ZENITH RADIO

THE EARLY YEARS 1919-1935

WITH VALUES

Harold N. Cones Ph.D

John H. Bryant FAIA

with

Martin Blankinship & William Wade

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ZENITH RADIO

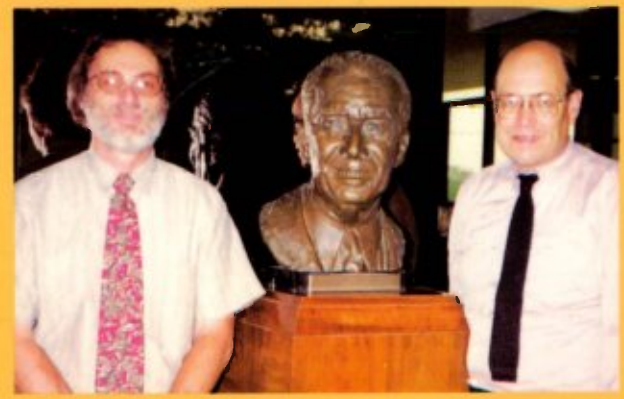
THE EARLY YEARS 1919-1935

Harold N. Cones John H. Bryant

with Martin Blankinship & William Wade

Zenith's "The Quality Goes In Before The Name Goes On" is perhaps one of the most recognized, and well earned, corporate mottos in America. Zenith Radio Corporation began as an agreement between two Navy radiomen who started business in 1919 as the Chicago Radio Laboratory. Luck and the infusion of capital from a wealthy adventurer and car salesman started them on a journey that would result in Zenith becoming the longest continuing electronic manufacturer in the United States. The road was in interesting one, with many pot holes impeding smooth progress, and a cast of characters that included some of Chicago's, and the nation's, highest society.

With access to the Zenith corporate archives and their discovery of the long sealed files of one of Zenith's founders, the authors present for the first time the documented story of Zenith radio and company development from 1919 through 1935. Professors Cones and Bryant draw on their long experience as radio enthusiasts and writers for both the popular and scholarly press to tell the fascinating story of Zenith's impact on early radio history. They present a wealth of never before published photographs, documents, and information, as well as color photographic portraits of many Zenith radios of the era. Complimenting the story is an illustrated catalog of nearly every Chicago Radio Laboratory and Zenith radio model produced between 1919 and 1935 and a database of valuable information which covers every radio produced by the company, along with a rarity and price guide.



Harold Cones Eugene McDonald John Bryant

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ZENITH RADIO
THE EARLY YEARS: 1919-1935

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THE EARLY YEARS: 1919-1935

HAROLD N. CONES, PH.D. AND JOHN H. BRYANT, FAIA

with

Martin Blankinship and William Wade

4880 Lower Valley Road Atglen, PA 19310 USA

This book is dedicated to Howard Fuog and to all of the men and women of the first two generations at Zenith. Howard Fuog began his career at Zenith in the 1930s as Commander McDonald's office boy and driver and ended it in the 1980s as a widely respected and loved senior sales executive. Without his encouragement and boundless generosity, this book would not have been written.

Without the hard work, creativity, and *esprit de corps* of the first two generations of Zenith employees, it would not have survived to become the quintessential American radio corporation. The quality went in before the name went on.

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Our most heartfelt thanks to these friends. If there are mistakes in the manuscript, they are ours, not theirs—as for us, we blame mistakes on each other.

FOREWORD

Zenith Radio Corporation began as an agreement between two Navy radiomen who started business in 1919 as Chicago Radio Laboratory. Luck and the infusion of capital from a wealthy former car salesman started them on a journey that would result in Zenith becoming the longest continuing electronic manufacturer in the United States. The road was an interesting one, with many pot holes impeding smooth progress, and a cast of characters that included some of Chicago and the nation's highest society.

R.H.G. Mathews and Karl Hassel, the Navy radiomen, and Eugene F. McDonald, Jr., the former car salesman, were joined in 1924 by an accountant, Hugh Robertson, another alumnus of the auto business, and in 1926 by Paul Klugh, a legendary salesman recently retired from the music industry. The group found themselves in the right place at the right time with the right chemistry for the frenzied early days of radio. Zenith quickly became a leader in Chicago radio and, eventually, national radio. The major credit for Zenith's success has traditionally been granted to flamboyant "Gene" McDonald, later known as "the Commander," who seemed to be able to create publicity for Zenith out of thin air. Although surely the major driving force at Zenith, as well as its public face, McDonald, sometimes called "Mr. Outside", worked in consort with the competent Hugh Robertson—"Mr. Inside"—and a large staff of dedicated people.

The authors found that the spirit of McDonald still pervades Zenith. Old timers eagerly shared McDonald stories with us and were openly proud of their association with him and with Zenith. It is still as the late Bill Nail, Zenith's long-time Director of Public Relations, reported in a 1985 interview: "Commander McDonald was the personification of Zenith...and I think still is. You can walk down the hall any day, depending on the age of the people that you run into, and you think he is in a corner office somewhere and is going to walk through. He died in 1958 and I have never seen a presence remain around even a new building so long." It is much like the Lee Iococca image of Chrysler of a few years ago or the Dave Thomas image of Wendy's hamburgers today. Yet, several modern writers somehow view the swashbuckling publicity schemes of McDonald as extremely negative and distasteful events, when, in truth, McDonald was but the most successful of the Sarnoffs, Crosleys, Grigsbys, and Grunows of the day, all of whom admired McDonald's ability to grab headlines for himself and for Zenith.

Of Robertson, Nail said, "I have heard him say over and over again—'Integrity in your products, integrity in your dealing with your employees, and integrity in all your business relationships.' I don't think there was a person who worked at Zenith who wouldn't say that was the spirit of the company. It just permeated the whole company..." Robertson was held in such high esteem by the rank and file that after McDonald's death in 1958, he was lovingly referred to as "Mr. Zenith."

Sam Kaplan, President of Zenith from 1968 to 1970, and McDonald's original office boy, once said, "The strong foundations of the company were built on two men: Commander McDonald and Hugh Robertson."

And the relationship of the two men of such great diversity of personalities? Robertson said publicly on many occasions that they "learned to understand each other merely by exchanging glances" and "had great respect for each other's abilities."

In this day of impersonal conglomerates and companies owned by absentee landlords, the authors were attracted to the "Mom and Pop" nature of the early days of Zenith and how control of the company remained in the same hands for nearly fifty years. As we completed the initial work for our first book, *The Zenith Trans-Oceanic: The Royalty of Radios*, in 1992 and 1993, we became further interested in the early days at Zenith and amazed at the general lack of information available. The Zenith "archives," like those of many near-century old companies, are pitifully incomplete; most of the corporate history was lost or discarded over the years. In August 1993, however, the authors stumbled onto a time capsule of immense value: in an old television assembly plant, up under the rafters and covered with pigeon manure, were the personal files of Commander McDonald, sealed soon after his death in 1958. The 138 file drawers not only revealed a great deal of information about Zenith Radio Corporation and McDonald's adventures, inventions, and relationships with historical radio figures, but they also provided an intimate view of American society and culture between 1922 and 1958. The files are currently being prepared by the authors for eventual donation to a scholarly institution so that they will be available for all researchers.

It is our desire in the first third of this book to tell the story of Zenith's early days clearly and accurately. We have called on hundreds of period sources, later-published histories, theses and dissertations, interviews, archives, and, of course, the McDonald files. There was a lot happening between 1919 and 1935, not only in radio, but in the whole society. We could not possibly tell the complete story of radio and society; we could, however, tell the Zenith story as we have come to understand it. Patent pools, the development of broadcasting, the financing of the medium and the like are fascinating reading in radio history, but we have chosen to write of them only as they relate to Zenith. This may lead the reader to feel that we are overstating the role of Zenith, but keep in mind, we are telling the Zenith story and how it relates to historical events. We realize that some background history is often helpful. In a few cases, we have provided synopses—not intended to be complete—in boxed text. We have also boxed some points of interesting information. This first section of the book is not a simple restatement of "The Zenith Story", the well-known booklet published by Zenith in 1955. Instead it is a well documented look at the early years of Zenith—and you will find agreement as well as disagreement with the 1955 booklet.

The middle segment of the book is devoted to photographic portraits of mostly near-perfect examples of many of the radios built by Zenith between 1919 and 1935. The radios featured in this section were photographed by the authors in the homes of many prominent collectors of Zenith products and every effort was made to provide clear and valuable images. Every reasonable effort was made to render the colors in the portraits section accurately. However, readers not intimately familiar with color photography and printing may put too much credence in the chromal accuracy of printed color photographs. Those who are familiar with these very analog processes realize that different batches of the same film render color differently as do, especially, different processing runs. We have made every effort, using quality materials, to be accurate; however, institutions and collectors wishing an accurate color reference for restoration are advised to locate another example of the set in question to use as a reference. And of course, there are chromal differences between examples of the same model which are engendered by aging. We believe that the Portraits section will serve both the scholarly and the radio enthusiast communities well as a visual survey of the wide range of Zenith radios produced during these years.

The final portion of the book is made up of an Illustrated Catalog and Database of the products of both the Chicago Radio Laboratory and the Zenith Radio Corporation. The Illustrated Catalog is, by far, the most complete collection of images of CRL/Zenith products ever assembled and is, thanks to radio ephemera collectors and retired Zenith employees, nearly a complete visual record of products from 1919 through 1932. In the 1933, 1934, and 1935 model years, large gaps exist in the catalog. Zenith produced—or at least listed—over 160 models that were never advertised in the trade journals or in Zenith-produced retail sales brochures that have survived. We have provided spaces in the catalog for images which may surface in the coming years and have filled these spaces with important information taken from sales materials of the era. The surviving Zenith retail sales brochures were the source for more than half of the images presented, and many images were found only in retail or wholesale print advertising. Some of the most crucial advertising materials were found in major universities, but the authors are especially indebted to a number of radio enthusiasts who have preserved some of this very rare data and shared it with us. Over a dozen images in the catalog came directly from photographs of radios found in the collections of members of the vintage radio community. Readers are cautioned that the images in the official Zenith brochures/catalogs

may not be accurate in every case. Where differences were found between the prototypes photographed for sales brochures and the actual production sets, that inaccuracy is noted. In a few cases where no image of a particular model was found, the authors have substituted images of similar radios: in every instance, the substitute image is clearly marked.

The Database which follows the Illustrated Catalog is the most complete listing of CRL/Zenith products ever compiled. For those looking for it, there is controversy aplenty in this section. Over the years, segments of this type of Zenith listing have been published by a number of authors, each with a slightly different approach, and each often with incomplete information. We have attempted to correct and standardize this information and it often does not agree with other published material. In addition to the normal technical material often found in this type list, we are pleased to present a record of those models which shared common cabinets. This cabinet information, compiled largely from the encyclopedic knowledge of our co-author, Martin Blankinship, has never been compiled before and should benefit institutions, scholars, and collectors alike.

Some readers may also be surprised to find that we have re-assigned year designations for a number of well-known models. Originally, we had intended to follow Zenith's own assignment of "model years" since that system has apparently served Zenith well for many years. After we began to study the product line in depth, we realized that Zenith's own listings were woefully inaccurate and worse, in conflict with themselves. For instance, the 800s series of models, beginning with Model 801, is listed in *Zenith Service Manual, Vol. 1*, as 1934 radios, yet the Zenith retail sales brochure shows these same radios as the "1935 Zenith 'Long Distance' Radio Line." Clearly, the service manual is incorrect as far as "Retail Model Year" is concerned. We now know that this internal conflict of dating sets persisted within Zenith throughout the radio years. We have established the "Retail Model year" as the method of organizing the Database and have relied primarily on Zenith retail sales information, rather than wholesale or service information, in doing so.

We are confident that our database is the most correct ever produced and that it will become the standard for both scholars and collectors of Zenith products.

As we prepared this manuscript, we experienced a great deal of frustration in deciding what material we should incorporate and what we should not. We have assembled a massive amount of information that is wonderful and interesting, but which is much more than we can effectively use. Do we tell how the switchboard operator at Zenith always rang three times if McDonald was calling, allowing the recipient to mentally prepare for a call from the Commander?—a great story, but not really relevant. It is, we guess, great to have more material than can be used, but it is not so great to sift through it and make decisions that may not tell the whole story. We did, however, decide to provide a long discussion of the Arctic adventures of McDonald. As we researched this topic, we were fortunate to uncover not only the more public papers of MacMillan and Byrd, but also the never before published papers of McDonald and Lt. M.A. Schur, the second-in-command Navy pilot on the 1925 expedition. These personal papers told such a fascinating story that we were compelled to include some of the information. If you are taken with this adventure, as we were, look for our book *Dangerous Crossings*, which will be published in late 1997 or early 1998. *Dangerous Crossings* will tell the whole story of the 1925 expedition. And one caution here: polar authorities are currently in disagreement as to the proper term for the "first people" who lived near Smith Sound, Greenland in the 1920s. Some authorities believe that the proper term for those living in this isolated community is "Inuit," while others use the term "Thule people," and yet other modern scholars continue to use the term "Eskimo." Since we have used many direct quotations from the private papers of the participants which use the term "Eskimo," we have used this term throughout.

Even with all that we have assembled, we have found information holes, some of them major. For instance, the earliest *detailed* information we can find on Zenith's export program is 1936, which is outside the time frame of this book. We have found *hints* that Zenith began exporting to England, Australia, New Zealand, and South America as early as 1925, but facts remain elusive. Many of the details of the very earliest years at Zenith have likewise disappeared with time. Another time frame problem we had to face was Zenith's entrance into the auto radio and farm radio markets. Although both products were manufactured and sold near the end of the time period discussed in this book, we elected to address them in the next book in this series, *Zenith Radio, The Glory Years: 1936-1945*, now in preparation.

We need to also say something about historical interpretation. We were unceremoniously taken to task for reporting information dealing with "firsts" in our earlier book. "First" is difficult to determine in these days of lost records; often, the only records remaining are magazine advertisements of dubious worth, since they were constructed in the days of wildly inflated claims; for instance, we have found ample evidence of widely advertised radios that were never made. "First" is also frequently a matter of definition. How does one define "portable" or "all electric?" We have attempted to present our documented views on "firsts" in extensive endnotes that provide definitions and discussion—but not necessarily *the* answer. And we continued from our first book the incorporation of copious endnotes to provide documentation and to enhance topics discussed in the main text: read these endnotes or you will miss a lot of valuable information.

And finally, a word about writing style. Over three years of work has pretty well polished this manuscript. Additionally, it was read and critiqued by a dozen professionals, ranging from radio historians to collectors to a colleague on the English faculty. All readers had one thing in common with the authors: nobody agreed on comma usage. To help you with your own preferences, here are some extra commas:, , , , , , , , , , , , , , , ; and for those of you who find too many commas, here is some space to put them . We have also elected to not interrupt long quotes with the annoying [*sic.*] when we found a misspelled word, reserving [*sic.*] instead for incorrect information in a quote.

This, then, is the history of Zenith Radio Corporation from its beginning in 1919 to the introduction of "the Big Black Dial" in 1936. And, because their impact on early radio was considerable, here is the role of Commander McDonald and Zenith on early radio history.

Professor Harold N. Cones, Ph.D
Newport News, Virginia

Professor John H. Bryant, FAIA
Stillwater, Oklahoma

SECTION I:
HISTORY OF ZENITH RADIO

Chapter 1

THE FOUNDATION YEARS

Radio grew to become a thriving part of American life during the "Roaring Twenties." In retrospect, the mood and events of the twenties had a formative role in the development of not only the radio instrument itself but the popularity and programming of the medium.

Many scholarly works define the twenties as a time of disillusion.[1] Before World War I, there was a country-wide feeling of progress and idealism. At the war's conclusion, however, the old troubles returned, new dictators arose, and the fires of idealism sputtered and went out. People reacted to this disillusion by turning inward. Self-interest resulted in general apathy and corruption in government and business and the age of the "gangster" was born. Self-interest was also expressed by decreasing morality and increasing attention being paid to such so-called hedonistic pleasures as jazz, drinking, dancing, and the reading of tabloids. The moral decay was epitomized by the "flapper." In actuality, those "living on the edge" were by far the minority, even though the reporting in the tabloids made it appear just the opposite. The majority sought escape from the events of the twenties and the "roaring" was infused into the Roaring Twenties.

Chicago in the twenties was on its way to becoming a major radio manufacturing and broadcasting center;[2] it was also on its way to becoming a national center for corrupt politics and gangland activity. Chicago was a wide open town under Mayors William "Big Bill" Thompson and William Devers. Illegal liquor, gambling, and prostitution became Chicago's image. The corrupt Chicago government was powerless against the likes of Al Capone. Tabloid newspapers emphasized crime and gave the impression that everyone in Chicago was in "the Mob"; in truth, there was a very active high society, referred to in the newspapers as "Chicago's Seven Hundred."[3] According to Bruce Linton in a 1953 dissertation, "There was widespread political corruption; there was a general revolt of manners and morals which could be witnessed in the recreational habits of the people. Chicago was typical of the general period, but the city was distinct in the marked contrasts of its life. It seemed to be civic-minded, yet there was political graft and organized rackets which grew unheeded by most citizens; there was a revolt of manners and morals, yet there was widespread support given to conservative literature and music."[4]

Into this national mood of escapism and self-centeredness came a new diversion—a whole new technology that allowed an average person to hear facts and entertainment at the instant of their occurrence. Unlike wireless, which had been around for twenty years or so and which had not really captured the public's imagination, "real radio" required no special skills or knowledge of code; it was to be had for the price of a detecting apparatus and a reasonable amount of patience. Music and voices came out of the air, bringing entertainment and news—and diversion from the troubles of the day. The hobby of DXing—the reception of far away radio stations—swept the country by storm in the early and mid-twenties and an ever increasing group of radio manufacturers worked energetically to provide radios that were billed as "long distance." Almost overnight, newspapers began to carry radio sections, and in early 1922, whole magazines, such as *Radio Broadcast* and *Radio Age*, were launched to feed the voracious appetite of the new radio buffs for information. Huge radio and radio trade shows sprung up, first in major cities, then everywhere, to provide potential customers with an array of merchandise available for their enjoyment. Sales of radios soared: in 1922, $60,000,000; in 1923, $136,000,000; and in 1924, $358,000,000.[5] As the medium learned what it was and how it operated, broadcast stations multiplied and fell quickly, as did radio manufacturers.

Among the hundreds of radio manufacturers that arose with the popularization of the medium was the Chicago Radio Laboratory, later to become Zenith Radio Corporation. From the very beginning, CRL/Zenith were committed to the idea that quality was more important than cost, a philosophy that allowed them to grow and prosper in the fluid environment of the 1920s. By the onset of the Depression in 1929, Zenith was stable enough to weather the financial storm and emerge as a major manufacturing and marketing force.

FOUNDERS

The founders of what was to become Zenith Radio Corporation were two radio amateurs, Ralph H.G. Mathews and Karl Hassel. The two were joined in business a bit later by Eugene F. McDonald, Jr., who contributed his considerable finances, publicity skills, and inventiveness. Soon after Zenith formed, master businessman and accountant Hugh Robertson and legendary merchandiser Paul Klugh joined the group, forming the nucleus that propelled Zenith Radio Corporation to a position as a major national manufacturer.

Ralph H. G. Mathews

Ralph Mathews built his first amateur station (9IK) in Chicago in 1912, soon after becoming interested in amateur radio.[6] While attending Chicago's Lane Technical High School in 1913 and 1914, he perfected an aluminum saw-tooth rotary spark gap disk which produced such a distinctive sound that it could be identified instantly by his amateur contacts. Already well known in the amateur community, he began to accept requests from other amateurs to build equipment of his own design for them. He graduated from high school in 1914 and began a commercial operation in 1915 as a means of supplementing his college costs.[7] He worked during high school and college summers as a shipboard radio operator, making $25 or $30 a month, which was not enough to cover all his college expenses. From 1915 until World War I stopped all amateur activity in 1917, Mathews covered most of his college and personal expenses by building and selling saw-tooth rotary disks, radio receivers of various kinds and other equipment for amateur purposes.

In March 1916, Mathews was appointed Trunk Line Manager for the Central Region of the US for the newly formed Amateur Radio Relay League (ARRL); in February 1917, he was elected to the Board of Directors for the group.[8] About this time his station call letters were changed to 9ZN and with the increased prominence of the station, its operator and his call, his manufactured products became known as "9ZN Spark Gaps"[4] or "9ZN Receivers."

Soon after the War started, Mathews enlisted in the U.S. Navy. He was assigned to the Naval Communications Division and he met Karl Hassel while stationed at Great Lakes Naval Training Station near Chicago. Both Mathews and Hassel were transferred to the Naval Intelligence Service for the 9th, 10th, and 11th Naval District in Chicago[9] and during that time decided to go into the business at the end of the War. Mathews was not released from active duty immediately after the War but soon began manufacturing amateur radio equipment. In early 1919, after release from the Navy, he formed a formal partnership with Karl Hassel, and by June 1919, along with friends, M.B. Lowe and Larry Dutton, they were building amateur equipment under the name Chicago Radio Laboratory.[10]

Karl Hassel

Karl Hassel was born in Sharon, Pennsylvania, on January 25, 1896. He attended Westminster College from 1914 to 1915 and continued his studies in 1916 at the University of Pittsburgh. He had received his amateur license in 1912 and, at Pittsburgh, operated the university's 2kw 500 cycle synchronous rotary spark gap station. A man named Gilmore, no longer at the university, had previously operated the station and, when Hassel arrived, he found he was the only person then on campus who could operate the powerful station. The very efficient station operated with a special license, 8XI, and had an antenna 125 feet high and 600 feet long stretched between two buildings. It operated primarily on 425 meters and because of its high antenna, was able to work a large geographic area (most amateurs used 200 meters, but since the antenna was most efficient at 425 meters, Hassel found himself transmitting on one frequency and listening on another). 425 meters was also the public service frequency and the station received frequent calls from a local news and weather station that was being covered by the 2kw university station. With the beginning of World War I (and the government closing all and dismantling most radio stations), the powerful University of Pittsburgh station was reserved as a government station. Hassel was one of three operators who took and passed the government examination and operated the station on a 24 hour a day basis. In early 1918, the university station was also shut down and dismantled and Hassel joined the Navy.[11]

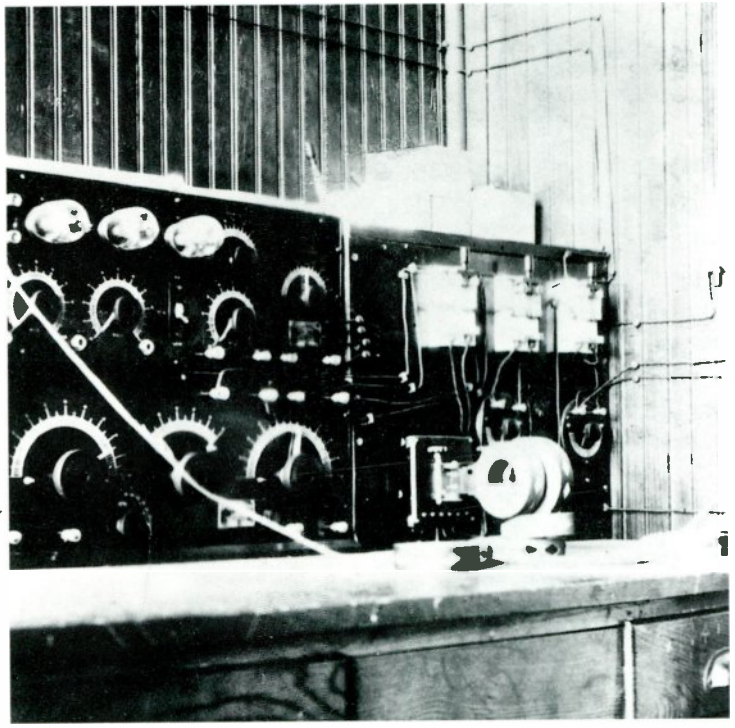
Hassel became a radio code instructor at Great Lakes Naval Training Station and there met Ralph Mathews. The two worked together at Great Lakes for a few months and then both were transferred to the Naval Intelligence Service offices in Chicago's Commonwealth Edison Building. When the War ended, they were held briefly before discharge with little to do, and it was during this time they decided to enter into a business partnership manufacturing amateur equipment.

The two initially lived in the Mathews family home at 1316 Carmen Avenue and their first manufacturing location was a table in the kitchen.[12] Operating as the Chicago Radio Laboratory, Mathews and Hassel produced a catalog in mid-1919. Mathews' father was involved in a printing company and helped them with the catalog: as Hassel said, "...it didn't cost us anything, or we wouldn't have had a catalog, I'm telling you, we didn't have any money."[13] Chicago Radio Laboratory at first operated as a retail mail order supplier of amateur equipment, selling a variety of non-CRL apparatus, as well as their own. The equipment featured in the first catalog was not stocked but rather manufactured or obtained as it was ordered.

Karl Hassel's account of the earliest days of production were recalled as:

> We used bakelite panels and they were all engraved by hand with many a resulting blister. We used what we thought was a very unique method of mounting the various parts on the bakelite panel so no mounting screws would show. We used a double panel with the apparatus proper mounted on the back panel and then the front panel was held on the back one by the pointer stops. I well remember how we used to get a set all put together and then discover we had left off something and so we had to take it all apart again to mount the part on the back panel. Many times we were on the point of discarding this idea and letting all the mounting screws show but we never did.[14]

On the kitchen table of this house at 1316 Carmen Avenue, R.H.G. Mathews and Karl Hassel constructed the radio products that led to the Chicago Radio Laboratory and Zenith. Photo by the Authors.



The N.C. & St. L. radio apparatus, composed of an AGN-2 Amplifigon above the CRL Regenerative tuner. Courtesy of Zenith.

Mathews' impressions of the early manufacturing days, recalled in 1978, were:

> The screw base socket modules were earlier models than those with UX sockets. The first De Forest audions were of screw base type.
>
> As to how many sets we made, I cannot give you a figure. We had 3 workmen, building them by hand. We built them 12 at a time, which took about 2-3 weeks. The total amount, I cannot give you. Then, as the business grew, we started building about 20 at a time.
>
> ...I can't remember what make of variable condensor (grid cond.) we used-we did not make the condensors and bought different ones, according to our tests of quality. Audio-transformers were made to our specs by Thordarson (they were good friends, and made things especially for us).
>
> ...All our cabinets were made by a very good cabinet-maker on Clark St. on the far north side of Chicago. We never used fir ply-wood for cabinets...All ours were oak ply.
>
> Due to our small hand construction, we seldom had much of a stock, but they weren't built specifically to order, unless something special was specified, when [sic.] we would make modifications to order.[15]

In addition to amateur radio activities and early manufacturing and mail order sales duties, Hassel and Mathews had at least two major commercial successes. In 1919, they installed a 2 kw spark transmitter for the N.C. and St. L Railroad, with one station at Tullahoma, Tennessee, and the other at Guntersville, Alabama, saving the railroad from installing telegraph wires over very rough terrain. Also in 1919, they installed a longwave receiver facility at the Chicago Tribune building designed to receive messages from the Paris Peace Treaty sent from Bordeaux, France. The receiving antenna used on the Tribune Building was 70 feet long and 30 feet high and was pointed at Bordeaux.[16] Because of radio secrecy laws, messages addressed to the Tribune could not be used by others; other newspapers had to wait for their correspondents' reports to clear the very congested transatlantic cable, providing the Tribune with a 12 to 24-hour advantage over their competitors.[17]

In mid-1919, manufacturing operations were moved to one-half of a 14' x 18' two car garage erected two blocks north of the Edgewater Beach Hotel, at 5525 Sheridan Road. Mr. Dewey, the manager of the hotel and a friend of both Mathews and Hassel, allowed the free use of the hotel-owned land with the understanding that the building would be removed if the hotel ever needed the property. The other half of the garage was devoted to amateur station 9ZN. A large antenna was erected,[18] and with the big synchronous rotary spark-gap transmitter,[19] 9ZN was soon heard worldwide. 9ZN was part of the first postwar transcontinental relay on December 4, 1919[20] (9ZN to LF to 6EA)[21] and in January 1920 was involved in setting the cross country record of 6.5 minutes for a round trip message (1AW to 9ZN to 5ZA to 6JD and return on same route with help from 9LR).[22] 9ZN was a featured visitation site during the first National ARRL Convention[23] held August 31-September 3, 1921, at the Edgewater Beach Hotel; Mathews was the Director General (chairman) of the convention and toastmaster of the banquet.[24]

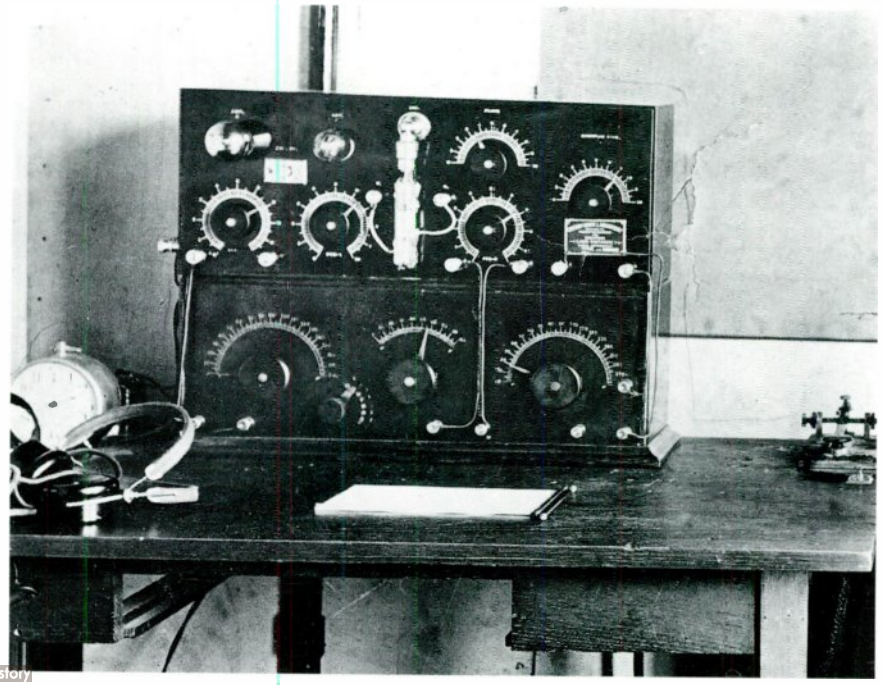
By early 1921, the garage on Sheridan Road had became too small and Chicago Radio Laboratory moved to a 3,000-square foot rented factory at 6433 Ravenswood.

