

# Proceedings of The Radio Club of America, Inc.

Volume 50, Number 2



October, 1976

Founded 1909

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THE RADIO CLUB OF AMERICA, INC.  
P.O. Box 2112, Grand Central Station, New York, N.Y. 10017

Founded 1909, New York, U.S.A.

# The Radio Club of America, Inc.

Price \$2.50

BOX 2112, GRAND CENTRAL STATION, NEW YORK, N.Y. 10017

Organized for the interchange of knowledge of the radio art, the promotion of good fellowship among the members thereof, and the advancement of public interest in radio.

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In cooperation with the Radio Club of America

### 67th Anniversary Banquet *Federal Regulation as it Pertains to FCC Licensees*

with

**Charles A. Higginbotham, Chief**

Safety and Special Radio Services Bureau, FCC

November 19, 9:00 am

**Ray Spence, Chief Engineer, FCC**

**Sam McConoughey, Chief, Mobile  
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**Samuel E. Probst, Director  
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**Registration Fee \$5.00**

For further information, contact;  
Val Williams, President, National Association  
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## ROUND TABLE '76

Moderated by **JERRY STOVER**

A question-and-answer session  
will cover the field of personal  
communications (Citizens,  
Amateur, Marine, Paging, etc.)  
Speakers are from the morning  
Senior Communications  
Symposium Session.

2:00 to 5:00 pm

(No charge for this session.)

New York Sheraton Hotel

7th Avenue at 56th St.

New York, N.Y.

**Friday, Nov. 19, 1976**

# WASHINGTON SECTION Holds First Meeting President Link "Honored"

By SMILEY ASHTON

The first "semi-annual" Radio Club Banquet was also the first meeting of the Washington Section of The Radio Club of America. It was held in the Washington Statler-Hilton Hotel on the evening of March 25, 1976. Attended by over 160 guests, the banquet was a fitting climax to "Radio Week" in Washington which saw the 1976 Annual IEEE/VTG Conference as well as important meetings of the Land Mobile Communications Council, the National Association of Business and Educational Radio, The ARRL and of course The Radio Club of America. While the Washington Section of the Club cannot claim total credit for the large and enthusiastic turnout for the banquet, it must be said that the precedent set by this first Radio Club of America meeting outside New York City has established an exceptionally high standard for succeeding chapters to follow.

Prime credit for the success of this first Washington Section Banquet and for the 1976 Annual IEEE/VTG Conference must go to Stuart Meyer, the Chairman of the Washington Section of The Radio Club of America. Stu worked tirelessly for many months to plan each detail and to insure its flawless execution. His week-long achievements were appropriately crowned by his superb performance as Banquet Toastmaster.

An announced highlight of the after-dinner activities included an address by a "mystery" speaker.



"Now you've heard from our mystery speaker," explains genial toastmaster Stu Meyer, as Fred Link finishes.

The festivities began with an introduction by Stu Meyer of distinguished members of the audience. One of those, John Johnston of the Amateur and Citizens Radio Division of the Federal Communications Commission, asked for time on the podium to make a short presentation. What followed was the beginning of a good natured "roast" of Radio Club President, Fred Link. Those who took active parts in fanning the coals and turning the spit included John Johnston, Federal Communications Commission bureau chief Charles A. Higginbotham, and of course Stuart Meyer.

John Johnston noted that Fred had long been interested in two-way radio and that he understood



Sam Lane, President, IEEE Vehicular Technology Group Administrative Committee, addresses the meeting.



"But this expires at three o'clock tomorrow morning!" (President Link gets his old ham ticket renewed.)



"Fifty years a radio operator? I must have started at age 10! (Fred Link gets his QWCA 50-year award.)

ARRL President Harry Dannals (behind podium) receives a Radio Club check for the ARRL Foundation.

that Fred had expressed a desire for an active license. He also noted that the FCC was able to locate Fred's application only with great difficulty because of the mountainous backlog the Commission was now experiencing. It was just within the preceding few hours they had been able to complete processing the license. Fred, at first delighted with the personalized service, became apoplectic when he noted that the license was for Class-D Citizens Radio Service and that it was to expire at midnight that same evening! Fred said that while he appreciated the Citizens Radio license, what he really wanted was to regain his ham ticket with his original call sign, W2ALU. Fred continued to regale the audience with anecdotes relating to his early days in ham radio. After about twenty minutes of his protestations, everyone realized that Link had been successfully snared by Stu Meyer's trap and the identity of the "mystery" speaker was resolved.

Fred Link, as usual, was in rare form, and his wit, anecdotes and repartee were thoroughly enjoyed by all the guests. The "roast" over, other presentations were made, including a special fifty-year award of the Quarter Century Wireless Association to Fred Link by David Talley, Radio Club Treasurer. Later, Fred Link, on behalf of The Radio Club of America, presented a check to Harry Dannals for the American Radio Relay League Foundation. Sam Lane, IEEE/VTG National Chairman, added his appreciation for Stuart Meyer's flawless arrangements for both the Annual Conference and for the Washington Section's Banquet.

At this point, Charlie Higginbotham mounted the podium and said he thought that Fred's desire for renewal of his old Ham Ticket could be accommodated since he, Charlie Higginbotham, had recently given Fred his code test and that Fred had passed—at least to Charlie's ear. Accordingly, Charlie presented Fred with his renewed ham ticket. Again, Fred was immensely pleased until he saw the expiration date was at three am the morning following the banquet.

Concluding a long week's activities was the presentation by Fred Link to Loren McQueen of the charter for Section Two of the Radio Club of America, headquartered in Campbell, California. With the presentation, Fred Link announced that he would personally visit the West Coast to make the presentation "on-site." At that point, Stu Meyer demanded "equal time" and Fred Link re-presented the charter of the Washington Chapter to Smiley Ashton, the section Vice Chairman. With the presentation of the California Section Charter, the Radio Club of America now has an active Section on each coast.

All in attendance are looking forward to the next Annual Radio Club of America Meeting in New York City, November 19, 1976.



"We're No. 2, so we'll try harder!" says Loren McQueen, receiving the California Section Charter.

Smiley Ashton receives (again) the Washington Charter.

# FIFTY YEARS OF MOBILE RADIO



by J. R. BRINKLEY, C. Eng. F.I.E.R.E.

Mr. John R. Brinkley (Fellow 1971) is Chairman and Managing Director of Redifon Telecommunications Ltd., which he joined in 1971. He is on the Board of Rediffusion Ltd., and Chairman or Board Member of several other companies in the group. His career in telecommunications began with the British Post Office at Dollis Hill Research Station, and during the war he was seconded to the Home Office where he was responsible for the development of v.h.f. radio for the police, fire and civil defence services. In 1949 Mr. Brinkley joined Pye Telecommunications as Chief Engineer, becoming Technical Director and subsequently Managing Director. In 1967 he joined ITT as International Manager of Mobile Radio. He has been responsible for many innovations in the mobile radio field and played a leading role in the introduction of 12.5 kHz channelling in the v.h.f. bands in the United Kingdom.

Mr. Brinkley is a member of the Home Office Frequency Advisory and Mobile Radio Advisory Committees. He served as a member of the Institution's Council from 1963-1966.

The early futurologists who so imaginatively predicted space travel, airplanes and submarines seemed—with few exceptions—to have missed out entirely on radio communication. It must therefore have been an astonished world to which Marconi first demonstrated ship-to-shore communication—over eight miles from the S.S. *Mayflower* to the Isle of Wight, in May, 1897. In July 1898 he transmitted the results of the Kingstown Yachting regatta to shore from the *Flying Huntress*—the first commercial transmission, paid for by a national newspaper.

Dramatic incidents packed the early days of marine radio, emphasizing to the public the importance of the new communications medium. In July 1910, Captain Kendall of the CPR liner *Montrose* bound from Antwerp to Quebec radioed that he suspected two passengers, Mr. Robinson and his son, to be in fact Dr. Crippen and Miss Le Neve, wanted in London for the murder of Crippen's wife. Inspector Drew of Scotland Yard took a faster ship and was on hand to arrest Dr. Crippen at the Canadian port.

Even more dramatic in its impact on the public was the loss of the *Titanic* in 1912. The U.S. Congress passed laws enforcing strict requirements in respect of the equipment and operators on seagoing vessels, and the industry began to assume a prominent place as a public service. In 1914 the British Mercantile Shipping bill laid down that every British ship carrying 50 or more persons more than 150 miles from the coast must have a wireless installation.

