassis on the bottom, replacing the missing HV chassis.

A nice, clear picture that fully fills the 30 inch screen.

Steve Kushman admires the final product.

To prevent interference between two horizontal deflection systems, one on each chassis, from interfering with each other or the video display, a horizontal sync pulse from the Royal Sovereign chassis is supplied to the RCA chassis so both high-power horizontal sweep circuits operate in synchronism. The RCA chassis provides low voltage to the Royal Sovereign horizontal and vertical deflection systems.

The restored Royal Sovereign is now operational with the RCA chassis providing HV and LV. It displays a bright, clear picture and good sound 62 years after its original birth. Few of these sets are operational as it is rare to find one with a CRT that is not dead or gone to air.

The set is almost complete. We are seeking a set of original knobs. The cabinet, which is good condition could benefit from some T.L.C. from our woodworking experts. We are also still looking for an original HV chassis for to restore the set to its original configuration. In the mean time, the set plays well with renewed life and is a delight to all who view this very special television receiver. CHRS has a truly historical and unique TV that once again plays magnificently.

John Staples, W6BM, is the trustee of the license of the W6CF ham station and a Fellow of the California Historical Radio Society in Preservation. He holds Amateur Extra and First Phone / Radar licenses, both issued in 1958, and a Ph.D. in nuclear physics, developing particle accelerators and laser systems at the Lawrence Berkeley National Laboratory. ◊

RFID — Retail RADAR In Your Hand

by Bart Lee, K6VK

I recently became interested in a Muni Card I used for a subway ride in San Francisco. So I took it apart. I think it's pretty much like a BART Clipper Card. It is an RFID device: ***R***adio ***F***requency ***ID***entification. I have found that taking things apart is very educational.

Figure 1 one is an enhanced graphic I have produced of the card's physical circuit. The square with the two leads is the capacitor that tunes the loop antenna to 13.56 MHZ. The bridge between two leads from the loop with the four dots next to it is the ***I***ntegrated ***C***ircuit chip (RFIC).

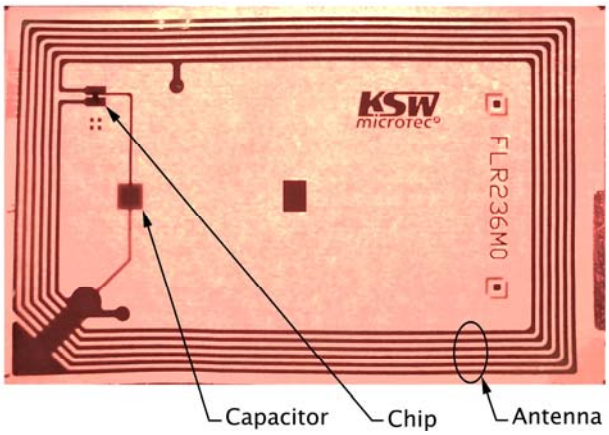


Fig 1: An enhanced graphic of the Muni card's physical circuit. The square with the two leads is the capacitor that tunes the loop antenna to 13.56 MHZ. The bridge between to leads from the loop with the four dots next to it is the Integrated Circuit chip (RFIC).

A brief look at RFID technology and the card's design follows. Links and references provide for more in-depth explanations. The idea of using radio interactions with objects for useful purposes (e.g., finding ships in fog) goes back to the earliest days of wireless, perhaps as early as 1903, according to some sources.

The primary purpose of an RFID device is to communicate the information stored on its chip. That information may be the identity or status of an item on a store self, the identification of a pet, or in this case a record of the balance remaining on my Muni Card. RFID has a myriad of uses and is pervasive in our lives.

The little alarm-sounding shoplifting protection devices on merchandise are one-bit RFID devices. If the tag still emits a "1" bit when read at the exit door, an alarm sounds; but if the cashier has changed to "1" bit to a "0" bit, then no alarm sounds. The commercial key is in the information in the chip. All the rest is just getting it in and out.

Wikipedia provides an excellent overview of RFID:

http://en.wikipedia.org/wiki/Radio-frequency_identification

The circuitry is a very simple radio that facilitates this transmission. A summary of RF ID technology described at the URL below follows:

> The underlying technology architecture of RFID is based on these components:
>
> 1 - A tag and its associated data structure reader with antenna,
>
> 2 - The reader's associated software communications protocol suite,
>
> 3 - A communications network database, and
>
> 4 - Data synchronization.
>
> A reader can be either stationary in a fixed state (e.g., mounted above a conveyor belt) or mobile as in a handheld device or attached to a forklift. The tag is a miniature chip with an affixed radio antenna.
>
> There are currently two types of tags: passive and active. Passive tags have no directly associated power source, they are powered solely by the radio signal of the reader that the device it is exposed to. Active tags do have a self -contained power source. For the passive tag, the reader initiates communication via a radio signal strong

enough to enable the tag to 'answer' the reader with a return radio signal carrying information regarding the item to which it is attached. In the case of an active tag either the tag or the reader can initiate communication. Passive and active tags can be either class 0 (read only) or class 1 (read/write) tags. The approved radio frequency range for RFID applications is 900MHz for Class 0, and either 13.56 MHz ISM Band or 860-930 MHz for Class 1, depending on the strength of signal required.

http://www.dataflows.com/RFID_Overview.shtml

RFID devices can be interrogated at long distances. How long depends on transmitter power and receiver sensitivity. Distances as far as thirty feet appears in the literature. Security is an issue with RFID tags. They are susceptible to unauthorized reads and access. Keeping one's RFID credit cards, those with a chip, and an RFID Passport, in a shielded wallet may be wise. Most such RFID systems are encrypted at some level. It turns out that RF ID tags that use encrypted modes are relatively easy to break. This is perhaps a tempting challenge for someone with too much time on their hands. There is potential for big mischief here. See "Reverse-Engineering a Cryptographic RFID Tag" located at:

http://static.usenix.org/event/sec08/tech/full_papers/nohl/nohl_html/

The Muni Card is a passive design. The card has no internal power source. The reader device sends a radio signal to it. The card picks it up with a loop antenna and turns the signal into a voltage. That voltage energizes the on-board silicon chip of transistors. They send their digital signal back out through the loop. The reader picks it up and analyses it for "go" or "no go," or how much "go." The chip depletes its available "go" information with use. In general the device can be "recharged" with more "go" usually by money into a charging device. The Muni Card works at about 13.5 MHz, not far from the 20 meter amateur radio band. Chips for pets and people are much smaller and work at correspondingly higher frequencies (e.g., 900 MHz). Some credit cards use more complex chips and keep track of a bank or credit balance on the card.

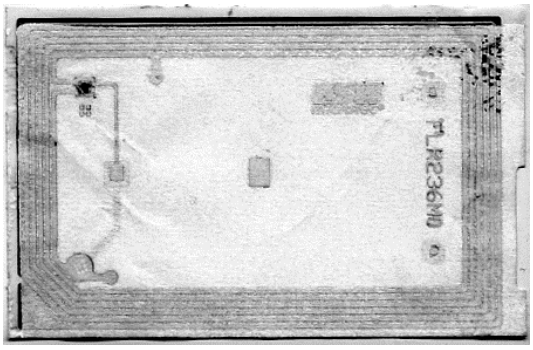


Fig. 2: Optical scan of the Muni card with most of the cardboard covering removed.

I removed the Muni Card covering primarily by soaking in Goo Gone®. Figure 2 is an optical scan of the physical card with most of the cardboard removed. Figure 3 is the idealized electrical circuit. Figure 4 is an equivalent circuit diagram. (Figures 1 & 2 are my own work.)

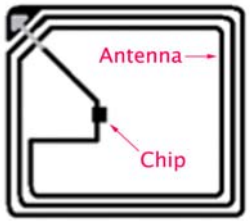


Fig 3: An idealized RFID diagram of the loop and chip configuration

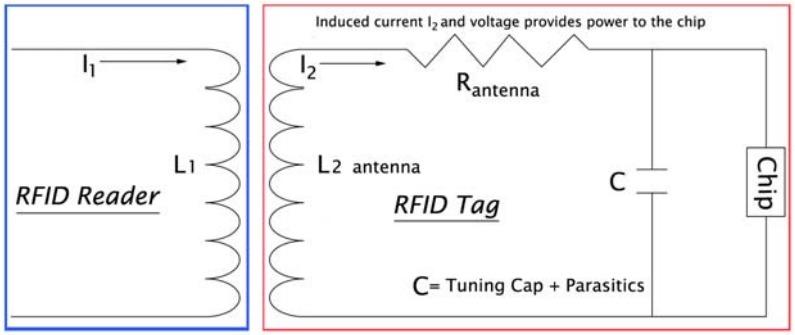


Fig 4: Equivalent Circuit Diagram showing inductance "L", capacitance "C" and resistance "R". There is also some capacitance in the chip and a small amount between the windings of the coil antenna. The inductance and total capacitance make the device resonate at a primary frequency.