The major product of Chicago Radio Laboratory was a two component regenerative receiver. The top portion of the receiver, called the Amplifigon, housed the detector and the amplifier, and the bottom portion, called the Paragon, was a tuner. CRL acquired the names Amplifigon and Paragon from the Adams-Morgan Company after they could not receive deliveries as agents for the company; they began building and modifying the units themselves.[25]

Since their equipment was built for the radio amateur, CRL placed their earliest advertisements in *QST*, the magazine of the American Radio Relay League—the first in June 1919. By the end of 1921, *QST* advertisements listed the 9ZN call followed by a small "ith," thus providing the trade name Z-Nith.[26] With the development of CRL's first broadcast receiver, however, the company began placing limited advertising in Chicago newspapers and a few trade publications. Growth, the associated moves to larger quarters, and the arrival of Commander McDonald combined, in retrospect, at precisely the right time to lay a solid foundation for the rapid development of the fledgling company.

The Chicago Tribune *receiving station installed by Mathews and Hassel in 1919 to receive news of the Versailles Peace Conference. The antenna for the installation was on the roof of the* Tribune *building and was 70 feet long and 30 feet high and was aimed at Bordeaux, France. The receiver was an early prototype for the 1921 CRL Altaceiver.* Courtesy of Zenith.

The receiver used at station 9ZN in 1919, composed of a CRL AGN-2 receiver and an Adams-Morgan Paragon RA-6. Courtesy of Zenith.



Eugene F. McDonald, Jr.

E. F. "Gene" McDonald, Jr., was born in 1886 in Syracuse, New York.[27] He was not particularly interested in school and, after dropping out of high school, worked briefly as a mechanic and engine builder for the Franklin Auto Company in Syracuse; then, because of his flamboyance and his outgoing personality, he was transferred to the Sales Division[28].

Our Factory and General Offices—6433 Ravenswood Avenue, Chicago, Ill.

The first Chicago Radio Laboratory factory in early 1921. Half of the 14' x 18' garage, located on Chicago's lake front at 5525 Sheridan Road, was used for amateur station 9ZN and the other half was devoted to radio production. The sign on the side of the building reads: "9ZN, Testing & Demonstrating, EQUIPPED WITH, CRL APPARATUS." Courtesy of Zenith.

In April 1921, Chicago Radio Laboratory moved to its second factory, located at 6433 Ravenswood Avenue. Mathews and Hassel rented the top floor of the building for $300/month and used the 3000 square feet to manufacture radio apparatus. Courtesy of Zenith.

Introducing Something New

MR. RADIO AMATEUR—

Shake hands with something new in wireless:—a radio manufacturing company producing apparatus designed by men who are prominent in amateur and experimental radio work and know from their own experience what the amateur wants and needs, and who have used the very apparatus they are now producing, and have done long distance relay work with it.

The Chicago Radio Laboratory has as its Construction Engineers some of the best known men in amateur radio throughout the country—men whose stations you have heard, and with whom you have worked.

These men have designed a line of apparatus of a quality never before seen on the amateur market, embodying all the latest developments in radio and selling at a moderate price.

One of our products is the "Amplifigon," illustrated above, an audion control cabinet designed primarily for use with the Paragon regenerative receiver, but which may be used with an undamped set or even with a loose coupler.

This cabinet comprises a detector and one step audion amplifier mounted on a Bakelite panel, in an oak cabinet, and embodies many new features, such as the use of a single high and low voltage battery for both detector and amplifier.

The mechanical construction is as perfect as it can be made, and a special sub-mounting is used, by which no supporting screws mar the appearance of the panel. For results—well, we are afraid you won't believe us if we do the set justice, so we advise you to try one out, and if you are not absolutely satisfied with the results obtained, we will refund you the purchase price without question upon the return of the instrument in good condition.

Send six cents in stamps for our catalog of our complete line of "long distance" receiving and transmitting apparatus.

In addition to our regular line, we will also design and make apparatus to suit your individual needs. Write us for more detailed information.

K. E. HASSEL, Sales Manager (Formerly of 8YI),
1316 Carmen Ave., Chicago.

CHICAGO RADIO LABORATORY

The first Chicago Radio Laboratory advertisement, QST, *June 1919.* Courtesy of Zenith.

He quickly became known for his promotional activities and his ability to obtain press coverage. For example, he arranged to drive William Jennings Bryan around the city of Atlanta in a Franklin and managed to appear in most of the photographs himself.[29] While driving a Franklin automobile up Lookout Mountain, Tennessee, on another of his promotional events, he fractured his skull in an accident which left him permanently deaf in one ear.[30] He also went on the road opening Franklin dealerships and became the Southern Sales Manager for the company. He left Franklin after five years and joined the Imperial Motor Company of Buffalo as Sales Manager, selling Packards, Pope-Hartfords, Buicks, and Babcock Electric cars.[31]

In late 1910, McDonald moved to Chicago to handle the business dealings of a good friend, Charles Hanna (who would later be mayor of Syracuse, New York). Hanna had invented a self-starting device for automobiles which operated by exploding acetylene in the cylinders of the engine. Although the self-starter was a concept whose time had come, Hanna's parent company went bankrupt and took with it all the money that McDonald had accumulated in his earlier endeavors.[32]

Stranded in Chicago, McDonald turned his talents to selling used automobiles. He approached the Detroit Electric dealer in Chicago with an incentive concept which would help them reduce their large inventory of used automobiles as well as make money for himself. He obtained used cars from the dealer, repaired them mechanically, painted them, and sold them for a profit. It was a successful partnership yielding McDonald $16,000 (and the dealer $5,000) in a year, a large amount of money in 1911. In order to promote this venture, he turned again to his flair for publicity. McDonald drove one of his "new" used autos up the steps of the Logan monument in Chicago's Grant Park, arranged for a photographer to be present, and paid a policeman $10 to arrest him.[33]

In 1912, McDonald made automotive history when he organized a finance company to sell Ford automobiles on credit.[34] Many items were sold on credit at that time, but not automobiles. Only the wealthy owned automobiles, the prevailing feeling being that if you could not pay cash, you should not own one. McDonald's time payment plan was considered foolish for a while by his contemporaries; however, he was soon selling over 20,000 automobiles a year, making at least $50 on each car, plus ten percent interest. His method was simple. In those days, most commercial vehicles were supplied by companies that purchased chassis from motor companies and built bodies to order. McDonald set up a company to finance these transactions, supplying the body builders with capital for the purchase of the chassis and the chassis builders money for parts, while receiving payment on a monthly basis from customers who bought the finished automobile. In effect, he bought automobiles new, sold them on time, discounted the paper at the banks, and amassed the profits.[35] This endeavor formed the foundation of the McDonald fortune and was the first of many McDonald "firsts."

At the outbreak of World War I, the 31-year old McDonald sold his time payment business and joined the Navy.[36] While in Chicago, he had purchased a "telegraphone," an early recording device that could be used to record a telephone conversation without the knowledge of the caller. By 1917, the U.S. manufacturer had gone out of business. The Navy was interested in the device and when they found that McDonald understood and could operate it, they offered him an officer's commission. Throughout World War I, he worked with the Naval Intelligence Corps investigating sabotage cases.[37] McDonald left active duty in the Navy in 1919 but remained an active member of the Naval Reserve with the rank of Lieutenant.[38] An unemployed but wealthy civilian, he briefly managed real estate properties while looking for a new business venture.

On New Year's Eve, 1920,[39] McDonald went to Layton Garage in Chicago's South Side to pick up his Packard. He noticed a small group of people listening to what he thought was a phonograph. When he questioned why so many people would be standing around on New Year's Eve listening to a phonograph, he was told that it was a new device called a "radio."[40] He listened to the broadcast and learned that the radio sold for $200.[41] When he found out that these "radios" were difficult to acquire and sold for a high price, he decided to go into the radio business.[42]

Upon investigation, he discovered that to manufacture radios it was necessary to hold a license from E.H. Armstrong, the inventor of the regenerative circuit; he also discovered that Armstrong had temporarily suspended issuing the licenses.[43] Further investigation during 1920 led him to the North Side of Chicago, to Hassel and Mathews' Chicago Radio Laboratory. McDonald bought one of CRL's new broadcast receivers and Hassel installed the $75 radio for him in his Illinois Athletic Club apartment in Chicago. It did not take McDonald long to become convinced of the profitable future of radio. Since CRL already held the Armstrong license, and since Hassel and Mathews had more orders than they could possibly fill for their products, McDonald offered to become a financial partner in their undertaking. A partnership was formed, with McDonald as the General Manager,[44] and the small company began a rapid growth period. McDonald's recollection of his early involvement with Hassel and Mathews was retold in a personal Christmas letter to close friend Herman Staebler written on December 18, 1942. Staebler had introduced McDonald to Hassel and Mathews:

> I then started an investigation with my patent attorney. He advised me not to go into radio unless I could get an Armstrong license. I investigated this and found that Armstrong would issue no more licenses; therefore I had somewhat given up the idea when one day you told me at the club that you knew a couple of youngsters out on the North Side that were building radios. I went out with you and you introduced me to Mathews and Hassel—the two owners of the company. I asked them if I could buy a set, and they asked me whether or not I had the money with me. I told them that I could give them a check immediately, and they decided they could deliver a radio to me. I asked them to install it in the club so that I could get familiar with the operation of it and later on I'd move it to my yacht.
>
> I then asked them if I might see their factory. As we walked through it I noticed that the only piece of machinery in there was one electric drill press—the rest of it was all hand work. They were having their panels engraved outside and in reality were just doing an assembly job and turned out about one or two sets a day. I asked them how business was. Mathews showed me a stack of letters containing orders over a foot high. I asked them why they didn't put machin-

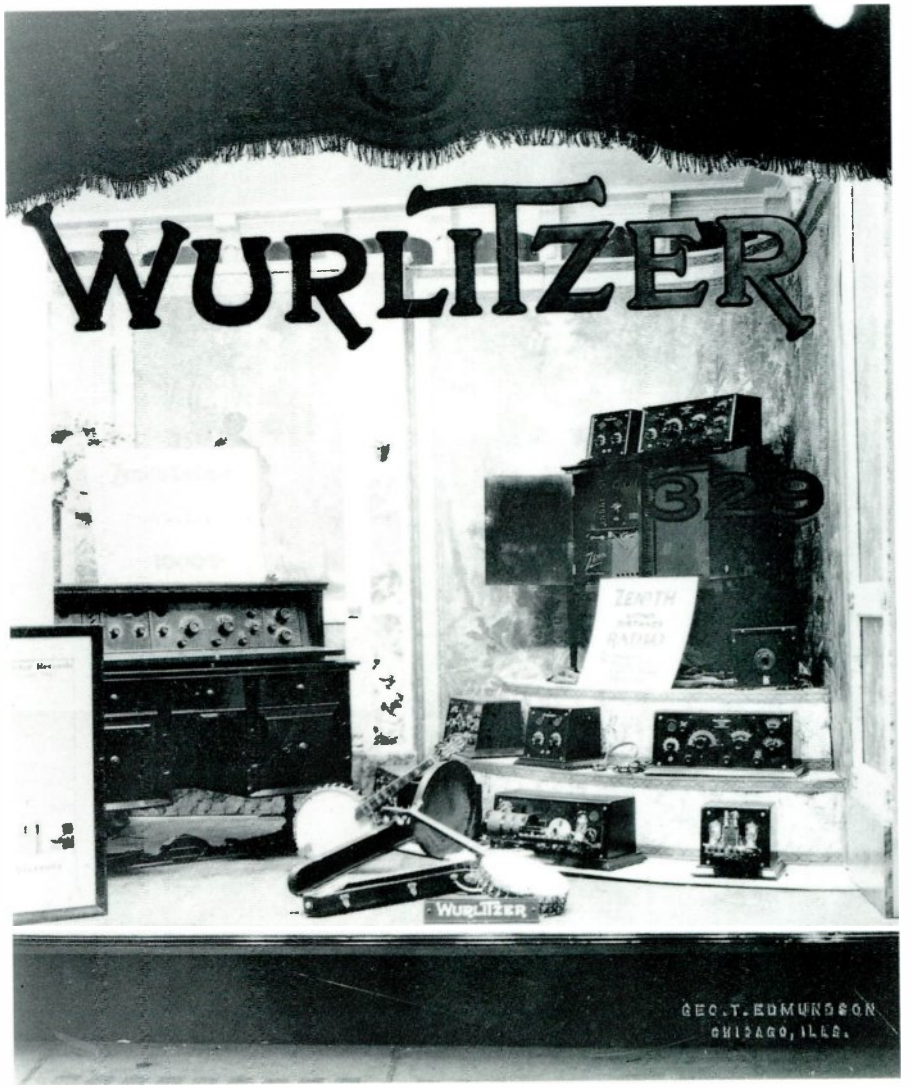
ery in and build in quantities. He said they didn't have the money. It was then I noticed engraved on the front of their panels "Licensed Under Armstrong Patents" and they assured me they had a license, but I found out unfortunately that the license ran to a co-partnership and Armstrong not issuing any more, would not re-issue and make it to a corporation. In spite of all three handicaps, however, I went into a conference with these two boys and their attorney—Mr. Irving Herriott. I told the attorney representing them that he could represent me, too, and that man has become one of my closest friends and is General Counsel for the Zenith Radio Corporation. We are today by far his biggest account.

I financed these boys only as General Manager and had to depend upon them as a Co-partnership to deal honestly with me. I made a contract with them that they were to get $100 a week apiece for ten years...The little company that used to turn out one or two radios a day, when you introduced me to them, last week turned out and delivered to the Government over $1,100,000 worth of radios in two days.

That's the romance of Zenith and the consequences of your introducing me to the two boys! I though you'd just like to have a record of this for your files...Thanks for the favor you did in introducing me.

Since the Armstrong patent was licensed to the Chicago Radio Laboratory, which produced Z-Nith products, McDonald formed Zenith Radio Corporation (first unofficially in Summer 1921, then officially on June 30, 1923), to become the marketing arm for the Z-Nith radios. It was not until several years later that the two merged so that both manufacturing and marketing could be carried out by Zenith Radio Corporation. The original Patent for Trademark for the famous Zenith Lightning Bolt, No. 164,341, was filed as Serial No. 162,805 by Karl Hassel on April 24, 1922. The trademark was issued on February 20, 1923.

In 1923, when Zenith was incorporated with McDonald as president, both Mathews and Hassel signed ten-year contracts with the company. The contracts guaranteed an annual salary of $5,200 each, a percentage of the profits, a company paid-for life insurance policy and options to buy stock.[45] By contract renewal time in 1933, Mathews' involvement with Zenith had become minimal and he did not negotiate a new contract.[46]



Wurlitzer show room window, 1922. All the small cabineted receivers shown are Model 1-Rs. The smaller units are 2-M amplifiers. At the far left is a previously unknown "console" type radio consisting of a lower desk unit, mostly likely holding batteries and the loud speaker. This is similar to a unit seen in the photograph of the Zenith booth at the 1922 Chicago Radio Show (shown elsewhere in the book). In the upper right of the display a 1-R and 2-M sit atop another previously unknown unit. A Zenith storage battery can be seen on the lower shelf of this unit behind the upper right corner of the white Zenith Long Distance Radio sign. Immediately above the "TH" of Zenith there is a large panel of grill cloth—to the left of the grill cloth, above the storage battery, is an electronic control panel with three filament viewing ports, several controls, and a row of binding posts and an old style Chicago Radio Laboratory nameplate. This panel may have been a special receiver panel or an audio amplifier. In any case, it is a previously unknown Zenith/Chicago Radio Laboratory product. Courtesy of Dale Goodwin.

The Howe and Arthur/Chicago Radio Laboratory/QRS Photographs

In late 1921, the popularity of Chicago Radio Laboratory equipment had driven demand to levels that were impossible to support from the small CRL factory on Ravenswood Avenue. In early 1922, Eugene F. McDonald, Jr. arranged for QRS Music Company at Kedzie Avenue and 48th Street to begin manufacturing CRL products using a combination of their own equipment and employees and those of CRL. CRL was producing only five radios a week in early 1922; by June 1922, it was producing50 per week. Since radio sales and manufacturing were cyclic, with the peak period being September to January, a manufacturing output of 50 radios in June would indicate phenomenal growth for the small company.

These photographs were taken at QRS Music Company by Howe and Arthur of Chicago in late 1922 probably for CRL catalog illustrations. Some of them were eventually used in an article published in *Radio Topics for December 1922*. It was charged (without documentation) in *Radio Manufacturers of the 1920s* that "this sequence of photos was entirely faked in the QRS section of the factory." Architectural review verifies that the photographs were indeed taken in the QRS building. The original photographs, found in the Zenith archives, appear to be contact prints of 8 x 10 glass negatives and are extremely detailed and clear. There is no doubt that the photographs are posed, as one would expect for use in a wholesale catalog, but surviving accounts from employees who worked in the QRS Building, employment/personnel records, and careful scrutiny of enlarged areas of the photographs indicate that they are, in fact, entirely authentic. They represent an invaluable resource for scholars of the history of technology and manufacturing and are an extremely rare detailed visual record of radio manufacturing in the early days of the industry.

The large work force in this series of photographs indicates they were taken during the peak radio manufacturing period; most of these employees were probably laid off in January and the work force was not again enlarged until the next August.

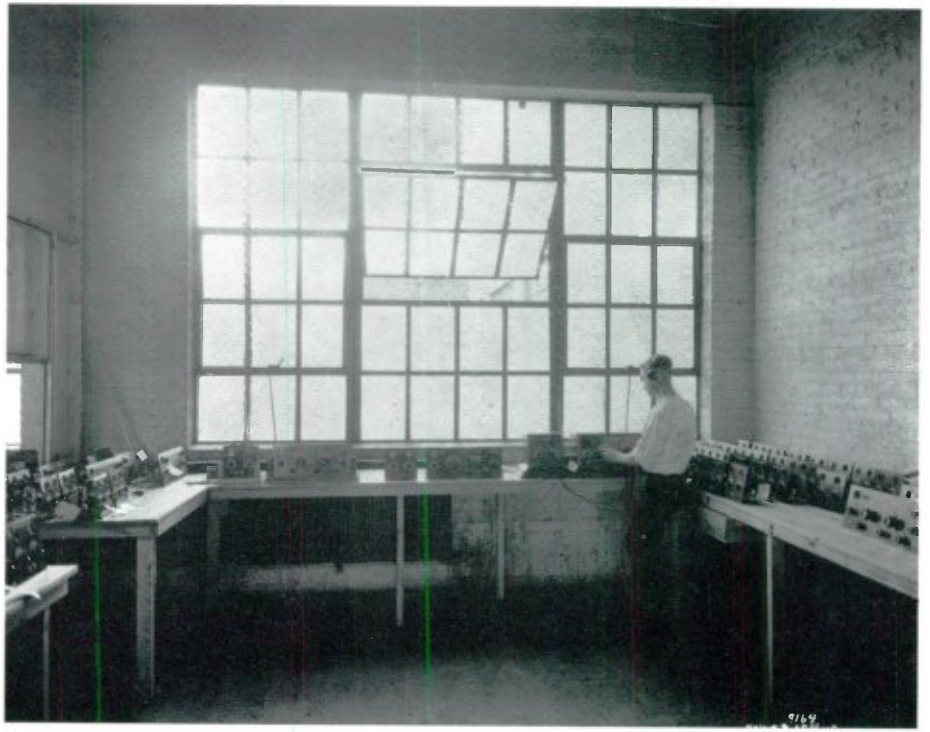
The Chicago Radio Laboratory Engineering Department at the Kedzie Street plant was led by CRL founder Karl Hassel, shown in the center of the photograph beyond the center table, looking to the left. The radio being tested at the center table is a Zenith 1-R.

Opposite page:
The punch press line on the second floor of the QRS Kedzie Street plant. These presses were used to turn out light metal parts for Zenith radios. The first operator is making connector links, the second is punching plates for variable capacitors, and the third is punching spacers for variable capacitors. The finished products were placed on trays on the wooden rollers of the conveyor: the first box in this photograph contains finished plates for variable capacitors in the Zenith Model 1-R.

Above:
This factory worker has just completed assembly of a tuning capacitor which is held in a multiple vice-type assembly jig. Two completed capacitors are seen beyond the worker's left hand. The white card and the paper held in the background were attempts to save on photograph retouching should this photograph be used in a catalog or advertisement.

Top right:
This photograph, retouched for a catalog illustration, shows the use of an assembly jig. The jig holds an almost completed Zenith Model 1-R radio receiver which is secured by the front panel. The horizontal frame of the jig is rotatable to allow easy access to the radio for further assembly or adjustments. The worker may keep the chassis free to rotate or may secure it at any angle by means of the pin and holed disk on the rear end of the jig.

Bottom right:
This factory worker is installing one of the two tuning capacitors on an early version Model 1-R radio receiver.



Opposite page:
These two machines were used to engrave the front panel markings on early Zenith radio equipment at the Kedzie Street plant. When CRL was located in the small garage at 5525 Sheridan Road, the panels were hand engraved; when the manufacturing operation was moved to the Ravenswood facility, the panels were engraved by an outside contractor. The woman in the foreground is using a twice life-size metal pattern, seen here on the upper table under her right hand, to engrave the main tuning dial on the earliest version of the Zenith Model 1-R radio receiver. This earliest version still incorporated the polished black bakelite front panel and carried a script "Chicago Radio Laboratory" engraving in the upper center of the panel. Later versions used the faux wood grained bakelite panels and carried the Zenith lightning bolt logo. In some cases, the numerals on various dials were stamped in the bakelite rather than engraved (the dial markings were not *stamped in this series as incorrectly reported in Douglas, 1991). The finished panel in this photograph has had the markings inked for photographic purposes.*

Above:
The assembly of the main tuning capacitors for the model 1-R. The first and third hand trucks on the left hold trays of components, while the center hand truck is transporting finished capacitors to the main assembly area.

Top right:
The coil winding and coil assembly area of the Kedzie Street plant. The coils shown are for the Model 1-R.

Bottom right:
This area of the Kedzie Street plant was devoted to final testing, alignment, and trouble shooting of completed chassis. The engineering employee shown here is tuning an early version Zenith 1-R receiver/2-M amplifier combination. His headphones are connected to the second of the two amplification stages of the 2-M amplifier. The other apparatus on the bench are all either 1-R receivers or 2-M amplifiers and are all examples of the rare first version of these devices.

Opposite page:
This view of the final assembly area in the CRL portion of the Kedzie Street plant focuses on the first true Zenith radio, the Model 1-R. The roller line in the right center of the photograph holds eight Model 2-M amplifiers in the foreground with a long series of 1-Rs following. The 1-Rs are distinguished by the large horizontal cylinder (the main coil) which is located on the lower left of the unit when viewing from the rear. More 1-Rs fill the tables to the immediate left of the roller line. Completed Model 1-Rs, in their cabinets, fill the table in the left rear against the wall. The two engraving machines which were used to produce most of the front panel markings for the early Zenith models are visible in the center background with their female operators standing by.

Top right:
The cabinet making shop was located on the first floor of the Kedzie Street plant. The table saw and joiner in the foreground were primary equipment used by the cabinet makers in turning raw planks (center and right background) into finished cabinets. Several stacks of assembled Model 1-R cabinets are visible in the background on the tables near the windows. All 1-R cabinets were solid wood.

Bottom right:
The packing and shipping department in the Kedzie Street plant. The two employees are packing four Zenith 2-M amplifiers for shipment on the table in the near background. Filled 2-M cartons are being numbered or addressed in the far background. Note also the flattened shipping cartons which are piled to the ceiling in the background. The larger Zeniths in the foreground are Model 1-Rs; the smaller units are 2-M amplifiers.

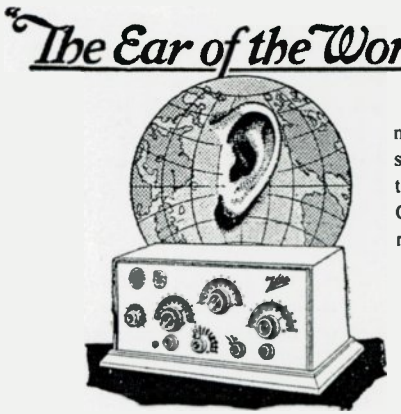
GROWTH OF THE COMPANY AND THE PRODUCT

E.F. McDonald, Jr., was already well known as an aggressive businessman when he became General Manager of Chicago Radio Laboratory. His first actions at CRL were the redirecting of the product line from the amateur market to the burgeoning broadcast market, the establishment of capital reserves and the development of recognition for the company name. As demand for the product increased in the Spring of 1922,[47] McDonald engaged his friend Tom Pletcher, well-known in the music industry and the President of the QRS Music Company, to take over the manufacturing of CRL receivers in his large (and partially empty[48]) new factory at 48th and Kedzie, in Chicago's Central Manufacturing District.[49]

In addition to making music rolls for player pianos, QRS began building radio products for Chicago Radio Laboratory. QRS built the products to CRL's design under the control of the CRL Engineering Department. McDonald and Mathews relocated to the Michigan Avenue downtown offices of Zenith[50] and Hassel stayed at the QRS factory to lead the CRL engineering staff. Chicago Radio Laboratory at that time held the Number 2 Armstrong Regenerative Circuit license and also a license from Dr. Lee De Forest, under various patents, relating to the use of honeycomb coils and ultraudion oscillators. The increased space at QRS allowed CRL to begin an assembly line operation and, by July, production had reached 15 sets per day.[51] Based on Pletcher's recommendation[52] and help, McDonald began distribution of his radio equipment exclusively through the well-established music distributor and dealer networks. These networks were well organized, were heavy advertisers and had several trade publications. The marriage of the music and radio trades was a fortuitous one and quickly gave CRL and Zenith products a sales edge.[53]

In 1922, Chicago Radio Laboratory was producing a line of products centered around the 1-R regenerative receiver. In addition to the one-tube 1-R receiver, the line consisted of two audio amplifiers—the two-tube 2-M and the three-tube 3-M—, headphones, an acoustical phonograph adapter, batteries, antenna wire, and other minor accessories. The Chicago Radio/Zenith catalog of 1922 indicates that a 1-M amplifier and a 2-R receiver were also manufactured, however internal shipping orders indicate that neither device reached market. The sloped front of the cabinets, Zenith decals on the tops and above all, the replacement of the laboratory black bakelite with brown bakelite having faux wood graining, are all clear indications of the reorientation of Chicago Radio Laboratory away from the amateur market and toward the burgeoning retail broadcast listening audience. Production of these models ran until spring 1923 when all but a few employees were laid off.

In early spring 1923, McDonald and his friends Thorne Donnelley and Elliot Jenkins, owners of WDAP, engaged in a publicity scheme to bring attention to both their products. Scheduled transmissions from Chicago to a moving liner in mid-ocean had never been achieved and, since a typical liner covered 600 miles a day, a maximum range of reception could be determined with such a test. McDonald gave his sister Florence a "standard Zenith receiving set—a set just like every other that is made by the Chicago Radio Laboratory"[54]—to take with her on the *S.S. Berengaria* traveling between New York and France. Each day, once in the morning and once in the evening, a special message was transmitted over WDAP, the official broadcasting station of the Chicago Board of Trade, that contained an erroneous statement about the length of the *Berengaria*. The message was concocted by WDAP co-owner Thorne Donnelley from numbers chosen at random by newspaper reporters several minutes before the broadcast. Shortly after each message, the *Berengaria* transmitted back the incorrect length, as received, and the correct length. The message was received by the *Berengaria* for at least 1824 miles out from New York. As stated in a *Radio Age*—*"The Magazine of the Hour"* article, "Out of a little bantering among friends sprouted an idea, only vague at first but soon developed definitely, finally that gives the Drake Broadcasting station, WDAP, and the Zenith, the distinction of having made important radio history."



The promotional impact of this test was not missed by the press and Zenith's role in the test was spread widely. *The Talking Machine World* reported the event as of interest to the music trade since "The Chicago Radio Laboratories have made an excellent record with the Zenith radio set and sell exclusively to music industries."[55]

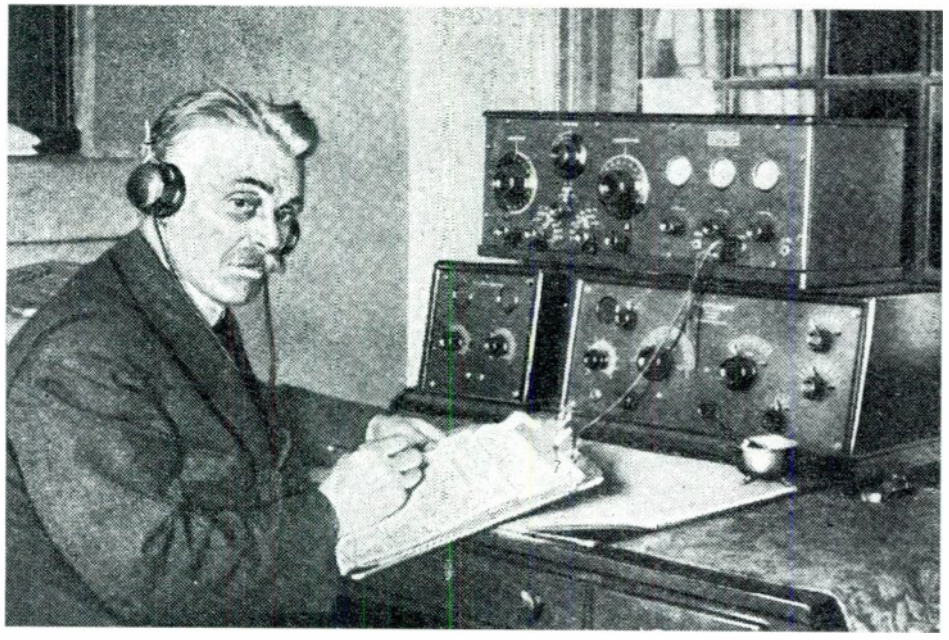
Early Factory Life at the Kedzie Street Plant

According to Joseph A. Wahlgren (hired by Chicago Radio Laboratory on July 24, 1922), in an unpublished article, "History of the 1st Ten Years With Zenith":

> The production lines were made up of roller conveyors, with work benches progressively staggered on each side of the conveyors. Material was issued to the lines in boxes, each box containing enough material for one set. The operator at the start of the line picked out the part his operation called for and made up his part of the assembly, placing the assembly back in the box—then pushed the box forward to the next operator until the set was completed and wired ready for inspection.
>
> There was no iron or steel used in the entire set except in the transformer laminations. Screws, brackets, etc. were made of brass. Panels and bases were made of bakelite and hard rubber. Most of our hardware such as screws, nuts, rivets, bushings, etc. were purchased from Whitehead Sales. The variable condenser and the tickler coil were actuated by a train of gears made of pressed leather. These later were changed to die cast gears which in turn were replaced by string drive.