Marine radio made rapid progress in those early days, first because the need for communication with ships for safety purposes was great; second, the low-frequency technology of the time, requiring large

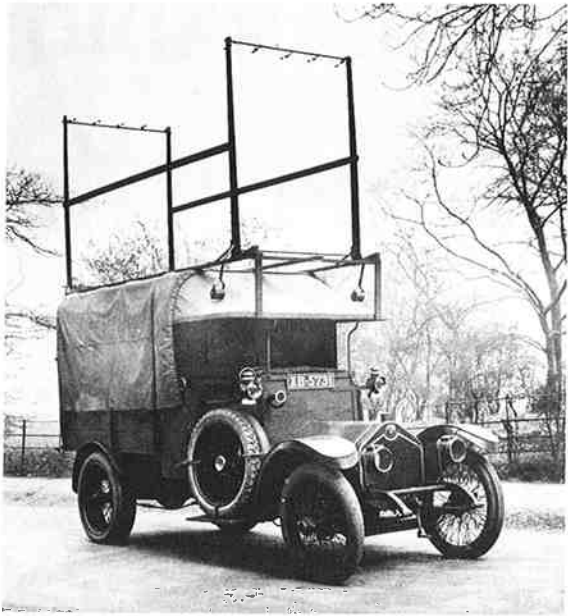
antennas and bulky transmitters, could be accommodated very readily aboard ship. Moreover, propagation of such frequencies was exceptionally good over water.

No such simple technology was to hand for communication with land vehicles. Large antennas were impractical, propagation of the low frequencies then available is relatively poor over land, and the long waves do not readily penetrate built-up areas. The few early attempts made to fit road vehicles had limited success. Serious interest was probably first aroused by the arrival of the tank in World War I. Meanwhile the interest in crime prevention was stimulating police interest in the wireless medium. Technological difficulties were, however, still formidable.

## Early Police Wireless

Despite these difficulties, by the 1930s some of the larger cities in Britain had installed medium-frequency transmitters operating around 2 MHz, transmitting one-way services to police cars. The transmissions were hand Morse, with some limited attempts to use telephony. These services were severely handicapped by high noise levels, fading and long distance interference and were of limited value even to the few cities which were fortunate enough to get a frequency or, more usually, share a frequency.

One remarkable pioneer police installation was put into service in 1932 by the Brighton police. Foot patrol policemen were equipped with "lightweight" receivers (4 lb!) operating on 2.3 MHz. The receivers worked remarkably well but the frequency



1920. An early attempt at mobile police communications.

limitations made a widespread development impossible. Brighton shared a channel with Glasgow patrol cars. The idea was good but it was not for another 35 years with the introduction of the u.h.f. pocketphones that foot patrol radio suddenly became an indispensable part of the beat policeman's life.

#### The First V.H.F. Systems

With the approach of the 1939 War, the British Government became concerned that police m.f. transmitters might serve as beacons to enemy aircraft. Plans were evolved to see whether frequencies in the region of 100 MHz could be used for police mobile communication. The possibility was not viewed with much optimism because it was believed, not unreasonably, that v.h.f. waves would be screened by buildings even more severely than m.f. transmissions. Nevertheless, a development programme was undertaken jointly at first by the Post Office and the Home Office in the hope that any communication might be better than none.

It was fortunate that some remarkable pioneer equipment design work had been carried out by the GEC at Coventry in the late 'thirties which had resulted in what were probably the first ever crystal-controlled v.h.f. transmitters and receivers working between 80 and 130 MHz. The equipment was very large by modern standards and occupied the entire luggage boot of the car, but it was effective and in its simple ability to communicate it was comparable to the best mobile equipment available today. The same basic equipment designs were used in *Spitfires* and *Hurricanes* and later by all allied aircraft and proved to be far in advance of enemy airborne radio.

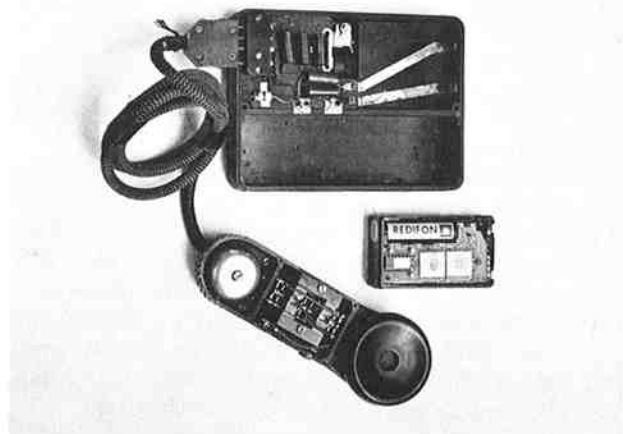
With this equipment the Home Office embarked on a comprehensive series of surveys. All the larger cities

and towns throughout Britain were tested for two-way coverage. Much to the surprise of all concerned, it was quickly found that, provided the main station was well sited and had a commanding view of the area concerned, excellent telephony was possible over ranges of 15 to 20 miles both to and from the car. The fixed station power was 100 W and the mobile about 10 W. An initial fiat that fixed stations were not to be sited on premises other than police stations, which were always in the centre and lowest part of the town and as a consequence bad sites, was ignored by the enthusiastic development team in the best Nelson tradition!

#### The Spread of V.H.F.

Before and during the War, because of the very small number of available frequencies, radio communication was available to Government users only. The coming of v.h.f. opened up much wider possibilities however and in 1948 the first non-government mobile radiotelephone system in Europe was installed in the vehicles of a Cambridge taxi company. The installation was carried out by Pye Telecommunications who were to become pioneers of the new development. Today, 27 years later, Europe has about a million vehicles using radiotelephones, with some 200,000 in the United Kingdom alone. These are used for almost every conceivable application in central government, local government, industrial and commercial fields.

Twenty-seven years ago the idea of mobile radiotelephone, even in fairly obvious applications like ambulances, was greeted with much scepticism. Strangely the ambulance authorities seemed lukewarm to the suggestion that communication with ambulances might save life. It would have been a godsend during the War). When it was discovered however, that four ambulances with radio could do the work of five without and save a corresponding amount of money, the development took off, and by



1932. Brighton had the world's first portable police receiver. Small modern digital paging receiver is shown top center for comparison.

the early 'sixties radiotelephones had become a standard fitting to all ambulances.

Electricity and gas authorities were to become amongst the biggest users (25,000 in the United Kingdom today), the first vehicles being fitted in 1950. The Automobile Association was also an early user for its breakdown service and began fitting in 1949. It now has a fleet of some 2500 radiotelephone equipped vehicles.

One of the remarkable features of these mobile services has been their high growth rate, usually about 15% per annum, the numbers thus doubling every five years. It is a matter of some debate how long such a growth rate will be maintained and of course the answer is not known with certainty. Much will depend upon licensing policies and the availability of adequate frequency space.

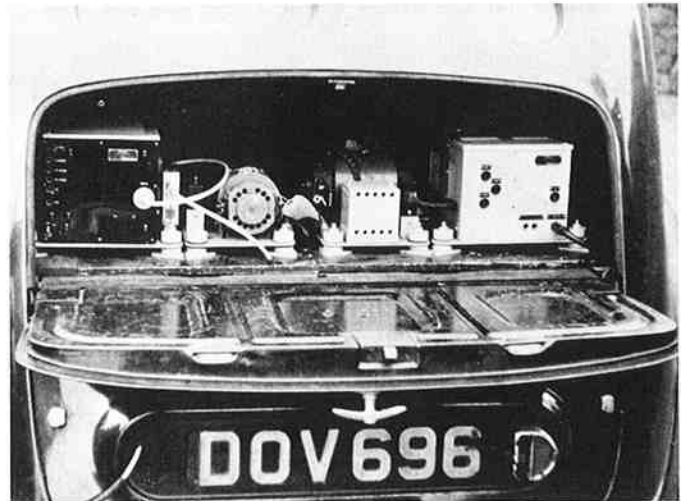
This rate of growth has been accompanied by dramatic improvements in equipment design and technique. Whereas transmitter power and receiver sensitivity are much the same as they were in 1940 nearly all other parameters have been substantially if not radically improved. The most spectacular single improvement lay in the replacement of the thermionic valve by the transistor. Fully solid-state transmitters and receivers began to take over in about 1960. The most important single contribution of this change was to reduce the fault rate of a mobile equipment from about four faults per year to one fault per year. Great improvements in quartz crystal design and manufacture have also taken place over the period and mobile radio as we know it today would not be possible without the remarkable advances in the performance of quartz crystal oscillators and quartz crystal filters.