In reference to the Muni Card, a microscopic examination of the RFID chip itself could disclose the physical circuit of the chip and therefore its logic. The chips often if not always provide encryption. But by looking at the actual chip under a microscope, the logic pattern can be determined from the chip structure and decryption can ensue. Once the cover was removed, I verified the Muni Card electrical/RF circuit structure by shining the light from a (red) light table through the card (figure 2), which made it translucent, so I could photograph the loop circuit as shadow (figure 1).

Fig. 5: This is the display unit of a World War Two IFF (Identification Friend or Foe) equipment. The scope showed a vertical trace displaying the return signal from an aircraft's transponder. Note, top left, a control by which a signal could be sent to an aircraft as a "challenge." (Bart Lee collection and photo).

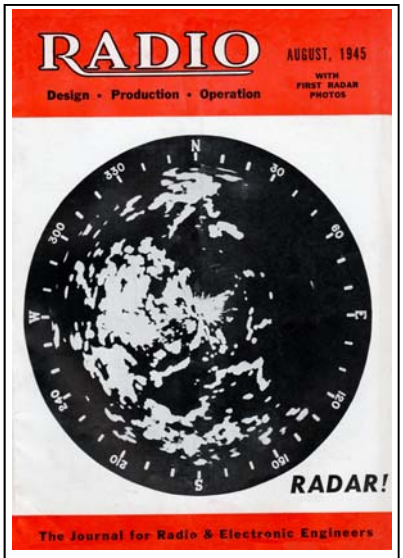


Fig. 6: The August, 1945 "Radio" magazine "WITH FIRST RADAR PHOTOS" made the first published disclosure of World War Two American RADAR. The article provides pictures of the Raytheon SG equipment.

The roots of RFID go back to RADAR in and after World War Two. RADAR (RAdio Detection And Ranging) bounces a signal off something metallic. But whether it's friend or foe is not thereby known. German planes returning to base wagged their wings to show German radar operators who they were by variations in the returned reflection. The Allies developed UHF transponders to identify their own aircraft, known as IFF for ***I***dentification ***F***riend or ***F***oe. Interrogation of a passive object was the next conceptual level. See figures 5 & 6. One history says:

> "An early, if not the first, work exploring RFID is the landmark paper by Harry Stockman, 'Communication by Means of Reflected Power,' Proceedings of the IRE, pp1196-1204, October 1948. Stockman stated then that 'Evidently, considerable research and development work has to be done before the remaining basic problems in reflected-power communication are solved, and before the field of useful applications is explored.'"
>
> http://www.transcore.com/pdf/AIM%20shrouds_of_time.pdf

The Decades of RFID Progress	Event
1940 - 1950	Radar refined and used, major WW II development effort. RFID invented in 1948.
1950 - 1960	Early explorations of RFID technology, laboratory experiments.
1960 - 1970	Development of the theory of RFID. Start of applications field trials.
1970 - 1980	Explosion of RFID development. Tests of RFID accelerate. Early adopter implementations.
1980 - 1990	Commercial applications of RFID enter mainstream.
1990 - 2000	Emergence of standards. RFID widely deployed. RFID becomes a part of everyday life.

By 1984 (perhaps all too significant a date!):

> "RFID tags were regularly being manufactured by several U.S. and European companies. Some tags could be programmed once at the time of manufacture or manually programmed at the time of installation. These are generally referred to as WORM or Write Once, Read Many tags. Some could be electronically programmed either by direct contact or via the RF link. These are generally referred to as Programmable tags. Usually EEPROM based, these can be re-programmed between 10,000-500,000 times."
>
> http://www.emory.edu/BUSINESS/et/rfid/timelinr.html

RFID technology has become pervasive. It is clear that it in the future it will be applied even more widely. Perhaps radio, in one form or another, is more than a passing fad and is here to stay.

73 de Bart Lee, K6VK (Fellow of the California Historical Radio Society, holding both FCC General [Commercial] with Radar and Amateur Extra licenses). ◊

WW-I Wireless Radio Communication — A Novelty That Did Not Quite Work

by Amnon Fisher

Communication through wire telephone and telegraph were the primary methods of controlling World War One vast armies. Both telegraph and telephone were already established technologies which functioned well during stationary battles, albeit being vulnerable to hostile fire, yet did not provide any solution to moving armies during an offensive. The nascent wireless technology promised to provide the solution, but other than some exceptions, mostly failed to facilitate the command-and-control communication channels during the opening phases of the war and during all subsequent assaults by either belligerent side. The wireless technology of 1914 was too complicated to operate, was too cumbersome to be considered portable, and in many instances exposed the strategic and tactical intentions of the armies using wireless communication. On the other hand, wireless communication was vital for the naval and submarine wars, greatly improved artillery effectiveness, and has become more effective toward the end of the war as more advanced equipment was to become available.

The German scientist Heinrich Hertz demonstrated in 1886 his first Spark-gap transmitter, proving in practice Maxwell's electromagnetic theory. The transmitter generated a disruptive discharge (spark) from an induction coil radiating electromagnetic waves which were detected by a primitive receiver. This discovery was followed by a series of discoveries by inventors such as Edison, Tesla, deForest in the US, Alexander Popov in Russia and Marconi in England, who further enhanced the new technology to create the equipment capable for transmitting Morse code over a long distance.

The equipment was cumbersome, heavy and required special skills to operate (Figure 1). For instance, the Slaby-Arco wireless system, reported in 1901 Scientific American,[1] which was used by the Russian navy during its 1904 war with Japan, had the following features: the weight of a complete station including transmitters, batteries, receivers, auxiliary apparatus, etc., was 30 kilogram (about 66 lbs), and the greatest distance intelligible signals could be transmitted was 20 kilometers from a land station using a long flexible cord pulled by a kite as an antenna. Aside from the cumbersome nature of the equipment, the Spark-gap wireless consumed wide bandwidth, which limited the number of "stations" transmitting simultaneously, and was omni-directional such that any enemy receiver within range could pick up the signal.[2] A major improvement to the Spark-gap wireless technology was the introduction of different pitch Morse code assigned to different transmitters operating in the same zone, hence enabling multiple simultaneous communications.[3] (That is, different transmitters generated Morse Code with a different unique tone). It will take until 1918 to develop and produce the high-vacuum tube (a.k.a. vacuum valve) amplifier as the basis of Continuous Wave (CW) wireless and the later introduction of AM (Amplitude Modulation) radio.[4]

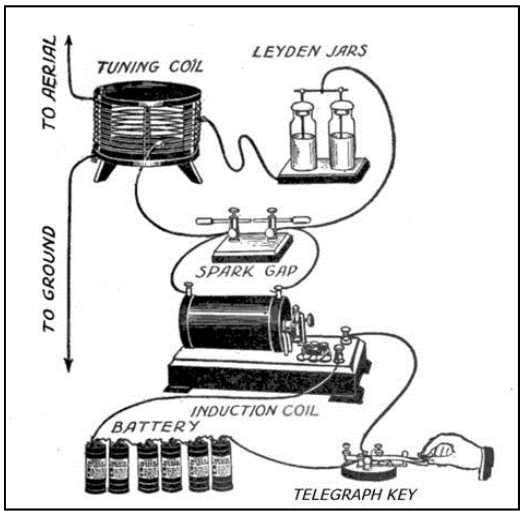


Fig. 1: Basic Spark Gap Transmitter

The attacking forces, advancing beyond their telephone and cable networks, relied on wireless messages that their opponents could intercept. Simple encryption methods (in modern terms) were used in order to conceal these messages. One method was for each letter in the message to be replaced by another letter in the alphabet using tables in the possession of both sender and receiver.[5] The process of encrypting a message, transmitting it by Morse code and deciphering the message on the receiver end to recreate the text took about 15 minutes from start to end, a time consuming process which was often skipped at the heat of battle. At the opening of the Russian front, the Russian armies lost each other's codes, therefore were sending messages in the clear, which the Germans read. The Germans decided to initiate an offensive once they intercepted the message indicating that the Russians will halt on August 20th.[6] Similarly, during the