Zenith Radio Corporation

The Corporation began with capital of $500,000 derived from common stock sold at $10/share. Eugene F. McDonald, Jr., the principle investor, became President and Treasurer of the new organization. Other officers were: Thomas Pletcher, Vice President (President of the QRS Music Company); J.R. Cardwell, Director (President of the Union Draft Gear Company and the J.R. Cardwell Manufacturing Company); U.J. "Sport" Herrmann, Director (Manager of the Cort Theater and close friend of Commander McDonald); Irving R. Allen, Director (Vice President of the H.W. Haster Advertising Company); N.A. Fegen, Secretary (Sales Manager, Lyon & Healy piano department); S.I. Marks, Assistant Treasurer (former civil servant).



Hiram Percy Maxim, the long-time president of the American Radio Relay League, was the first person to hear a special "Hello America" broadcast from England. His feat was recorded in a short article accompanied by this photograph which was published in Popular Science, *April 1924. Maxim is shown with his special "double receiving radio" which included a 1922 Zenith Model 1-R receiver, bottom right, and Zenith Model 2-M two-stage amplifier, bottom left. Both sets also carried the name of the Chicago Radio Laboratory.* Courtesy of Zenith.

McDonald garnered considerable publicity for Zenith when he persuaded his new friend Donald B. MacMillan, a well known Arctic explorer, to put Zenith radios on his Arctic exploration schooner, *Bowdoin*, for his year-long 1923-24 Arctic Expedition. The project was eminently successful for both the explorer and Zenith.[56] In 1923, McDonald built one of Chicago's pioneer radio stations, station WJAZ, at the Edgewater Beach Hotel in Chicago. During the 1923-24 MacMillan expedition, McDonald read the world news and letters from relatives and friends to the Arctic exploration team every Wednesday night at midnight CST over WJAZ. For extra impact, McDonald arranged a special Christmas Eve broadcast where MacMillan's sister, Lettie, as well as other notables,[57] relayed messages to the expedition. McDonald himself accompanied the expedition as far as the coast of Labrador before returning to broadcast from Chicago. The public was totally caught up in the adventure and large audiences listened every Wednesday night. This was not only an innovative news technique but was also a powerful marketing tool for radio in general and Zenith radios in particular. The 1923-24 MacMillan Expedition was the first polar expedition that was able to maintain contact with civilization throughout the long polar winter. The fall of 1923 was the first major print campaign for Zenith and virtually every newspaper advertisement included Zenith's role in the MacMillan Expedition. Zenith also capitalized on its role in the expedition by providing window displays to its dealers that relayed the message that Zenith dependability and quality allowed it all to happen.

Development and production of the 3-R and 4-R receivers were undertaken during the late spring and early summer of 1923. In late spring, Chicago Radio Laboratory facilities were moved from the north side to the south side of the second floor of the QRS building. During this down time, the five remaining CRL employees[58] operated a machine for printing words on QRS music rolls. Production resumed again in summer 1923 and proceeded until spring 1924. At this stage the com-

Arctic explorer Donald B. MacMillan being interviewed in Chicago, most likely about his recently completed Arctic expedition. Fall 1924. Note the Zenith Companion at bottom left. MacMillan is holding an Eskimo sled dog he brought back to America to accompany him on his lecture tour during the winter of 1924-1925. The puppy was said to be a descendant of one of the sledge dogs which accompanied Admiral Peary and MacMillan on their successful expedition to the North Pole in 1909. Courtesy of Zenith.

Showcasing the Zenith Companion in Chicago, Fall 1924. This group gathered at Zenith to greet Donald B. MacMillan, who had recently returned to the U.S. after leading a 15-month expedition to the Arctic. Chicago Radio Laboratory/Zenith had equipped MacMillan's expedition with radios, which marked the first successful use of radio in the High Arctic. Left to right: U.J. "Sport" Herrmann, a life-long friend of both MacMillan and McDonald, Zenith founding president Eugene F. McDonald, Jr., Donald B. MacMillan, and James I. Kerr, producer, with Herrmann, of the Chicago Radio Show and the New York Radio World's Fair. Courtesy of Zenith.

pany determined it needed service men; accordingly, twenty-five were hired and sent to the factory to gain assembly and wiring experience.

Both the 3-R and 4-R were four-tube receivers, each offering three stages of internal audio amplification. Each could power a loudspeaker without additional amplification. The 3-R, selling for $160, continued the retail/consumer thrust of Zenith with a more elegant sloped front cabinet with a faux-wood grained brown bakelite front panel.[59] The 4-R represented a partial return to the CRL "laboratory" look, with a boxy cabinet and an engraved black bakelite front panel. It sold for $85. A unique feature of the early 3-Rs was a complex rotary switch which, through a cam-lobed shaft, allowed the operator to switch-in one, two, or three tubes of audio amplification[60] from the front panel.

As sales soared, the production rate by QRS became a major problem. In a December 10, 1923, letter to Thomas Pletcher, President of QRS, McDonald complained, "On the morning of Saturday, December 8th, we were 3,353 orders behind in our deliveries. At the writing of this letter we are much further behind." McDonald then provided, as an example, the waiting *daily* orders for nine of Zenith's largest clients for the 3-R (26) and 4-R (44) and pointed out that Zenith had 30 accounts and that CRL was behind in deliveries to 25 of them. McDonald concluded the letter with, "You have asked me for figures. This is only part of them, but you will see how serious the situation is, and our problem is not now one of sales, but production." Given McDonald's growing confidence and proven business track record, it is probable that he began to consider severing the QRS-CRL relationship at that time.

Zenith's first self-contained portable and first console set were also introduced in 1924. The portable—called *The Companion*—was a six-tube chassis receiver built into a revamped black suitcase with a screen covering the hole in the end for the speaker horn.[61] The horn was made of *papier mache* and was driven by a speaker unit supplied by Amplion or Baldwin. The control knobs were spaced on each side of the handle on top. The set was totally self-contained, having an internal loop antenna and using dry cells A-B and C.[62] The console was a converted phonograph cabinet that had the phonograph mechanism replaced with a radio. CRL produced a PhonoPanel which was a 3-R circuit reconfigured on an almost square panel. The panel was sized to fit four different Victor phonograph cabinets, in some cases replacing the phonograph mechanisms, and in other cases, replacing a portion of the record storage area. CRL may have bought Victor cabinets for this conversion, but most likely, they only provided the PhonoPanel to dealers at the retail level, who then performed the conversions.

In the late spring of 1924, the Zenith Super VII series containing Hassel-designed nonreactive tuning[63] was developed and production of the 3-R and 4-R was curtailed.

The Super VII series represented Zenith's first attempt to offer a full range of radio models. The Super VII itself was a very large table or mantle radio, measuring almost four-feet wide. Most Super VIIs were likely sold as Super VIIIs, with optional "spinet legs" configured like the small piano these sets resemble. The Super IX was desk-like, with a single enclosed speaker and room in the cabinet for batteries or eliminators. The very rare Super X, at almost double the basic Super VII price, was Zenith's first console set. The Super X offered dual speakers[64] "which are harmonically synchronized twin speakers and horns, designed to reproduce both high and low pitched tones which would be impossible with single unit speakers"[65] and may have been the first production set ever so equipped. A look at how Zenith viewed quality in this series can be seen in a letter from McDonald to Zenith distributors on February 26, 1925, concerning the battery eliminator to be used in the Model X:

> Model X can be sold only at $475.00 because it will be without the battery eliminator. And here again I have opportunity to disclose to you more inside information on Zenith policy. We have produced in our laboratory a battery eliminator that gave excellent results. We built ten of them. They were used in various parts of the country and were thoroughly satisfactory. We endorsed them fully and the order was issued to put these battery eliminators into production. We spent thousands of dollars advertising the Model X with the battery eliminator. Much to our disappoint, when the eliminators came through the factory they had the hum of the 60-cycle characteristic of all battery eliminators that as yet appeared on the market. While the hum is not audible, in fact less than that of any other battery eliminator, we were fully aware it would distort the quality of reproduction and lessen the Zenith standard. Since these eliminators did not reach the high standard, we decided regardless of our investment not to put them on the market until they were right. Purchasers of the Model X can have it equipped with storage battery and battery charger. When then, the battery eliminator is perfected as we hope it will be sooner or later, you can furnish it to those customers because it will be built to fit the Model X.[66]

At this time, sub-assemblies for the Super VII series were made in the main QRS plant at 48th and Kedzie with the final assembly, packing, and shipping being done in a converted meat packing plant west of Kedzie Avenue, on 47th Street. Assemblies and parts were transferred between the two plants in a cart that the employees called the "Black Maria."

It must have been obvious by this time that the QRS-CRL arrangement had outgrown its usefulness. In late 1924, Zenith moved to its four-floor 3620 South Iron Street facility and resumed manufacturing its own products.[67]

Promotional photograph of the Zenith Super IX. Courtesy of Zenith.

THE REFINING OF NATIONAL SALES AND DISTRIBUTION

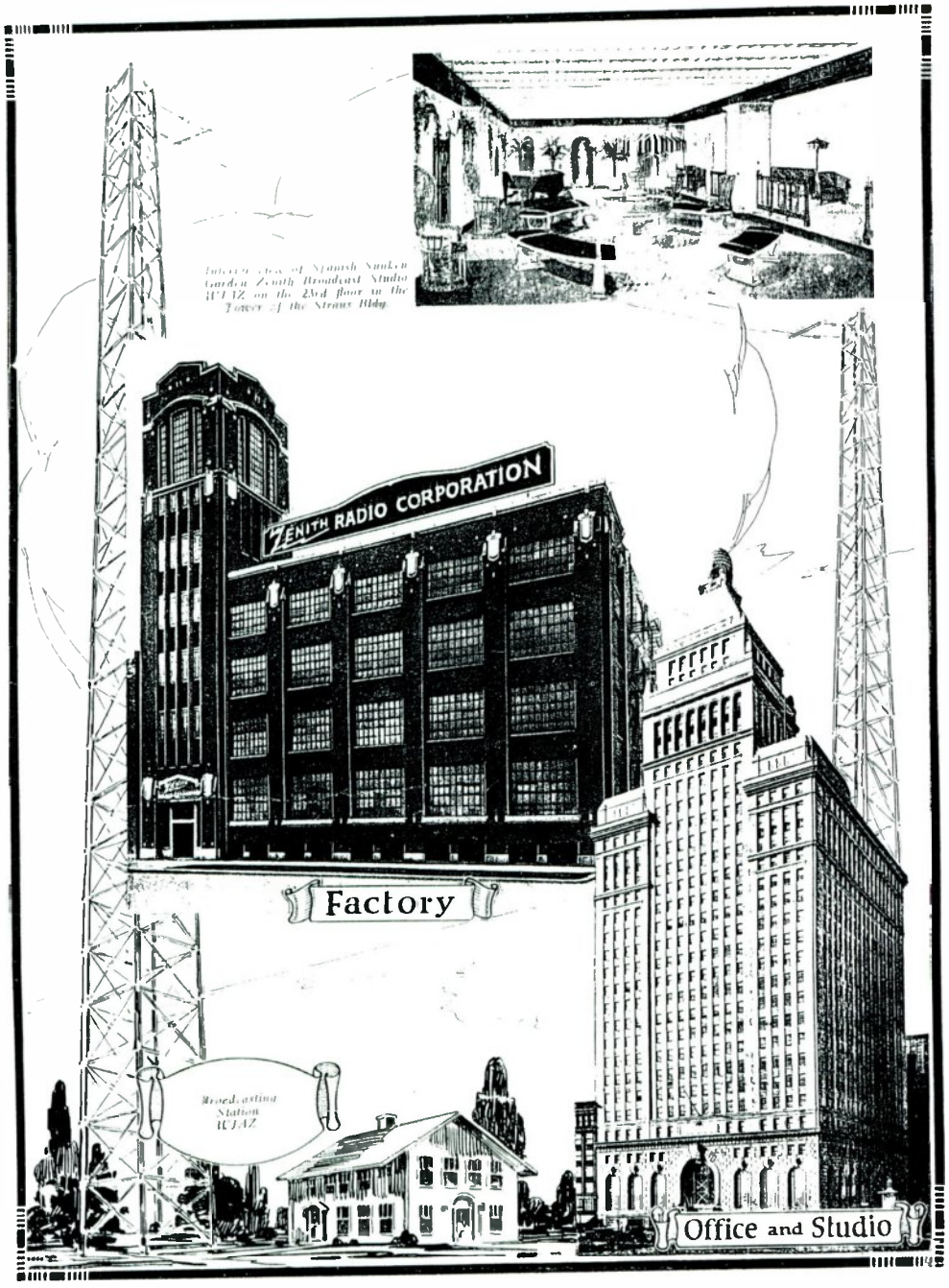
Many radio manufacturers entered the market on the coattails of the broadcast radio fad in the early 1920s. Their products varied widely in quality and value and sales techniques generally were as spotty as the product: the commonality in early radio advertising was hyperbole.[68] Most early radio manufacturers were short-lived. Those who were successful were those who perfected sales techniques and distribution systems and who were able to keep production costs under control.[69] Zenith was fortunate that the right mix of people came together at the right time to guide the company into the national market; Zenith's financial success, and overall success had, at its heart, its system of distribution, inventory, and production control.

Hugh Robertson—Inventory Control and the Profit Margin

Hugh Robertson, a quiet accountant born in Scotland in 1889, joined Zenith Radio as office manager on December 11, 1924. While in the automobile business in 1920,[70] he became interested in radio when he saw his first crystal set. Working with an auto mechanic friend, he built first a crystal set and then a tube set. Robertson's partner in the business, Al Pearson,[71] also became interested in radio but quickly became more interested in how expensive radio parts were. The three started making tube sockets which they sold for 15 cents in a market normally selling them for 50 cents. Likewise they produced condensers and eventually developed a reflex circuit for radio. In June 1922, Robertson was involved enough with the radio business that he manned a display booth for The Electric Research Laboratories at the first Chicago Radio Show.[72]

Robertson's interest in radio lagged with time and he returned to full-time management in the automobile business. A chance meeting with McDonald in November 1924 resulted in McDonald asking him to come to Zenith. He joined Zenith as office manager soon after its move to Iron Street[73] where it became Robertson's job to bring organization to Zenith's rapid growth.[74]

Robertson's first task was to get the distribution system in check. He found Zenith produced radios for distributors without any idea of how many they would buy or could take, often leaving Zenith unable to fill orders for a specific model or with a large and expensive inventory to manage. He started a program which required the distributors to provide a commitment for ordering products and required them to update the commitment quarterly. Once those figures were known, parts ordering at Zenith could be regulated to match known commitments, and if all procedures were followed, by year end, all commitments would have been met and the factory empty. Determining advance production and sales figures—an inventory control program—seems very basic now, but the concept was new in the radio industry when Robertson introduced it. It quickly spread, becoming the industry standard.[75] His procedures, which took several years to mature, also allowed Zenith to increase advertising for slow selling models, regulate the size of the factory work force, and minimize capital invested in outdated parts. The financial stability that resulted from the Robertson system built a fiercely loyal group of distributors and dealers.



The 3620 South Iron Street Zenith Radio Corporation factory, the fourth home of the organization. By the time of the move to Iron Street, Zenith station WJAZ was in operation. Courtesy of Zenith.

MORE GROWTH

After the move to Iron Street in late 1924, the Super VII series was the main product line. By this time, Zenith had developed a rapidly expanding Export Department and placed A.G. Linsig in charge of the operation.[76] Linsig had worked with the export division of the Victor Talking Machine before arriving at Zenith and carried the corporation smoothly into international sales. As early as fall 1923, Zenith sent engineer Charles Marshall to England to help organize Zetavox Radio & Television, LTD., an English subsidiary of Zenith Radio. Zetavox operated for a period of three years before being transferred by Zenith to local businessmen.[77]

Paul B. Klugh—Effective Sales Management

Paul Klugh's extensive background in the music business as former President of the Autopiano Company and former President of the National Association of Piano Manufacturers attracted McDonald's attention when he was organizing the National Association of Broadcasters (NAB) in 1923.[78] Klugh had been recommended to McDonald by Tom Pletcher, President of QRS Music Company[79] then also a Vice President and Director of Zenith. Klugh became Executive Secretary of NAB and his involvement in this work caused him to become interested in the business aspects of radio. He requested and received from McDonald the East Coast Zenith distributorship in late 1923. In 1926, he joined Zenith itself as Vice President and General Manager. In the eight years before his retirement in July 1934, he guided the Corporation through many of its most successful model introductions. Klugh's association with Zenith brought the company considerable recognition as he involved himself in NAB business, and in later years, in the Radio Manufacturers Association.[80]

THE CORPORATION MATURES

In 1925, McDonald again returned to the Arctic with MacMillan,[81] this time as second in command of the expedition and as commander of the specially modified steamship, the *S.S. Peary*. Zenith equipped the *Peary* and MacMillan's Arctic sloop, the *Bowdoin* with special-built Zenith shortwave equipment. Zenith intended to use this equipment to demonstrate to the Navy the superiority of shortwave equipment over the distance-limiting longwave equipment then commonly in use. McDonald dramatically demonstrated the superiority of shortwave early in the expedition, when he used the equipment instead of the by then useless longwave equipment to solve a fuel problem at Godhaven, Greenland, in a matter of few hours. The expedition then proceeded as far north as Etah, on the north shore of Greenland, where it made extensive use of shortwave (primarily 40 meter) communications. The *Peary,* using shortwave, was able to contact the *U.S.S. Seattle*, located in the harbor of Wellington, New Zealand, over 12,000 miles away. This success, as well as the success of other Navy shortwave experiments conducted that summer, had tremendous impact on the Navy, which then began purchasing shortwave equipment for the fleet. Although records are incomplete, it appears that Zenith did not seek to supply the Navy with radio equipment. Indeed, Zenith did not seek to exploit their new found fame in shortwave in any way, but instead gave the circuit diagrams to amateurs to encourage their migration from mediumwave to shortwave frequencies (eight years later, however, in 1933, Zenith introduced their own home receivers designed to receive shortwave broadcasts). For many years thereafter, Zenith products were advertised as "the choice of Arctic explorers", with Admiral MacMillan still being featured in Zenith advertising as much as 30 years later.[82]

1927 style. Promotional photograph for the Zenith English model 10-tube Deluxe. This model, along with the other models of the Deluxe series—the Colonial, the Italian, the Chinese, and the Spanish—were popular theater lobby radios. Courtesy of Zenith.

In late 1925, Gilbert E. Gustafson, a young radio operator who handled the Chicago end of radio communications with the 1925 MacMillan Arctic Expedition, joined the engineering department at Zenith. Although primarily affiliated with the operation of WJAZ until its shutdown in November 1931, "Gus" became a legendary engineer, and eventually Chief Engineer, then Vice President, Engineering, responsible for many of the innovations in Zenith receivers.[83]

Late 1925 also marked the beginning of production of the grandest Zenith models to date, the 10 tube Deluxe receivers. There were five cabinet styles, each handmade: the Colonial, the English, the Italian, the Chinese, and the Spanish. The price for these models ranged from $650 to $2,000 (approximately $5,500 to $17,000 in 1995 dollars), with the Spanish being the most expensive. At the time, the Deluxe was the only regularly manufactured line operating successfully without loop or outside antenna. These sets contained ten tubes, operated on battery power and used a very special six-gang tuning condenser.

The Super 27 series was developed by Zenith engineers in the Summer of 1926 and introduced to the wholesale market in the fall for the 1927 retail year. The three sets of the Super 27 Series closely resembled the Super VII, VIII, and IX on which they were modeled. The Super 27 Series sets were the first Zenith sets which ran "from light socket" and Zenith advertising has always stated flatly that the Model 27 was the first all-electric set.

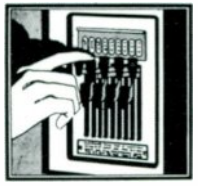
During the latter half of 1926, Zenith introduced its most broadly based line of radios, the Models 11, 12, 14, 15, and 16, as the 1927 Line. The aluminum chassis introduced for Models 11, 12, and 14 is believed to be the first widely produced metal chassis in the industry. The AC version of this chassis, used on Models 11E and 14E, was the first Zenith chassis to use AC tubes.[84] The battery operated Model 11, priced at $110, was less than half the price of the least expensive Zenith receiver of the year before. This fact was liberally proclaimed in Zenith advertising. The Model 15 was the only Zenith set ever produced with an external set-top loop antenna. The large Model 16 was the first of a long line of massive vertically oriented consoles which were a distinctive feature of the Zenith line until WW II. The 10-tube Deluxe receivers of 1926 were reintroduced in the 1927 Line as AC sets, with the Spanish Deluxe being top of the line at $2500.[85]

Also in 1926, Robertson became Treasurer of Zenith, by order of The First National Bank of Chicago, after the corporation began having trouble repaying a bank loan. The bank chose to work with the company only if Robertson were made chief financial officer, continued his inventory control procedures and reported to them at regular intervals. Robertson was successful and Zenith was soon on sound financial footing again. Had Robertson not been so successful, The First National Bank could have put the company into bankruptcy, a fate which overtook many similar small radio companies during that period. Hugh Robertson therefore, saved the company from bankruptcy. Under his solid fiscal management Zenith rose to become a major force in the commercial radio industry. The Corporation finished 1926 by declaring stockholders the regular annual dividend of six percent, plus an extra four percent, a result of profits exceeding those of 1925 by 175 percent.[86]

The Patent Pool

The stability[87] at Zenith made possible successful negotiations for a license to use the RCA/Westinghouse/GE patents and in March 1927, Zenith became the first[88] RCA competitor to be issued such a license. The "patent pool" began issuing a limited number of licenses in an attempt to shake off a potential Federal Trade Commission monopoly action. The issuance of the license ended negotiations started by the Chicago Radio Laboratory in 1922. Zenith paid a large undisclosed sum for past use of the patents[89] and agreed to pay a royalty of 7.5% of the factory selling price for every radio produced using the patents.[90] Because the monopoly covered virtually every aspect of radio technology, it was blamed for causing many of the estimated 500 small manufacturers that emerged in the early 1920s to declare bankruptcy due to either real or potential patent infringement and legal action by RCA. As McDonald explained the situation in a March 26, 1927, article in *Radio World*, "We have carefully studied the patent situation and on advice of our attorneys have decided that the basic patents of the radio industry are held by the Radio Corporation of America and its associated companies. Among its pioneer patents in radio are the inventions of Alexanderson, Armstrong, Langmuir, Hull, Rice, White, Chubb, Lowenstein, Mathes and many others." The earliest manufacturers such as Zenith, who acquired the Armstrong patents before Armstrong sold them to Westinghouse in 1920, were able to survive the storm with Armstrong technology. The acquisition of these patents in 1920 provided Westinghouse the power to join the GE-AT&T patent cartel. This patent pool was administered by a new company, the Radio Corporation of America, which was owned 60 percent by GE and 40 percent by Westinghouse. RCA functioned initially as a licensing cartel and sales company for GE and Westinghouse radios. The opening of this restrictive patent pool, therefore, was expected to bring stability to the radio manufacturing business.[91] After Zenith, All-American, Splitdorf, Stromberg-Carlson, Freed-Eiseman, Fada, King, Howard, Murdock, Bosch, Crosley, Freshman, Federal, Atwater Kent and Philco quickly obtained licenses.[92] Zenith thus helped pave the way for this new stability, but at the price of steep royalties for existing and future patents. Ironically, Zenith, the first manufacturer to be granted a patent pool license in 1927, was the manufacturer that finally fractured the unfair RCA monopoly 30 years later in 1957.[93]

The SEVEN MAGIC WORDS IN RADIO FOR 1928



① Press
② the
③ Button
④ and
⑤ There's
⑥ your
⑦ Station

Zenith
Automatic Tuning

To every Zenith dealer the seven magic words—"Press the Button and there's your station" spell an opportunity to roll up profits that may never be quite so big again.

You have the jump, now!

Stock Zenith Automatic Radio.

Use Zenith Automatic "Press the Button" advertising and *win.*

The Zenith Model 17(E) was most likely the single most advertised set produced by Zenith. It is also the only early Zenith model known to garner its own exclusive factory brochure. The Model 17, introduced in mid-1927 as an addition to the 1927 line, was the last of the long horizontal Zenith models patterned after the spinet piano. Like the earlier Super VII and the Super 27 series, the Model 17 was available as a long table set, a table set with spinet legs, or a table set on a "console base," which looked like a Super IX base but offered twin speakers. Unlike the two previous series however, the model number did not change as accessories were attached.

The 30 Series of radios was developed in 1927 and introduced in a somewhat piecemeal fashion as the 1928-1929 Line. The 30 Series consisted of one basic six-tube TRF chassis with a four-gang tuning capacitor, and a finger dial tuning control. In the AC sets, this chassis was supported by a separate power supply of either one or two rectifier tubes and was known in some factory brochures as the "E" chassis. It was inserted in three different cabinets, producing a bewildering 27 different models and submodels. Some of the proliferation of model numbers was due to a new model nomenclature which assigned an additional trailing number or letter to the base model number to connote what would be called "options" in a later era. Thus, the basic model 33 could be obtained as a 33, a 33X, a 333, and a 333X. Had Zenith produced the 33 for 25 cycle 110 VAC power, there would have also been a 332 and a 332X.

The proliferation of models was probably driven by Zenith's desire to test the concept of add-on options to a wider degree than in previous models. The Model 35, a "highboy" console, was offered with or without the new "Automatic Tuning," with or without a "Power Dynamic" speaker requiring a second rectifier, and with or without special chassis modification for higher performance. Supplying these choices in set configuration in each of three power choices (AC-60 cycle, AC-25 cycle and DC) created an incredible 14 different models of the Model 35. Most likely an all time Zenith record, the strategy was largely abandoned soon after.

Three other large console radios were offered in the 1928-29 Lines which were really not part of the 30 Series. The almost unknown Model 37A was a special version of the E chassis and was Zenith's first radio-phonograph combination. The Model 39A and Model 40A shared a nine-tube TRF chassis. The massive 40A was Zenith's second radio phonograph and is believed by many to be one of the most beautiful sets ever produced by Zenith.

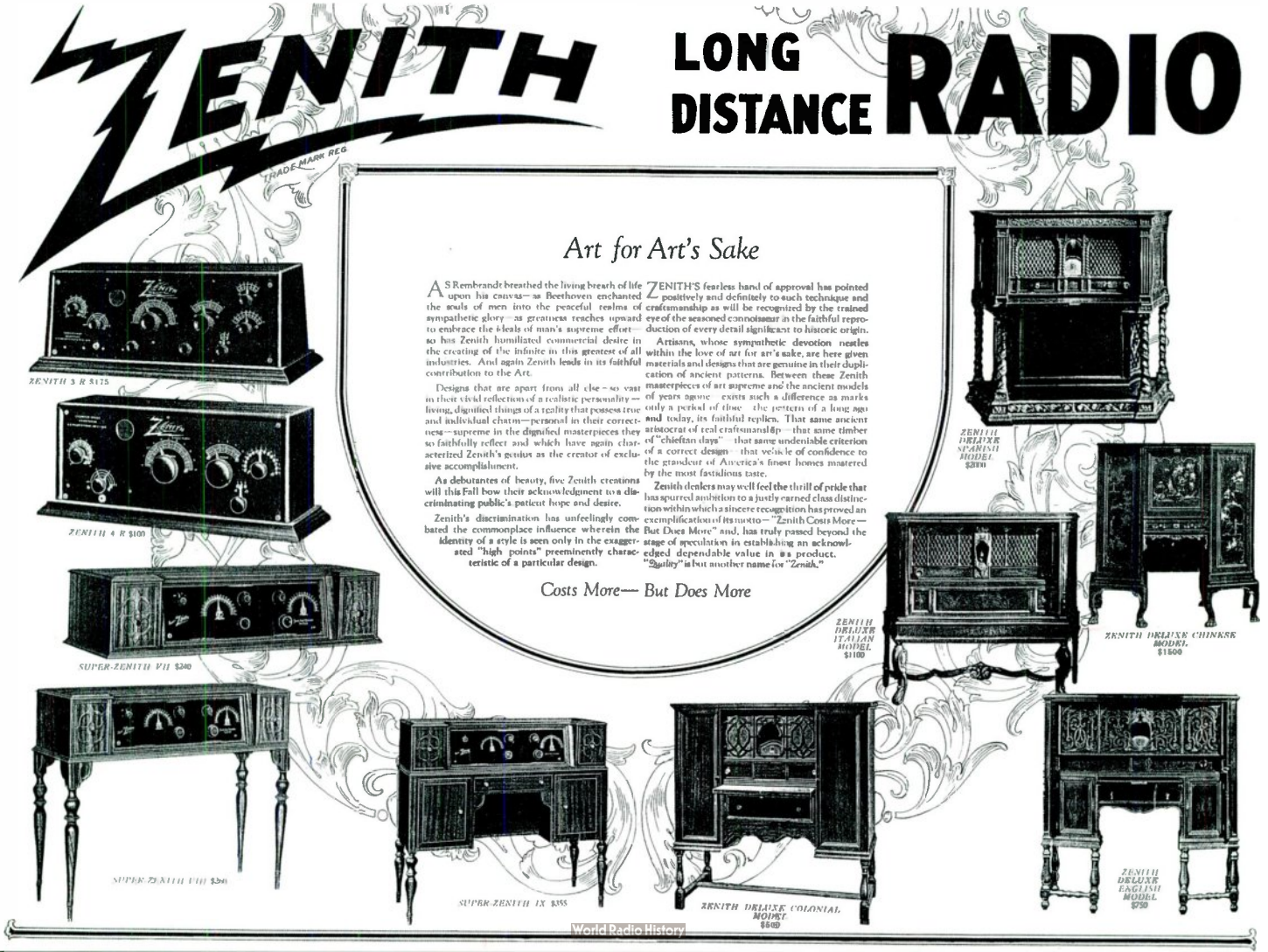
A boxcar load of Zenith radios leaves the Iron Street plant for Philadelphia along with some Zenith (and distributor) publicity. Courtesy of Zenith.