Despite the improvements in equipment design and the reduction of cost in real terms, the present level of about 2% of all vehicles fitted with radiotelephones seems very low and a good case can be made for envisaging between 10% and 20% before any degree of saturation is reached. If the cost of running and fuelling vehicles continues to escalate over the next twenty-five years, it may well transpire that in time radiotelephones will become compulsory for all land vehicles as they are at present for all but the smallest aircraft and ships.

### The Great AM-FM Controversy

No doubt all great innovations have their areas of controversy. In mobile radio the chief contention has centered around rival modulation systems, amplitude modulation and frequency modulation.

British users and manufacturers were well committed to the use of AM before FM equipment on the relevant frequencies became available. When FM did make its appearance a remarkable controversy broke out on the respective merits of the two systems. The controversy began in 1945 and is not even entirely ended today, thirty years later. The arguments had and still have a strong commercial



1945. A "boot-mounted" transmitter and receiver.

bias. No manufacturer wants to carry two versions of equipment, one AM and one FM, and each company has tended to polarize on the system which suited his particular commercial circumstances. The result has been a sustained and vehement argument about the two systems, whose performance differences, in the main, are distinctly marginal.

When the u.h.f. bands were opened up in the 1960s, manufacturers opted out of carrying two ranges of equipment and settled quietly on FM as standard. The standard use of FM in the u.h.f. band has however not stimulated the introduction of narrower channelling at u.h.f. where 25 kHz is still general, in spite of the fact that it was shown very clearly in 1970 that provided low-ageing quartz crystals are used, 12.5 kHz channelling at u.h.f. is entirely practicable. The failure to introduce 12.5 kHz channelling at u.h.f. with the same promptness



1964. This modern u.h.f. radio, the Pye Pocketphone, represented a breakthrough in police portable radio.

# THE RADIO CLUB

## 67th Anniversary Awards Meeting and Banquet

**New York Sheraton Hotel  
7th Avenue at 56th St. NYC  
Friday, Nov. 19, 1976  
ROUND TABLE '76  
2:00 PM**

Speakers from the Naber Communications  
Symposium held at 9:00 AM See announcement  
inside front cover

Attitude adjustment Party 5:30  
Dinner 7:00PM

Bill  
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with which it was introduced at v.h.f. in 1968 represents in my opinion, a presently lost opportunity which successive generations of users will not appreciate when they run out of u.h.f. channel capacity so much sooner than might otherwise have been the case.

### Personal Portables—The Pocket Radiophone

The Brighton Police pioneers of the 'thirties clearly had the idea of personal radiotelephone imaginatively conceived. True, their set was a receiver only and they must have viewed the prospect of a two-way pocket set as remote indeed. That particular cake was to take another thirty-five years to bake. The vital ingredients were the transistor with its tiny size and small power consumption and the miniature monolithic quartz crystal filter which provided the highest receiver selectivity in a tiny package. These component developments did not occur overnight and indeed it is interesting that when the Brighton sets were first operated, primitive quartz crystal filters had already appeared and the transistor had been conceived but not realized.

As always, a main problem was to get a really small antenna, small enough to go in the pocket and yet capable of radiating efficiently to base stations over a radius of several miles. The elegant solution came in the 1960s with the development of v.h.f. in the 450-MHz band with the tiny antenna that this made possible. An outstanding example was the Pye pocket radiotelephone (1964) introduced first for police service and later for every conceivable application where hand-held communication is beneficial. Some 70,000 of these portables are in everyday use today in the UK. There are some 1000 personal portables in use at London Airport alone. When it is considered that 50,000 people are employed at that site, the number now fitted must surely be a very small fraction of the number of those who could benefit from pocket communication.

The use of personal portables is growing at an explosive rate and may well catch up and pass the numbers used in vehicles. As in the case of the vehicle application the demand for frequencies exceeds supply but the use of radiating cable or leaky feeder systems may help to solve this problem in the future. One of the most remarkable systems of this kind has been installed in the London Stock Exchange. In this scheme 400 stockbrokers can speak instantly to their offices over 103 channels spaced at 12.5 kHz in the 450 MHz u.h.f. band. Radiating cable enables excellent two-way coverage throughout the vast building complex yet confines interference to a radius of about half a mile.

The pocket radiotelephone must have an immense and still largely untapped future in wider fields. It does not take too much imagination to look at the hand-held calculator with its miracle of digital processing to envisage it complete with built-in transmitter and receiver giving full access to the public telephone network. I believe this will be one of the great new mobile developments of the future.



# CARL DREHER—1896-1976

By BILL OFFENHAUSER

David Sarnoff admired Carl Dreher; Carl had accomplished the formal engineering education at CCNY that Sarnoff had earlier wished for, but did not attain. When RCA was incorporated in 1919 and Sarnoff was made General Manager, it was Carl Dreher who went along to advise Sarnoff on the technical performance of the General Electric recording system for wireless signals, which used a Dudell galvanometer, later used for sound motion picture recording in RCA Photophone. Sarnoff turned it down, despite the fact that General Electric had supplied several such recording systems to the US Navy during the World War 1 period. Unfortunately, all technical records of the equipment seem to have been destroyed.

With the tremendous surge in radio broadcasting that started in 1920 when there were less than ten broadcast station licenses, to 1923 when the number jumped to 583, Carl Dreher was moved into broadcasting, and was perhaps best known as the Chief Engineer of station WJZ, New York. In 1921, RCA's gross sales were \$1,468,920; by 1924 they had reached \$50,747,202. By 1929, when National Broadcasting Company had begun operations after the July 1926 contracts for the sale of the Telephone Company's broadcast stations had been signed, RCA gross sales reached \$182 million, of which NBC alone grossed \$22 million.

In 1923, Carl Dreher joined The Radio Club and became interested and active in its papers. In 1923 Professor Hazeltine described his original tuned radio frequency amplification with neutralization of capacitance coupling; in Feb. 1924, Howard Armstrong told the story of the superheterodyne. Radio was coming quickly out of its swaddling clothes, and Carl Dreher observed the best of it.



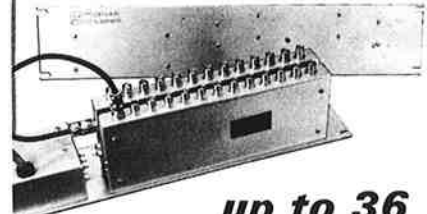
In 1928, Dreher became Chief Engineer of RCA Photophone Inc., the RCA sound motion picture subsidiary started with the aid of Owen D. Young to compete with the Telephone group. In 1929 he was elected Vice-President of The Radio Club; Lewis M. Clement was elected President. Toward the end of 1929, Carl moved out to California to become Director of Recording for RKO Studios. While at RKO, he supervised the technical solutions to the many problems of sound on color film and at the same time established the operating procedures for the production of sound in motion pictures, including wide film of the finest sort, and in excellent color. He was instrumental in changing film production over from a by-guess and by-God operation to the well planned engineering procedure that persists to this day.

Several years later, when studio budgets were cut sharply by the Depression, he returned to New York—and to his love of editing and writing, for The Nation and other outstanding publications.

Carl Dreher's entire life was lived in the spirit of the poet who wrote:

Count that day lost  
Whose low descending sun  
Views from thy hand  
No worthy action done.

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# Armstrong, Sarnoff Awards



**W.G.H. Finch**

Captain William G. H. Finch, Navy Retired, has been awarded the Armstrong Medal “for his important contributions to radio art and science.”

As early as 1921, between New York City and Buffalo, he demonstrated a radio teleprinter based on an early Finch invention, a highly sensitive relay and circuits. In 1932 he established the first radio teleprinter press circuit in the United States—between New York and Chicago—and in 1933 the first international radio teleprinter circuit, for International News Service—between New York and Havana. He was Vice President and Chief Engineer, in charge of radio operations for Hearst.

In November 1932, Finch, then a lieutenant, conducted a number of successful tests of his radio teleprinter aboard the U.S.S. Reuben James with Navy stations along the East Coast. In 1934-35 he was Assistant Chief Engineer, Federal Communications Commission, and Chief Engineer in the Federal investigation of common carriers (telephone and telegraph). Meanwhile he developed black-and-white and Color Fax systems. Many broadcasting stations used this system to experiment with the Radio Newspaper. Large companies, including ITT, were licensed under his patents. More than 180 patents on Fax and Communication Systems were issued to him.

Licensed Ham 1912, call letters 8MK and 8IE. Licensed Professional Engineer (New York). Registered Patent Attorney United States and Canada. Fellow Radio Club and I.E.E.E.