1914 August offensive Kluck's army was 80 miles beyond the nearest railhead while Bulow's was 100 miles. The commanders communicated between themselves using the few available wireless sets, which were bulky and difficult to use, rather than lose time on encryption, sent messages in the clear, which enabled the French and the British to intercept them, revealing the German intentions.[7] During the period between September and October of 1914, the French and the British intercepted fifty radio messages in plain language from German divisions, army corps and army groups, providing insight to the collapse of the German command, leading to the victory of the Marne and the subsequent Race to the Sea.[8] Even if encrypted, messages could be deciphered on the basis of linguistic structures. The British intelligence was the most advance army in code breaking. Between October 1917 and March 1918 it successfully deciphered 577 messages out of traffic of 639 messages generated by German artillery spotters back to their batteries, giving the troops enough advance notices, thus hampering the effects of the German artillery.[9]

Fig. 2: British army forward wireless station at the Somme in 1917. Source: Wireless World, Marconi and the Making Of Radio

On the international front, the Ententes cut the German's overseas telegraph lines when war broke out, forcing their diplomatic, naval and military communications to rely on coded wireless messages, which the Ententes could eavesdrop and learn how to decrypt. In 1917 there was a proposal for Mexico to form a military alliance with the German-led Central Powers. The proposal was conveyed in the Zimmermann telegram that was sent via wireless from Germany to their embassy in Mexico-city. It, in part, promised that for Mexico's cooperation that the territories of Texas, New Mexico, and Arizona would be returned to Mexico. The interception by the British intelligence of the Zimmermann telegram was the impetus for the US to declare war on Germany.

The British were the first to use Continuous Wave (CW) transmitters instead of the Spark-gap transmitters, which were more reliable; the tuning was sharp to allow four times the number of sets to operate in a specific area, and they consumed less electrical energy. The German army, however, continued to use the Spark-gap technology throughout the war.[10] CW was used extensively by the British army in the August 1918 campaign with sets at the divisional headquarters and each artillery brigade. The most extensive use of wireless communication by the British was airplanes making artillery observations. Striking power was much enhanced by counter-battery observations done by airmen using wireless. By 1915 British aircraft were carrying radios employing special codes to communicate with their batteries and monitor the effects of their fire (Figure 3). Typically observation airplanes carried two people, a pilot and an artillery observer who would send Morse code messages containing fire correction information back to the artillery headquarters which would then pass the corrections to the artillery batteries by telephone.

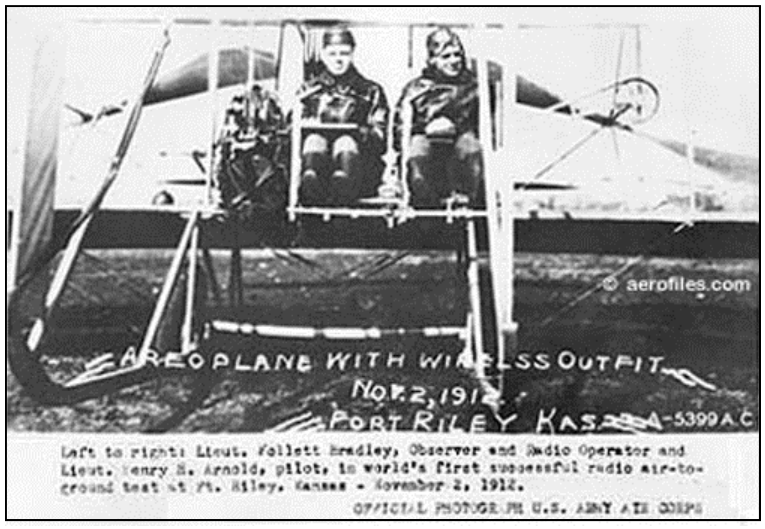


Fig 3: Airplane with wireless outfit 1912
(Left) Observer and radio operator, (Right) pilot.
Source: Aviation time line chronology—Aerofiles.com

By 1917, ninety percent of the British artillery work was being done in conjunction with aerial reconnaissance, greatly improving the artillery effectiveness.[11] Speech radio, after years of development, had reached a few aircrafts in an acceptable form, but until the end of the war, artillery observers communicated though a one-way Morse code.[12]

The most significant benefit of the new wireless telegraph invention was the ability to track ships at sea. For the first time this technology enabled commercial and military ships to provide information about their locations. The Royal Navy and British Army traced the position of enemy wireless stations in German submarines, surface naval vessels, and Zeppelins (Figure 4). The Wireless

Ship act, passed by the US congress in 1910, required from all ships carrying more than 50 passengers and traveling more than 200 miles off-shore to be equipped with wireless equipment. Subsequent to the Titanic sinking, the Spark-gap transmitter became standard equipment installed in all commercial and military vessels. The first successful naval battle use of wireless transmission was during the 1904 Russo-Japan war. The cruiser *Shinanomaru* spotted the Russian fleet in the straits between Japan and Korea and sent a wireless message to the Japanese fleet that permitted it to prepare an ambush in the ensuing Battle of Tsushima Straits. The Russian fleet, having inferior and unreliable equipment based on Slaby-Arco inventions, had shut off their receivers and did not intercept the Japanese message.[13]

Fig. 4: Marconi Direction Finder, c.1916. Designed to detect positions of wireless stations.
Source: Wireless World, Marconi and the Making Of Radio.

Early wireless equipment size and weight was of no obstacle to be placed on warships, which could use their on-board electricity generators to power the radios. Yet, naval wireless telegraphy could not send voice messages, but only Morse code which also took ten to fifteen minutes to code, send and decode, making the technology useless during a naval battle.[14] Realizing that unencrypted messages will be eavesdropped instantaneously, navies returned to use the old fashioned semaphores signaling during battle, which was secure but was limited to having an established eye contact between communicating ships.

Even if encrypted, German shore command never appreciated that the British not only routinely intercepted their signals to the fleet, but expeditiously deciphered them, with the result that the British Grand Fleet was often out to sea before the German High Sea Fleet has hoisted anchor.[15] In 1914 wireless proved itself as vital for communication between ships and played a major role in the subsequent German U-boat offensive, yet the wireless range of many scouting destroyers in the North Sea was less than fifty miles (this was true for both British and German submarines[16]). In their U-boat battle against the Ententes' convoys, the Germans attempted to make use of the latest communication technology. As wireless range increased to almost 1,000 nautical miles in 1918, the Admiralty attempted to use a larger cruiser as floating information station off the British coast in order to coordinate attacks on convoys.[17]

In summary, the nascent wireless radios of 1914 were exactly what the belligerent armies needed in order to facilitate communication between moving armies and their respective headquarters, but the technology came short of delivering the expected goals contributing, among other issues, to the stalemate in the Western front. The equipment was heavy, required special skills and was exposed to eavesdropping. Encryption methods were too slow and were too easy to decipher, exposing armies' intentions to the enemy. On the other hand, wireless technology proved to be a vital tool for the navies and was very instrumental in artillery fire control from the air and ground. It will take another 20 years to build rugged and portable radio communication equipment using AM Short-wave bands, and solid encryption technology.

This article was originally submitted by Amnon Fisher, a long time CHRS member, as a mid-term paper for a graduate class on the First World War at Stanford University, conducted by Professor Gil-li Vardi.

References:

[1] Collins, Fredrick; *Slaby-Arco portable Field Equipment*, Scientific American Dec. 1901 p.425.

[2] The US, as it entered the war in 1917, banned any commercial and amateur use of wireless in order to allocate the entire spectrum for military uses, and also prevent any potential German espionage directed from their radio stations in Mexico.

[3] Mead, Peter; THE EYE IN THE AIR; London 1983; p.76

[4] The three-electrode vacuum tube, originally called the Audion, was perfected by Lee de Forest in his Palo Alto Laboratory and then was called the Audiotron.

[5] In some more advanced encryption schemes, another layer of replacement was used.

[6] Stevenson; THE HISTORY OF THE FIRST WORLD WAR; Penguin 2005; p.66.

[7] Ibid p.54.

[8] Ferris, John, THE BRITISH ARMY AND SIGNALS INTELLIGENCE; Alan Sutton 1992; p.5

[9] Ferris, John; p.15.

[10] Bidwell & Graham; FIRE-POWER; London 1982; p.142.

[11] Kennedy, Paul; *Britain in the first world war*, in MILITARY EFFECTIVENESS Vol. 1 p.49 and Bidwell p.143.

[12] Mead, p.105.