In April 1928 McDonald announced that "the Zenith Radio Corporation and no other radio company has acquired complete control of the H.N. Marvin[94] Automatic Radio patents and has also purchased the A.J. Vasselli Automatic radio patents...it is the intention to license its competitors under its automatic radio patents."[95] In the 1928-1929 Line, Zenith introduced the first radios with "Automatic Tuning", the Models 35A, 37A, 39A, and 40A, which incorporated a nine button sliding tuning mechanism that allowed the listener to return to any pre-set station by "just pressing the button."

On September 7, 1928, McDonald sent a letter to his friend Curtis Wessel, publisher of *The Phonograph & Talking Machine Weekly*, "secretly" informing him of the stock transaction that had just taken place at Zenith: McDonald and Klugh has just purchased the entire stock holdings of Thomas Pletcher and J.R. Cardwell, two of the largest stockholders in Zenith.[96] The stock was purchased at a price above the market quotations and gave McDonald, personally, controlling stock interest.[97] During fall 1928, Zenith brought suit against Grigsby-Grunow, supplier of many of their powerpacks, accusing them of intentionally providing flawed materials in order to ruin Zenith's reputation for high quality.[98] In late 1928 and early spring 1929, Zenith equipped a full production cabinet shop in the nearby Harris Building at 35th and Iron Street. By the summer of 1929 the new plant was producing cabinets for the 1930 Line.

An interesting company "legend" concerns the 1929 production of a custom built radio for King Alexander I of Yugoslavia. An emissary of the King approached Zenith about the building of the custom set after several radio manufactures in New York turned him down because they thought it was a joke of some sort. The set was housed in an ornate Zenith cabinet and had an electric remote control with a 75 foot cord. Legend or not, Zenith did receive an order to supply radios for the Yugoslavian school system.[99]

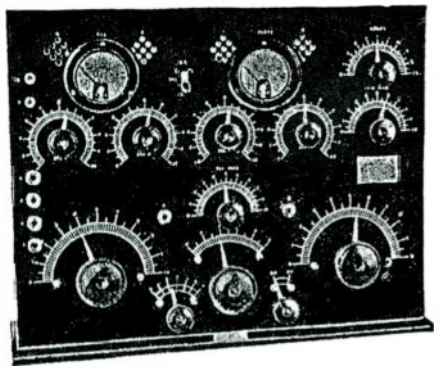
Fiscal year 1929 saw earnings exceed the one million dollar mark for the first time.[100] With a well developed distribution system, a full range of national advertising and the 50/60 model series in development, the future looked very bright for Zenith.



THE MOST SPECTACULAR INSTRUMENT
ON DISPLAY AT THE RADIO SHOW—

THE

Z-NITH
MULTICEIVER



When you want a complete receiving set, you want one that really *is complete* as well as efficient and flexible.

Such requirements you will find in the Z-NITH Multiceiver. This set comprises a 180 to 1200 meter regenerator combined with a detector and three-step amplifier.

The use of this instrument is not confined to the short waves as jacks are provided whereby two long wave coils may be plugged into the circuit to permit the reception of undamped, long wave stations.

It is indeed a superb set from every point of view. The results that are obtained will gratify you to say the least and its general appearance will please you as much.

When at the Radio Exposition visit Booth 36
and be convinced of the Z-NITH *Products.*

Chicago Radio Laboratory

Office and Factory—6433 Ravenswood Ave.—Testing Station 9ZN—
5525 Sheridan Rd., Chicago, Illinois

ZENITH
TRADE MARK

Sets are the Acme of Perfection

These wonderful sets are known all over the world. Dr. MacMillan, the great Arctic Explorer, now near the North Pole, selected a "Zenith" because of its flawless construction, its unusual selectivity and its tremendous REACH. The "Zenith" has already established two history-making long distance records.

The first was made when a passenger on the steamer "Berengaria," without additional amplifiers, received broadcasting from Chicago right up to the shores of France—a distance of 3,465 miles.

On board the "Bowdoin," 11 degrees from the North Pole, hundreds of stations at great distances, such as Dallas, Texas, Catalina Islands, and Honolulu, have been heard.

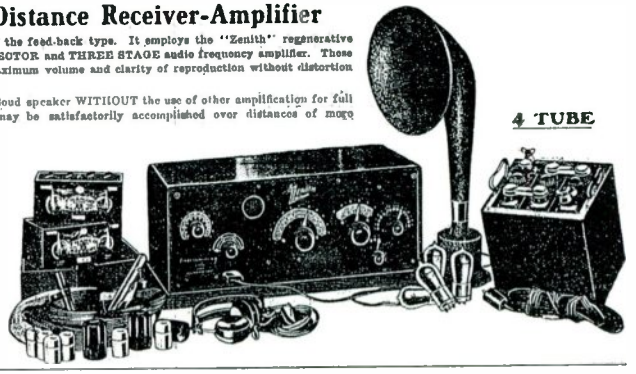
Guaranteed to be free of distortion of any kind. The selector with which each set is equipped blots out any nearby station or stations.

"Zenith" 4R Long Distance Receiver-Amplifier

A complete 3 circuit regenerative receiver of the feed-back type. It employs the "Zenith" regenerative circuit in combination with an AUDION DETECTOR and THREE STAGE audio frequency amplifier. These three stages are carefully balanced to insure maximum volume and clarity of reproduction without distortion or body capacity.

This set may be connected directly to any loud speaker WITHOUT the use of other amplification for full phonograph volume. Loud speaker reception may be satisfactorily accomplished over distances of more than 2,000 miles.

4 TUBE



RECEIVING SET WITHOUT ANY PARTS

1H7291—"Zenith" 4R (4 tube) Receiver-Amplifier. Substantially built and beautifully polished upright cabinet, dull finish panel, all binding posts at rear of cabinet, doing away with unsightly wiring on panel. This set will give uniformly satisfactory local and long distance reception under all conditions. Each in heavy shipping carton. Each **$58.25**

Retail Price $85.00 Lots of 3 Each **56.00**

COMPLETE RECEIVING OUTFIT

1H7924—"Zenith" 4R (4 tube) Receiver-Amplifier, 1H7291 with the following equipment which makes a complete receiving outfit:

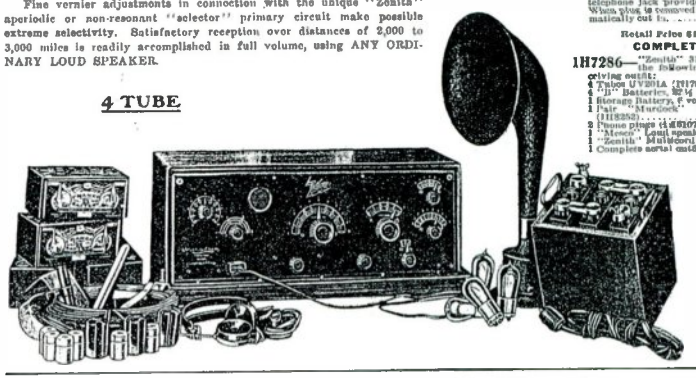
4 Tubes, UV201A (1H7903)	Each	
4 "B" Batteries, 22½ volt (1H7777)		$119.50
1 Storage Battery, 6 volt, 80 ampere (1H7468)		
1 Pair "Murdock" Headphones, 3,000 ohms (1H8585)	Lots of 3 Each	
2 Phone plugs (1H8107)		$117.00
1 "Manhattan" loud speaker (1H7951)		
1 "Zenith" multicord (1H7797)		
1 Complete aerial outfit (1H Special)		

"Zenith" 3R Long Distance Receiver-Amplifier

Nothing has been left undone to insure faultless reception under any and all conditions. This set combines a specially designed distortionless 3 stage amplifier with the super efficient "Zenith" 3 circuit regenerative tuner. The 3 stages of audio amplification are perfectly balanced, insuring full volume and clear, faithful reception without distortion or body capacity. For the man or woman who wants the best this model is recommended

Fine vernier adjustments in connection with the unique "Zenith" aperiodic or non-resonant "selector" primary circuit make possible extreme selectivity. Satisfactory reception over distances of 2,000 to 3,000 miles is readily accomplished in full volume, using ANY ORDINARY LOUD SPEAKER.

4 TUBE



RECEIVING SET WITHOUT ANY PARTS

1H7285—"Zenith" 3 R (4 tube) Receiver-Amplifier. Highly finished mahogany cabinet, brown grained, hard rubber panel arranged in a general slanting position, all connections to batteries, aerial and ground and loud speaker are located at rear of cabinet, telephone jack provided on front panel for use of head phones. When plug is removed the loud speaker is automatically cut in. . . . . Each **$109.75**

Retail Price $180.00 Lots of 3 Each **105.50**

COMPLETE RECEIVING OUTFIT

1H7286—"Zenith" 3R (4 tube) Receiver-Amplifier 1H7285 with the following equipment which makes a complete receiving outfit:

4 Tubes UV201A (1H7903)	Each	
4 "B" Batteries, 22½ volt (1H7777)		$171.25
1 Storage Battery, 6 volt, 80 ampere (1H8466)		
1 Pair "Murdock" Headphones, 3,000 ohms (1H8585)	Lots of 3 Each	
2 Phone plugs (1H8107)		$168.75
1 "Manhattan" loud speaker (1H7951)		
1 "Zenith" Multicord (1H7797)		
1 Complete aerial outfit (1H Special)		

"Zenith" Multicord

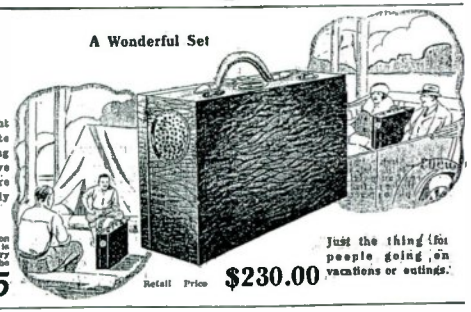
1H7797—This is a complete set of battery wires all recessed in one cord with positive contact connectors at one end and a plug at the other. This type of cord eliminates entirely the possibility of misconnecting batteries in the set. 1 in box. Each **$2.70**

"Zenith" Radio Companion

A Complete Portable Receiving Set

6 TUBE

A Wonderful Set

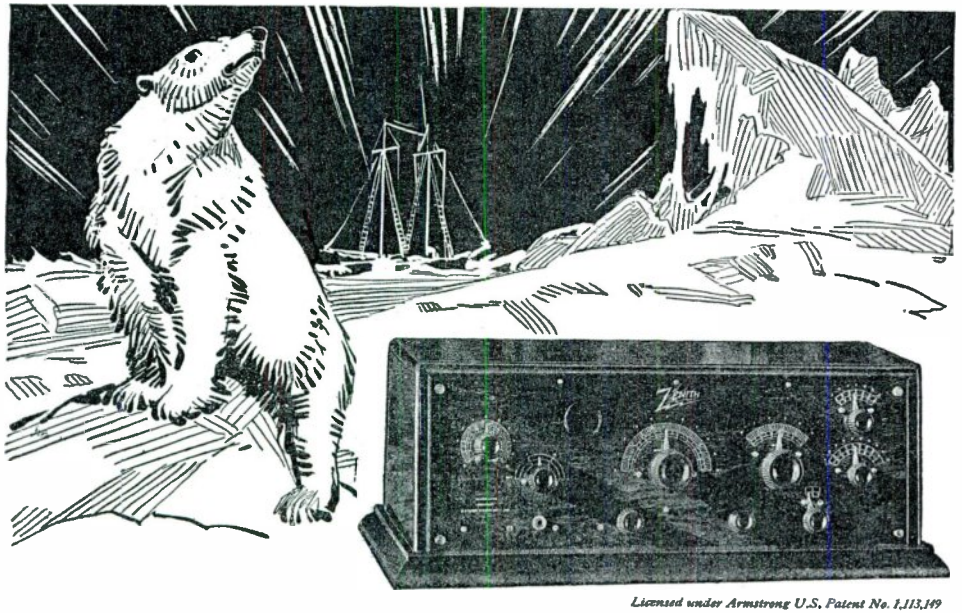


A 6 tube set completely self-contained in a small beautifully finished light traveling case, considerably smaller than the average suit case. Complete with tubes, all batteries and antenna. Reception may be had without opening the case, while walking, riding in an automobile or train. This set will prove very satisfactory for vacationists and traveling people who ordinarily are unable to move their radio set about. The "Zenith" Companion is practically as efficient in the summer as in the winter.

1H8336—"Zenith" 6 tube companion, wood case with handle for carrying, imitation leather covered, 3 controls located at the top. These controls are all that is needed for tuning, outside loop, built in loud speaker with six UV 199 tubes and necessary batteries. For maximum volume it is only necessary to swing the case so the loop faces the direction of the particular station that is to be tuned in. No external antenna or connections are necessary. This unit brings in distant stations with real volume, clarity and quality: Complete with all parts ready for operation. Each **$160.25**

Retail Price **$230.00**

Just the thing for people going on vacations or outings.



Licensed under Armstrong U.S. Patent No. 1,113,149

Eleven Degrees from the North Pole

Ice—endless miles of ice, as far as the eye can see. And frozen fast in the ice, amid the deadly stillness and the unearthly lights of the Arctic, a staunch little eighty-nine foot schooner! But Donald B. MacMillan and his band of brave explorers are not alone tonight.

Under their ice-bound hatches they listen eagerly to the news of the outside world, broadcast to them from the Zenith-Edgewater Beach Hotel Broadcasting Station, Chicago—to violins in Newark, Schenectady, Los Angeles—to singers in Atlanta—to a lively orchestra in Honolulu.

Stations in all these cities—and in several hundred others—they have readily tuned in; yet the Bowdoin tonight is only eleven degrees from the North Pole!

Out of all the radio sets on the market, Dr. MacMillan selected the Zenith exclusively—because of its flawless construction, its unusual selectivity, its dependability and its tremendous REACH.

And you can do all that Dr. MacMillan does, and more, with either of the two new models described at the right. Their moderate price brings them easily within your reach. Write today for full particulars.

ZENITH
TRADE MARK
Long-Distance Radio

Model 3R The new Zenith 3R "Long-Distance" Receiver-Amplifier combines a specially designed distortionless three-stage amplifier with the new and different Zenith three-circuit regenerative tuner.

Fine vernier adjustments—in connection with the unique Zenith aperiodic or non-resonant "selector" primary circuit—make possible extreme selectivity.

2,000 to 3,000 Miles With Any Loud-Speaker

The new Zenith 3R has broken all records, even those set by its famous predecessors of the Zenith line. Satisfactory reception over distances of 2,000 to 3,000 miles, and over, is readily accomplished in full volume, using *any ordinary loud-speaker*. No special skill is required.

The Zenith is the only set built which is capable of being used with all present-day tubes as well as with any tubes that may be brought out in the future. The Model 3R is compact, graceful in line, and built in a highly finished mahogany cabinet $160

Model 4R The new Zenith 4R "Long-Distance" Receiver-Amplifier comprises a complete three-circuit regenerative receiver of the feed-back type. It employs the new Zenith regenerative circuit in combination with an *audion detector* and *three-stage* audio-frequency amplifier, all in one cabinet.

Because of the unique Zenith "selector," unusual selectivity is accomplished without complication of adjustment.

The Zenith 4R may be connected directly to any loud-speaker *without* the use of other amplification for full phonograph volume, and reception may be satisfactorily accomplished over distances of more than 2,000 miles..... $85

ZENITH RADIO CORPORATION,
Dept.S, 328 South Michigan Avenue, Chicago, Illinois

Gentlemen:
Please send me illustrated literature on Zenith Radio.

Name.....

Address.....

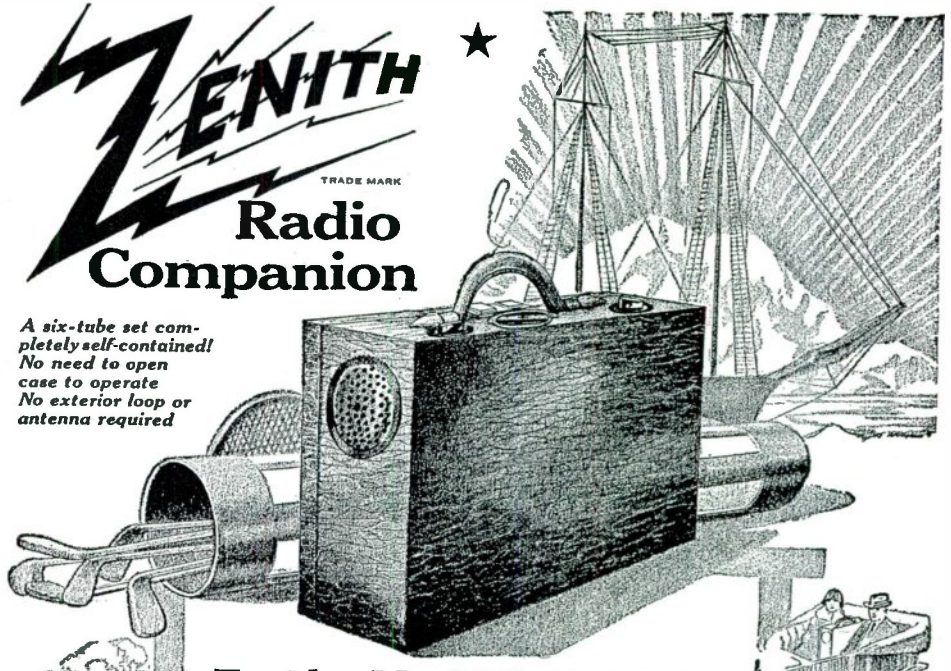
Zenith Radio Corporation

McCORMICK BUILDING, CHICAGO

ZENITH ★ Radio Companion

TRADE MARK

A six-tube set completely self-contained! No need to open case to operate No exterior loop or antenna required



Zenith—MacMillan's Choice
Encased in a Light Traveling Bag!

Here's a six-tube radio set that's entirely self-contained — tubes, "A" batteries, "B" batteries, loud speaker and loop antenna complete, and it's a *Zenith!*

Packed into a small, beautifully finished traveling case — much smaller than the average suitcase —this new Zenith is the most compact set ever made giving clarity, quality, volume and distance.

Do you see those two little buttons close to the handle? Those are the controls. In order to operate the new Zenith Radio Companion you simply turn the controls to bring in the station you want—then for maximum volume you swing the case so that the loop is facing that particular station. You will be astonished at the clearness with which the music and the voices come through—and in what volume!

Think what it would mean to you to be able to take one of these new Zeniths with you on your travels and outings. A real radio set—the exclusive choice of Donald B. MacMillan for his Arctic expedition—yet so compact that it takes up no more space than a light traveling bag!

Think of the fun you could have with this set—the dance music you could listen to on moonlit nights—the orchestras that would play for you as you and your pals gathered round the camp-fire—the companionship it could give you on your motor parties—at the bathing beach. Picture the enjoyment it could bring your guests at the house-party or the week-end gathering.

Again, think how such a set would while away a lonesome evening in that dreary out-of-town hotel—what a godsend it would be to that invalid mother —to that dear relative or friend who must spend weeks and months in the hospital!

You will want to know more of this remarkable set—so light and compact, so easy to operate, so wonderfully convenient. No earphones, you understand. No outside antenna. Yet clarity, volume, quality, distance! A real Zenith, packed into a traveling case!

The coupon will bring you full particulars.

Listening, with the keenest pleasure, to music and voices in the cities they have left behind!

Lively orchestras entertain these boys, miles and miles from civilization.

Receiving the latest market reports, the latest news developments, with the aid of the Zenith Radio Companion.

The height of luxury —motoring to music!

When three is company at the bathing beach.

A constant source of entertainment and delight to invalids.

Zenith Radio Corporation
McCormick Building
Chicago, Illinois

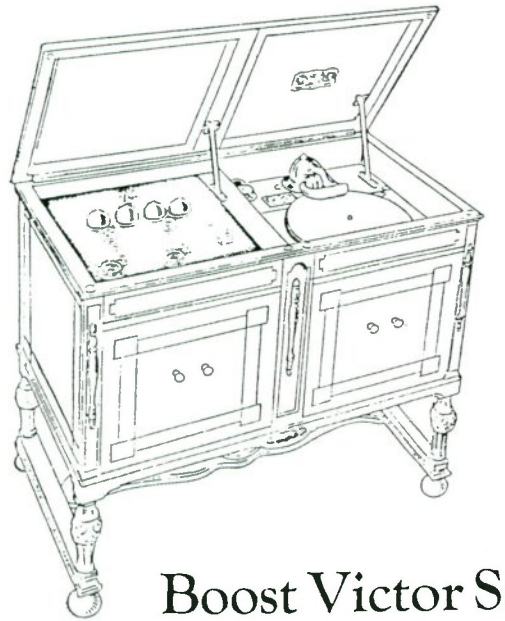
ZENITH RADIO CORPORATION,
Dept.2-G 328 S. Michigan Ave., Chicago, Ill.

Gentlemen:
Please send me illustrated literature on Zenith Radio, including full particulars of the new Zenith Radio Companion.

Name.....

Address.....

.....



Boost Victor Sales With ZENITH Radio

Many of your customers want both talking machine and radio. They want them in combination. They insist that each be of the highest quality. Boost your sales with the Victor Model Zenith.

ZENITH—*the Height of Achievement*—MacMillan's choice at the North Pole—holder of the Berengaria long-distance record. This set combines unusual distance range, selectivity, simplicity and beauty. It uses *either* dry or storage batteries. With Zenith's three stages of amplification, volume—with tone quality—is unequalled. If desired, it is louder than phonograph reproduction. It is unnecessary to place your head inside the horn to hear distant stations, with the Zenith.

READILY INSTALLED—The Victor Model Zenith perfectly fits four Victor models—Numbers 215, 400, 405 and 410. Combining Victor and Zenith is simplicity itself.

PRICE—Retails, without equipment, at $150.

Here's a real opportunity to make big sales you otherwise would lose—an opportunity to plus sales already made. A receiving set built by music men, *for* music men, at a music man's *discount*. Exclusive territory available, which insures price maintenance. A letter will prompdly bring you full details.

ZENITH RADIO CORPORATION

332 SO. MICHIGAN AVE. CHICAGO

1269 BROADWAY NEW YORK CITY

ZENITH RADIO

TRADE MARK REG.

Super-Zenith VII—the ideal radio set for the fine home

They Cost More But They Do More

Super-Zenith X

Fulfills your utmost desire, in beauty and performance

The new Super-Zenith is beautiful to look at—lends an atmosphere of dignity and worth to library or drawing room.

Naturally you expect unusual performance from so beautiful a radio set. And—unusual performance is exactly what you ***get.***

Tuning, for example, is controlled by ***two dials only***—so perfectly adjusted that each station comes in always at the same dial settings. ***It never varies.*** Powerful locals may be on full blast, yet you can tune them out completely and bring in distant stations. Tone reproduction is always clear and true; the volume always adequate.

Before you make your choice, be sure to see and try the new Super-Zenith. A fifteen-minute test will give you a new standard of radio values, as applied to beauty of construction—and—***performance.***

Dealers and Jobbers: Write or wire for our exclusive territorial franchise

ZENITH RADIO CORPORATION

332 South Michigan Avenue, Chicago

ZENITH—the exclusive choice of MacMillan for his North Pole Expedition
Holder of the Berengaria Record

THE complete Zenith line includes seven models, ranging in price from $95 to $550.

With either Zenith 3R or Zenith 4R, satisfactory reception over distances of 2,000 to 3,000 miles is readily accomplished, *using any ordinary loud speaker.* Models 3R and 4R licensed under Armstrong U.S.Pat.No.1,113,149.

The new Super-Zenith is a six-tube set with a new, unique, and really different patented circuit, controlled exclusively by the Zenith Radio Corporation. It is **NOT regenerative.**

SUPER-ZENITH VII—Six tubes—2 stages tuned frequency amplification—detector and 3 stages audio frequency amplification. Installed in a beautifully finished cabinet of solid mahogany—44⅞ inches long, 16¾ inches wide, 10¾ inches high. Compartments at either end for dry batteries. Price (exclusive of tubes and batteries) $230

SUPER-ZENITH VIII—Same as VII except—console type. Price (exclusive of tubes and batteries) $250

SUPER-ZENITH IX—Console model with additional compartments containing built-in Zenith loud speaker and generous storage battery space. Price (exclusive of tubes and batteries) . . $350

SUPER-ZENITH X—Contains two new features superseding all receivers. 1st—Built in, patented, Super-Zenith Duo-Loud Speakers (harmonically synchronized *twin* speakers and horns), designed to reproduce both high and low pitch tones otherwise impossible with single-unit speakers. 2nd—Zenith Battery Eliminator, distinctly a Zenith achievement. Requires no A or B batteries

Price (exclusive of tubes) $550

Price (without battery eliminator) $450

All Prices F. O. B Factory.

Zenith Radio Corporation
Dept. 2B
332 South Michigan Avenue, Chicago, Ill.

Gentlemen: Please send me illustrated literature giving full details of the Super-Zenith.

Name .....

Address .....

.....

ZENITH
LONG DISTANCE RADIO

Achievement—

Ambitions Realized in Success of Zenith Policies

Widespread knowledge of the successful working out of Zenith's policies makes necessary no elaboration of the facts. Zenith has permanently established its leadership, not alone in the excellence of its products, but in the soundness of its policies—policies which are essential to the upbuilding of an unbreakable retail field organization.

The Zenith Exclusive Territorial Franchise is all that the term implies. The Zenith Franchise is not a figure of speech to entice a dealer today only to disregard his position tomorrow. A Zenith dealer becomes an integral part of the Zenith Organization, and is considered as such; thereby he enjoys a partnership in Zenith rather than the relationship of "buyer" and "seller."

Supplementing its strict enforcement of territorial exclusiveness, Zenith's "non-cut" price policy has stood out preeminently as the greatest dealer and consumer protection afforded in the industry. Permanency of any given line cannot withstand the shock of unstable prices. Irrespective of credit allowance to the dealer, whereby his stock on hand is to be protected, there is to be considered that great public confidence which governs the destinies of all retailing—that confidence which cannot reconcile losses beyond a product's natural depreciation. In an unloading market a price-cutting policy renders a consumer's purchase practically worthless; and leads to an advertised dissatisfaction, not alone with the product but with the dealer as well.

Zenith products are the result of Radio's most modern laboratories and factory. Zenith apparatus has always been and will continue to be a year or more ahead in the industry. The mechanical and electrical plan of a circuit may be of the highest type of efficiency and performance—but if when in production each set is not so constructed in respect to materials and workmanship as to compare equally with the laboratory model, not only does its advertised claim fall short, but service becomes an insurmountable, profit dissipating obstacle to dealers.

All Zenith apparatus is constructed from materials which have undergone the most severe tests before being entered into our stockroom. In some instances great quantities of raw material are rejected by Zenith. After passing so rigid a test, each Zenith set during construction and assembly passes through 75 various departments and operations, during which each set is subjected to 153 gauge tests and 25 electrical tests. As a result, Zenith dealers have realized greater profits through minimized service requirements; and have built greater sales through public satisfaction, made possible because of dependable Zenith performance and sturdy, durable apparatus.

Zenith design is correct. In point of historic style, period and technique, in point of woods employed and in the treatment thereof, and in point of construction, Zenith models awaken a commanding desire and encourage that exquisite pride of possession which inevitably results in sales.

Zenith DeLuxe models represent each an absolute perceptible value in the faithful replicas of a materialized ideal. Expense has been secondary in their designing and production. Carving that is carving has been employed by artisans whose life's work has been dedicated to Art. Exquisite masterpieces have been created—individual in their distinctive characterization of something new—Radio. A style has been originated and established that will hereafter identify Radio in that same manner as has typified the identity of what we know to be—a piano—a phonograph—or an automobile.

The following pages are by exclusive Zenith Distributors—established merchandisers whose ability to select and distribute quality goods is marked by long years of successful service to the Dealer Trade.

ZENITH RADIO CORPORATION ✦ STRAUS BUILDING ✦ CHICAGO

It Costs more—but it Does more

Why Did Commander MacMillan Take Zenith to the Arctic?

As the result of his experience with Zenith Radio last year, Commander Donald B. MacMillan again chose Zenith exclusively for his quest to the Arctic.

Zenith DeLuxe—Spanish Model

Super-Zeniths priced from $240 to $355

DeLuxe Art Model Cabinets from $500 to $2,000

Other Zenith Sets $100 and $175

Ten Tubes—

With But a Single Dial!

IF you would really know the wonder of fine radio reception—listen to the ten-tube Zenith DeLuxe!

You will be astonished at the difference those added stages make—not merely in distance but in gorgeous tone and instant selectivity.

Imagine a tone, for example, so clear and mellow that each instrument in a big orchestra can be readily identified.

Imagine a control so perfectly synchronized that the turning of a single dial gives you a complete *procession* of programs, each coming in the instant the dial touches its proper mark, each vanishing less than two points beyond.

To make the statement that one has discovered "the best in radio" without having listened to the ten-tube Zenith DeLuxe is like calling a violinist the greatest in the world without ever having listened to Kreisler.