During the war, Captain Finch was directly in charge of research, development and design of counter-measures electronic systems (Electronic Warfare) Buships, Navy. A member of Counter Measures Committee of the Joint Communications Board, Joint Chiefs of Staff. He was Assistant Chief of Office of Naval Research and Chief of Patents and Patent Council of the Navy when he retired.



**Fred M. Link**

The Sarnoff Citation is an award established in 1973 and is named after the late Brigadier General David Sarnoff, a member of the Radio Club of America dating back to 1926. The award is given “for significant contributions in electronic communications.”

Fred Link, president of our Radio Club, is truly deserving of this award for his most significant contribution to military, public safety, international and common carrier two-way radio communication. He is universally recognized as the father of land-mobile radio. In 1931 he founded the Link Radio Corporation in New York City. Under Fred’s direction, the early superregenerative “rush boxes” and simple AM mobile transmitters gave way to sophisticated FM vehicular equipment utilizing the spectrum with maximum communication effectiveness.

Link’s pioneering of FM in public safety communications provided him with the opportunity to supply a broad range of equipment to the armed services during World War II. The famous “LINK” AN/TRC (often called An Track) was the backbone of communications in numerous military operations

At the close of World War II, Link Radio produced the first “high band” 150-MHz equipment which saw wide service in the Taxicab Radio Service, as well as public safety, public utility and common carrier use. A few years later, Link Radio pioneered the use of the 450-MHz UHF frequencies for a broad variety of services. Under Fred’s direction (in the early ’50’s) the Detroit Checker Cab UHF multi channel cellular system became operational.

Fred M. Link is a truly deserving recipient of the Sarnoff Citation for significant contributions in electronic communications.

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# Pioneer, Batcher Awards



**Harold H. Beverage**

Harold H. Beverage constructed his first radio in 1908, at the age of 15. In 1916, he began his professional career with General Electric, in association with Dr. E. F. W. Alexanderson. One of his first assignments was to develop the Alexanderson Barrage Receiver, to prevent the Germans from jamming reception of radio signals by the U.S. Expeditionary Force in France. An outcome of these successful experiments was the invention of the famous Beverage antenna, later used by Paul Godley in Scotland to receive American amateur radio signals in the 1921 shortwave transatlantic tests.

With the fading problems that arose with the "short wave revolution," Dr. Beverage collaborated with Dr. H. O. Peterson to invent diversity reception, now in worldwide use.

In 1920, Dr. Beverage was transferred to the Radio Corporation of America and placed in charge of the laboratory at Riverhead, NY, developing equipment for international traffic reception. After a number of research and development positions, he became—in 1942—Director of Research for RCA Laboratories.

Dr. Beverage has received many honors, including the Armstrong Medal from the Radio Club, the Liebman Prize and Medal of Honor from the Institute of Radio Engineers, the Presidential Certificate of Merit, The Certificate of Appreciation from the U.S. Signal Corps, the Modern Pioneers Award from the NAM and the Lamme Medal from the IEEE. He is an Eminent Member of Eta Kappa Nu and Honorary Member of Tau Beta Pi. His most recent honor was the Marconi Gold Medal from the Veteran Wireless Operators Association in 1974. He was President of the Institute of Radio Engineers in 1937. As an Honorary Member of the American Committee of the International Union of Radio Science (URSI), he has attended international assemblies in London, Tokyo, Munich and Ottawa. Dr. Beverage is a Fellow of the Radio Club of America, the American Association for the Advancement of Science and the IEEE.



**Morgan McMahon**

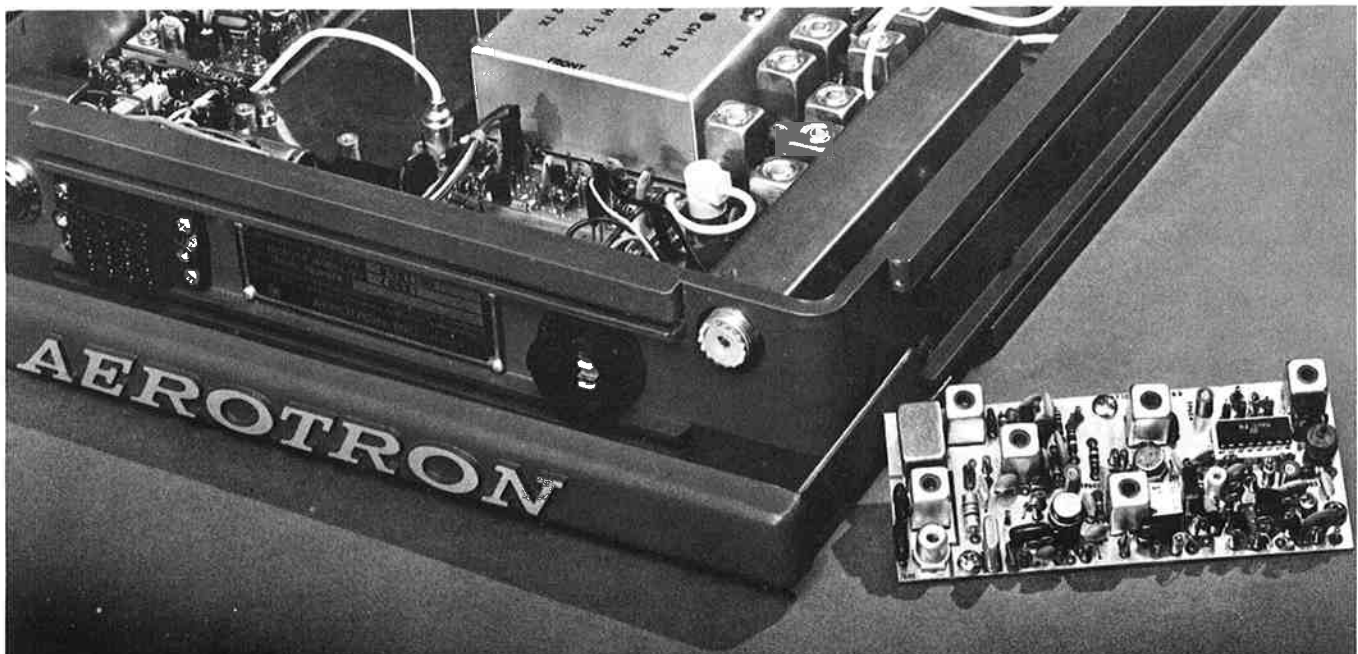
"Our big push," says Morgan McMahon, speaking for himself and wife Gladie, "is to preserve the history of radio before it evaporates." To that end, he and his wife "made a fateful decision" in 1973. Then Chief Scientist of TRW, with a distinguished record of pioneering and invention in the solid-state field, he gave up his position and went on a part-time consultant status with TRW, to give him more time to devote to historical research and to Vintage Radio, the little company named after its first book, which publishes works that preserve the history of radio.

In 1972, the McMahons published *Vintage Radio*, based on the late Harold Greenwood's 1961 *Pictorial Album of Wireless and Radio*. It covered transmitters and receivers from 1887 to 1929, with photographs not only of radios, but speakers and other components, and even a page of test instruments of the 1920's. Nostalgic illustrations and advertisements appeared among the photos of broadcast receivers and 200-kW transmitters, with the occasional short article recalling the old times. The book was such a success that a second edition had to be published.

The *Radio Collector's Guide* came out in 1973, followed in 1974 by a reprint of Sidney Gernsback's 1927 *Radio Encyclopedia*. A book of schematics, Supreme Publications' *Most-Often-Needed 1926-1938 Radio Diagrams*, was next, also in 1974.

In 1975 a completely new book, *A Flick of The Switch*, filled with photos of receivers of the 1930's to the 1950's, with a few articles on the period and short chapters on the radio amateur, collecting and kindred subjects, appeared.

The McMahons are continuing their work, and more publications are on the way. "Yet," says Morgan, "much valuable history is still slipping through our grasp. While Gladi and I do what little we can, we beseech the rest of the radio community to record and save historical facts and artifacts. Remember that some day—sooner than we think—television and electronics will also have history that someone should have recorded. ."



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operation, and optional ten channel scanning. The Mpac fits neatly into tight places while the compact control head mounts easily under the dashboard.

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**RADIO ENCYCLOPEDIA,** Gernsback's 1927 classic beautifully recreated, 175 pages. \$14.95 hard-cover, \$10.95 soft.