[13] Lee, Bartholomew; *Wireless Evolution from Mysterious Wonder to Weapon of War, 1902 to 1905*, AWA REVIEW Vol. 25, 2012.

[14] Stevenson; p.88.

[15] Hetwig, Holger; *The dynamic of necessity: German Military Policy during the First Word War*, in MILITARY EFFECTIVENESS Vol.1 edited by A.R. Millett; p.98.

[16] Kennedy; p. 54.

[17] Ibid, p.104.

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The Boss Of The Bay And Beyond: A History Of San Francisco's KYA Radio

by John F. Schneider with epilogue by David Ferrell Jackson

One of San Francisco's earliest and most popular stations faded into the ether many years ago, but it left behind a colorful and turbulent legacy that included personalities as diverse as newspaper mogul William Randolph Hearst and the innovative programmer Bill Drake. CHRS History Fellow John Schneider provides this rich history of KYA, adapted from his popular collection of articles on early broadcasting, which can be found at TheRadioHistorian.org.

Beginnings: 1926—1928

Vincent I. Kraft (figure 1) was a Seattle radio pioneer who operated a radio parts distributor called the Northwest Radio Supply Company. In 1919, he turned his personal amateur radio station into experimental broadcasting station 7XC, which in 1921 was relicensed as broadcasting station KJR. Not content to operate just one radio station, he soon went on to construct additional stations in Portland, Spokane and San Francisco. Kraft formed the Pacific Broadcasting Corporation and planned to connect the stations with telephone lines and create a new Western network.

Fig. 1: Vincent I. Kraft (circa 1920).

Fig. 2: Clift Hotel - the location of KYA in 1926

In 1926, Kraft acquired the equipment from the defunct station KFOB in Burlingame, planning to use the equipment for his new station. But the equipment was not found to be usable and was scrapped. It's most likely that Kraft himself built the San Francisco transmitter.

His San Francisco station, licensed under the call sign KYA, went on the air December 18, 1926. Kraft's partner was Frederick C. Clift, owner of the Clift Hotel in San Francisco, and so the station was installed at the hotel.

KYA first broadcast on 750 kHz with a 1,000 watt transmitter. Kraft had applied for 1,000 watts, but the license issued by the Department of Commerce did not specify a power level. Kraft told the press he planned to increase the power to 20,000 watts. On Christmas day, his two other Northwest outlets, KEX in Portland and KGA in Spokane, also went on the air, each with 20,000 Watts. A Los Angeles outlet, KPLA, was also planned to go on the air within the next several months.

Fig. 3: Clift Hotel (1926) - the first KYA studio

KYA's first studios were on the fifth floor of the Clift Hotel (figure 2 & 3) at Geary and Taylor Streets, with the transmitter on the sixteenth floor. The inverted-L antenna was supported from wooden poles on the roof of the hotel. Claire E. Morrison, KPO's engineer and principal announcer, was hired as manager, and Edward Ludes of KJBS became the chief announcer.

When the responsibility for radio licenses was shifted from the Department of Commerce to the newly-formed Federal Radio Commission (FRC) in 1927, a period of frequency "musical chairs" began as the FRC moved stations around the dial to try and create order out of the chaotic broadcast spectrum. As a result, KYA operated on several different frequencies over the next two years:

June 1, 1927	– 970 kHz	- 500 Watts
Feb. 15, 1928	– 850 kHz	- 1000 Watts
March 1, 1928	– 830 kHz	- 1000 Watts
April 4, 1928	– 850 kHz	- 1000 Watts
Nov 11, 1928	– 1230 kHz	- 1000 Watts

In 1927, the company joined forces with the West Coast Theatres and KYA moved into new studios in the basement of the Loew's Warfield Theater Building (figure 4) at 988 Market Street. The new studios were elaborate and well-decorated, designed to be a showplace for theater-goers that might amble down the staircase before a performance. The agreement with the vaudeville theater chain also provided a ready source of entertainment for KYA's broadcasts, as performers only had to walk down to the basement to broadcast a program. KYA adopted the slogan "West Coast Theatres Studio." A postal loop hookup was established with KPLA in Los Angeles and sponsored programs were exchanged between the stations. An agreement was also made with the San Francisco Examiner that provided for the exchange of news bulletins and publicity, and KYA became the Examiner station.

Fig. 4: Loews Warfield Theater (circa 1922). KYA moved into the basement in 1927.

The Linden Years: 1928—1929


Fig. 5: Adolph Frederik Linden (circa1929).

In 1928, financially overextended and more interested in building stations than operating them, Kraft sold his interests in his four radio stations to Adolph F. Linden (figure 5), co-owner with Mr. Edmund Campbell of the ritzy Camlin Hotel in Seattle. Both men were also directors of Puget Sound Savings & Loan. Kraft still owned KXA in Seattle and later went on to build and operate KINY in Juneau, Alaska.

Under Adolph Linden's direction, expansion of the small network of stations occurred at a fast pace. The money flowed freely to upgrade the facilities and programming. The staff started calling him "Daddy" Linden, in reference to the wealthy Daddy Warbucks in the popular comic strip "Little Orphan Annie."

Late in 1928, soon after taking over the stations, Linden signed an agreement with the Columbia Broadcasting System (later CBS) to distribute their programs in the West. At the time, Columbia's network lines only extended as far West as Omaha and its chief executive, William S. Paley, was anxious to extend its programs to the Western part of the country. The agreement called for Linden's network to pick up Columbia's programs in Omaha and carry them westward. Linden also fed his own programs on the Western hookup, originating in either Seattle or San Francisco.

He called his new network the American Broadcasting Company – the first of several radio networks that would carry that name (unrelated to today's ABC). The ambitious ABC network program schedule debuted on December 22, 1928, with a three-hour program sponsored by the Union Oil Company. On January 6, 1929, new telephone circuits were added to feed additional affiliated ABC stations in Omaha (KOIL), Denver (KLZ), Salt Lake City (KDYL) and Los Angeles (KMTR; it later became KLAC). The burgeoning network now had eight stations.

KYA had now become a network programming center. It originated ABC network programs every other night, with KJR in Seattle having the responsibility for alternate nights. Occasionally, KYA also originated programs that were fed east to the entire Columbia chain, including the East-West Football Game and the "Old Gold Program." Its 1929 slogan was "The Theatre of the Air."

Fig. 6: Dick Haller, Program Manager.

Linden spared no expense in hiring the best radio talent. Dick Haller (figure 6), a respected radio programmer from KGW in Portland, became the new San Francisco program manager. ABC's program mix combined serious music with vaudeville-style comedy. Liborius Hauptmann (figure 7), a nationally-known Viennese orchestra conductor directed the Pacific Salon Orchestra (figure 8). Baritone Albert Gillette (figure 9) was heard as a soloist, with the "Neapolitan Singers" sextet, and also as part of a mixed quartet.

The lighter side of ABC's San Francisco programs included the vaudeville comedy team of Metro and Cosmo (figure 10), who were typical of the vaudeville performers of the time that found their way onto radio. Consisting of Tom Smith (Cosmo) and Jack Dean (Metro), they were known on the air as the "Politan Brothers," and also doubled as musical performers on other shows. Deane, who was born to New York vaudeville performers and grew up in the theatre, sang popular ballads and accompanied himself on the guitar.

Fig. 7: Liborius Hauptman.

Fig. 8: Pacific Salon Orchestra.

Another comedy program started at KYA and ended up as a national hit. KYA announcer Johnny Patrick combined joined forces with staff organist Helen Troy in 1928 to create a daily series of short skits written by Patrick under the name "The Funniest Things." The name soon changed to "Cecil and Sally" (figure 11) and it became a national hit. It was one of the first programs to be syndicated to stations around the country through disk recordings made in the San Francisco studios of MacGregor and Sollie. Over the next five years, the program was said to have attracted 15 million fans. Hundreds of episodes of the program survive today thanks to the existence of those early recordings.

Fig. 9: Albert Gillette, Baritone.

Fig. 10: Metro and Cosmo.

In 1928, it finally became apparent where all the free-flowing money for the ABC network was coming from. Taking advantage of their management positions with the Puget Sound Savings and Loan, Linden and Campbell had been regularly tapping into the bank's money to keep the network afloat and to finance their lavish Camlin Hotel. A bank auditor noticed some questionable withdrawals and called them to the attention of the board of directors. They included about $1 million in loans to the radio stations, plus loans to the Camlin Hotel and an oil partnership in Oklahoma, which left the bank short of its required liquid capital.