Zenith sells on performance—is backed by extensive advertising and intensive merchandising—recognizes the dealer's right to a handsome profit.

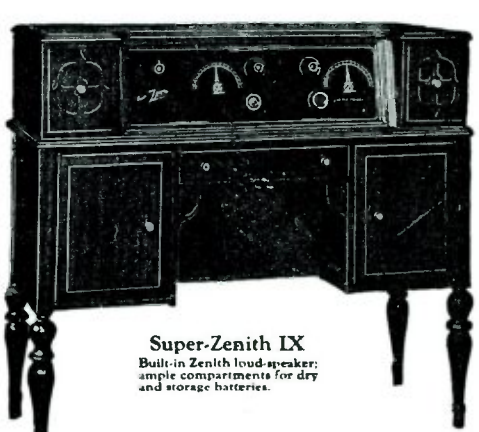
Zenith is going to spell big money for some dealer in your territory. Wire for all information.

ZENITH RADIO CORPORATION, *Straus Building*, Chicago

ZENITH
LONG DISTANCE RADIO

Costs More—but Does More

For some—a "radio"
*For others—*Zenith!



Super-Zenith IX
Built-in Zenith loud-speaker; ample compartments for dry and storage batteries.

Super-Zeniths priced from $240 to $355.
DeLuxe Art Model Cabinets from $500 to $2,000
Other Zenith Sets $100 and $175

New Zenith De Luxe Chinese Model
Equipped with two built-in loud speakers, Bates Rotary Log, illuminated dial, single control specially constructed Zenith Radio Circuit.

Some prefer the blare of a circus band—or the friendly jangle of a hurdy-gurdy. To them it is the only music.

Those who delight in blare and jangle do not *need* a Zenith—but they will find that even such music rings truer to their ears brought in by Zenith radio.

Others go breathless at the golden notes of a lyric soprano—or the rapturous harmonies of a great symphony.

Such people—born with a love for music—should *never* content themselves with any radio instrument less fine than Zenith.

Zenith's appeal to the eye is instant—and enduring. Its clear, sweet tone is a revelation.

To see and hear one of the new Super-Zeniths for the first time is a memorable experience. Yet that experience is yours for the asking—in your own home if you so desire.

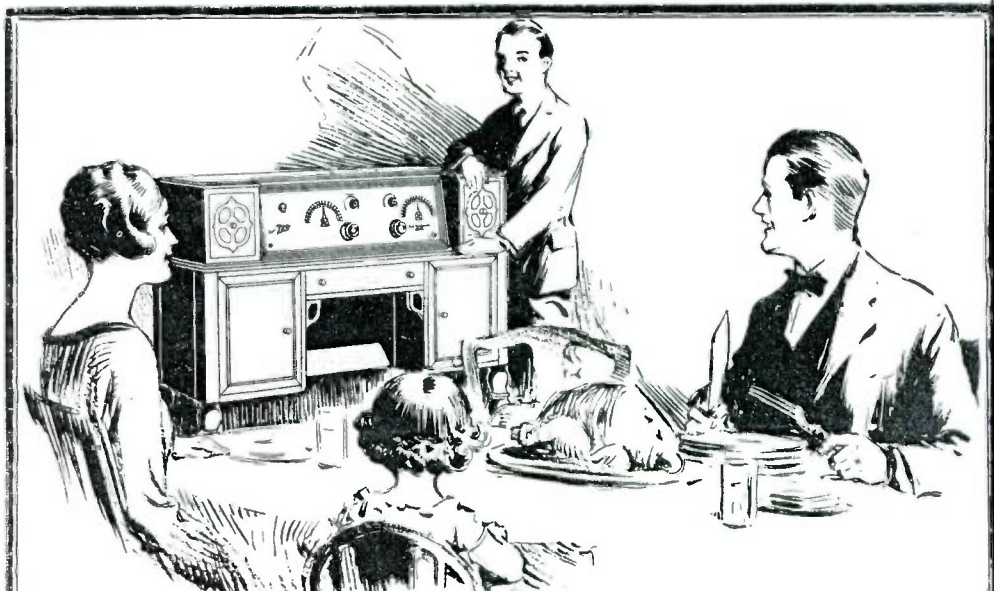
Simply telephone your nearest Zenith dealer.

Again Commander Donald B. MacMillan chose Zenith for his Arctic Expedition. When human lives may depend upon the reliability of radio performance, only one reason can explain his choice: Zenith has proved to be the best obtainable at any price.

ZENITH RADIO CORPORATION
Straus Building, Chicago

ZENITH RADIO
LONG DISTANCE

It Costs More
But It Does More!



On Thanksgiving Day
A Feast of Music—with
Zenith Radio

Long-faced Puritans are out of style. Be really ***thankful*** on Thanksgiving Day, and celebrate your gratitude with songs and gaiety!

Zenith radio provides entertainment such as you never dreamed.—Fine music at the merest turn of a knob, and flooding the living room with warmth and cheeriness.

But ears are better than eyes for appraising radio. Come in and listen to one of the new Super-Zeniths. Or—let us demonstrate one to you, in your own home. Call us up and tell us when.

(Dealer's Signature)

ZENITH RADIO
LONG DISTANCE

Costs More—but Does More!

EL

ZENITH
→LONG DISTANCE← RADIO

DE FAMA MUNDIAL

ES el producto de uno de los fabricantes de aparatos de radio más antiguos de los Estados Unidos, por muchos años a la cabeza en los negocios de radio. Al comprar un Zenith, Ud. no está arriesgando su dinero en la compra de un receptor desconocido. El Super Zenith, construído en tres modelos distintos, para alimentación directa (corriente alternativa de 110 voltios y 60 períodos) o para acumuladores, combina todos los elementos indispensables para obtener selectividad, poder, distancia y suprema calidad de tono.

Super Zenith instalado en una base de tipo consola.

Los modelos Zenith, de 10 válvulas, funcionan sin antena exterior o sin antena de cuatro, y son, al presente, la última palabra en radio. Los gabinetes son hechos en cinco estilos, de diferentes épocas, y cada uno es el producto de un experto dibujante. Todos son de un solo regulador, y capaces de recibir señales en ondas desde 105 hasta 550 metros. Los altoparlantes son compuestos, para permitir la fiel reproducción de todos los tonos de la escala musical.

Vea Ud. al representante más cercano de los de la lista adjunta o escriba directamente a

ZENITH RADIO CORPORATION
EXPORT DEPARTMENT
3620 Iron Street, Chicago, Ill. U. S. A.

FABRICANTES DEL
Super Zenith y Zenith de lujo y también del Eliminador Zenith de batería "B", (funciona con corriente alternativa de 110 voltios y 60 períodos) muy duradero y de absoluta confianza.

Max Glucksmann,
Buenos Aires,
Argentina, S.A.,
Calle 25 de Mayo, 35tre

Herman Stoltz & Co.,
Rio de Janeiro,
Brasil, S.A.
Caixa Postal 209

Max Glucksmann,
Montevideo,
Uruguay, S.A.

Andean Trading Co.,
Guayaquil,
Ecuador.

Fleemore Strachan, Ltd.
156 Hereford St.,
(P. O. Box 353),
Christchurch, Nueva Zelandia.

Messrs. Folch & Co.,
Casilla 16-V,
Valparaiso, Chile.

C. Makino & Co.,
Shoshen Building,
No. 5 Kaigan-dori
Kobe, Japón.

Weil Bros & Compañía
Pribram (Prague),
Czechoslovakia.

Messrs Maxwell & Mohr
Port-au-Prince
Haiti, W. Indies.

Maxwell-Kelso Sales Co.,
Cristóbal,
Zona del Canal, Panamá.

Dada, Dada & Company,
Apartado 274,
San Salvador,
El Salvador, América Central

Dealers Who Look Ahead Choose

ZENITH
→LONG DISTANCE← RADIO

NOT all is gold that glitters is an adage that it behooves radio dealers to ponder well before deciding upon a new line of radio for the ensuing season and after. The alert dealer will seek deeper than appears on the surface for those merits in back of a line which are most essential in determining its ultimate success and that of the dealer who ties up to it.

ZENITH RADIO has always had unusual eye appeal, and the same is true of the new Zenith line for 1927-28. But the main Success of Zenith has been due to the policies and practices of the organization behind the product, which have established Zenith in the forefront of the radio industry in the estimation of consumer and dealer alike. Briefly summarized, these are the facts:

ZENITH HISTORY. As far back as 1915, the first work was done upon Zenith Radio. The two men who started in business in those early days are still active in the Zenith organization—one is the chief engineer. (From a meagre beginning the business has developed under the influence of high ideals and principles, so that today it stands without a peer in the high quality radio field.)

TRILLING & MONTAGUE,

"Grow With Us"

TO OUR COMPETITORS

"They copied all they could follow
But they couldn't copy my mind
And I left 'em sweating and stealing
A mile and a half behind."
—*Kipling.*

Zenith led the way in 1926 with our model 27 using 199 or 299 tubes. We have been highly flattered by many imitators, but Zenith does not stand still; now for the first time is produced a strictly Batteryless set (No Camouflage) using the good old reliable 201A and 301A storage battery tubes direct from the light socket.

THE NEW MODEL 17

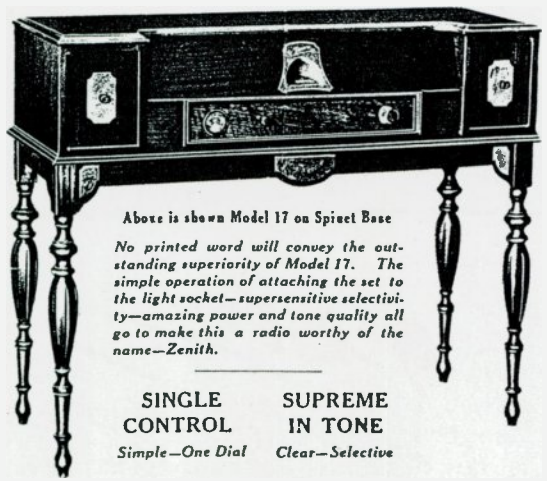
Zenith Model 17 operates on Storage Battery Tubes—direct from the Electric light socket, using 110 volts alternating current of 60 cycles. No liquids, trickle chargers, dry or storage batteries are used.

Double Shielding to insure the utmost in supersensitive selectivity. Condensers mounted on one shaft — permanently balanced. Oversize, heavy-duty transformers.

Easy to operate—Single Control (Dial calibrated to wave lengths calibration). Electrically illuminated dial. Operating cost—about one cent per hour.

Now for the first time—reliable, dependable storage battery tubes, such as 201A and 301A using electric current direct from the light socket, with no liquids or electrolytes.

Supreme in Tone—Zenith has long been noted for its tone quality. Model 17 gives amazing reproduction.



Above is shown Model 17 on Spinet Base

No printed word will convey the outstanding superiority of Model 17. The simple operation of attaching the set to the light socket—supersensitive selectivity—amazing power and tone quality all go to make this a radio worthy of the name—Zenith.

SINGLE CONTROL
Simple—One Dial

SUPREME IN TONE
Clear—Selective

ZENITH TRADE MARK REG.
→LONG DISTANCE← TRADE MARK REG. RADIO

3620 IRON STREET - - - CHICAGO

The Quality goes IN *before the Name goes* ON

WHY does not Zenith build a radio receiver to sell for less than $100.00?

ZENITH has the laboratory, the engineers, the organization and the financial resources to build any kind of radio. Then why not go below the $100.00 price?

THE answer is that the Zenith standard of quality *cannot be built into a receiver of lower price.* Zenith will not put its name to a receiver that is not highly selective, powerful, faithful to the entire tone scale and wrought with surpassing skill and durability.

PERFORMANCE comes first in Zenith—there is no compromise. The 6-tube set has six *working* tubes instead of five working tubes and one balancing tube. Instead of three condensers the 6-tube set has four—the 8 and 10-tube sets have five and six condensers respectively.

IN every detail the same exacting standards are carried out. Zenith costs more but it *does* more. Hear Zenith and you will agree that Zenith is unsurpassed.

Zenith Model 14

A sensitive, highly selective 6-tube receiver of remarkable tone quality and range. The cabinet is of walnut veneers with ornamental overlays and panels of beautifully figured maple. The doors do not stand open like wings, but fold back against the sides of the cabinet, out of view. Model 14 will bring you all that is fine in radio.

For Battery Operation—$180
Completely Electrical—$275

ZENITH RADIO CORPORATION
3602 Iron Street · Chicago

ZENITH
LONG DISTANCE RADIO

World's Largest Manufacturers of High Grade Radios—16 models—4 different circuits—6, 8, and 10 tubes—battery or electric—antenna or loop—$100 to $250.

Licensed only for Radio amateur experimental and broadcast reception

The NEW 1927 RADIO
~is here~

No Batteries

No Acids

No Chargers

No Water

No Worry

No Attention

Supreme in Tone

Single Contol

Doubly Shielded

Selective

Powerful

Light Socket Operated

ZENITH
TRADE MARK REG.
→LONG DISTANCE← RADIO

Zenith makes the first and most important announcement in radio for 1927—The New Zenith, Model 17. Not a camouflaged, so called "Light Socket" Radio Set, but a truly custom-built radio, designed to operate *without wet or dry batteries, chargers, acids or water.* Just plug in to the light socket—that is all. No attachments to worry over. Always full power—this new model is adapted for use with 201A and 301A tubes. The tone is incomparable. ***Send for descriptive literature***

ZENITH RADIO CORPORATION, 3620 IRON STREET CHICAGO, ILL.

To Our Friends

We send you all our best wishes for a happy and prosperous new year.

We are deeply grateful for your confidence and enthusiastic support of Zenith resulting as it has in our gross sales and net profits for the period of July 1 to December 1, 1926, being the largest in our history.

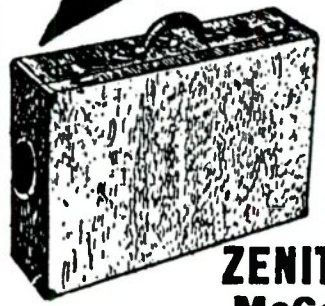
We pledge ourselves to give you in the future as in the past the best that there is in radio and that the Zenith banner will float at the head of the procession of radio development.

ZENITH RADIO CORPORATION
3620 Iron Street Chicago, Illinois

ZENITH
TRADE MARK

Super-Portable

A six-tube radio set, completely self-contained. Does not need to be opened to operate. Write today for full particulars and name of nearest dealer.



ZENITH RADIO CORPORATION
McCormick Building, Chicago

Zenith was first

at the Arctic

to build De Luxe Radio

holder of world's long distance record

to build batteryless receivers

Zenith *is* first

The Zenith De Luxe ten-tube Electric was the first receiver of this type to be produced on a commercial scale. Now it is the first ten-tube set to be equipped with a power speaker, ready for operation from any light circuit. The Zenith De Luxe Model brings remarkable tone quality, range and selectivity. It reproduces all voices and instruments with fine delicacy and faithfulness. It tunes out the most powerful broadcast and selects the wanted station without interference. Hear this great musical instrument! Your delight in Zenith will not lessen—*in years.*

English Electric
De Luxe Model

The ten-tube Electric Chassis in this beautiful example of period furniture. Entirely electric, with power speaker—no batteries, loops or antenna. The doors in this model are shown moved back into the recesses—another exclusive Zenith feature.

Price $800.

Western United States Prices Slightly Higher
Send for illustrated folder

ZENITH RADIO CORPORATION
3604 Iron Street - Chicago

ZENITH — LONG DISTANCE — RADIO

World's Largest Manufacturers of High Grade Radio—16 models—3 different circuits—6, 8 and 10 tubes—battery or electric—antenna or loop—$100 to $2500

Licensed only for Radio amateur, experimental and broadcast reception.

At last! ZENITH — LONG DISTANCE — RADIO

QUALITY and PERFORMANCE for $100.00

NEW MODEL TWELVE

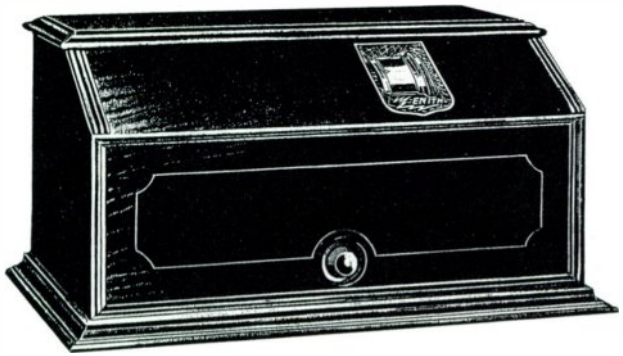
Six tubes—uses power tube.
Four condensers permanently balanced on one shaft
Full metal shielding.
One control knob (*only one.*)
Single dial — self logging — electrically illuminated.
Sensitive—selective.
Compact—powerful—superior tone quality.
Tested by the same ZENITH experts, and with the same care, as the ZENITH De Luxe Models (priced at $650.00 to $2500.00).

Price (less accessories), $100.00

NOW!

The only *complete* radio line on the market — ZENITH, $100.00 to $2500.00—wire or write for details.

ZENITH
Radio Corporation
3620 Iron St., Chicago, Ill.



"THE QUALITY GOES IN BEFORE THE NAME GOES ON"

ZENITH — RADIO

THE simplicity of operation, and the amazing performance under any and all circumstances, have extended ZENITH fame throughout the world. Buyers in foreign lands with their natural leaning toward fine, careful workmanship and precision of manufacture, are among the most enthusiastic users of ZENITH.

When you buy a Zenith you are buying, in addition to fine Radio, the results of over twelve years of research and precision manufacturing. Zenith laboratories carry on a never-ending chain of experiments, the benefits of which are obvious to those who appreciate the marvelous reception of a Zenith. Over thirty million dollars has been spent for Zenith Radio Receivers by the great American public.

1928
ZENITH — RADIO
The Quality Goes In Before the Name Goes On

Zenith Radio Corporation
3620 Iron Street, Chicago, Illinois
"*World's largest makers of high-grade radio*"

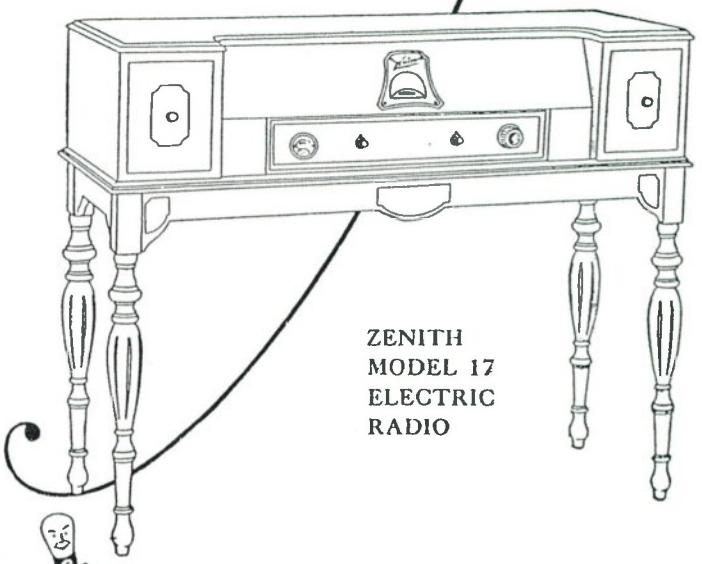
Printed in U S A.

ZENITH · FARRAND · EVEREADY

A COMPLETE LINE *of* BATTERYLESS *and* BATTERY *Sets* . . . .

The Battery line from $100 up. Think what this means. .a *popular-priced* ZENITH Radio!

Now



ZENITH MODEL 17 ELECTRIC RADIO

ZENITH quality has always been recognized. In fact, no other make of radio has been so closely associated with quality manufacture.

The introduction now of ZENITH Batteryless receivers further establishes the leadership of ZENITH engineering. The introduction, likewise, of a popular-priced ZENITH receiver (from $100 up), gives the ZENITH dealer unprecedented opportunity to concentrate and cash-in on *one* consumer-demanded line.

North American

1845 Broadway, New York

Chapter 2

ORDER OUT OF CHAOS

THE ROLE OF ZENITH AND MCDONALD IN EARLY BROADCAST RADIO HISTORY

The magic of early radio broadcasting was considered boundless; enthusiasts assumed there was room in the air for everyone who wanted or needed to use it. It did not take long however, to find that there were indeed a very limited number of spaces to be used by everyone in the burgeoning radio broadcasting industry. The earliest broadcast pioneers also assumed that nationwide coverage could be achieved by increasing transmitter power. It was quickly determined that this was also not so. The first high power stations did indeed have wider coverage than their smaller cousins, but their average coverage was no greater than 150 miles during the daytime, and worse, the increased power meant that they often interfered with other stations on the same frequency in an area many times larger than their average coverage.

The first formal meeting to attempt to regulate the new medium occurred in Germany in 1903 in response to a monopoly attempt by the Marconi Company. The result of the meeting, which was attended by eight nations, was an agreement for all wireless companies to communicate with all other wireless companies. The planned 1904 meeting of the same group, intended to refine the agreement, was not held until 1906 and was attended by 27 nations. The United States attended the meeting but was reluctant to pass laws regulating wireless use. The U.S. Congress did pass the Wireless Ship Act in June 1910 which contained all the items called for in the 1906 Berlin Protocol and which required passenger ships to carry "an efficient apparatus for radio-communication, in good working order, in charge of a person skilled in the use of such apparatus..." In 1912, 29 nations met in London at the London Wireless Conference to work further on the Berlin Protocol.[1]

The U.S. Congress passed the Radio Act of 1912 in the aftermath of the *Titanic* disaster and in response to the national regulatory statute required under the provisions of the London Wireless Conference of 1912.[2] The Radio Act of 1912 required that all wireless stations be licensed by the Secretary of Commerce, who was to assign to each a wavelength that would promote communication and minimize interference. Ironically, the newness of the medium, and the requirements of the International Radio Convention for exchange of information on each country's stations, caused legislators to frame the law so that the Secretary of Commerce had power neither to deny a license nor to enforce the use of any assigned wavelength. This law and its restrictions continued in force until 1927 and was the only regulatory law covering early radio broadcasters, even though it was a law only designed to regulate ship-to-ship and ship-to-shore wireless communications.[3]

In late 1921, the first broadcasters applied to Secretary of Commerce Herbert Hoover[4] for station licenses and wavelength assignments. By then, a great deal of interest and activity in radio had developed not only by commercial interests, but also by governmental agencies and radio amateurs. The Radio Division of the Bureau of Navigation selected a broadcast wavelength of 360 meters (833.3 kHz) and assigned all the first applicants to that single wavelength.

By March 1, 1922, there were 60 radio broadcast stations licensed,[5] the earliest stations being licensed in September 1921; by May there were 218.[6] Although low in power, these stations were all operating on the same frequency and were in some cases interfering with each other. Hoover responded to this situation by selecting a second frequency, 400 meters, for use by stations with higher power output.[7]

On February 27, 1922, Secretary Hoover called a conference (later to be known as the First Radio Conference) to consider, among other things, the postwar distribution of radio wavelengths. This conference was charged with eliminating radio frequency conflicts among such governmental agencies as the Army, the Navy, and the Department of Commerce; it only loosely concerned itself with broadcasting since the interference problem was just then being recognized.[8] It did, however, recommend one exclusive wavelength for government use (485 meters—618.6 kHz), two wavelengths for private broadcasting (360 and 400 meters—833.3 and 750 kHz), which Hoover had previously assigned), and four wavelengths for use by both groups. A supervising board of twelve (six government and six civilian representatives) was planned to direct changes proposed by the conference.[9] [10] Identical radio bills were introduced in both the Senate (Senator Kellogg) and the House (Representative White) to implement the recommendations but both bills died in committee.[11]

By December 1922, 565 licenses had been issued (although not all stations were in operation)[12] and a general trend was developing for stations to increase their audience by increasing their power, thus furthering interference problems. Realizing that broadcasting was rapidly becoming an industry, Secretary Hoover called a Second Radio Conference in March 1923.[13] In addition to the government constituencies involved in the first conference, Hoover invited radio engineers.[14] He charged the group with lessening the growing confusion in broadcasting.[15] This conference resulted in a number of recommendations,[16] among them:

- the term "wavelength" should be abolished and replaced by "frequency," to be expressed *kilocycles*;
- all the frequencies between 550 and 1350 kilocycles should be allocated for broadcasting;[17]
- the country should be divided into five administrative radio zones;
- station frequencies should be spaced 10 kilocycles apart to avoid interference, and stations within the same radio zone should be spaced 50 kilocycles apart;
- the Class classification of radio stations should be continued (Class A, less than 500 watts power; Class B, between 500 and 1000 watts power; Class C, very small stations to remain on the old 360 meter wave length);
- the new broadcast band should be divided into "channels," with 86 non-interfering frequencies available: 44 were recommended for distribution to the Class B stations, 31 to the Class A stations and one to Class C.

These recommendations were implemented and with 570 stations spread over 86 channels, the improvement was obvious. Since a large audience was vital to the financial success of each broadcaster, stations were encouraged to increase power to expand their audience, starting the trend toward ever-increasing power. By September 1922, 44 stations were broadcasting at 500 watts and several were preparing for even higher power.[18] The move toward the use of more power to increase audience share made financial sense since equipment, electricity, and station growth were expensive. In addition to these fixed expenses, broadcasters faced the mounting cost of entertainment: phonograph records, once played for free, began to require royalty payments, live performance costs were increasing as entertainers began to understand radio, and volunteer entertainers were no longer accepted by a more discriminating audience.[19]

THE NATIONAL ASSOCIATION OF BROADCASTERS AND THE "MUSIC CONTROVERSY"

By early 1922, the declining sale of phonograph records related to the popularization of radio broadcasting and the realization that the problem would worsen caused The American Society of Composers, Authors and Publishers (ASCAP) to begin looking toward the radio industry for the recovery of lost royalties. At that time, broadcasters freely used phonograph records without regard to compensation to the copyright owners involved, in spite of a 1917 court decision which upheld the right of creative artists to license their products.[20] ASCAP, founded in 1916, provided the means for artists to license and copyright their creative efforts.

In April 1922 the ASCAP legal staff claimed that the radio reproduction of copyrighted songs fell under the "public performance for profit" portion of the copyright law and the copyright owners were entitled to compensation by the broadcasters.[21] ASCAP notified all broadcast stations of their intention to collect royalties for their members but the announcement was largely ignored by the fledgling industry.

Being unsuccessful with the broadcast industry as a whole, ASCAP decided to move against Westinghouse, General Electric, RCA, and a few other giants of the new industry. Because these large broadcasters held most of the patents that allowed the technical existence of the radio industry, ASCAP believed that these broadcasters could not ignore the pleas of holders of similar rights. ASCAP called for a conference to discuss the issue, but they were once again ignored. The broadcasters agreed to a meeting only after ASCAP threatened to sue them for copyright infringements if they did not meet.

This meeting occurred at ASCAP offices in New York on September 20, 1922, and was attended by representatives of ASCAP, the Author's League of America, Music Publishers Association of the United States, the Music Industries' Chamber of Commerce, the Music Publishers Protective Association, the Department of Commerce, AT&T, RCA, GE, Westinghouse, and others.[22] The meeting was polite and each side presented its concerns. ASCAP's major concern was their right to royalty money; the broadcasters' concern was their desire not to pay it.[23] Of major importance to the broadcasters was the payment of performers; many performers performed free for the exposure on radio and the broadcasters felt that if they paid some, they would have to pay them all.[24] The meeting ended without resolution.[25]

ASCAP called The Second ASCAP-Broadcaster Conference a month later, on October 25, 1922. At this meeting, the broadcasters expressed sympathy for the artists but stated that they could not afford to pay for the music if it would lead to paying the artists, composers, and orchestras. ASCAP responded by filing a suit and notifying all broadcasters that they were revoking all temporary licenses for broadcast of their music. Additionally, they established a rate schedule that fixed fees for the use of their music at $250 to $5,000 per year per station depending on the size of the station's audience (which ASCAP determined by location, wattage, and profits). The arbitrary nature of the ASCAP action caused a small group of broadcasters,[26] organized by Eugene F. McDonald, Jr., of Chicago Radio Laboratories (and station WJAZ), to meet in Chicago in early 1923 to form an organization to fight ASCAP; this organization was the founding group of the National Association of Broadcasters.

The group quickly moved from a discussion of ASCAP to the need for a regulatory body for radio similar to the Interstate Commerce Commission.[27] The Meeting Minutes indicate that McDonald first used the term "Federal Communications Commission" as a name for such a group. They also considered rules and regulations that should apply to a free enterprise system for radio.[28]

Shortly after this meeting, McDonald, who knew little of the music business, called on his friend and business colleague Thomas Pletcher, President of the QRS Music Company, for advice. He told Pletcher that his group of broadcasters believed that authors and composers should be paid directly for their contributions, rather then through ASCAP, but did not know how to proceed with the organization. Pletcher suggested that the group hire Paul B. Klugh, a very knowledgeable recently-retired music roll manufacturer, as Secretary of the new organization.[29] McDonald successfully recruited Klugh, who assumed the position of Executive Chairman. McDonald embarked on a campaign to persuade RCA, GE, Westinghouse and AT&T to join the fledgling group, but was unsuccessful.