**RADIO COLLECTOR'S GUIDE, 1921-32:** Data book with 50,000 facts on 9,000 models by 1,100 makers, 264 pages, \$6.95.

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Larsen Electronics of Vancouver, WA (James Larsen, Fellow 1974, President) was selected for the 1976 Manufacturer of the Year Award made by the Communications Marketing Conference at its 1976 Annual Meeting, held in Kansas City, MO.

The plaque, presented to Chris

and Jim Larsen by Don Ranniger, co-chairman of the event, read:

"CMC 76 Manufacturer of the Year. For outstanding performance, distinguished leadership and unqualified support of representative selling, this achievement award is presented to Larsen Electronics, Inc., Vancouver, Washington."

## CLUB DISCUSSES LIFE ON MARS

Dr. Joseph S. Hogan, Professor of Atmospheric Sciences at the State University of New York, Stony Brook, NY, spoke at the September 22 meeting of the Club, held at Luchow's Restaurant in New York, in conjunction with the NY Metropolitan Chapter, Quarter Century Wireless Association (QCWA) and the New York Metropolitan Chapter of the Vehicular Technology Group of the IEEE (IEEE/VTG).

In discussing "Extraterrestrial Life and the Mars Probe," Dr. Hogan described the communications facilities provided for the probe, and the various experiments used to determine the possible presence of life—or the absence thereof—on the planet. He showed a number of strikingly local-looking slides of the Martian terrain. Other pictures of Mars—some in color—were passed around the tables, as well as some red volcanic stones from Arizona, which looked so much like the red stones in the photos as to indicate rather definitely what

the Mars rocks were probably made of.

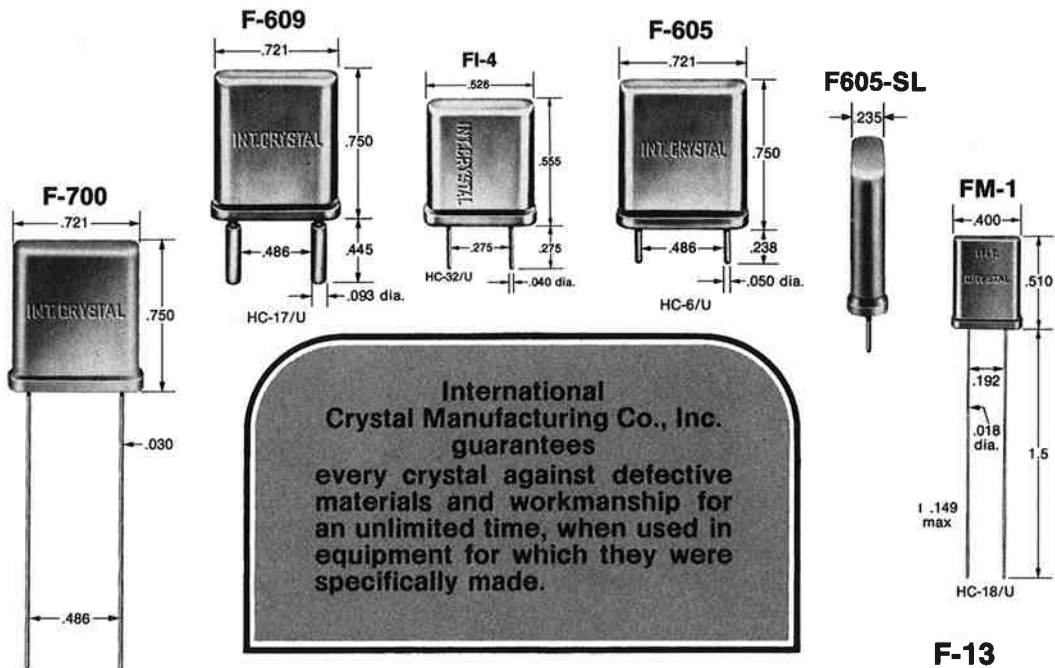
At the time of the meeting, the scientists had not yet completely evaluated the results of all the tests made on the Martian soil samples, and were strictly neutral as to the results expected. Nevertheless, Professor Hogan was much impressed by the signs of life so far turned up. He went so far as to state that, in his opinion, based on the general agreement of the experimental results so far with what had been expected should the soil contain living organisms, that "there is a high probability" that life would be found to exist on the planet. This is spite of the negative results of one of the experiments.

Dr. Hogan also pointed out that the determination as to whether life existed or not was not the only purpose of the Mars probe. Answers to questions that were "in the minds of people since the days of Aristotle," and particularly more clues as to how the solar system formed and evolved, were expected.

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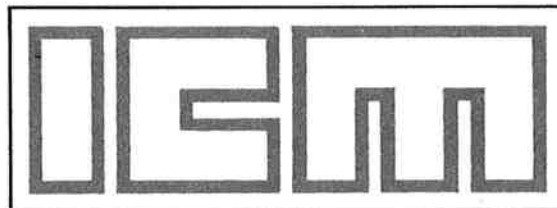
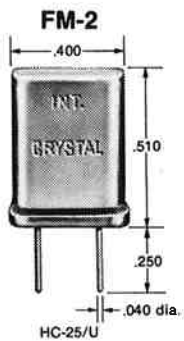
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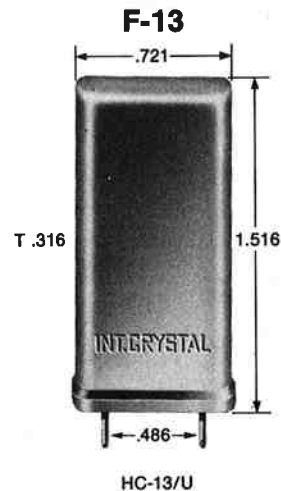
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# News of the Membership

Samuel L. Gravely, Jr., (Fellow, 1972) became a Vice Admiral with his promotion during the summer to the command of the Third Fleet, based on Pearl Harbor and consisting of 100 warships and 60,000 sailors and marines.

Vice Admiral Gravely was born in Richmond, VA, 54 years ago, and was commissioned as an ensign in 1944. After four years of civilian life he returned to the Navy in 1949, and became an admiral in 1971, while commanding a guided-missile frigate off the coast of Viet Nam.

David C. Ferrell (M 1973) has just been made Vice President of Marketing, Communications Division, E.F. Johnson Co., Waseca, MN.

## CLUB MEMBERSHIP UP

The Radio Club of America membership was 671 October 1. This compares with a membership of 617 at this time last year.

Of the 671, 115 are Life Members.

## OBITUARY

The deaths of two members have been reported since our last report was published:

Salvatore Barone (F 1926) died March 6, 1976. He was until his retirement President of Northern Radio Co. of New York City. He was a Director of the Club in 1950.

Daniel E. Harnett (F 1926) died Sept. 11, 1975. He was born in 1899. He had worked with Pacent Electric Co., Hazeltine, Emerson and General Electric Co.

## CLUB MEETS NOVEMBER 10

The Radio Club of America will have a regular luncheon meeting, with the QCWA and EEE/VTG New York sections, on November 10. The group will assemble at noon at Luchow's Restaurant, 110 East 14th St., New York City.

Featured speaker of the meeting will be Barry Farber, who appears daily on WOR radio, 710 kHz.

CB RADIO, by Leo Sands. Cornerstone Library Inc., 630 Fifth Avenue, New York, NY 10020. 5 x 8 inches, 191 pages. Softcover \$2.45.

Written strictly—and clearly—for the would-be CB user who has absolutely no knowledge of radio technology, this work tells the reader what Citizens Radio is all about, what CB transceivers are, roughly how they work, and gives information on controls, power sources and antennas. Some information is given on installation and maintenance, and the reader is told what can be expected of CB radio in the way of usefulness and protection.

There are more than 70 pages of appendices (twelve of them) covering everything from the 10-code and FCC rules and regulations to a temporary operating permit form.