The state supervisor of savings and loans was called in to investigate. But instead of closing the bank, state regulators made an agreement with Linden and Campbell to

Fig. 11: Cecil and Sally.

make restitution on loans totaling about $1.75 million, taking the radio stations, hotel and all of their personal assets as collateral. Linden resigned his position as president of the bank – only to be replaced by Campbell. The bank agreement was never made public, and Linden continued drawing on the bank's money to finance the stations.

On June 1, 1929, the ABC network welcomed additional affiliate stations to the network (figure 12): WIBO Chicago, WIL St. Louis, WRHM Minneapolis (also known as WLB), KFAB Lincoln, Nebraska, and KTNT Muscatine, Iowa. KFBK in Sacramento also joined the network on July 13, 1929. Later that month a press release stated that ABC was lining up a number of stations on the East Coast, including WOL in Washington, D.C.

In 1929 Linden's ABC promoted a popular series of outdoor summer concerts "under the stars" from a stage at Seattle's University of Washington football field. Meredith Willson and Alfred Hertz were hired as the directors, and they brought in more than fifty of the nation's best musicians from around the country. The live concerts were broadcast over the network three nights a week for several weeks. The concerts were a great broadcast success but a financial disaster. Instead of being "music under the stars," most of the events turned into music in the Seattle rain, and the city's music fans stayed home.

It was the final undoing for the overextended network. Everything came to a screeching halt in August when Puget Sound Savings & Loan filed for bankruptcy protection and the flow of depositors' money to KJR and the ABC network stopped abruptly. The leased telephone lines that carried the network's programs were shut down for nonpayment. The unpaid musicians packed up and went home. (Meredith Willson related that he couldn't find work afterwards in New York without running into someone who blamed him for not being paid in Seattle. This encouraged him to move his family to San Francisco where he started a new career in West Coast radio at KFRC.)

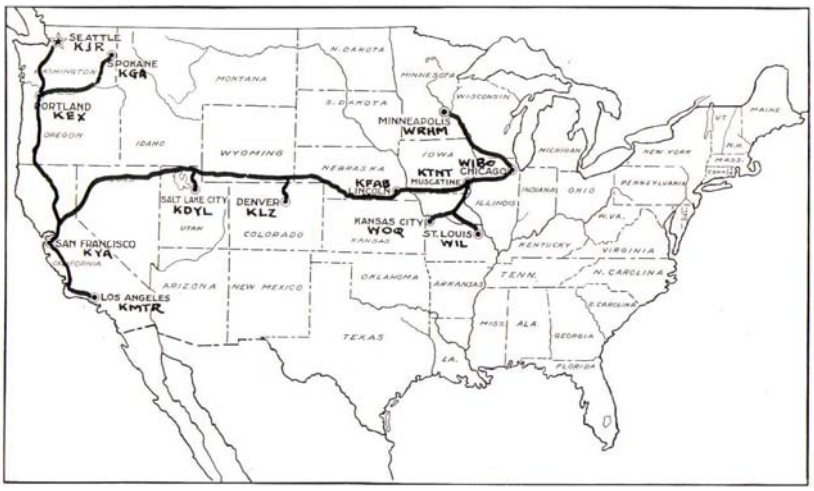

Fig.12: Linden's American Broadcast Network in 1928/1929.

In Seattle, things quickly started to fall apart without the bank's financial backing. On August 15, 1929, the American Broadcasting Company was declared insolvent and control of the network and its four stations was transferred to Ralph A. Horr, court-appointed receiver. Five days later, the news reached Washington, D.C., that ABC had cancelled its plans to extend to the East Coast because of financial difficulties.

On August 25, The Columbia Broadcasting System took over control of ABC's leased lines so they could continue to feed the network's Western affiliates directly, announcing that they would begin feeding the "Columbia Northwest Unit" on September 1. The new Columbia Northwest stations would be KVI in Tacoma, KOIN in Portland and KFPY in Spokane (later KXLY). Columbia's head, William Paley, would soon make a deal with Don Lee in Los Angeles to add his stations KFRC and KHJ, and the combined group of Northwest and California stations would form the nucleus of what soon became the Columbia-Don Lee Network.

Scrambling for a solution to his financial dilemma, Adolph Linden was able to negotiate a last-minute sale of the radio stations and the ABC network to Twentieth Century Fox. On October 15, 1929, he loaded his family into their Lincoln

sedan and headed for New York to ink the deal. But, according to former KJR employee Homer Pope, the deal unraveled at the final moment:

> *It was a big windfall for him – he was going to be able to cash in, pay off his debt, get himself out of trouble and the whole shebang, and so he took off with his wife and kids and drove across the country – he took a long leisure trip across the states – to get back to New York to take care of this deal and solve all of the problems. In the meantime, the stock market crashed, and they backed out. And so the vacation that he took in between was his demise, financially, because they were prepared to go, but when the stock market crashed they decided not to.*

The Lindens stayed in New York and tried their hands unsuccessfully at the restaurant business until an arrest warrant arrived from Seattle in 1931. He was brought back to Washington, and both he and Campbell were charged with failure to make good on their 1928 restitution agreement and for defrauding shareholders and depositors out of $2 million. Both men were convicted and sentenced to fifteen years at the Walla Walla State Penitentiary. Campbell tried to commit suicide by jumping out of a second story window of his home, but only broke his leg. Campbell served seven years at Walla Walla and later worked as a credit manager until his death in 1954. Linden was paroled in 1938 and started a small Seattle record company called Linden Records, where he enjoyed another successful career releasing the music of local jazz musicians. He died broke in 1969.

On September 13, 1929, the KYA license was transferred to F. O. Dahlquist, a court-appointed receiver, and KYA went off the air for three months. Receiver Ralph A. Horr took control of KJR, KEX and KGA on October 1. Working together, the two men brought the old ABC network back on December 22, 1929, under the name of the Northwest Broadcasting System, or NBS. It was a new regional network serving all four stations, with programs originating at KJR.

In the Spring of 1930, the four radio stations (KYA, KJR, KEX, KGA) were sold to Ahira "Hi" Pierce, owner of Seattle's Home Savings and Loan, who was able to keep the stations afloat for a while during the Depression's deepest year. They even experienced a short rebirth and broadcast some popular, quality programming. But in a strange repeat of history, Home Savings and Loan went bankrupt and Hi Pierce was also jailed for misappropriation of funds.

Amazingly, money was found to purchase a new state-of-the-art RCA 1001-B screen-grid transmitter for KYA (figure 13 & 14), and in June of 1930 the "Greater KYA" debuted with its new transmitter from atop the Hotel Whitcomb at 1231 Market Street. (The location had been vacated by KFRC in 1927.) The 90-foot long T-type antenna was supported from 115-foot poles on the roof of the hotel. The original KYA transmitter was shipped to Seattle, and it probably ended up at one of Vincent Kraft's stations in Alaska.

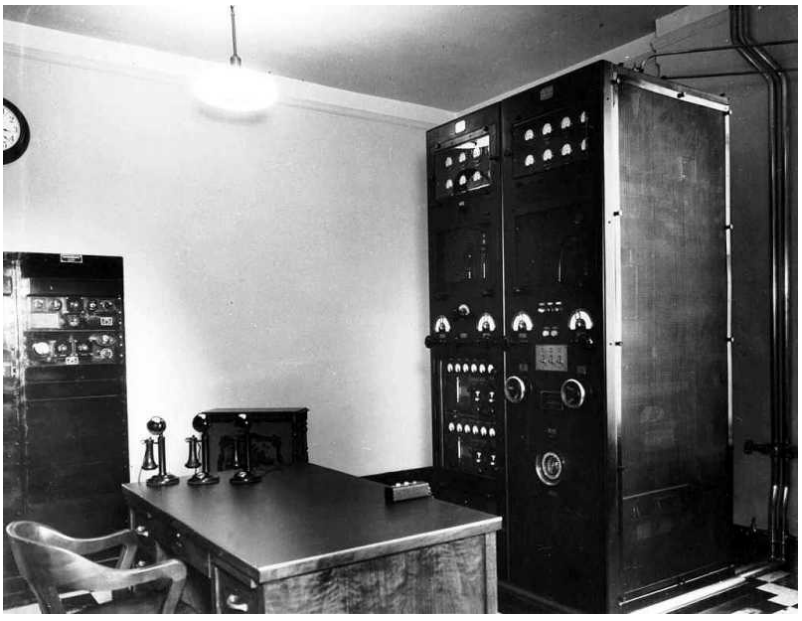

Fig.13: The RCA 1001-B transmitter at the Hotel Whitcomb (circa 1930).