The actual organizational meeting for the NAB was held in the studios of WDAP (Chicago) on April 25 and 26, 1923, with 54 representatives of various radio constituencies. Representatives of ASCAP presented their positions, and after discussion, left the meeting. A committee was then formed to propose the methodology for an organization that would carry out the aims of the broadcasters. The committee consisted of E.F. McDonald, Jr. (WJAZ), T. Donnelley (WDAP), J.E. Jenkins (WDAP), W.S. Hedges (WMAQ), P.B. Klugh, R.M. Johnson (Alabama Power Company), and George Lewis (WLW and Crosley Manufacturing Company). The group, known as "the Committee of Seven," reported out on April 26, 1923, and their recommendations were accepted: the association was to be formed and would be known as The National Association of Broadcasters; NAB's offices would be established in New York City and they would employ a managing director. Paul Klugh was selected as the Managing Director by a unanimous vote.[30]

The second NAB meeting was held at WDAP on May 14 and 15, 1923. After housekeeping chores, the group moved at once to discussion of the development of a music bureau; someone had already been hired to oversee the operation. Added to the temporary governing board ("the Committee of Seven") were: H.A. Rumsey (Chicago Board of Trade), H.J. Power (American Radio and Research Corporation), T. Shepard (WNAC), W.E. Woods (WEB) and a Mr. Bowden.[31]

The third meeting, held June 11, 1923, concerned itself again with development of the Music Bureau. Klugh reported on the results of advertisements he had placed in trade journals for songs; over 300 songs had been submitted. The advertisements promised that the song titles would be announced before and after playing, resulting in "superlative publicity at no cost to you."[32]

"BY REQUEST" WJAZ GOT 4284 TELEGRAMS IN FOUR HOURS

Left to right: Mr. C. H. Handerson, WJAX, Cleveland; Mr. Raymond Walker, Manager of Bureau of Music Release; Senator Frank W. Elliott, WOC, Davenport; Mr. Eugene McDonald, Jr., WJAZ, Chicago; Mr. Paul B. Klugh, Executive Chairman; Mr. William S. Hedges, WMAQ, Chicago; Mr. J. Elliott Jenkins, WDAP, Chicago; Mr. C. B. Cooper, Department of Commerce Radio Committee; Mr. John Shepard, III, WNAC, Boston; Mr. Powel Crosley, Jr., WLW, Cincinnati. Executives of the National Association of Broadcasters in their convention at the Hotel Commodore, New York, are examining the results of a test of the size of a listening audience at WJAZ. 4284 paid telegrams, averaging 75 cents each in cost were received in four hours. It is estimated that only one person in a hundred would be willing to spend this amount, and that therefore the number of listeners-in on that night may fairly be estimated at 400,000

A WJAZ listening audience survey sponsored by McDonald and the National Association of Broadcasters. Photo from Radio Broadcast. Courtesy of Zenith.

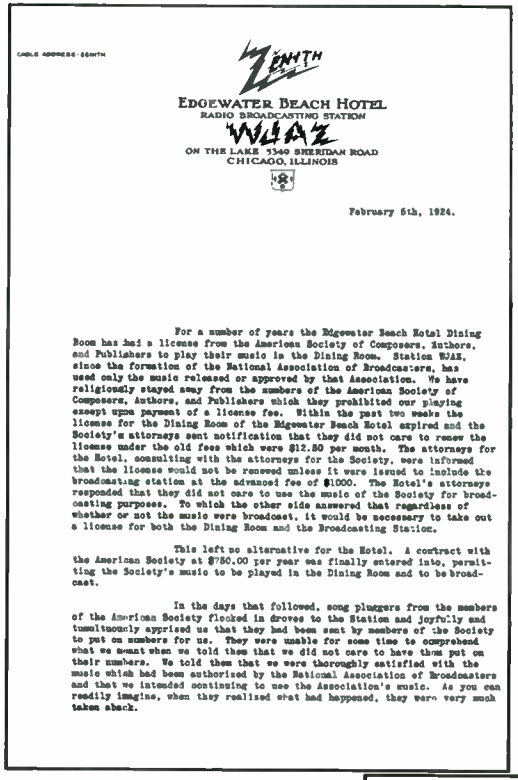
The First Annual Meeting of the National Association of Broadcasters was held in conjunction with the annual National Radio Show held in New York in October 1923. This meeting, called to order by Chairman Klugh in the Commodore Hotel in New York City on Thursday, October 11, 1923, resulted in the election of the first officers of the NAB. Eugene F. McDonald, Jr., of Zenith and WJAZ, was elected the first NAB President.[33] A number of addresses were presented (including "The Future of Broadcasting," by McDonald) and the group received a list of music holdings in the NAB Music Bureau. A discussion of legislative plans was also undertaken. The group wanted to accomplish two goals with their legislation: music copyright revision and modernization of the 1912 Radio Act.[34] During the meeting, McDonald conducted a test of the size of the audience at WJAZ by asking listeners to send in paid telegrams acknowledging their reception. The audience was estimated to be 400,000, based on receiving 4,284 telegrams in four hours. The results generated considerable publicity for the young broadcasters group.

In conjunction with the 1923 Chicago Radio Show in November, WJAZ and WDAP, both headed by officers of the National Association of Broadcasters (McDonald and Thorne Donnelley), together with another Chicago station, KYW, conducted an audience survey of music preferences. For twelve days the stations requested listeners to write telling what they desired most to hear. The three stations received a total of 263,410 pieces of mail, with WJAZ receiving 170,699; WDAP, 54,811; and KYW, 37,900. It was estimated that not more than one in fifty listeners would respond, which suggested that the three stations were being heard by an audience of 13,170,500.[35] The results of the survey, in which 67.4% of the respondents were male and 32.6% were female, showed the three highest music choices to be popular (29.0%), followed by classical (24.7) and jazz (18.4%). Other high ranking choices were old-time songs (5.7%), dance music (2.9%), sacred music (2.1%) and vocal selections (2.1%).[36] It has to be more than coincidence that this survey was conducted by NAB officers at a time when NAB was looking for direction in developing its Music Bureau.

In the early days of the organization, McDonald used the disseminating power of radio when he encountered the publisher of a radio fan magazine who had surplus issues remaining when a planned magazine merger had not occurred. McDonald offered to mention the magazine on all five of the stations then involved in the broadcasters' association for a $1,000 contribution to the NAB. The scheme worked, and within 24 hours the magazine was sold out. According to McDonald some years later, it worked so well that "...the publisher came back to us to continue it at a thousand dollars a month but our members were hesitant, fearful that they would be criticized for putting on that which would become obviously advertising; the public never dreamed that this was a paid ad that was put on in the first place."[37]

In 1924, ASCAP attempted to flex its muscle and thus created a situation that brought the music copyright problem to Congress. The Edgewater Beach Hotel (home of WJAZ) had always paid a fee to ASCAP for the music used in its dining room. Since, at times, this music was broadcast over WJAZ, ASCAP refused to renew the performance license unless a broadcast license was also secured, even though the hotel decided no longer to broadcast it. The broadcasters determined it was a good test case.[38] The fact that McDonald's WJAZ was involved and that he was also President of the NAB undoubtedly was an important factor in choosing this incident for a test case.

On February 22, 1924, Senator Clarence Dill, at the urging of the NAB, introduced a bill to the Senate to amend the Copyright Act of 1909 to make radio performances of copyrighted material



CABLE ADDRESS: ZENITH

ZENITH

EDGEWATER BEACH HOTEL
RADIO BROADCASTING STATION
WJAZ
ON THE LAKE 5349 SHERIDAN ROAD
CHICAGO, ILLINOIS

February 5th, 1924.

For a number of years the Edgewater Beach Hotel Dining Room has had a license from the American Society of Composers, Authors, and Publishers to play their music in the Dining Room. Station WJAZ, since the formation of the National Association of Broadcasters, has used only the music released or approved by that Association. We have religiously stayed away from the numbers of the American Society of Composers, Authors, and Publishers which they prohibited our playing except upon payment of a license fee. Within the past two weeks the license for the Dining Room of the Edgewater Beach Hotel expired and the Society's attorneys sent notification that they did not care to renew the license under the old fees which were $12.50 per month. The attorneys for the Hotel, consulting with the attorneys for the Society, were informed that the license would not be renewed unless it were issued to include the broadcasting station at the advanced fee of $1000. The Hotel's attorneys responded that they did not care to use the music of the Society for broadcasting purposes. To which the other side answered that regardless of whether or not the music were broadcast, it would be necessary to take out a license for both the Dining Room and the Broadcasting Station.

This left no alternative for the Hotel. A contract with the American Society at $750.00 per year was finally entered into, permitting the Society's music to be played in the Dining Room and to be broadcast.

In the days that followed, song pluggers from the members of the American Society flocked in droves to the Station and joyfully and tumultuously apprised us that they had been sent by members of the Society to put on numbers for us. They were unable for some time to comprehend what we meant when we told them that we did not care to have them put on their numbers. We told them that we were thoroughly satisfied with the music which had been authorized by the National Association of Broadcasters and that we intended continuing to use the Association's music. As you can readily imagine, when they realized what had happened, they were very much taken aback.

Letter from Eugene F. McDonald, Jr., President of the National Association of Broadcasters, to members of the NAB, the press and interested parties, explaining the Edgewater Beach Hotel music problems with ASCAP. Courtesy of Zenith.

#2

Here you have a glaring example of the tactics used by the American Society of Composers, Authors, and Publishers. You also have an instance of a broadcasting station with the privilege, but by no means the desire or intention, of using the Society's music.

The affair has proven to be somewhat of a boomerang for the Society as is evidenced by the development of this day when the resignation of the Will Rossiter Music Company of 30 West Lake Street, Chicago, one of the oldest publishers in the business, was tendered to the American Society of Composers, Authors, and Publishers. It is our prediction that a number of the other larger publishers of popular airs will shortly resign from the Society. Mr. Rossiter's representative frankly stated that they no longer wanted to be deprived of popularizing their music over the radio stations of the National Association of Broadcasters, which they would be so long as they continued as members of the American Society. They have had their eyes opened by the success of independent publishers through radio.

The Hotel Association, the Moving Picture interests, the Dance Hall interests, and many others are ready and willing to join with us in combined effort to change the copyright law, which is our only salvation, because, while the Society fee may be $500 to $5,000 this year, we have no control over what it will be in future years.

Every broadcasting station in the United States should be a member of the National Association of Broadcasters and use the Association music exclusively.

Regardless of any rumor to the contrary, please be assured that the policy of the Zenith-Edgewater Beach Hotel Broadcasting Station remains the same as in the past - foursquare and always for the National Association of Broadcasters.

Cordially and sincerely yours,

ZENITH-EDGEWATER BEACH HOTEL BROADCASTING STATION

E.F. McDonald, Jr.,
Executive Office,
332 South Michigan Ave.

EFM:GS

essentially legal and royalty-free.[39] A nasty battle ensued, with ASCAP waging a publicity campaign encouraging all musicians to join the fight. NAB, small and new, had little money to fight back and a plea to broadcasters for financial help brought nothing. NAB Chairman Klugh felt the only remaining avenue for funds was the radio listening audience and suggested they be approached. McDonald decided to air well-written five minute appeals for funds for several nights over WJAZ: the result was $4,533.03 for the NAB to use in their fight for the Dill Bill. Another series of NAB announcements urged listeners to write or wire Washington. The intent was to get a million letters to Congress supporting the NAB views. NAB, at McDonald's urging, also proposed a radio stamp tax in Fall 1924. Proceeds from the sale of stamps to manufacturers would be used to engage some of "the best known" performers for work on radio. The stamps were to be attached to the radio apparatus as it was sold, indicating to the purchaser the manufacturer's support for the program. The radio stamp tax program never began but demonstrates the determination of the NAB to overcome the demands of ASCAP.[40]

The hearings for the Dill Bill essentially pitted those who wanted to make money when their music was played against those who did not want to pay money to play it. The NAB cause was represented by NAB President Eugene F. McDonald, Jr., Executive Secretary Paul Klugh and Counsel Charles Tuttle. During the deliberations for the Dill Bill, two complementary bills were introduced in the House (H.R. 713 by Representative Johnson of Washington and H.R. 6250 by Representative Newton of Minnesota).[41] In January 1925, an ASCAP-supported bill, the Perkins Bill (H.R. 11258), was introduced in the House. This bill called for massive changes in the copyright law, in general, and especially those portions concerned with radio broadcasting.[42]

Two years of debate followed. The NAB endorsed its stand at each succeeding annual conference. McDonald's involvement also continued. He was appointed one of ten members of the Copyright Committee of the Fourth National Radio Conference called by Commerce Secretary Hoover in Washington on November 9, 1925.[43] The fight to not pay royalties, however, was rapidly being lost and the NAB and ASCAP entered secret negotiations. McDonald stepped down as President of the NAB in 1926 as he began battle with Secretary Hoover over frequency allocations, but he continued his involvement with NAB for many years, holding a variety of offices.

At about the same time, the first ASCAP royalty battle started. The American Telephone and Telegraph Company, owners and licensees of many of the patents covering radiotelephone transmission, and therefore broadcasting, began demanding royalties on their patented circuits, thus reining in the many broadcasters who had liberally borrowed AT&T patents in the rush to get stations on the air.[44] Many of these stations had been built by local and amateur engineers who paid little attention to patent rights. Many small stations, faced with music *and* patent royalties[45] ceased operation. As stations withdrew, they were replaced by newcomers, so that station numbers remained at about 550 through 1923 and 1924; audiences, however, grew to about 5 million, attracted by improvements in technology and the medium.

During this period of unparalleled audience growth, many broadcasters began hard sell advertising to raise revenue for growth as well as profit. The attempts were so awkward, at least initially, that many felt that the medium of radio broadcasting was not conducive to advertising[46]. Advertisers, on the other hand, sought a large and guaranteed audience that radio could not yet offer. With time, techniques were refined and the art of broadcast advertising developed into its modern form.

Radio science was so new that to many, it was no more than a curiosity that some areas of the country provided excellent listening possibilities while others did not. During 1923 and 1924, it was discovered that some channels "worked" better than others and the science of antennas and propagation began to be widely studied and understood.

The trend toward increasing power continued as stations attempted to expand audiences. The Class B stations, many of them using 500 watts, began upgrading to the upper 1,000 watt limits of their license. The Radio Corporation of America was experimenting with 50,000 watt transmitters for international communications.

In order to increase audience size, the American Telephone and Telegraph Company carried out its first experiments in interconnecting (networking) stations by wire. Using telephone wire hook-ups, they sent programs from WEAF in New York to several outlying stations. They also carried out extensive hook-ups for the 1924 political party conventions. These experiments ultimately led to a permanent "network" of stations that sold national advertising and programs. The Westinghouse Company also established a network but used radio to interconnect stations, rather than telephone wires. Foreign broadcasts were picked up and rebroadcast on the new station networks by RCA.

The greater audiences were in the large cities and it was there that stations and power multiplied the fastest. Station interference in the cities began creating the same kind of problems that had led to the Second Radio Conference in 1923. In coastal cities, there was also interference from ship radio, since ships were still allowed to use frequencies in the broadcast band. Many large cities imposed a "silent night," when all broadcasters in the city suspended operation to allow DXers a chance to hear new stations.[47]

FEDERAL CONTROL OF RADIO BROADCASTING

Even with its many problems, radio broadcasting appeared to be maturing; the tendency toward expansion in the number of stations had fallen off. In September 1924, there were only 533—six months earlier there had been nearly 600. Even with this decrease, interference was worse, since many of the surviving stations had increased their power.[48] Additionally, all the channels in the broadcasting band were assigned. In October 1924 Secretary Hoover called the Third Radio Conference to consider the situation.

The Second Radio Conference had included governmental agencies as well as engineers; the Third Conference added representatives of radio manufacturers and broadcasters. Although it was well known that Secretary Hoover was powerless to enforce his assignments of power limits and frequencies, most broadcasters had willingly abided by his actions, which to that point had tended to clarify the situation and minimize the interference problem. The worst problem encountered at that time was the strategy of dividing time between conflicting stations in the cities; although not a popular regulatory strategy, it was adhered to by the affected broadcasters since it avoided interference.[49] The Third Radio Conference recommended, among other things:

- ship-traffic should be removed from the broadcast band and established at higher frequencies;[50]
- the broadcast band should be further expanded to 550 to 1500 kilocycles (now kHz);
- the number of radio zones should be increased to six, with the Pacific Coast using the same frequencies as those assigned to the North Atlantic states;
- increase in power, even above 1,000 watts, should be encouraged to foster better program technical quality and less static as well as a larger permanent radius.

The adoption of the recommendations resulted in 89 channels being available in the broadcast band (six of which were allocated to Canada by mutual agreement). The use of the same frequencies on the West and East Coasts effectively added an additional 30 channels. Again there seemed to be room for everyone.

The fix, however, was temporary. By the end of 1925, the number of stations using 500 watts or more had increased from 115 to 197. At that time, only two stations were broadcasting with more than 500 watts, by the end of 1925, the number was 59, 32 of them using 1,000 watts, 25 using 5,000 watts and two using power in excess of 5,000 watts. The broadcast band was again as crowded and as interference-prone as it was before the Third Radio Conference was called.

In the past, the broadcast band had been widened to add new frequencies as interference increased, but this was no longer possible. The five to six million home receivers in operation were all constructed for the 550-1500 kHz band and both ends of the broadcast band spectrum were also being used by other legitimate non-broadcast interests, thus blocking further expansion.

On Friday night, February 5, 1926, Zenith radio station WJAZ dressed its personnel as pirates to pose for promotional pictures and present the operetta "The Pirate." The intent was to bring public attention to the government suit against WJAZ for frequency jumping. McDonald and WJAZ won the case and paved the way for logical government control of the broadcasting industry. Courtesy of Zenith.

Congressman Wallace White's bill received vigorous testimony as a variety of groups attempted to impact final radio legislation. Secretary Hoover's testimony stated his belief that ultimate control should stay with the Secretary of Commerce,[51] a stand that angered McDonald and the NAB. McDonald felt that control should be placed with a "communication commission for radio," rather than a single individual.[52]

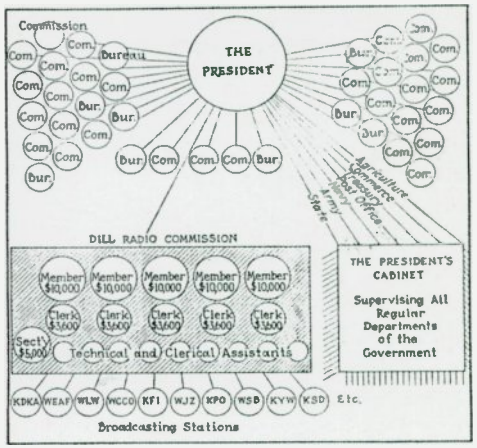
In November 1925, in response to the worsening situation, Secretary Hoover called another conference—the Fourth Radio Conference. Again representatives of the industry were called upon to solve the problem. In his opening remarks, Hoover told the broadcast industry it would have to slow down its activities; not only were the channels overfilled, there were 175 new applications.[53] The assembled group suggested that the Secretary issue no more licenses; however, the Secretary was bound by the 1912 Radio Act which did not allow him to deny licenses. The conference ended in the hope that Congress would come to the aid of the broadcast industry by passing a new radio bill.

That winter a new Act to regulate Radio Communications was brought before the House of Representatives by Wallace White of Maine. Congress was unwilling to rise to the task, fearful that it would be unwise to give the control of such an audience appeal medium to any one man or department.

The industry watched the deliberations carefully and when nothing happened, McDonald took matters into his own hands, taking the first step in challenging the hollow authority of the Secretary of Commerce. Zenith had retained the WJAZ callsign after the Edgewater Beach Hotel station was sold to WGN in 1924. McDonald requested a frequency of 930 kHz for the new WJAZ and was informed by the Commission that WJAZ would have to share the frequency with KOA (Denver) and WSAI (Cincinnati), leaving only two hours for operation. When part interest in WJAZ was sold to the *Chicago Herald Examiner*, McDonald requested additional broadcast hours and was denied. Chicago was one of the most radio-congested areas in the world. McDonald, already feeling that the assignment of times and frequencies was discriminatory, and driven by the inability of Congress to pass a radio bill, jumped frequencies in late January 1926 to 910 kHz, one of the six channels reserved by agreement for Canadian broadcasters, thus forcing government action;[54] another station in Shreveport, Louisiana, promptly followed suit. As a publicity stunt to draw attention to the case, WJAZ went on the air the night of February 5 with an operetta entitled "The Pirate". At the Commander's urging, the station personnel dressed as pirates and posed for pictures, which were published widely.[55] When the Secretary of Commerce attempted to deny the license renewal for WJAZ, McDonald took the government to court.[56] On April 16, 1926, the case was decided in United States Circuit Court in McDonald's favor, proving finally that the existing frequency allocation laws, dating to 1912, were unenforceable and that the Secretary lacked authority.[57] McDonald was then asked to appear before Congress where he suggested the formation of the Federal Radio Commission (later to become the Federal Communications Commission).[58]

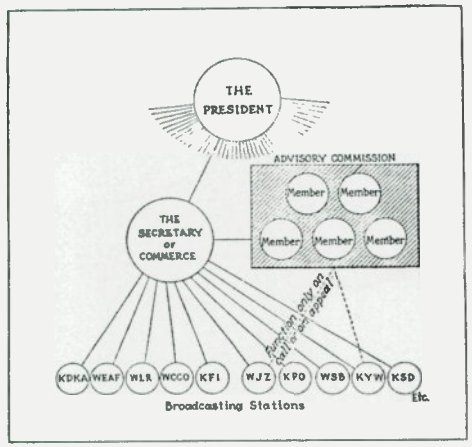
With the loss of the control of the spectrum by the Secretary of Commerce, chaos ensued. One hundred and fifty-five new stations suddenly appeared, bringing the number to over 700. Previous ideas of frequency allocations were forgotten as stations freely chose operating times and frequencies. Coupled with frequency-jumping, many stations increased power in an attempt to drown out interfering stations. It was obvious that some form of regulation would have to come soon and stations jockeyed for the best positions.

How Broadcast Stations Will Be Regulated Under Proposed Legislation



Dill Bill Commission

Here is an outline of the complicated and expensive machinery which the Dill Bill would set up. This commission of five politicians would be responsible only to the President, whose many and diversified other duties would make adequate supervision of the commission impossible.



White Bill Commission

The advisory commission co-operating with the Department of Commerce as provided in the White Bill would make radio control simple and efficient, placing authority in an administrative department of the Government with the advice and consent of a committee of radio men.

Comparison of the Dill Bill and White Bill. Radio Retailing.

The 69th Congress, when it met in December 1925, was faced with the urgent necessity of doing something about radio. The White Bill (H.R. 5589), brought up again for consideration, still proposed that control of radio be in the hands of the Commerce Secretary. Although this time an advisory panel of nine was proposed, Congress still objected to giving such power to an individual. Additional radio bills were proposed by Senator Robert Howell (S.1) and Senator Clarence Dill (S. 1754). Howell's bill was designed to anticipate anyone claiming a radio wavelength as a vested right and Dill's bill provided for a Radio Commission of five members named by the President, with consent of the Senate.[59] A great deal of debate, centered primarily on the White Bill and the Dill Bill, resulted in Congress deliberating too long and ending their session without the passage of a radio bill. When the Attorney General was asked for a legal opinion by Secretary of Commerce Hoover on the then existing radio law, he was told that he was practically without authority over broadcasting.[60]

As Congress geared up again for the 70th session in December 1926, it was obvious that the radio industry would not stand still another year without the passage of a radio bill.[61] Harsh critical editorials and cartoons had appeared in many industry publications demanding the passage of some form of radio legislation. The White Bill (which had passed the House but not the Senate in the 69th Congress) retained control of radio with the Secretary of Commerce and was most favored by the industry. The Dill Bill (which had passed the Senate but not the House), establishing a radio commission, was chiefly criticized for its hasty construction and the $10,000 salaries to be paid to a new group of five commissioners. It was virtually unsupported by the broadcast industry.[62]

The Dill Bill was not criticized by McDonald however, who strongly supported it, with minor modifications. He also advocated the "confiscation of the air" by the government.[63] McDonald, who felt the White Bill gave too much power to a single individual (Hoover), had launched a massive letter-writing effort to every member of Congress in April 1926, urging each to vote down the White Bill and pass the Dill Bill.[64]

As Congress reconvened on December 6, 1926, the conference committee that was to iron out the differences in the White Bill and the Dill Bill had not yet met and, again, it appeared that legislation would not be forthcoming.[65]

On February 23, 1927, after a flurry of activity,[66] Congress passed the Radio Law of 1927, a combined White/Dill Bill which created a Federal Radio Commission of five men (one from each of the newly created radio zones) who were provided a year to study the problem, make suggestions to correct it and then leave their solutions to the Secretary of Commerce to administer.[67] The Commission was then to serve as a court of appeals for frequency and power conflicts. This effectively stopped the unchecked growth of broadcasting by providing a regulatory body that possessed the power to withhold a license if it felt it was necessary for the public good.

In March 1927, President Coolidge announced the appointment of the Federal Radio Commission, to be headed by Rear Admiral W. H. G. Bullard.[68] The Commission set to work at once, eliminating American broadcasters from Canadian frequencies, denying dual transmission frequencies and reallocating many frequencies. Although the Commission's methodology was questioned by the popular press from time to time, there was general agreement that radio broadcast matters were better organized than they had been in five years.[69]

Making a Football of an Industry

Frustration with lack of Congressional action as shown in Radio Retailing, *August 1926.*

Regulatory changes to improve the congested radio broadcasting band became much more orderly with the establishment of the Federal Radio Commission. For example, in November 1928, in an effort to better radio reception, the FRC redistributed the nation's broadcasting facilities equally among the five radio zones proportionate to state population.[70] The days of chaos in the broadcasting industry seemed to be finally under control.

The impact of Commander Eugene F. McDonald, Jr. in shaping the modern broadcasting industry was major. The McDonald-founded National Association of Broadcasters not only fought for broadcast reform but, with others, brought the music copyright problem to Congress. McDonald, through WJAZ, effectively challenged the hollow authority of the Secretary of Commerce and brought an end to restrictive frequency allocations that created radio chaos. His urging and actions played a definitive role in the formation of the Federal Radio Commission to oversee radio broadcasting activities. His audience testing techniques demonstrated the power and size of radio audiences and determined their preferences in music and political matters. In spite of McDonald's involvement and direction of these pivotal activities, his role has been largely overlooked by radio historians who prefer to write of the politics of Dill and White, or who dwell on contributions of more public celebrities such as David Sarnoff of RCA.

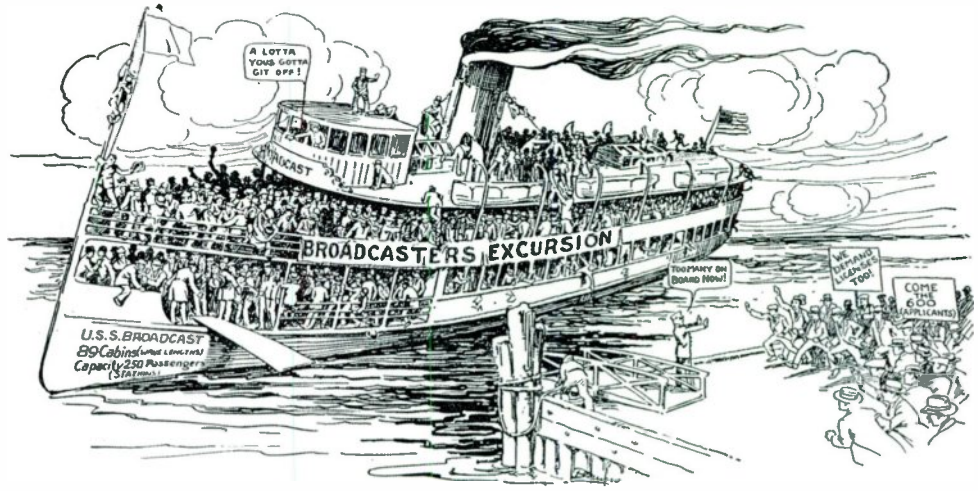
The new radio law will probably make available wave lengths for broadcasting stations as low as 150 meters. What will be the feeling of a purchaser of a high priced set who cannot hear these low wave lengths? We know of only one radio set regularly manufactured which will take wave lengths from 150 to 550 meters without changing. It is the 1927 model ten tube Zenith DeLuxe operating without outside antenna or loop and yet gives great power and distance. It is the highest grade, most selective and most sensitive receiver made and is the pride of its makers, the Zenith Radio Corporation, 3620 Iron Street, Chicago, Illinois.

Zenith advertising copy. The Talking Machine World, *December 15, 1926.*

A Lot of Broadcasters Will Have to "Get Off"

Before Those Left Can Get Anywhere

On What Basis Will Selection Be Made?

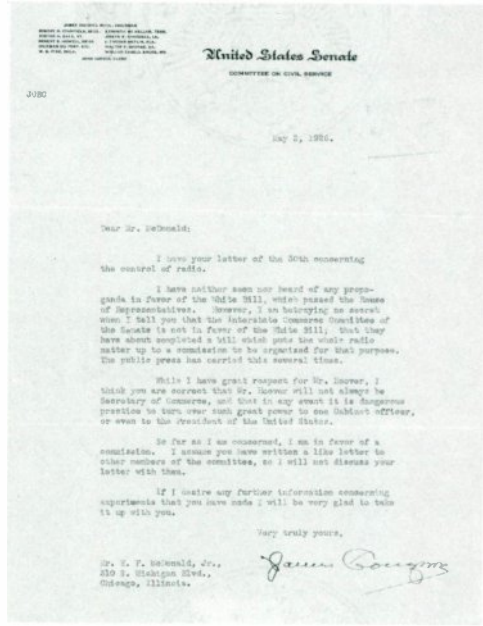


With 780 broadcasting stations now built or building, it is clear that a large number of broadcasters will have to be ordered "off the air" by the supervising authority, if good reception by the listening public is to result.

On what basis can this selection of stations be made? Tastes differ on program values. Who can say what class of program renders the greatest "service to the public"? Technical excellence of station equipment alone is not an adequate criterion.

The only definite measuring-stick left to guide the supervising authority in ordering stations to close up, is length and character of past service to the public. However inequitable the application of this priority rule may seem in special cases, it remains as the only definite basis on which selection can be made without endless litigation and argument. Hence *Radio Retailing* urges consideration of "priority" as well as good service, in determining who shall be ordered to shut down.

Frustration with the broadcast problem as seen in the December 1926 issue of Radio Broadcast. *By this time, the passage of legislation was only two months away.*



United States Senate

COMMITTEE ON CIVIL SERVICE

JUSO

May 2, 1926.

Dear Mr. McDonald:

I have your letter of the 30th concerning the control of radio.

I have neither seen nor heard of any propaganda in favor of the White Bill, which passed the House of Representatives. However, I am believing no secret when I tell you that the Interstate Commerce Committee of the Senate is not in favor of the White Bill, that they have about completed a bill which puts the whole radio matter up to a commission to be organized for that purpose. The public press has carried this several times.