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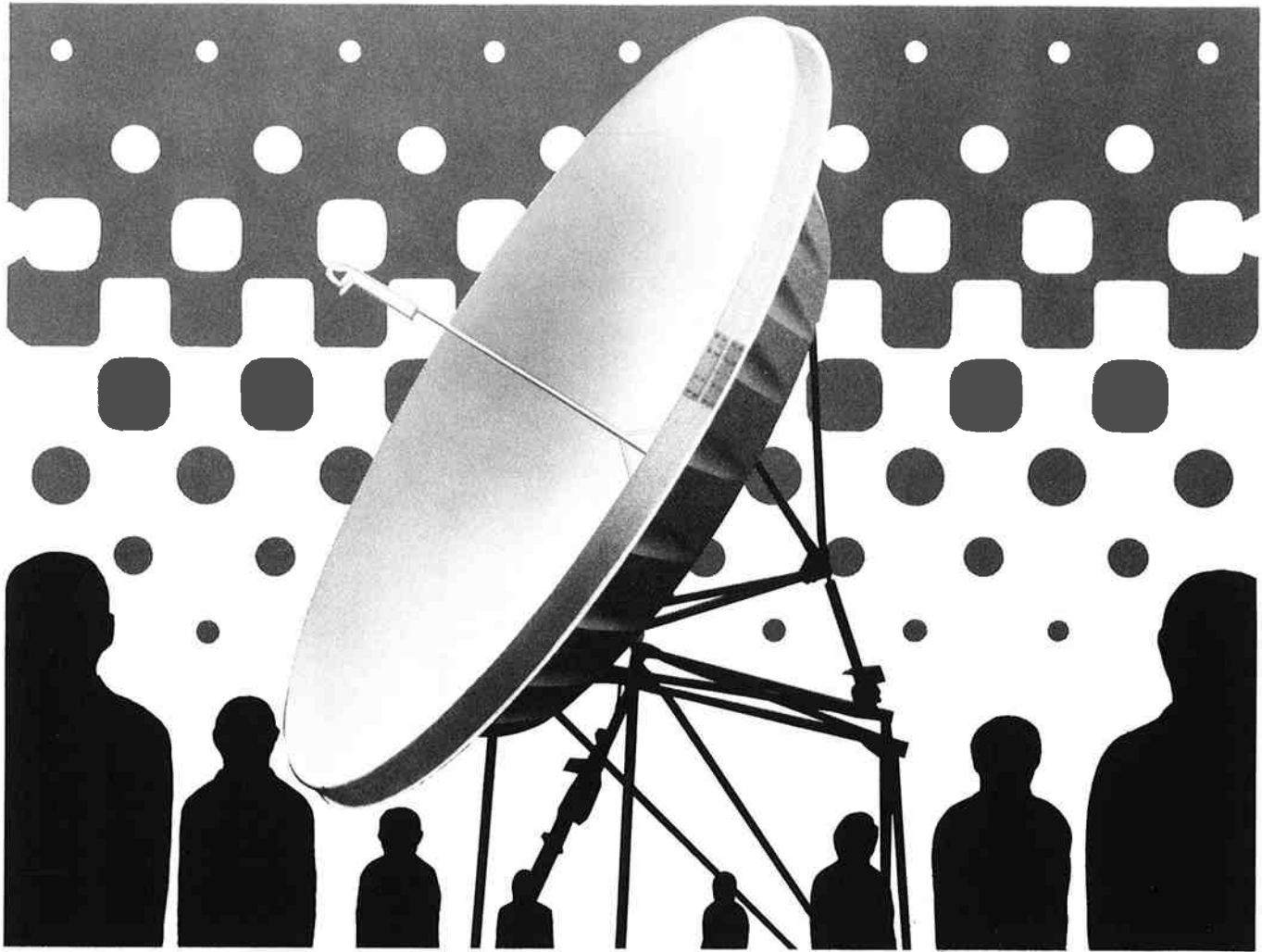


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# Citations to New Fellows, 1976

**Eugene Becken** *Chairman, Executive Committee, Board of Directors, RCA Global Communications, New York, NY 10004*

For his many contributions to international communications during a 41-year career with RCA Global Communications, Inc., and for his technical leadership in international satellite communications services.

**Robert S. Black** *Radio and Microwave Coordinator, Exxon Co., U.S.A., Houston, TX 77001.*

Engineering and management in transmission systems ranging from 200 kHz to 12 GHz, and for special services in the petroleum industry.

**Lewis A. Bondon** *Founder and President, Prodelin, Inc., Hightstown, NJ 08520.*

For contributions over the past 32 years in developing improvements in the area of military and industrial microwave and satellite antenna systems.

**Thomas A. Campobasso** *Vice President, International Sales and Service Division, Collins Radio Group, Rockwell International, Dallas, TX 75229.*

Leadership in electronic communications and as continuing President of the AFCEA.

**Francis T. Cassidy, Jr.** *General Manager, ITT Domestic Communications Operations, ITT, New York, NY.*

For important contributions to communications, in the fields of engineering, invention and management.

**Victor Colaguori** *Oakhurst, NJ*

For important communications services during the Normandy landings in World War II and

contributions to military electronics since that time.

**Frank J. Devine** *Communications Specialist, State Law Enforcement Planning Agency, Trenton, NJ.*

For contributions to public safety communications over a long period of years and for services as President of APCO.

**Max Elliott** *Communications Advisor, Northern California Emergency Medical Care Council, Redding, CA 96001.*

For developing special communications systems in Orange County and for his international status in land mobile radio.

**Milton R. Friedberg** *Cleveland, OH 44118.*

Contributions in the field of land mobile communications and antennas.

**Mal Gurian** *Vice President, Sales, Aerotron, Inc., Fort Lee, NJ 07024.*

For his continuing activity in the planning and execution of industrial two-way radio systems.

**William S. Halstead** *Telecommunications Consultant, Woodland Hills, CA.*

For numerous contributions to the communications art, especially in the field of restricted-range (induction) radio systems and FM multiplexing.

**Richard E. Horner** *President, E.F. Johnson Co., Waseca, MN.*

For leadership in the fields of aircraft, space, land mobile and citizen radio communications.

**Douglas J. Johnson** *VP-Director Commercial Operations, Western Tele-Communications Inc., Denver, CO*

Leadership in common carrier data, microwave and video communications and message switching.

**Samuel R. McConoughey** *Chief, Mobile Services Division, FCC, Washington, D.C.*

For contributions in mobile radio development and planning, and updating of FCC rules and regulations.

**R.D. Mignault** *President, Pye Electronics Ltd., Montreal, P.Q., Canada.*

Leadership in the communications field in Canada.

**S. Edwin Piller** *Program Manager, Federal Systems Group, Fairchild Camera and Instrument Corp., Syosset, N.Y.*

Engineering and management achievements in television, military radio and single sideband, and in amateur organizational activity.

**Kenneth Richardson** *(Editor, DeForest Pioneers Newsletter) Lynbrook, N.Y.*

For his numerous services and contributions—dating from 1908—to radio organization, publicity and history.

**John B. Runyon** *Computer consultant. Locust, N.J.*

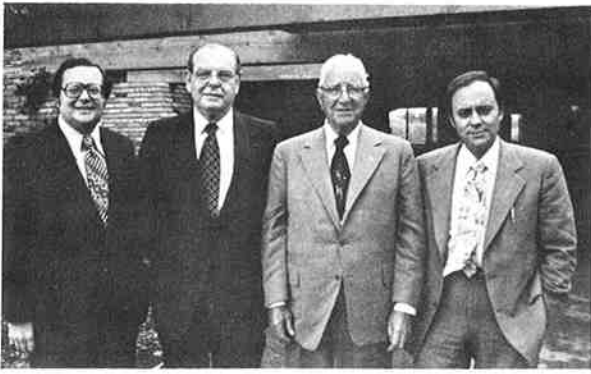
For contributions in the fields of computers and computer programming.

**Theodore P. Rykala** *Communications Consultant, American Natural Gas Systems, Detroit, MI.*

For leadership as President of the Utility Telecommunications Council and for achievements in communications in the natural gas field.

cont'd. on Page 20

## Halligan Visits Hallicrafters



William Halligan (Fellow, 1964) Hallicrafters' founder, visits Hallicrafters' new plant in Grand Prairie, Texas to wish success to new owner, Darrell Fletcher, and to foster the continuation of the Hallicrafters' tradition of excellence in the manufacture of personal communications products for domestic and world markets. Hallicrafters was founded by Mr. Halligan in 1933 in Chicago.

Welcoming Mr. Halligan are, from the left, Cliff Mathews, Jr., Executive Vice-President; Cliff Mathews, Sr., President; Mr. Halligan; and Darrell Fletcher, Chairman of the Board. Hallicrafters was purchased from Northrop Corp's Wilcox Electric Division in November 1975 by Breaker Corp., CB antenna and accessories manufacturer in Arlington, Texas. Mr. Fletcher is also Board Chairman of Breaker.

## California Section Membership

The California Section is growing rapidly, and a list of its membership dated September shows 44 California members.