Fig.14: 1930 ad announcing the transmitter.

The NBC Period: 1931—1933

In October of 1931, the National Broadcasting Company (NBC) announced it had acquired the Northwest Broadcasting System and its four radio stations. Since 1927, NBC had been operating its Pacific Coast "Orange" Network from San Francisco, recreating its New York "Red Network" programs and feeding them to seven western stations (KPO and KGO in the Bay Area, KFI Los Angeles, KOMO Seattle, KGW Portland and KHQ Spokane).

But in the East, NBC was also running a second network called the "Blue Network," and they saw the NBS purchase as a mechanism to bring the Blue Network's programs to the West. So, on October 18, the inaugural program of the NBC West Coast "Gold Network" was broadcast from New York. The new stations of the Gold Network were: KPO San Francisco, KECA Los Angeles, KJR Seattle, KEX Portland and KGA Spokane (KGO in Oakland stayed with the Orange network). Additionally, KFSD in San Diego and KTAR in Phoenix could choose from programs on either the Orange or Gold Networks.

KYA's problem was that it didn't fit into NBC's grand plan. The network already had two stations in San Francisco – KGO and KPO – and didn't need a third one, but it absorbed the station into its organization as best it could. In 1932, the studios moved to the NBC headquarters at 111 Sutter Street, where locally-produced KYA programs were augmented by occasional overflow network programs that the other two stations couldn't use or didn't want. The transmitter stayed at the Whitcomb Hotel, and NBC made only a few minor equipment changes during its ownership of the station.

The Gold Network lasted just two short years. On April 1, 1933, NBC announced it was shutting down the "KPO Network" or "Secondary Network" because of high line costs. Instead, NBC would broadcast the programs through KPO's new high power 50 kW transmitter in San Francisco, built to provide clear nighttime coverage up and down the coast. The three Northwest stations were leased to the NBC Orange Network affiliate in their respective cities for $1 a year – KOMO in Seattle took over KJR; KEX in Portland went to KGW, and KGA in Spokane joined with KHQ. (The leases were later converted into sales.) But this solution was not possible in San Francisco, with the result that KYA would be sold again.

The Hearst Period: 1934—1942

On February 1, 1934, NBC sold KYA and the original Pacific Broadcasting Corporation to Hearst Enterprises, owned by San Francisco Examiner publisher William Randolph Hearst. In addition to his nationwide chain of major newspapers around the country, Hearst also owned a stable of radio stations, including WINS in New York, WCAE Pittsburgh, WBAL Baltimore, WISN Milwaukee, and KEHE in Los Angeles. And so KYA now became part of the Hearst family. KYA's studios moved into Hearst Building at Third and Market Streets in 1934. The new studio and master control room were compact but functional (figure 15 & 16). The transmitter remained atop the Whitcomb Hotel.

KYA's corner office must have had a revolving door, because the turnover in managers was very high during the Hearst years. The station manager was Edward McCallum in 1935; he was replaced by Bob Roberts in 1937. Clarence Juneau became the next manager in February 1938, coming from the Los Angeles Hearst station KEHE. He resigned the following October and was replaced by program director Reiland Quinn. In 1940, Quinn returned to the job of program

Fig. 15: KYA Studio A in the Hearst Building (circa 1937).

Fig. 16: KYA Studio A control room (circa 1937).

director, and Harold H. Meyer (the former manager of WSUN in St. Petersburg) was appointed general manager. In 1942, program director Dean Stewart became KYA's acting manager for a short time.

In 1936 the original Pacific Broadcasting Corporation was dissolved. It had been maintained as a separate holding company for KYA, but now the station became a part of Hearst Radio, Inc., which owned its group of stations around the country. KYA's license was transferred to the parent company on March 12, 1936.

KYA continued to carry occasional NBC special event programs after the sale to Hearst, as well as a few CBS programs in 1937 through an agreement with KFRC. These arrangements ended in 1936 when CBS purchased KNX in Los Angeles, upsetting the entire structure of the Columbia Don Lee Network. The result was that the Hearst stations KYA San Francisco and KEHE Los Angeles joined with the McClatchy stations to form the California Radio System (CRS). Each CRS member station contributed programs for broadcast by all stations on the network. Most of these were musical programs with such names as "Minute Melodies," "Novelties at Noon," "The Hollywood Serenaders," and "Rhythm and Rhyme." The California Radio System ceased operations in 1939.

Fig. 17: Ernie Smith, Sports Announcer (circa 1937).

Fig. 18: Florence Grimes of the Whirly Giggs (circa 1936).

During the Hearst years, KYA employed a staff of fifty, including a full staff orchestra. There were a number of regular live band broadcasts, featuring the well-known bandleaders Ted Fio Rito, Ozzie Nelson and Phil Harris. KYA broadcast all the San Francisco Seals home baseball games from Seals Stadium, and also regular sporting events from Civic Auditorium and Kezar Stadium. Several news commentators and sportscaster Ernie Smith (figure 17) were heard over the network, as well as Pacific Coast League baseball games. One of the programs offered to the network by KYA was comedy series "The Whirly Giggs," broadcast at 10 PM Saturdays, with Florence Grimes (figure 18) playing the lead character Mrs. Pearl E. Giggs.

KYA was never a money-making operation for the Hearst chain. In 1938, Broadcasting Magazine commented that, "with no major network affiliations, it has not been a particularly thriving enterprise." (This did not improve with time — financial information filed with the FCC in 1942 showed a three-month operating loss of $18,700.)

One of KYA's problems was that it suffered from a low-power (1,000 watts) signal, which, combined with its inefficient antenna on the roof of the Hearst Building, resulted in inferior coverage. The station received complaints that it did not deliver an adequate signal to outlying areas. A series of debates from the University of California was canceled because the station did not adequately cover Berkeley. The Emporium Department Store and Associated Oil Company also canceled programs because of poor coverage.

To solve this problem, KYA applied to the FCC in January of 1935 to raise its power to 5 kW from its location at the Whitcomb Hotel. Surprisingly, this caused the FCC to set KYA's license renewal for hearing because it conflicted with a simultaneous application for increased power at KDON in Salinas. The Commission also interpreted the application as a proposal by KYA to offer new service. The FCC held a hearing and then on December 12, 1935, scheduled a further hearing. Hearst's lawyers made an elaborate pleading to the Commission for reconsideration, and the

Fig. 19: Carol Atherton, Soprano (circa 1936).

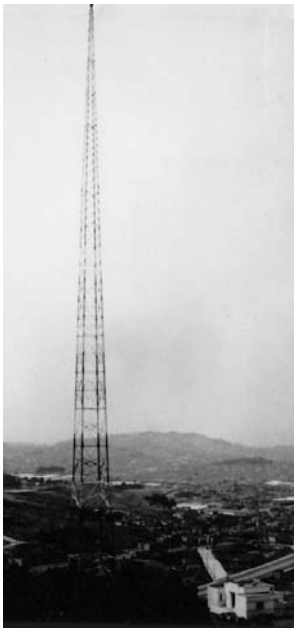

Fig. 20: New KYA antenna tower on Candlestick Hill.

result was that the FCC renewed the license with the condition that KYA would build an improved transmitter plant with greater antenna efficiency.

On April 13, 1936, the Hearst organization acquired a parcel of land on Candlestick Hill in the southeast corner of the city, and it filed for approval to construct a 450-foot self-supporting tower, offering much better efficiency than the old-style T-type antennas that were quickly being retired around the country. A daytime power of 5 kW was requested for the new site, reduced to 1 kW at night. A new RCA 5C transmitter was ordered and construction was begun on an imposing concrete art deco structure. The Bethlehem Steel Company provided the tower. After numerous construction delays caused by inclement weather, operations from the new site began on June 1, 1937 (figures 20-24). Reports of vastly improved coverage quickly poured in from around the region.

To provide better service to the East Bay, KYA opened an auxiliary studio in the Hotel Oakland in April 1937 (figure 25), but it was closed in November of the following year as a cost-saving measure. In 1937, KYA was broadcasting from 7:00 AM to 2:00 AM daily, but by 1940 the station was signing off at midnight. On March 21, 1941, KYA's frequency was changed from 1230 to 1260 kHz as a part of the nationwide realignment of frequencies required by the NARBA treaty. In 1942, KYA began broadcasting 24 hours a day for the first time.