While I have great respect for Mr. Hoover, I think you are correct that Mr. Hoover will not always be Secretary of Commerce, and that in any event it is dangerous practice to turn over such great power to one Cabinet officer, or even to the President of the United States.

So far as I am concerned, I am in favor of a commission. I assume you have written a like letter to other members of the committee, as I will not discuss your letter with them.

If I receive any further information concerning experiments that you have made I will be very glad to take it up with you.

Very truly yours,

James Couzens

Mr. E. F. McDonald, Jr.,
360 N. Michigan Blvd.,
Chicago, Illinois.

Response from Senator James Couzens, Chairman of the Senate Committee on Civil Service, to McDonald's letter supporting the Dill Bill. Couzens was also involved in the senate hearings on the patent pool. Courtesy of Zenith.

Chapter 3

CREATING A MARKET

RADIO AND RADIO TRADE SHOWS

In the very early days of broadcasting, radio receivers in the U.S. were chiefly homemade by "radio enthusiasts" from supplies bought in hardware stores. The American industrial complex, looking for new products and profits, was quick to see the developing interest and a large number of radio manufacturers rapidly entered the market place. Established manufacturers of amateur equipment like Chicago Radio Laboratory had the market edge initially, but by late 1922 there were a large number of factory-made sets available and were very much in demand. Displays of these new radios were just as quickly established and soon blossomed into major radio shows. To maintain their competitive edge, it was imperative that Chicago Radio Laboratory and Zenith Radio Corporation display their new products along with other manufacturers. McDonald used the shows to establish "bragging rights" for his company's products and initially provided financial backing for the Chicago shows.[1] Radio magazine coverage of the shows also gave Zenith national exposure and McDonald always arranged for the Zenith booth to have something special to call attention to itself and for it to be located in a prominent location.

Among the earliest radio show organizers was Chicago Theater manager U.J. "Sport" Herrmann. Herrmann described in May 1922 the immense public interest in seeing first-hand the latest radio equipment:

> Because of the enormous demand, most manufacturers of radio equipment are months behind in filling orders. By October, conditions should be greatly improved. The radio shows which have been held in other cities during the last year have been pronounced successes. In New York the public was turned away by the thousands every day during the show in the Pennsylvania Hotel and the crowds were so great around the exhibits as to cause actual discomfort.
>
> The nation-wide, ever-growing interest in radio has amply demonstrated that only the largest exhibition buildings are adequate to properly handle the enormous crowds whose enthusiasm has placed radio shows on the plane with the big national automobile exhibits.[2]

Radio shows began first as informal affairs, but within a few months during 1921 became large, organized, and frequent. Soon, virtually every major city hosted a show and many smaller rural areas combined efforts to produce regional shows and demonstrations. *Radio Dealer* for May 1922 reported the phenomenon: "The sudden flood of radio shows that has overtaken the radio field during the past month is equalled in unexpectedness and strength only by the demand for radio equipment. Radio clubs, newspapers, dealer organizations, individuals, and radio exhibition companies all are trying to put on radio shows in their respective localities within a period of a few weeks."

By 1925, radio shows had proliferated to the point that the June *Radio Retailing* listed 20 shows between August 22 and December 1. The nation had gone radio crazy! Even early-on, the audience was certainly present: a May 1922 *Radio Age*—"*The Magazine of the Hour*" article reported that there were 600,000 radio sets in the country, 150,000 in the middle west, and estimated that each had an audience of five persons, "making a total of 2,500,000 who are associated with the wonders of wireless."[3]

U.J. Herrmann was responsible for organizing and managing many of the largest shows in the nation, primarily in Chicago and New York. "Sport" Herrmann, a one-time newsboy, built the Cort Theater in Chicago in 1909. The theater made him a millionaire and he became a nationally known yachtsman and adventurer. Because of their similar interests, Herrmann and McDonald became good friends in 1920 and Herrmann served on the Zenith Board of Directors from 1923 until his death in 1939. Herrmann, often on his yacht *Swastika*, accompanied the Commander on many of his adventures (see section "Adventure, McDonald, and Zenith Radio").

The Chicago Radio Laboratory booth at the Summer 1921 ARRL Convention in Chicago. R.H.G. Mathews is on the left and ARRL official and QST *magazine editor K.B. Warner is on the right. The equipment on display includes (left to right): two Z-nith Regenerators in the foreground, two Amplifigons (amplifier/detector) stacked on top of each other, an AGN-2 above an AGN-1, an Alticever Type CW-3 (in center of row, with round white meters; tuned longwave frequencies), and a Multicever Type MC-3 (tuned shortwave frequencies). The two spiked wheels at right are Hy-Rad direct-drive rotary spark gap disks. These disks, developed by Mathews prior to World War I, aroused so much interest among other radio amateurs that they requested he make them for sale, thus forming the basis for first the Chicago Radio Laboratory and then Zenith.* Courtesy of Dale Goodwin and Zenith.

Chicago Radio Laboratory/Zenith products were exhibited at shows other than in Chicago and New York. This is the small booth occupied by CRL at the Atlanta, Georgia, Radio Show in December 1922. Pictured are 1-Rs and 2-Ms. Courtesy of Dale Goodwin and Zenith.

Herrmann's radio shows, managed through "The Radio Manufacturers Show Association" (at times, "The American Radio Exposition Company"), fueled the fires of average people looking for information on the new medium and, in later years, the latest innovations in improved products. The shows also allowed suppliers and manufacturers to meet and exchange ideas. Of particular interest to Zenith, of course, was the Chicago Radio Show. For a brief period of time in the mid-1920s, it appeared that Chicago could become the hub of radio manufacturing and broadcasting[4] and the nation watched the events associated with the Chicago show closely. Zenith rushed development of their products for introduction at the Chicago show, as did many manufacturers, in order to have the latest on the market for the Christmas season. Due to the Christmas sales season and the fall radio shows which preceded it, the retail model years became offset by about three months: the 1924 line of radios, for example, was actually introduced in the fall of 1923, and so on. This skewing of the model year introduction has accounted for much confusion in later years, but in the early days of radio it was necessary to insure that Christmas sales would be strong.

A closer look at some Herrmann-produced shows will provide a flavor of what was happening in radio at the time, the pace of its progress and the social events that were guiding radio development and design. The following section also highlight the Zenith products being featured in the early Chicago and New York radio shows.

THE CHICAGO RADIO SHOWS

During 1922, Chicago hosted five radio shows. The two largest, next to Herrmann's Chicago Radio Show, were the annual National Radio Show (later the National Radio Exposition) which started in July 1921, and the Pageant of Progress, also first held in 1921. These shows, more local in scope, featured not only Chicago manufacturers exhibits, but also radio contests for school children and radio related exhibits by Girl Scouts, Boy Scouts, Campfire Girls, the Army, the Navy, the Department of Commerce and the Weather Bureau.[5] One of the more interesting exhibitors at National Radio Show in 1922, Radio Units, Inc. of Chicago, demonstrated a completely enclosed portable radio that operated without an outside antenna or ground, which in retrospect, may have been among the first to be considered truly portable.[6] Of interest was the parade from the Drake Hotel to the American Furniture Mart during the 1925 National Radio Exposition: the music was provided by "an invisible band" broadcasting from KYW through radios being carried by the march participants.[7]

The First Chicago Radio Show: Herrmann arranged the First Chicago Radio Show at the Chicago Coliseum for October 14 to October 21, 1922. The show was endorsed by the Chicago Executive Radio Council[8] and was managed by "Jessie" James Kerr.[9] Additionally, this was the first show to be endorsed by the National Radio Chamber of Commerce and by the Radio Division of the National Electrical Manufacturers.[10] Kerr and Herrmann attended almost every radio show in the year and a half preceding their show and settled on a plan for the Chicago show that was intended to draw on the strengths and minimize the weaknesses of the other shows. For example, 60% of the floor space for the show was devoted to aisles to prevent the crowding prevalent at other shows.[11] In addition to entertainment by Ed Wynn, the show featured a society night, a radio ball, a children's afternoon and educational seminars and meetings. Chicago Radio Laboratory exhibited "Zenith Long Distance Radio Apparatus," Model 1-R, 2-M and 3-M, as well as a "console" which never went into production. The show was deemed successful by many trade publications, including *The Talking Machine World*, *Radio Dealer* and *Radio Age—"The Magazine of the Hour"*.

CRL/Zenith display at the First Chicago Radio Show, October 14-21, 1922. Exhibited are 1-Rs, 2-Ms, and 3-Ms as well as a "console" (far right of booth) which never went into production. Courtesy of Dale Goodwin and Zenith.

The Second Chicago Radio Show: Chicago Coliseum, November 20-25, 1923. The interest generated by the first show caused the second show to be much anticipated by the industry. In addition to the sold out exhibition space, Major Edwin Armstrong, Dr. Lee De Forest, E.F. Liewelling, and Professor Hazeltine were featured speakers. Attendance was estimated at 90,000 to 100,000, with 18,000 paid attendance each night. As an indication of the growth of radio since the 1922 Radio Show, "we find that in 1922 the bulk of the onlookers consisted of schoolboys, whereas this year's attendance consisted of 80 percent adults, and it is estimated that 50 percent of these were women"[12] —the buying public was out in mass. Much of the flavor of the show's success can be seen by this segment of the January 1924 *The Radio Dealer* article on the show:

> So pleased were the exhibitors at the success of the show commercially, that the greater number of them immediately sent in their requests for space in next November's exposition, preparations for which on a greater scale even, are already under way.
>
> A high compliment was shown by them to the managers of the exposition, U.J. Herrmann and James F. Kerr, when they signed a round robin petition, asking Messrs. Herrmann and Kerr to manage the next fall and winter expositions in New York, Chicago, and on the Pacific Coast, and pledging their patronage and support. Tentative dates have been set for the New York show in October, and the Chicago show dates for next year have been set for November 18-23. The west coast show will be held in January or February 1925.

Zenith, through WJAZ, and in cooperation with WDAP, KYW, and The National Association of Broadcasters, broadcast from the show inviting listeners to give their preferences in programming—291,000 messages were received (see section "Order Out Of Chaos" in this book). The theme of the Zenith exhibit booth was the romance of MacMillan's voyage to the Arctic (see section "Adventure, McDonald, and Zenith Radio").

Third Chicago Radio Show: Chicago Coliseum, November 18-23, 1924. Nearly 200,000 visitors attended the Third Chicago Radio Show. The show featured many radio-phonograph combinations and was therefore strongly supported by the talking machine interests. For the first time, the newly formed Radio Manufacturers Association took an active part in the sponsorship of the event. The Radio Manufacturers Show Association, newly organized into a heavily financed trade group of sixty prominent radio manufacturers, provided an advisory board composed of, among others, E.B. Mallory, Chairman of the Radio Division of the Associated Manufacturers of Electrical Suppliers, Paul B. Klugh, Executive Secretary of the National Association of Broadcasters, and Calvin Harris, a radio publicity expert. Herrmann remained as Managing Director and Kerr as General Manager in the new organization. The new group, driven by the success of past shows, announced that they had leased New York's Madison Square Garden and the Chicago Coliseum for the next ten years. They were also looking toward a similar agreement in the west.[13]

For the first time at a radio show, receiver demonstrations by exhibitors were not allowed. In the past, with many receivers in operation at the same time, Herrmann and Kerr found the individual demonstrations slowed the crowd and intermodulation caused howls that did not do justice to the quality of the receiver being demonstrated. Instead, they provided radio music throughout the hall from a variety of Chicago broadcasters by way of a concealed receiver. The crowd was kept in circulation by switching the music from one bank of horns to another and the system was effective.[14] One of the most talked about exhibits was a large radio controlled ship which could "at will sound its horn, move it in various directions, right, left, front or back, light various lights all over the ship, ring its bell, release toy balloons imprisoned within it, fire its cannon, play a phonograph concealed within, imitating a ship's band, or do all these things or any of them simultaneously."[15]

The Zenith Radio Corporation, which had provided the literature bags for visitors at Herrmann's First Radio World's Fair in New York the previous September, also provided them for the Third Chicago Radio Show. The nearly 200,000 visitors carried bags prominently marked, on both sides, "Zenith" throughout the show, collecting literature to take home for later viewing.[16] Commander McDonald was extremely proud of his "coup."[17] The Zenith exhibit featured the original Zenith radio used by MacMillan during the 1923 Arctic Expedition. Donald Mix, radio operator on the expedition, was at the exhibit booth to answer questions about the trip. Zenith models exhibited included the new super Zenith Models VII, VIII, IX, and X, as well as the standard line 3R and 4R and the Zenith suitcase portable.

The Fourth Chicago Radio Show: Chicago Coliseum, November 17-24, 1925. There was a major administrative change for this show, with the departing of James Kerr and the addition of Clayton Irwin, a well known radio industrial promotion figure. It was estimated that over 250,000 attended the show[18] and took home Zenith carry bags. Commander Donald MacMillan, just returned from the 1925 MacMillan-National Arctic, was the guest of honor for the show. McDonald arranged for two show-stealing Eskimo children to be present at the Zenith booth and at show facilities. The Zenith booth featured the new Zenith Deluxe models.

The Fifth Chicago Radio Show: Chicago Coliseum, October 11-17, 1926. Zenith displayed its 1927 line, "consisting of five models of ten-tube Deluxe sets, all operating without antenna or loop." Also displayed were battery operated radios as well as the newly perfected electric models which are "purely electric [running] off ordinary lighting circuit."[19]

THE NEW YORK SHOWS

New York hosted its earliest large radio show, The National Radio Show, in Madison Square Garden in 1921. This annual show, managed by J.C. Johnson, as well as the annual New York American Radio Exposition, established New York as the major eastern show site. The annual American Radio Exposition began in New York at the Grand Central Palace in 1922. It was managed by J.C. Johnson, who also managed the National Radio Show and several west coast shows. Chicago Radio Laboratory and Zenith rarely exhibited at these shows, exhibiting instead in New York at the Herrmann produced Radio World's Fair.

Zenith Radio Corporation display at the First Radio World's Fair, Madison Square Garden, September 22-28, 1924. Moving clockwise around the booth: phonograph cabinet with the right front door closed and the left door open, a 3-R in a phonograph cabinet with record storage below, a table model cabinet with a 3-R mounted above the speaker grill (at base of sign), and a 3-R. The phonograph cabinets were most likely made by Victor and contained a normal production 3-R face plate and chassis; this unit was mounted usually in the record storage area. The "Phono Panel" was introduced by Zenith for its 1924 model line. The large object to the right of the picture is a block of ice containing a facsimile telegram. The telegram, sent with Zenith radio apparatus, was sent to McDonald by MacMillan while he was in Greenland and expressed his thanks for the Zenith radio equipment. Courtesy of Dale Goodwin.

Herrmann's New York Radio World's Fairs

Buoyed by the success of the Chicago Radio Shows, Herrmann and Kerr launched the First Radio World's Fair in New York's Madison Square Garden and 69th Regiment Armory for September 22-28, 1924. In addition to the major U.S. manufacturers, prominent European manufacturers were represented. The response from jobbers and manufacturers was so great that additional space had to be added. The "new inventions" section exhibited 100 devices, among them three instruments designed to broadcast "pictures in motion."[20] 175,000 visitors attended the event. *The Talking Machine World* for October 15, 1924, reported the shift to factory finished receivers from "homemade-like" that was evident at the show:

A most significant fact in evidence at the show was that even within the past twelve months radio has developed markedly from an amateur assembling to a straight general manufacturing proposition, for whereas in previous shows of smaller caliber producers of parts were strongly in evidence, this year the showing of complete manufactured receivers and complete amplifying units for direct sales to the public predominated strongly.

The Fourth Annual Chicago Radio Show had as its guest of honor Commander Donald B. MacMillan, who had recently returned from a successful Arctic expedition. McDonald, who had been second-in-command of the expedition arranged for two Eskimo children to be present at the Zenith booth, shown here in traditional clothing of the central area of the west coast of Greenland. The children, said Radio Age *for January 1926, "were the pets of the thousands of visitors at the show." In this photograph, the children are standing with a Chinese Deluxe model Zenith in the Zenith booth. This photograph is unique in that it shows the radio with its doors open; it was virtually always photographed with its elaborately painted doors closed.*

Zenith displayed the Super Zenith for the first time, as well as the standard Zenith receivers and the suitcase portable, the Companion. The focal point of the Zenith booth however, was a facsimile telegram frozen in a huge cake of ice. The telegram, sent with Zenith radio apparatus, was sent to McDonald by MacMillan while he was in Greenland and expressed his thanks for the Zenith equipment. MacMillan's original Arctic radio equipment was also on display.[21]

The Second Radio World's Fair was held in the 258th Field Artillery Armory, September 14-19, 1925. It was estimated that this show attracted 150,000 visitors. Zenith was represented at the show by Paul Klugh and displayed its newest receivers.

The Third Radio World's Fair was held in Madison Square Garden between September 13-18, 1926. According to *The Radio Dealer* for October 1926, "The new merchandise proved to be more refined and advanced than models of previous years." The article further stated that "power-operated receiving sets" occupied about 10% of the displayed sets and "...the outward appearances of receiving sets and their cabinets were more beautiful than those of previous seasons."[22] The Zenith display featured the all-electric Deluxe sets.

THE RADIO MANUFACTURER'S ASSOCIATION RADIO TRADE EXPOSITION

The First R.M.A. Radio Trade Exposition was held in the Stevens Hotel in Chicago June 13-18, 1927. The R.M.A. shows were held for the manufacturers to view each other's products and were not open to the general public. Herrmann was not directly involved with this event but his partner, Clay Irwin, was the general manager. Herrmann assumed management responsibilities for the following RMA shows.

A July 1927 Radio Retailing article indicated that battery-powered sets constituted 65% of the exhibits and "was in no way diminished by the display of A.C. tube receivers."[23]

Zenith was an exhibitor at the convention and Commander McDonald sat at the head table at the banquet in his capacity as publicity chairman for the event. The RMA banquet was attended by over 2200.

The Second R.M.A. Radio Trade Exposition was again held at the Stevens Hotel in Chicago. The meeting, held June 11-15, 1928, marked for the first time a joint meeting of the R.M.A., the Radio Wholesalers Association and the National Association of Radio Writers. 21,000 members of the radio trade registered for the event.

The third show was held June 3-7, 1929, and was expanded to also include the Music Industries Chamber of Commerce, the National Association of Music Merchants and the Federated Radio Trade Association. The combined show spread into three hotels along the lakefront and the banquet was broadcast through the National Broadcasting Company network.[24] The main development showcased at the show was the screen-grid tube. Other items of interest were improved sound due to "inductor" speakers, more radio-phonograph combinations, and the increasing use of walnut in cabinet materials.[25]

The fourth RMA show switched locations to the new auditorium on the boardwalk in Atlantic City, New Jersey. Joining the RMA were the National Federation of Radio Associations, the Radio Wholesalers Association, the Institute of Radio Engineers, the National Association of Broadcasters and the Radio Press Association. The show was held June 2-6 and attracted fully 80% of the set manufacturers in the country[26] who displayed a wide line rich in remote controls. The show was so fractured, the facility so inappropriate, the trade show so unbusiness-like and the Atlantic City distractions so great that a general demand arose to return the next show to Chicago with a refreshed format.[27]

The 1931 RMA show was held June 8-12 once more at Chicago's Stevens Hotel. The show clearly reflected the effects of the Depression: fewer manufacturers (only 34 set manufacturers with an average of six sets per line), smaller sets (an average of two midget sets per line, each averaging five tubes) and lower prices. A surprise at the show was the demonstration of home talking movies by several manufacturers.[28] Meeting in association with the R.M.A. was the Sixth Annual Convention of the Institute of Radio Engineers, the Music Industries Chamber of Commerce and N.A.M.M., the National Federation of Radio Associations, and the Radio Wholesalers Association. The combined meeting dates extended from June 4-12.[29]

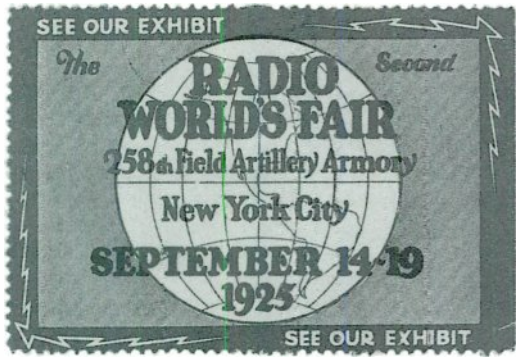
THE RADIO INDUSTRIES BANQUET

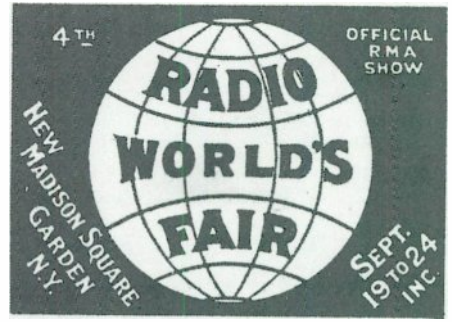
Beginning in 1924, the then newly formed Radio Manufacturer's Association[30] began holding an annual Radio Industries Banquet, initially in association with New York's Radio World's Fair. General Chairman of the banquet and popular toastmaster was National Association of Broadcasters Executive Director (and Zenith Board member) Paul B. Klugh. By 1926 the banquet attracted more than 2000 members of the radio industry and had such committee chairmen as Powel Crosley, Jr. (Finance), A. Atwater Kent (Seating), Alfred Grebe (Treasurer), David Sarnoff (Program) and Eugene McDonald, Jr. (Publicity).[31]

Almost as soon as there were home radio receivers, a multitude of radio shows brought the ever-changing technology quickly to the public. For many manufacturers, including CRL and Zenith, the exposure to potential customers, both at the shows and in the radio magazines that reported the shows, garnered a great deal of business and publicity that would not have been available otherwise. The shows also provided the manufacturers with a "due date" for new refinements and a chance to view the competition. Zenith was a master at working the shows, introducing a new "first" at almost every fall Chicago Radio Show, then declaring their products "a year ahead of the competition."

The radio buying public responded to the shows with enthusiasm, attending—and later buying— in vast numbers. The excitement of the shows, especially in the early days, fanned the fires of radio "long distance DXing" and helped propel radio listening to a national pastime.

Opposite page:
Radio show cinderellas (nonpostage stamps) for the Herrmann produced Chicago and New York radio shows. Author's collection.





Chapter 4

ZENITH AND EARLY BROADCASTING

ZENITH'S ROLE IN EARLY COMMERCIAL BROADCASTING

RADIO STATION WJAZ

In mid-1922, Zenith decided to build a broadcast station at the Edgewater Beach Hotel, near the Sheridan Road amateur station site. Although intended to operate as any other commercial broadcast station, McDonald was especially interested in designing and completing WJAZ[1] in time for MacMillan's 1923 Arctic Expedition (see section "Adventure, McDonald, and Zenith Radio"). WJAZ was to serve as a voice for Zenith and the Chicago Radio Laboratory and as such began McDonald's long-standing commitment to broadcast only "the highest type of classical music."[2] The station formally went on the air at 833 kHz[3] on Saturday night, May 12, 1923[4], with a "20 watt"—actually closer to 600 watt—transmitter[5] running into the same fan antenna, on 175 foot steel towers, used for Mathews' and Hassel's amateur station 9ZN.[6] The transmitter and antenna were located 300 yards north of the Edgewater Beach Hotel (5349 Sheridan Road), immediately on the shore of Lake Michigan.

The studio and operating room were constructed behind the orchestra area in the Marine Dining Room on the hotel's main floor and were enclosed in triple plate glass. The studio, draped in cherry-red velvet, was totally soundproof,[7] yet all activities could be observed by patrons in both hotel dining rooms (the Colonial and Marine Dining Rooms), as well as visitors on the beach promenade and the hotel terrace. The studio became know as "the Crystal Studio." Microphones in the studio were totally concealed in floor lamps or behind the velvet drapes, their gain adjusted by the operator. Since people outside the studio could not hear what was going on inside, a radio and speaker were set up in the Marine Room to monitor the broadcast. Initial scheduling for the station called for "no talkers," only musical entertainment starting at 10:00 PM and running until 2:00 AM on Tuesdays, Wednesdays, Thursdays, Fridays, and Saturdays and 5:00 to 8:00 PM on Sundays. During evenings when the orchestra was playing, orchestra music alternated with Crystal Studio performers.[8]

Almost from its initial broadcast, the powerful station began interfering with broadcast reception throughout the Chicago area.[9] The Edgewater Beach Hotel received many complaints and requested WJAZ to decrease its power; WJAZ, in order to get maximum range for the MacMillan expedition broadcasts as well as maximum advertising potential, desired to keep power high. During the latter part of the MacMillan Expedition, in April 1924, McDonald decided to close the station and it was sold, first briefly to the *Chicago Tribune*,[10] and then to the Edgewater Beach Hotel, who operated it as WEBH.[11]

The McDonald/Amos 'n' Andy Connection

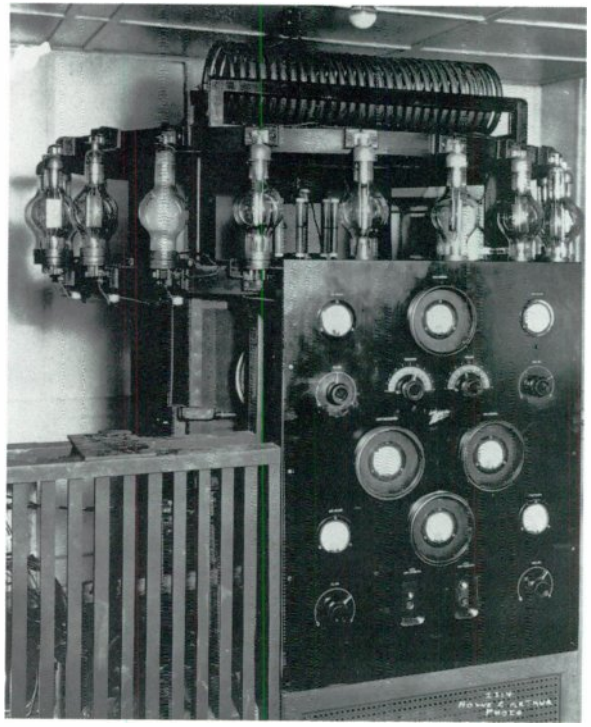
Freeman Gosdon and Charles Correll, before they became "Sam 'n' Henry" at WGN and Amos 'n' Andy at WMAQ, spent seven months as a harmony duo on WEBH beginning in April 1925. It was while they were at WEBH that Gosdon, Correll, and Gene McDonald became good friends. They visited frequently and McDonald became the godfather of Correll's son in later years.[12]

A 1924 Zenith press release[13] explaining the demise of WJAZ stated "...Because of the uncontrollable interference caused by this station throughout the entire North Shore of Chicago, the company decided to erect a new station far enough away from the city and its environs so as to be no longer an interference to the three millions of people who make up the second largest city in the United States."

In *The Talking Machine World* for September 15, 1924,[14] McDonald was quoted as saying:

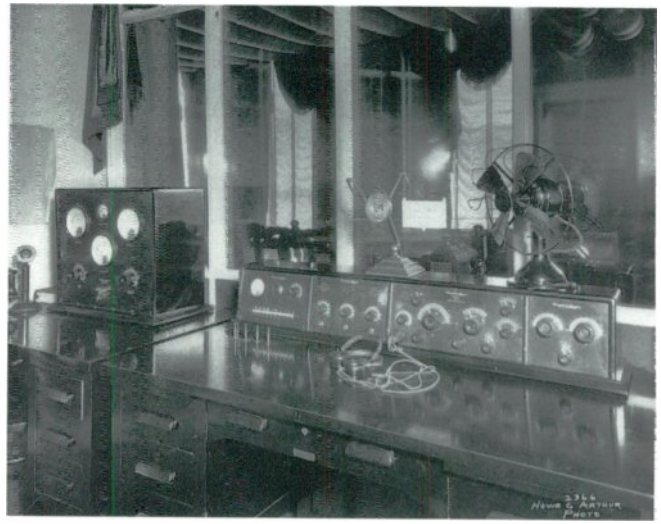
> For very evident reasons, broadcasting stations sprung up in the big cities. Most of the available radio talent was in the big cities. Most of the money available for the new enterprise was in the big cities. But the presence of broadcasting stations in the big cities developed difficulties...I read many of the letters that were addressed to our station and a fair share of them were strong protests against the interference with outside reception...letters of this nature were so numerous that I recognized we were face to face with a serious problem and that the only solution was the erection of broadcasting stations in sparsely settled localities, where the chance of interference is at a minimum...our new station will be located in a small community, where broadcasting can be done with the least possible interference. The main studio will be near Chicago's center, in the Gold Coast district, at the Club Chez Pierre, and in the exquisitely beautiful studio of Pierre Nuyttens, the artist,[15] where the atmosphere is so uniquely impressive as to inspire anyone of artistic temperament...remotely controlled studios are no longer a problem with the excellent service that is furnished by the American Telephone and Telegraph Company over great distances...

E.F. McDonald, Jr. reads the news during a November 1923 special weekly broadcast to the MacMillan Arctic Expedition. McDonald had recently returned from accompanying MacMillan on the first leg of the journey. The expedition carried Zenith radio equipment and was the first to maintain constant contact with the "outside" world; WJAZ was constructed primarily to maintain this contact.



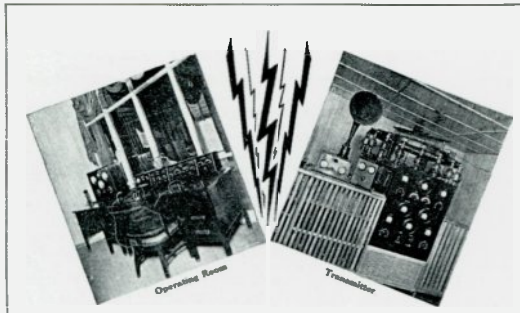
The WJAZ Edgewater Beach Hotel transmitter, called by Popular Science *the most powerful transmitter in the world. 1923.* Courtesy of Zenith.