Lewis E. Best	Marion Henson	Merle G. Parten
Hugh Cassidy	Warren M. Herlihy	Donals R. Pearson
Roy M. Colen	R.W. Johnson	Marvin M. Peterson
Austin G. Cooley	Bill Jumper	Ed Prystup
Bruce D. Cramer	Walt Kaelin	Wm. F. Roberts
LaNeil and Bill Eitel	James J. Lamb	L. Eugene Root
Max Elliott	William P. Lear	Fred D. Rowe
Clifford G. Fraser	Arthur E. McDole	Chandos Rypinski
Lloyd A. French	Morgan E. McMahan	Owen E. Thompson
Frank A. Genochio	Loren R. McQueen	Robert W. Thompson
Vincent C. Gilbert	Robert A. Mason	M.C. Towns, Jr.
Glydus Gregory	James A. Maxwell	Jack Troster
R.H. Griese	C.C. Miller	Robert C. Walton
John R. Hall	Leroy O. Nelson	Kent J. Worthen
Ralph M. Heintz	Peter K. Onigian	

Not only is the membership large—it covers a wide territorial area. Four of the members, Austin Cooley, the Eitels and Bill Lear live over the border in neighboring Nevada; three, James H. Baker, Bruce M. Karr and George C. Reinheimer, are in Oregon, and the members below are in Washington:

Paul K. Dawes	Jim and Christina Larsen
J.W. Ford	Richard G. Quantz
Bobby J. Hudson	William A. Wilson

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For fine base station antennas that cost you no more, look into Phelps Dodge Stationmasters, Super Stationmasters, broadband, coaxial, cardioid, ground plane, yagi, corner reflector, parabolic and others. Our new 80-page catalog has the full story. Ask for a copy: Phelps Dodge Communications Company, Route 79, Marlboro, New Jersey 07746, Telephone 201-462-1880.

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# An Early Power Supply Problem

Our Fellow-Member E. Jay Quinby, whose early experiences in electricity-electronics included positions as conductor on electric trolley lines, apparently had other connections with the street railway system. He reports:

One of the smallest cars on the New York Third Avenue Railway's system operated back and forth between Fordham Square and Kingsbridge about once an hour, passing the door of 2674 Bailey Avenue, where I boarded with "Ma" Cockaday. It operated under the control of a veteran operator affectionately known to its patrons as "The Skipper," who indeed resembled the famous character in Fontaine Fox's Toonerville Trolley.

In a partnership with Ma Cockaday's son Larry (later to become famous for his Four-Circuit Tuner) I acquired a special experimental grade radio transmitter license, with call letters, 2XK, which permitted us to operate a pioneer broadcast station, using a Navy surplus CW-936 radiotelephone set built by the Western Electric Co. for the World War I sub-chasers.

In those days the radio amateurs often provided their plate-supply voltage by rigging up aluminum-plate rectifiers in a group of mayonnaise jars purloined from the kitchen. But these messy electrochemical devices were not as convenient as the substitute we initiated.

With the 600-volt DC feeder of the trolley line just outside the window, Larry and I contrived to sneak a slender, almost invisible copper wire outside our station, splicing it into the railway power supply. Presto! we had an unlimited source of DC, although slightly illicit and illegal. The small current thus obtained was probably within the bounds of petty larceny. But unfortunately Ma Cockaday caught us red-handed in the act of making the splice, and voiced disapproval in no uncertain terms. Nevertheless Station 2XK continued operation with this

slightly noisy source of plate supply. It produced a continual background hiss with a heavy snap, crackle and pop component.

Having just returned from a cruise to the Far East aboard the tramp steamer *Ida*, I brought with me a primitive foot-pumped reed organ from Japan and a handsome Chow pup named Chong. Through a primitive carbon microphone attached to a tin funnel, organ music was broadcast to thousands of crystal-detector headphone receivers throughout Gotham. The Chow pup, allergic to the organ, voiced his objection in mournful howls. The resultant fan mail brought word that the audience enjoyed the organ music, but complained that the soprano couldn't seem to carry a tune.

All went well until the fateful night the Skipper lost control of his little Birney as he rolled down that Bailey Avenue hill on his last run, heading for the barn. A storm had made the rails slippery, and just as the trolley passed Station 2XK its pole jumped the wire, snagged a span wire, and as a result down came the trolley wire, to begin dancing around. As it whipped against the rails it produced a spectacular pyrotechnic display, accompanied by explosive reports. The whole production resembled a Zeppelin raid over London.

Ma Cockaday, startled out of her wits, immediately assumed that the whole disturbance was caused by that surreptitious connection to the feeder cable and demanded that it be removed instanter, while the whole neighborhood was being illuminated with brilliant blue, green and red flashes to augment the lightning that accompanied the storm.

Perhaps it was just as well that the two proprietors of Station 2XK complied promptly with the order to cease and desist tapping the railway feeder, for the crew of the work car that was quickly dispatched from the Kingsbridge car barns to re-rig the damaged overhead cable would probably have discovered the connection.

## Citations (Cont'd)

**William A. Shand** S.A. Co.,  
*Business Consultants, Vienna, VA.*

For contributions in the fields of digital microwave and multiplex radio communications, and application of air-to-ground live television transmission.

**Charles E. Summers** Manager, IBM  
*Private Radio Services, IBM, Armonk, NY.*

For original contributions in land mobile two-way radio and paging, and pioneer work in digital radio communications.

**Harold V. B. Voorhis** Summit, NJ.

For more than 60 years activity as an amateur and in amateur radio organizations.

**Amory H. ("Bud") Waite, Jr.**  
*Oceanport, NJ.*

For numerous activities, as coordinator, Signal Corps Arctic and Antarctic research teams, and for polar electronic research and invention.

**William J. Weisz** President,  
*Motorola, Inc., Schaumburg, IL.*

For outstanding contributions in the field of two-way radio, dating from work on the Handie-Talkie to the present, and for international leadership in the field of communications.

**Lowell E. White** National  
Manager, Telephone Market  
Development, Motorola  
Communications and Electronics  
Inc., Glen Rock, NJ.

For early pioneering work in the public safety communications field, and for continuous work in Common Carrier Radio communications systems.

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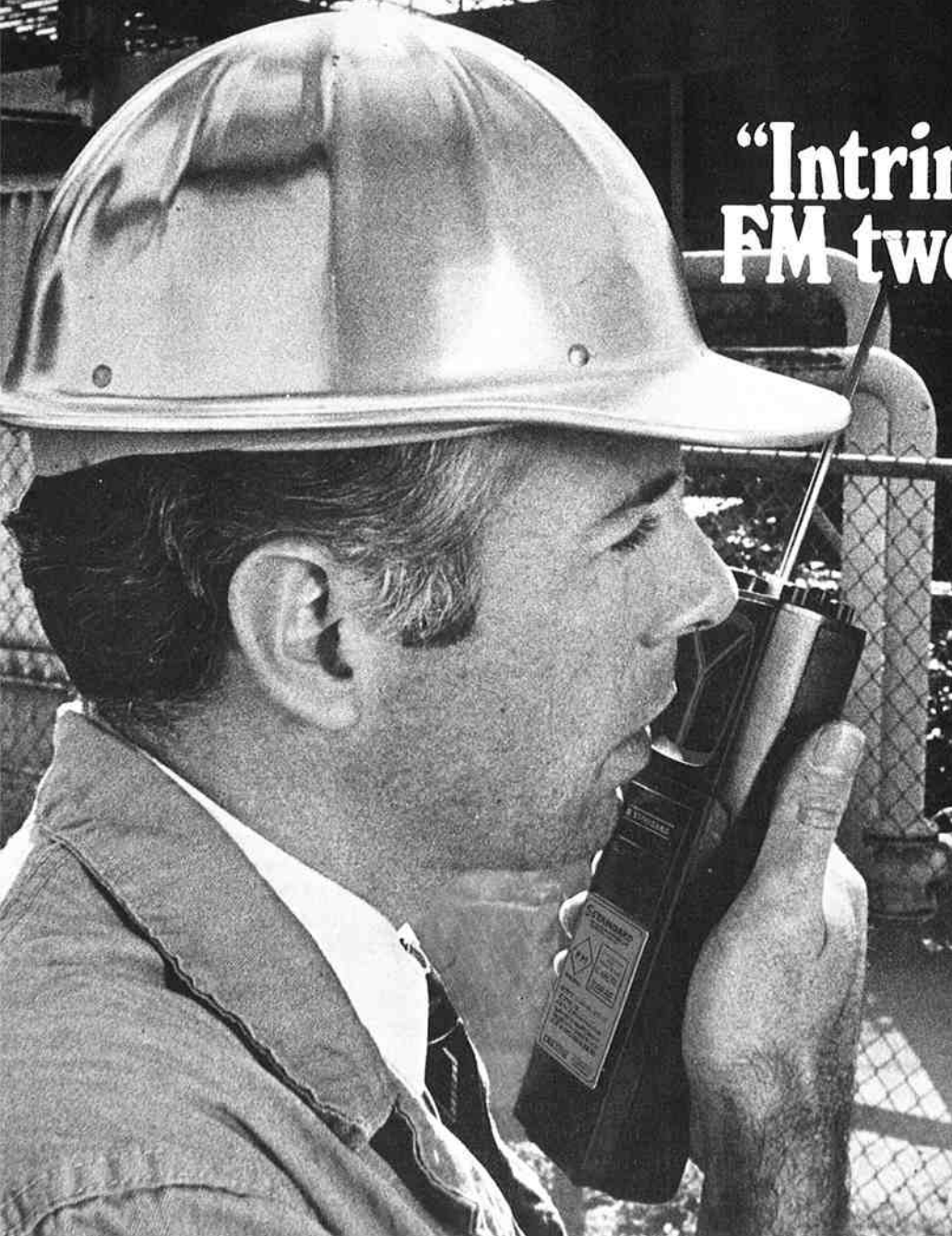
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## Life Member Contributions Are Appreciated