Fig. 21: New art deco KYA Transmitter building on Candlestick Hill. Designed for William R. Hearst by Julia Morgan. (circa 1937).

Fig. 22: Generators in basement of new transmitter building.

Fig. 23: RCA 5-C Transmitter in the new art deco building.

Fig. 24: RCA 5-C Transmitter. The operator is probably Clair Morrison.

The Hearst organization began reducing its radio holdings in 1938 when it sold six of its ten stations. KYA was not a part of those first sales, even though it continued to operate at a financial loss to the corporation. Finally, in 1942, it was KYA's turn to leave the Hearst empire.

Fig. 25: Auxiliary KYA Studio in the Hotel Oakland (1937).

Palo Alto Radio Station, Inc.: 1942—1945

In 1942, Hearst Radio sold KYA for $50,000 to a group of Stanford professors and instructors doing business as "Palo Alto Radio Station, Inc." This began a turbulent period in the history of KYA — over a period of almost twenty years, KYA was operated by no less than eight different owners!

The Palo Alto group had applied to the FCC to construct a new 1 kW station in Palo Alto, but the FCC then instituted a wartime freeze on new station applications, so they abandoned that plan and instead took the opportunity to buy KYA when it became available.

The company was headed by President Wilfred Davis, the former manager of the San Francisco Opera Company (1928-31) and the Sherman Clay & Company. In 1936 he had managed the Northwest Concert Division of CBS, which stimulated his interest in station ownership. Davis was the largest shareholder with 20% of the stock. Other owners included vice president O. H. Blackman, the retired president of a New York advertising agency (6%); vice president Dr. Frederick E. Terman, a Stanford University professor of engineering and former president of the Institute of Radio Engineers (IRE) (2%); secretary/treasurer John M. Kaar, owner of Kaar Engineering, a radio manufacturer in Menlo Park (4%); Dr. Harry R. Reynolds (12%); and Dr. George E. Gamble (10%) and Dr. E.F. Roth (10%), both surgeons. In addition to these individuals, there were 19 additional minor stockholders. After the KYA sale, only four stations remained in the Hearst organization: WINS New York, WBAL Baltimore, WCAE Pittsburgh and WISN Milwaukee.

The Palo Alto group's stated intention was to provide better radio service to the city of Palo Alto and Stanford University, and it had obtained the promise of cooperation on programming with the university's president. The new buyers planned to build secondary studios in Palo Alto, but in the end KYA continued to operate from the same studio in the Hearst Building during the company's entire ownership of the station.

New KYA staff members were announced. Davis became the president/general manager; E. E. Roundtree, former head of the INS news bureau in Seattle, became the assistant manager; Don J. Fedderson became sales manager; and Dean Stewart continued as the program director. Alfred Frankenstein, a San Francisco Chronicle music critic, was contracted as a music consultant. And Jack Temple, the brother of actress Shirley Temple, was hired as an announcer. He created a new program called "Hollywood Star Parade" featuring news of the film industry.

Sales manager Fedderson was the rising star of the group. He was new to radio, having been lured away from the advertising department of a local newspaper, but he learned the field quickly. In 1943 he was promoted to vice president/general manager, and shortly afterwards became the president. He had a good head for sales and promotions and single-handedly took KYA into the black within one year — perhaps for the first time in its history.

Fig. 26: Dude Martin and his Roundup Gang (1942).

One of the KYA stars receiving favored treatment by Fedderson was the country and western musician Dude Martin (real name John McSwain), whose "Round Up Gang" came over to KYA in 1939 from KTAB and was a regular feature on the station until 1950 (figure 26). Martin followed in the footsteps of local western music radio pioneers like Mac McClintock (KFRC) and Charlie Marshall (KPO).

Fig. 27: Clarence Leisure (circa 1942).

Fedderson gave Dude's band the prime 5 PM time slot and kept the program sponsored and profitable for both the station and bandleader. One of the musicians with the Dude Martin band was a fellow named Al Cernik, who would play with Dude on KYA each afternoon after he finished his shift at a South San Francisco tannery. He later hit the big time after changing his name to Guy Mitchell. As for Dude Martin, he went on to become a KGO radio and television host in the early 1950s before moving up to Los Angeles TV; he was elected to the Bay Area Radio Hall of Fame in 2008.

Other KYA air staffers in 1942 were announcers William Mackintyre, Eric Boden, Len Curley, Bob Emerick, Clarence Leisure (later with NBC) (figure 27), Jack Williams, actor Vernon Wilson, Abel Lawrence Zitcer, commentator Ruth Laing Keator, newscaster William Darrell Connell, Dwight Newton (who contracted as an artist while also working at the San Francisco Examiner) and pioneering sportscaster Ernie Smith (Bay Area Radio Hall Of Fame 2007).

The technical staff (some shown in figure 28) included Chief Engineer Paul Schulz, Claire Morrison (formerly with KPO and KYA's first manager), Carl Christiansen (formerly with KPO and KJBS), Toby Hamma, Ralph Abry, Vern Harvey, Bill Overstreet, Russ Pray, Carleton Schwarz and Montague Bancroft.

Fig.28: KYA engineering staff (circa early 1940s)
Top row: Paul Schulz, Russ Pray, Toby Hamma, Joe Landells
Bottom row: Clair Morrison, Chrisman (no first name noted on photo), Bill Overstreet. RCA 5-C Transmitter behind.

Successive Owners: 1945—1983

On October 10, 1945, the holding corporation Palo Alto Radio Station, Inc., was sold to New York City newspaper publisher Dorothy Schiff Thackrey for $348,800. The Palo Alto group had realized a seven-fold profit on their investment in just three years!

Mrs. Schiff was the owner of the New York Post and, with her husband, Ted Thackrey, owned WLIB in Brooklyn, N.Y. Bartley C. Crum was named the new president. The Thackreys kept Don Fedderson as vice president and general manager and also made him manager of KMTR in Hollywood, another station they had also just purchased.

There were no major programming changes at KYA during this time. One of its most popular programs was the morning "Rhythm Rodeo," a western music record show hosted by folksy "Foreman Bill" Mackintosh (figure 29). Western music was popular early morning fare on several stations at that time, serving the still-sizeable farm and agricultural community in the Bay Area (figure 30). (Other local programs included "Western Farm Home" on KROW and "Sagebrush Serenade" on KPO).

A 1956 KYA advertisement listed some of the day's program lineup:

6:10 to 8 AM	– Foreman Bill Mackintosh and his "Rhythm Rodeo"
8:10 to 9 AM	– Dave Dorris, "It's A New Day"
11:15 AM to 1 PM	– George Ruge and his "Ballroom of the Air"
1:30 to 3:30 PM	– Les Malloy's "1260 Club"
5:05 to 6 PM	– Dude Martin and his Roundup Gang, dinnertime music
11:10 PM to 1 AM	– Bob Emerick and his "Telequiz Top Tunes"

And KYA/Chronicle "Time Clocked News" was heard every hour on the hour from 6 AM to Midnight.

In July of 1949, KYA's studios moved from the Hearst Building to the Fairmont Hotel (figure 31). In April of the following year, the station was acquired by J. Elroy McCaw and John D. Keating (each 50% interest) for $200,000. McCaw had ownership in KELA, KALE and KYAK in Washington state and KVOR in Colorado Springs. Together they had interest in KPOA in Honolulu and KLZ in Denver. (McCaw's son, Craig, went on to found McCaw Cellular, which later became AT&T Mobility.)

Fig. 29: "Foreman Bill" Mackintosh (circa 1942).

Don Fedderson moved to the Schiff Thackrey stations KLAC and KLAC-TV in Los Angeles, and Gil Paltridge, the former owner of KGIL in San Fernando, became KYA's new manager. The commercial manager was Wilt Gunzendorfer, formerly the manager at KROW. The next year John Fearnhead was named manager. KYA affiliated with the Dallas-based Liberty Broadcasting System from 1950 until the network ceased operations in 1952.

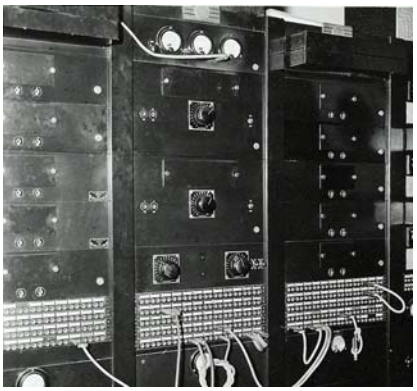

Fig. 31: Speech rack at the Fairmont Hotel installation (early 1950s).