We are very much encouraged by the enthusiastic response to our appeal for funds to support new Club activities. The Club thanks the following members who made donations amounting to a total of \$720.

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## Veteran Wireless Operators Present Awards to Five

The Lee deForest Gold Medal Audion Award of the Veteran Wireless Operators Association (VWOA) was presented this year to Francis T. Cassidy, president of the United States Transmission Systems, a subsidiary of ITT. The award was granted for "a quarter century of dedicated research and development work in the field." Mr. Cassidy holds a number of patents in communications, including the patent for the channel combiner and divider system for automatic alternate voice and data communications.

The Marconi Memorial Gold Medal of Service was given to John McKenna, president of RCA Service Operations, and to Lt. Commander Russell A. Langdon (USN Retired); the Marconi Memorial Gold Medal of Achievement to William A. Leonard II, radio and TV broadcasting executive of the Columbia Broadcasting System (CBS), and the Marconi Memorial Gold Medal of Honor to Arthur C. Goodnow, for research and development of broadcast transmitters.



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# New Members

Since the March Proceedings was printed, 52 new members have joined the Radio Club of America.

**BAKER, James H.** Forest Industries Telecommunications, P.O. Box 5446, Eugene, OR 97405.

**BANE, Clayton F.** Bane Advertising Agency, 391 Monterey Blvd., San Francisco, CA 94131.  
**BODSON, Charles D.** National Communications System, 8th & S. Courthouse Rd., Arlington, VA 22204.

**BOEHM, Edward F.** Phelps-Dodge Communications Co., Rte. 79, Marlboro, NJ 07746.

**BORMAN, William M.** Motorola Inc., 1776 K St. N.W., Washington, DC 20006.

**CASSIDY, Francis T.** ITT, United States Transmission Systems, Inc., 67 Broad St., New York, NY 10004.

**CHILDS, Gailand M.** E.F. Johnson Co., Waseca, MN 56093

**COLLAMORE, Jerry A.** Forest Industries Telecommunications, P.O. Box 5446, Eugene, OR 97405.

**COOPER, Robert B.** Community Antenna TV Association, 4209 N.W. 23rd, Oklahoma City, OK 73107.

**CORNELL, Paul M.** Bird Electronic Corp., 30303 Aurora Road, Solen, OH 44139.

**DAWLEY, Garwin R.** Motorola Inc., 1299 E. Algonquin Rd., Schaumburg, IL 60196.

**DETTRA, John E. Jr.** Dettra Communications, Inc., 2029 K. St. N.W., Washington, DC 20006.

**DETWILER, Royce D.** Wescom Microwave, 3393 De La Cruz Blvd., Santa Clara, CA 95052.

**EMMONS, Thomas W.** Police Radio System, County of Monmouth, NJ. Dutch Lane Road, Freehold, NJ 07728.

**EICHENSEER, Lee E.** Bunker Ramo Corp. 33 E. Franklin St., Danbury, CN 06810.

**FAUST, Ted R.** Repco, Inc. 1940 Lockwood Way, Orlando, FL 32804.

**FELLER, Arthur H.** FCC, Office of Chief Engineer, 2025 M St. N.W., Room 7102, Washington, DC 20554.

**GERARD, Steven A.** Pye Communications Ltd., Newmarket Road, Cambridge, England.

**GODWIN, Morgan W.** Davis Publications, Inc., 229 Park Avenue S., New York, NY 10003.

**HALE, Weldon, P.** Supt. of Communications, Baltimore County, MD. 308 Centre Ave., Towson, MD 21204.

**HAMILTON, Hugh S.B.** Pye Telecommunications Ltd., Newmarket Road, Cambridge, England.

**HOLT, Allan E.** Search and Recruit International, 5 Koger Center, Norfolk, VA 23502.

**JACOBS, George.** U.S. Information Agency, Frequency Division. 1750 PA Ave. N.W., Washington, DC 20547.

**KELLER, Joseph E.** Keller & Heckman Law Firm, 1150 17th St. N.W., Washington, DC 20036.

**LARSEN, Christina,** Larsen Electronics Inc., P.O. Box 1686, Vancouver, WA 98663.

**LEWIS, Shirley M.** IBM, Private Radio Services, Old Orchard Road, Armonk, NY 10504.

**LOCKWOOD, Judy S.** Communications Publishing Corp., 1900 W. Yale St., Englewood, CO 80110.

**McMULLIN, Tom J.** Communications Industries, Inc., 511 N. Akard, Dallas, Tx 75201.

**MARSHALL, Joseph,** FCC, Office of Chief Engineer, 2025 M St., N.W. Washington, DC 20554.

**MEHRLING, Howard W.** Retired Avionics Engineer, 365 LaVilla Drive, Miami Springs, FL 33166.

**MITCHELL, Robert H.** E-Systems Inc., 41 E. Park Dr., Huntington, IN 46750.

**McKIM, Wallace W.** Criminal Justice Institute, 6001 Cass Ave., Detroit, MI 48202.

**McMURPHY, Charles Brower.** Retired Chief of Communications, 4917 Sterling St., Fremont, CA 94356.

**NELSON, Leroy O.** Pacific Tel. & Tel. Co., 140 New Montgomery St., San Francisco, CA 94105.

**PEARSON, Donald R.** U.S. Forest Service, North Fork, CA 93643.

**PEDERSON, Robert C.** Andrew Willson, Inc., Electronics Division, 1170 U.S. Route 22, Mountinside, NJ 07092.

**PLACE, Roy E.** Repco Inc., 1940 Lockwood Way, Orlando, FL 32804.

**PRESTON, Lester, C.** Motorola, Inc., 85 Harristown Rd., Glen Rock, NJ 07452.

**RICHARDSON, Richard G.** City of Minneapolis Communications, 313 S. 3rd St., Minneapolis, MN 55415.

**ROBICHAUD, Joseph A.** Temsco, 6623 Backlick Rd., Springfield, VA 22150.

**SCHERMERHORN, Romain W.** Repco, Inc., 1940 Lockwood Way, Orlando, FL 32804.

**SCHIMMEL, Eric J.** NAM, Telecommunications Committee, 1776 F St. N.W., Washington, D 20006.

**SCHLEICHER, George P.** Illinois Bell Tel. Co., 225 West Randolph St., Chicago, IL 60606.

**SIMONS, Leon,** Amateur -K2MJN. 303 East 57 St. New York, NY 10022.

**SURINA, Robert C.** Retired, military communications, 2605 Ridge Road Drive, Alexandria, VA 22302.

**TARBELL, Harry,** Pacific Paging, 10400 Allen, Beaverton, OR 97005.

**TAWNEY, Royce,** Kokusai Electric Co. of America, 5422 West Rosekrans Ave., Lawndale, CA 90260.

**TROTT, Raymond C.** Decibel Products, Inc., 3184 Quebec St., Dallas, TX 75247.

**WAINWRIGHT, Wayne** RTS Communications, 3475 Woodward Ave., Santa Clara, CA 95050.

**WEISZ, William J.** Motorola, Inc., Motorola Center, 1303 Algonquin Rd., Schaumburg, IL 60176.

**WHEEL, William E.** Pye Telecommunications Ltd., Newmarket Rd., Cambridge, England.

**WICKLINE, William A.** Antenna Specialists Co., 12435 Euclid Ave., Cleveland, OH 44106.

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