In both the Thackrey and McCaw cases, the licensee corporation itself had been sold, and KYA continued to be operated by Palo Alto Radio Station, Inc. In 1951 the name of the corporation was changed to the Palo Alto Broadcasting Company, and then in 1954 to KYA, Inc.

KYA was sold again in 1958, this time to Golden State Broadcasters, Inc., for $1 million, which included a construction permit for KYA-FM. The new owner was Milwaukee broadcaster Gerald Bartell, who named Morton Wagner as the new manager. The following year the corporation was folded into the parent company, Bartell Broadcasters, Inc.

In the summer of 1958, KYA moved out of the Fairmont Hotel, moving just one block south into KSFO's former studios at Number One Nob Hill Circle, which was an annex building added to the south side of the Mark Hopkins Hotel during the war. (KSFO, curiously, had just recently moved *into* the Fairmont.)

Fig. 30: Cactus Jack ad (circa 1955).

In January of 1959, KYA-FM took to the air on 93.3 MHz with a full time simulcast of KYA-AM. KYA at this time was a disk jockey station playing "middle of the road" music. In 1958, rock 'n' roll music made its first appearance on KYA, originally for just a portion of the station's broadcast day, but it quickly proved successful and took over the entire day's schedule.

In 1961, Phil Yarborough, a young little-known Georgia disk jockey who used the air name Bill Drake (figure 32), was assigned the task of programming the station. Drake made a number of drastic changes, streamlining the carnival sound of early rock radio to create an entirely new radio programming concept. KYA, the fast-paced "Boss of the Bay" became an instant success and soon overtook the other early rock n' roll radio stations, KOBY and KEWB.

Fig. 32: Bill Drake (circa 1971).

Les Crane was named KYA's Program Director in January of 1962, but Bill Drake remained as KYA's morning man until later that year. When Drake left he became a programming consultant, taking "The Drake Sound" to other stations around the country, playing a key role in transforming early rock 'n' roll radio into "Top 40" radio. In 1966, Bill Drake took over the programming of KFRC, soon supplanting KYA as the dominant local Top 40 station. The two stations continued to battle it out in the lucrative Top 40 market through the 1970s. Drake went on to become a multi-millionaire, programming nearly a hundred AM and FM stations from his home in Bel Air in the 1970s.

On August 7, 1962, KYA AM and FM were sold again – this time to the Churchill Broadcasting Corporation for $1.25 million. Clinton D. Churchill became KYA's new president and general manager, and Lewis Avery was the vice president and sales manager. See figures 34-38 for images of KYA in the 1960s.

In August of 1966, KYA was sold to the Avco Broadcasting Corporation for $4.4 million. Lewis Avery became the vice president and general manager, succeeded by Howard Kester the following year. He was followed in 1974 by Clifford M. Hunter, and KYA adopted a "Pop Adult" music format in 1976.

Fig. 33: Ticket to the Beatles concert.

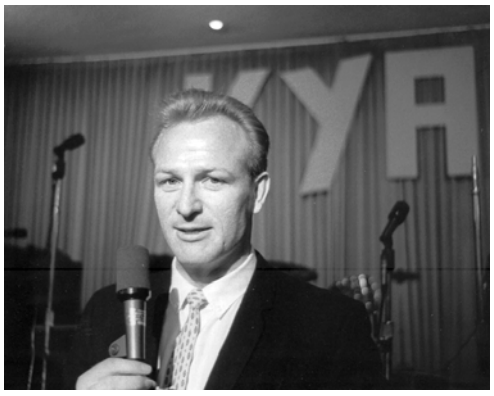

Fig. 34: Gene Nelson (circa 1965).


Fig. 35: "Super Harlow" Meyers (1968).


Fig. 36:Johnny Holliday Bobbitt (1968).


Fig. 37: Tom Campbell with the Monkees (circa 1969).

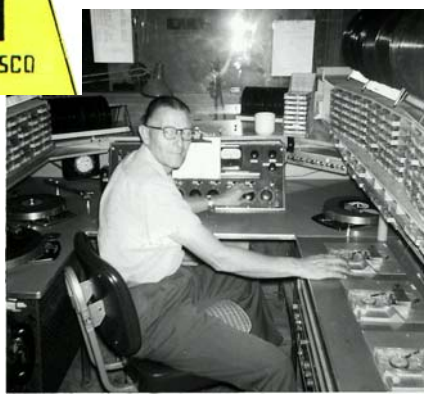

Fig. 38: Carl Christiensen, KYA engineer (circa 1965).

In 1977, KYA AM and FM, along with WRTH in Wood River, Illinois, were sold to the King Broadcasting Company, operators of KING AM/FM/TV in Seattle, and James Kime became the general manager. In March of 1980 a new KYA broadcast center was dedicated at 300 Broadway. Fred Schumacher became the manager the same year, and the station adopted an adult contemporary format called "Easy Rock 1260," which was switched to an Oldies format the next year.

In early 1983, King Broadcasting acquired San Francisco's KSFO (560 AM) from Gene Autry's Golden West Broadcasters, and made the decision to spin KYA-AM off to Bonneville Broadcasting Co., a division of the Church of Jesus Christ of Latter Day Saints, in a $3.5 million deal approved by the FCC on October 19 of that year.

On December 13, 1983, venerable 1260 KYA ceased to exist. Its Oldies programming and much of its personnel moved over to KYA-FM, which King Broadcasting retained, while new sister station KSFO took on a personality-oriented music format. Bonneville, which took control of the 1260 signal on the same date, was already the owner of KOIT-FM (96.5), and so KYA-AM's call letters were changed to KOIT because the station would now duplicate its new FM sister station's easy listening format, merging into KOIT's studio complex at 77 Maiden Lane in San Francisco.

Epilogue

In 1985, the 1260 AM call letters were changed to KXLR with the debut of a short-lived news and information format, but they changed back to KOIT (AM) in 1986 when the station returned to simulcasting KOIT(FM), this time with an updated light rock music format.

In early 1986, the original KYA self-supporting tower on Candlestick Hill came down in a windstorm with 115 mile-per-hour winds (figure 39). A temporary antenna was used until it could be replaced with a new guyed tower in 1987 (figure 40). KOIT(AM) continued to operate on 1260 kHz with 5,000 watts daytime and 1,000 watts at night.

In 1992, KOIT AM/FM moved to new studios at 400 Second Street, and in 1998 they moved again to 455 Market Street. The stations continued to duplicate programming 24 hours a day under the ownership of the Bonneville Holding Company.

Finally, in December 2007, the former 1260 KYA became KSFB, broadcasting programs of interest to the Catholic community as part of the growing Immaculate Heart Radio (IHR) network, pending the station's sale by Bonneville, which was divesting itself of much of its radio holdings. In February 2008, IHR's purchase of the station for a reported price of $14-million became final.

The Bay Area Radio Museum presents an archive of KYA airchecks from its Top 40 era at www.BayAreaRadio.org/audio/kya and also re-creates the era with a digital radio station, Classic 1260 KYA, featuring longtime KYA "Boss Jock" Gary Mora along with vintage jingles and music from the 1950s, '60s and '70s at www.1260KYA.com.

Fig. 39: Wind topples Candlestick Hill antenna tower (1986).

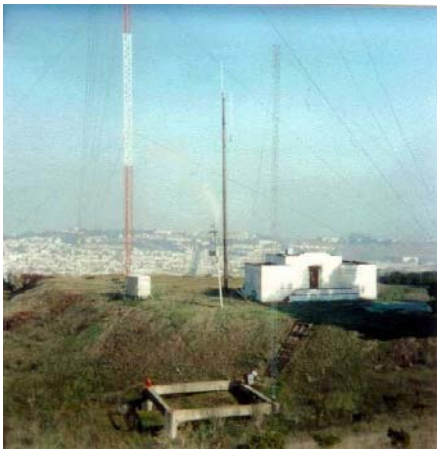

Fig. 40: Replacement antenna tower (1987).

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John Schneider is a lifelong radio historian, and a Fellow in History of the California Historical Radio Society. He contributes regular articles on radio history to "Radio World" and "The Monitoring Times", and is the author of the Arcadia Publishing book "Bay Area Radio" and the book "Seattle Radio" scheduled for release in November. He is also the Latin America Broadcast Business Manager for iBiquity Digital Corporation - the creators of HD Radio.

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Front: Wes "Scoop" Nisker, Bonnie Simmons,
Terry McGovern, Richard Gossett

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