Claudia Muzio of the Chicago Civic Opera Company sings during a special WJAZ broadcast to the MacMillan Arctic Expedition. The group is gathered at the dedication of Chicago Yacht Club's new Belmont Harbor clubhouse. E.F. McDonald, Jr. at left and Commodore Sheldon Clark at right. Courtesy of Zenith.



The WJAZ Edgewater Beach Hotel control room. Control panel equipment, left to right: a special panel, a 3-M, a version of the 3-R, and a special tuning unit. The Crystal Studio can be seen through the glass past the control panel. Courtesy of Dale Goodwin and Zenith.

A WJAZ Edgewater Beach Hotel QSL (verification) card sent to Samuel Murphy on May 23, 1923, for a May 16, 1923 reception. The letter that accompanied the card was signed by R.H.G. Mathews. Courtesy of the Committee to Preserve Radio Verifications.



LESS than a century ago, aye, within the living memory of some, the era of machinery and of scientific invention began. Among us are not a few who vividly recall the horse on land and the sailing craft at sea, as the swiftest means of transportation. A letter was written in longhand and depended for speed of delivery upon the fleetness of foot of the horse or the strength of the wind at sea. News spread slowly those days. Education was a rare privilege. Only the rich could afford books. Business seldom ventured out of the confines of a restricted neighborhood. Life was keyed to the swiftness of carriage.

Witness the change within one hundred years. Out of the social conditions obtaining at the close of the eighteenth century grew a new kind of thinking, which quickly developed into a very definite attempt at scientific research and discovery. So much success attended this new movement in human endeavor that man found himself gradually acquiring control of forces he never thought could be subjugated. And so, quickly in their turn he brought steam, electricity, the air, under the influence of his mental process. Out of his thinking emanated the locomotive, the telegraph, the telephone, the automobile, the aeroplane, and last but not the least, the

Crystal Studio

radio. Life today is scaled to the swiftness of these. Such is the metamorphosis in the brief space of less than a century.

Radio without doubt, classes as one of the most marvelous discoveries ministering to mankind. The telephone and the telegraph are wonderful, even though they require the earth to be wound in wire. But to dispense altogether with wires, with all means of conduction, and to invent a mechanism so powerful and yet so delicate that it transmits through space with speed equal to light, the gentlest strains of the violin, or the crashing chords of a grand opera orchestra ensemble, so as to be heard by means of a sensitive receiving instrument over 3,000 miles distant even sooner than the audience in the rear of the same grand opera house hears the same music, profoundly mystifies a world to which the telephone and telegraph are commonplace, and which otherwise stolidly accepts the myriads of other inventions as matters of course.

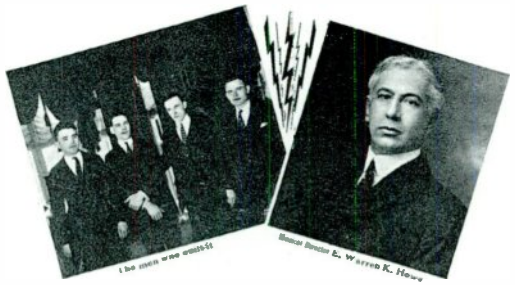
Just as the telegraph and telephone for adequate service require stations and exchanges, so radio in order to convey to the listening public diversified entertainment, needs a

WJAZ MOBILE—THE WORLD'S FIRST SELF-CONTAINED PORTABLE BROADCAST STATION

When announcement was made that a new station location was being sought, Zenith was deluged with letters from the Chambers of Commerce of many of the small communities in the outlying districts of Chicago, some letters from two hundred miles away. It was initially decided to erect temporary broadcasting stations in all the towns selected for testing, a plan that was quickly abandoned as impractical and too costly. R.H.G. Mathews then conceived of a mobile broadcasting station that would not only allow site testing but would also allow live broadcasts directly from events and catastrophes in the greater Chicago area. Zenith engineers quickly developed the idea into reality and on September 22, 1924, the mobile WJAZ[16] demonstrated its ability for the radio inspector of the Ninth Radio District in Chicago. For the first time ever, the broadcasting station came to the inspector rather than the inspector coming to the station.[17] The mobile station began testing locations on September 24, 1924.[18]

Promotional materials and newspaper releases announcing the soon-to-arrive Zenith mobile station were sent ahead of its arrival. One promotional document[19] provided the complete details of the mobile station:

> We have in the Zenith Portable Broadcasting station, WJAZ, for the first time, a complete self-contained, self-sustaining battery operated broadcasting station, able to function entirely without any external sources of supply and carrying its own collapsible antenna mast and antenna. The station can be set up in the middle of a field without any other power supply than its own and without any supports other than its own antenna mast and operate indefinitely especially since it is equipped with a complete gas engine generator charging outfit which is able to charge the batteries while the outfit is in broadcasting operation. This feature is of special interest as otherwise the period of operation possible would be rather short.
>
> The set is of 100 watt power and uses four 50 watt tubes, two as oscillators and two as modulators. All the apparatus is completely panel mounted with the customary Zenith slant panels. The inductances, capacities, and other apparatus is mounted behind these panels in a



medium in the shape of an organized agency called a "broadcasting station." This is a radio clearing house. It functions much as the theatre. It undertakes to furnish radio entertainment of a definite sort — music, song, and speech in attractive variety, so as to make radio reception a source of education and pleasure.

No expense has been spared by the builders of the Zenith-Edgewater Beach Hotel Broadcasting Station to make it not only the most powerful, but also the finest and most elaborate broadcasting station in the world. This distinction is deserving, because of the completeness and modernity of the radio equipment; the actual as well as latent power for transmitting the location and architecture of the station and studio; and, of course, the character of the entertainment.

The Crystal Studio is deserving of special mention. It displays not only rare ingenuity in its operating facilities, but in exquisite appointments. It was designed so that the public might witness and enjoy the broadcasting as it is actually being done in plain view. The studio is glass encased and sound-proof. Although the audience is separated from it by a triple-plate glass wall, it is enabled to hear the program by means of the Zenith console radio receiving set outside the studio. On the east the studio faces the beach and promenade; on the north, the north terrace of the hotel; on

the west, the Colonial dining-room, and on the south, the Marine dining-room. Drapes are of red velvet, with the indirect lighting system and its wealth of color combinations hidden behind the billowed ceiling. The artists are not concious of singing into microphones, for these are cleverly concealed from view.

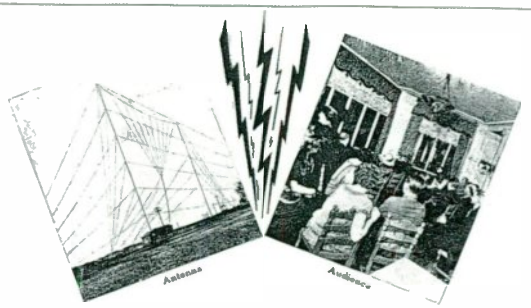
The acoustic properties of the studio, designed by R. H. Townsend of the Brunswick Experimental Laboratory, show the results of much thought and care.

The studio alternates with the orchestra in supplying the program. The station operator not only functions as announcer but also by means of signal lights directly supervises the orchestra playing in the Marine dining-room and the artists performing in the Crystal Studio through his direct control of the modulation. In addition he has control of the transmitter located five hundred feet to the north by means of an inter-communicating system.

The quality of the program is insured by E. Warren K. Howe, our musical director, who is widely known in musical circles and who personally supervises the rendition of our programs after careful selection of only the highest class of talent. Everything possible will be done to maintain for the Zenith-Edgewater Beach Hotel Broadcasting Station, the topmost place it now enjoys.

WJAZ is "on the air" from 10:00 P.M. to 2:00 A.M. Tuesday, Wednesday, Thursday, Friday and Saturday, 5:00 P.M. to 8:00 P.M. Sunday. Chicago daylight saving time.

Visitors are welcome.



STRUCTURAL DATA — STATION WJAZ

Height of Towers	—	175 feet.
Generator Power	—	10 kilowatts at 4,000 volts.
Type of Antenna	—	8 wire vertical fan with cage lead in.
Antenna Insulation	—	Porcelain throughout.
Type of Ground	—	Insulated counterpoise.
Microphones	—	Special Zenith design stretched diaphragm type.
Wave Length	—	448 meters.

ZENITH

EDGEWATER BEACH HOTEL
RADIO BROADCASTING STATION
WJAZ
ON THE LAKE 5349 SHERIDAN ROAD
CHICAGO, ILLINOIS

cabinet equipped with glass sides, allowing easy observation of the entire construction and interior of the set. Electric lights are provided inside the set, for the same purpose.

The entire truck is electric lighted with spotlights on the panels as well as a number of spotlights designed to illuminate the antenna mast which is of sectional type such as was used by the army during the war and is fifty-three feet in height.

The antenna is extremely novel consisting of four heavily braided copper cables with extremely fine wire making them extraordinarily flexible. These wires are provided at each end with snap hooks which are attached to rings which fasten to two spreaders. Clips are provided on each spreader for connection purposes.[20]

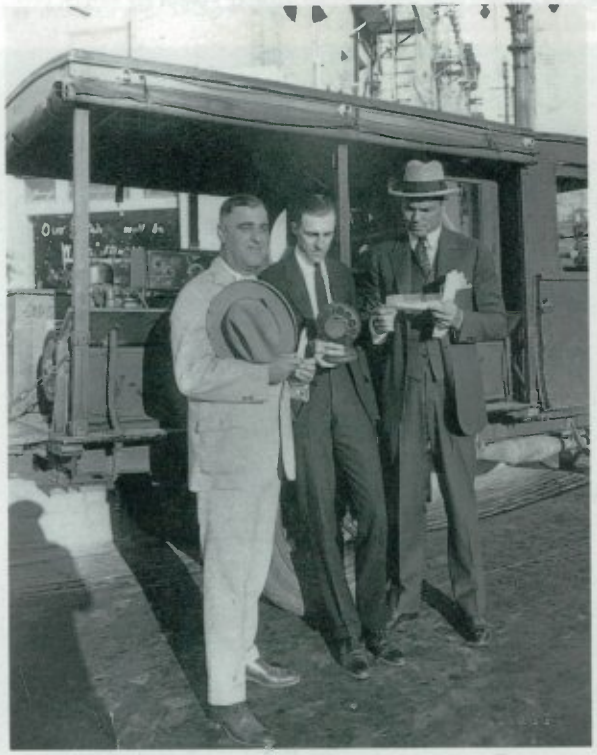
The entire frame work and body of the truck,[21] including the iron strips on the floor, are connected together and grounded, the grounding strips all being brought to one point at the side of the truck where a heavy connection lug is attached.

The battery supply is 24 volts with a total of 320 ampere hours. This battery arrangement operates a 24 volt to 1500 volt direct current generator which of course is equipped with the necessary filter system to eliminate all generator hum. Standard broadcasting microphones, line amplifier etc., are used. Three microphones may be used, one for announcing, one for orchestra and one for studio purposes, where these are necessary. A switching control arrangement is provided whereby each one of these or any of them at once, may be used at the will of the announcer. Special armored cable is provided whereby the microphones can be placed as far as 300 feet from the truck, allowing the broadcasting of performances in halls etc., with the truck parked outside.

The wave length is 268 meters. The call letters are WJAZ and the average radiation 4 amperes with an upward modulation of about 1 ampere.

Special switching arrangements are provided whereby the gas engine generating outfit, not only charges the 24 volt battery, but also charges the lighting and ignition batteries of the truck at the same time and also operates a 24 volt to 350 volt motor generator which serves to charge the high voltage "B" batteries used on the line amplifier. In this way, the one gas engine charges the complete set of batteries, high and low voltage all simultaneously and this can be done while the set is in actual operation without in any way disturbing it.

Jack Dempsey and mobile WJAZ near Dempsey's training camp.



Jack Dempsey's manager, R.H.G. Mathews, and Jack Dempsey with mobile WJAZ.
All photos on this page Courtesy of Dale Goodwin.

Above: *The MGM Lion, Numa, takes over mobile WSAX at Gay's Lion Farm in El Monte, California. It was said the WJAZ broadcast the first lion's roar during this trip. Zenith sent 20,000 picture sheets to its dealers extoling this and other adventures of its mobile unit.*

Below: *R.H.G. Mathews (r) being welcomed to Soldier's Field with the new WJAZ mobile unit. The mobile unit was built on a 1924 Federal-Knight 1-ton truck chassis.*

(For immediate release gratis.)

PORTABLE BROADCASTING STATION TO VISIT

Radio listeners will have an opportunity to hear programs broadcast from _____, when the Portable Broadcasting Station, WJAZ, arrives here on _____. This station is owned and operated by the Zenith Radio Corporation of Chicago and is touring Ohio under the auspices of the Northwestern Radio & Instrument Company of Lima, and the American Light Company of Zanesville, and The Cleveland Talking Machine Company of Cleveland.

Local programs arranged by the Chamber of Commerce, Rotary Clubs and local civic organizations, have met with enthusiastic response by listeners wherever stops have been made. High class talent meets the truck on arrival and an unusually good program is sent out. Unusual treats are in store for _____ residents owning radio sets and it is expected that many will avail themselves of this opportunity to see a broadcasting station in actual operation.

Mr. H. R. G. Mathews, Chief Transmission Engineer of the Zenith Corporation, and Division Manager 9th District American Radio Relay League, acts as announcer.

This station, during the eclipse of the sun in January, moved to Escanaba, Michigan, and broadcasted test programs in the interest of science and research.

This trip it is hoped, will create new interest in radio throughout Ohio, especially during the summer months. Dealers along the route report an increased sales directly traceable to the interest created by this unusual demonstration.

The Zenith parent station will soon be on the air again, broadcasting from their studio in the new Straus Building, Chicago. The call letters will be WJAZ, the same used in 1923 and 24 when the Edgewater Beach Hotel station was owned by the Zenith Radio Corporation.

WJAZ will be the official broadcasting station for the MacMillan Arctic Expedition leaving in June on a trip into that unexplored area lying between Point Barrow, Alaska, and the North Pole. Radio messages will be sent and received by the Expedition there in that section of the world generally acknowledged to be the most difficult in the world to reach by radio waves.

Press Release sent ahead of mobile WJAZ during Zenith promotional tour in Ohio. Courtesy of Zenith.

Roy R. Smith, Treas. R. H. G. Mathews, Pres. Gordon A. De Witt, Sec'y

AMERICAN RADIO BROADCASTING CORP.

10,000 WATTS — **WJAZ** — 329.8 METERS

EXECUTIVE OFFICES—SHORELAND HOTEL
5454 SOUTH SHORE DRIVE
CHICAGO

Dear Mac:—

I be enclosed might have enough bearing on the automatic receiver to be of help. I will try & get you more information, both on patents & on the receiver you mentioned.

Mathews.

Letterhead of the American Radio Broadcasting Corporation, R.H.G. Mathews, President. ARBC operated WJAZ for Zenith between December 1926 and May 1927. Courtesy of Zenith.

WJAZ EKKO stamp. During the 1920s and 1930s (and in some cases, the 1940s), many radio stations in the US, Canada, and other countries sent these stamps, marked with their call letters, as proof of station verification. The stamps, distributed by the EKKO Company of Chicago, were very collectible. Author's collection.

Chapter 5

ADVENTURE, MCDONALD, AND ZENITH RADIO

Throughout his life, Eugene F. McDonald, Jr. was a person who explored the outer limits of what was possible. At Zenith, it was often McDonald's drive for new and better products—sometimes over the objections of the engineering staff or business office—that lifted the corporation above so many of its less successful competitors. Beyond his personal creativity and leadership that contributed so much to the entire radio industry, McDonald also pushed the limits of the possible in his private life. He was fascinated by the unknown and by speed, personally setting a number of speed records in outboard speedboats. He also had life-long commitments to geographic and archeological exploration and to living life as a gentleman adventurer.

The best known, though poorly remembered today, of the McDonald/Zenith adventures were the two MacMillan Arctic Expeditions of 1923-24 and 1925. McDonald personally participated in both expeditions and Zenith provided each with specially developed communications gear. In those times, most exploration was privately funded, partly by geographic societies, partly through lecture fees of the principals, partly by the news media and partly by the sponsorship of various corporations which then garnered publicity and advertising material by their association with these publicly acclaimed heroic ventures.

It was a fortunate coincidence that Zenith's rapid growth in 1921-22 placed it in the position of being able to fund its first extensive national advertising campaign at exactly the same moment that MacMillan was persuaded to take modern radios North for his fifteen-month-long 1923-24 Arctic Expedition. Coincidence or not, Zenith took full advantage of the fact that Zenith radios provided the first successful radio communication in the history of Arctic exploration. The entire 1923-24 Zenith retail advertising campaign celebrated the connection between itself and the expedition.

In contrast, even though Zenith and McDonald, personally, provided much more support for the 1925 Expedition, Zenith made almost no use of that fact in retail advertising in 1925-26. Although the expedition was covered in the radio industry press and noted in some of Zenith's advertising within the industry, retail advertising in 1925-26 focused almost exclusively on the new line of Zenith radios.

What is even less understood today about these two expeditions is the adulation and international celebrity associated with polar explorers in that pre-Lindbergh era, the extreme personal danger which each expedition member routinely accepted, and the contributions to radio science and aviation made by the 1925 expedition.

Also little remembered is McDonald's continued personal interest in, and funding of, exploration and high adventure. In the period 1926-35 McDonald funded and led several important archeological and geographical expeditions in then remote portions of the Great Lakes. In 1930, he also led a large treasure hunting expedition in an unsuccessful search for the richest pirate treasure in the Western Hemisphere. Although these latter adventures were not used in Zenith advertising, their coverage in the press served to keep both Zenith and McDonald in the public eye.

THE 1923-1924 MACMILLAN ARCTIC EXPEDITION

At the close of the 20th century, with instant access to worldwide news coverage, it is difficult to appreciate the geographical and psychological isolation of famous explorers like Henry Morton Stanley, David Livingston, Robert Falcon Scott, Adolphus W. Greely, or Robert E. Peary. These men and their compatriots in the last great era of terrestrial exploration accepted the fact that they would be utterly cut off from contact with, or assistance from, the outside world for very long periods of time. Many explorers lost their lives to cold, disease, or starvation, primarily because they lacked the communications systems that would have allowed them to relay their plight to the rest of the world.[1] By the last few months before World War I, it became clear to explorers that the new radio science had to be applied to polar work if exploration were to continue without more tragic loss of life.

Donald B. MacMillan

Only one American polar explorer spanned the period from the sledge and rock-cairn-based style of expedition[2] to that which utilized aircraft and high frequency radios[3]: Admiral Donald Baxter MacMillan. Today, MacMillan is hazily remembered as the American polar admiral between Peary and Byrd. In fact, MacMillan began his long Arctic career in 1909 as Peary's young lieutenant on the first expedition to actually reach the North Pole.

Although Peary won the Pole, ending much of the glamour of Arctic exploration, MacMillan fell in love with the Far North and dedicated his life to the scientific exploration of the region. Between his first expedition with Peary, and his last, 48 years later in 1957, MacMillan spent more time in the High Arctic than any explorer in history and never lost a man to cold or hunger. The scientific work accomplished by his expeditions added greatly to the understanding of Arctic flora, fauna, geology, and geomagnetism. His early expeditions were also the first to undertake serious anthropological and linguistic studies of the polar Eskimo communities.

MacMillan's first Arctic experience with Peary in 1909 had relied entirely on the rock-cairn system for intra-expedition communication and at that time it was "well known" that radio would not work north of the auroral belt. The Peary party was cut off from contact with the outside world for almost 14 months. Peary's first telegram from Smokey Tickle, Labrador, the most northerly Marconi spark-gap wireless station, electrified a waiting world: "HAVE MADE GOOD AT LAST. I HAVE THE POLE..."[4]

Donald B. MacMillan, 1923. Courtesy of Zenith.

When MacMillan mounted his own Crocker Land Expedition[5] of 1913-17, he took a small spark-gap wireless station north with him.[6] As feared, it failed to perform north of the auroral belt and MacMillan was virtually cut off for four years; he and his men did not learn of WWI until the summer of 1916.

The *Bowdoin*

Peary and other major polar explorers had commissioned Arctic exploration vessels based on the freighter designs of the day, strengthened for use in the ice fields. The record of these large ships was mixed. They could carry a large load of men, dogs and supplies, but they were vulnerable to the crushing forces faced in the wind and tide-driven ice fields. They also tended to be fuel hogs, often requiring close escort of a collier/freighter. At the close of WWI, MacMillan was determined to acquire his own ship and continue his Arctic explorations. His experiences with the traditional large Arctic vessels led him to conclude that a small sailing vessel, much like the Grand Banks schooners of his father's time, would be much more suitable for Arctic work.[7]

Being primarily a sailing vessel, she would be less dependent on fuel supplies, and the gracefully curved hull of a sailboat could pop above the pressures of the ice, rather than be crushed like the slab-sided freighters. MacMillan's Arctic schooner, christened the *Bowdoin*, after Bowdoin College, the alma mater of both MacMillan and Peary, was built by the Hogdon brothers of East Booth Bay, Maine.[8] She was paid for by "friends" from all over the country who purchased shares in her for $100 each. Seventy-five years later, after hundreds of thousands of Arctic miles and Arctic service throughout WWII, the *Bowdoin* still makes journeys north.[9]

The 1921-22 MacMillan Expedition, sponsored partly by the Department of Terrestrial Magnetism and Atmospheric Electricity of the Carnegie Institution in Washington, D.C., focused on charting portions of Baffin Island and on undertaking the first of many MacMillan-led magnetic studies. MacMillan, four seamen and two scientists "wintered over," locked in the ice for 10 months. The *Bowdoin* performed well. This was the first trip north for the *Bowdoin*, and the last trip north that MacMillan would make without a working radio.

MacMillan, McDonald, and Zenith

The first meeting of MacMillan and McDonald, detailed years later by MacMillan, occurred at a dinner given on March 21, 1923, for him during one of his lecture visits to Chicago. The dinner was hosted by U.J. "Sport" Herrmann, owner-manager of the Cort Theater, Chicago Radio Show, and part owner of the Boston Red Sox and life-long friend of Zenith's McDonald. The dinner was a private affair attended by prominent naval officers and city officials including Gene McDonald.

After dinner, Commander MacMillan gave an informal address touching on the hardships of the Arctic. He stated that the greatest problem was not, as commonly supposed, the intense cold of as much as 60 below, nor the privations of short rations, but rather that of the awful solitude.[10] Herrmann asked why MacMillan did not take radio equipment and MacMillan replied that there was not room on his small vessel. A lengthy discussion took place that resulted in MacMillan becoming very enthusiastic about the possibilities of using modern radios on his planned 1923-24 trip to North Greenland.

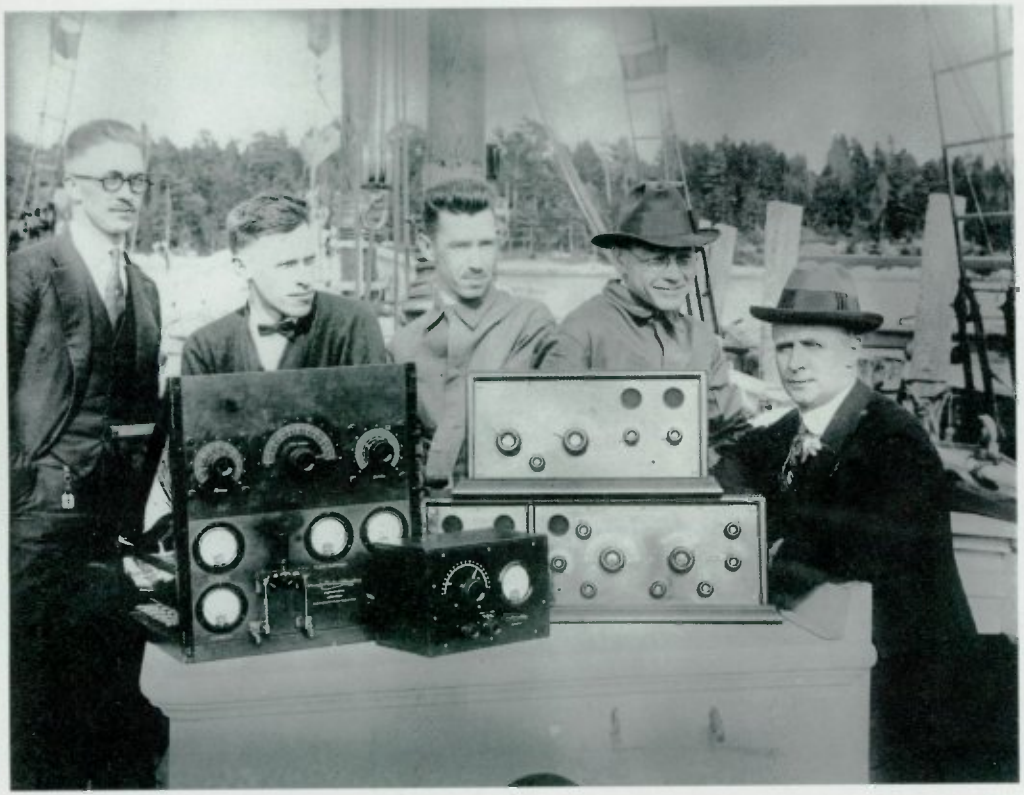
This almost chance encounter of the two developed into a lifelong friendship between MacMillan and McDonald and led to several breakthroughs in the development of high frequency radio.[11] Soon after MacMillan's March visit to Chicago, both Zenith and, at McDonald's suggestion, the American Radio Relay League (ARRL), were at work arranging for full radio communication between MacMillan in the Arctic and North America. One of the first decisions was to use the new "shortwave" bands being developed for both amateur and radio broadcast purposes. It was felt that radio at these higher frequencies would have a better chance of penetrating the auroral belt and provide reliable communication in, and from, the Arctic. All commercial communication at the time was on what would today be called longwave, or low frequency radio (15 kHz to 300 kHz), which had been previously shown to be useless north of the auroral belt.

R.H.G. Mathews, in his dual roll as Vice President of the ARRL and Zenith representative, undoubtedly recommended utilizing the large and eager amateur community to monitor communications from the Arctic and to pass messages northward. MacMillan worked closely with ARRL President Hiram Percy Maxim in developing these plans. Donald H. Mix, whose amateur call sign was 1TS, was selected as radio operator and MacMillan was awarded a special station license for WNP (Wireless North Pole) by the U.S. government.

1923-24 Expedition Radio Equipment

In mid-April 1923, Zenith sent M.B. West, 8AEZ (and a member of the ARRL Board), east to survey the *Bowdoin*, then docked in Southport, Maine. He determined the space available for radio equipment and antennas and returned to Chicago. The Zenith design team was composed of engineers with experience on the new "shortwaves" because of their personal experience as amateur radio operators. The team included Lowe ("GZ"), Clausing ("8YL") and M.B. West.

The Zenith team designed and constructed a special 100 watt "interrupted continuous wave" transmitter using two 50 watt Western Electric 'G' tubes. Power for the transmitter and two receivers was provided by a half-kilowatt Telefunken alternator powered by a 32 volt DC motor which ran on the *Bowdoin*'s very large storage batteries. The batteries were kept charged by either of two 350 watt Delco light plants. One thousand special 'B' batteries were supplied by the Burgess Battery Company. Burgess also supplied tools and materials which would enable the *Bowdoin*'s radio operator, Donald Mix, to construct a second two-year supply of batteries should the party be trapped in the North.[12] All of the electrical power equipment on the expedition was contributed by the manufacturers with the understanding that the manufacturers could then use their association with the expedition in promotion and advertising.



The newly unpacked Zenith radio equipment on the deck of the Bowdoin. *L to R: Fred Schnell, ARRL Traffic Manager, Don Mix, radio operator for WNP, K.B. Warner, editor of* QST, *M.B. West, Zenith designer of the equipment, and Donald B. MacMillan.* Courtesy of Zenith.

MacMillan operating the Zenith radio equipment in the radio room of the Bowdoin. Courtesy of Zenith.

The Zenith team also supplied two radio receivers: a specially built longwave receiver and an early version of the current top-of-the-line Zenith commercial receiver, the Model 3-R, for use as the primary "shortwave" radio. *QST* magazine highlighted the Zenith contribution to the expedition in a July 1923 article:

> Station WNP, on board the "Bowdoin". If there ever was a first class amateur station it is this very Zenith station that the "Bowdoin" will carry northward to the inside of the aurora. Everything about the equipment is beautiful, not in surface finish alone, but with that fine capability and fitness that marks apparatus built by those who understand its uses. This is not the conventional attempt of a commercial firm to build a short-wave set: no, this outfit fairly bristles with the information that its builders KNOW the short-wave radio game. That is why, in less than a month, it was possible to design the set, build it, make thorough-going tests of all the parts and of the finished set, then to pack up and move to Wiscasset and have installation under way before the month had closed. It would have been fine work as a rush commercial job; it was still finer as a free-will contribution from Zenith toward a scientific investigation.[13]

The role of radio in the 1923-24 expedition was to be fourfold: break the radio barrier of the auroral belt, provide possible life-saving support to Arctic expeditions, provide entertainment to the expedition party through the long Arctic night, and to link the expedition to the news media through dispatches transmitted by WNP to the North American Newspaper Alliance.

QST explained the critical role that radio amateurs would play in the success of the expedition in the July 1923 article:

> As explained in further detail elsewhere in this article, our job is going to be work Mix and get the story from him, and deliver it to the nearest newspaper which is a member of the syndicate—the North American Newspaper Alliance. It's going to be a tough proposition when the weather is bad, and no man knows what success we will have when WNP is in daylight for five months nor when she is on "the other side of the Aurora," because no man has ever tried those things before. But if any wave can get thru with the power the "Bowdoin" can carry we think it'll be our amateur waves, and if anybody can copy WNP we know it will be done by us amateurs of the ARRL.

The rush of preparation and provisioning continued throughout the spring of 1923. The sponsorship of magnetic studies by the Carnegie Institution during the 1921 Expedition was continued and new substantial sponsorship by the National Geographic Society was obtained. As the departure date drew near, three special guests were invited to accompany the expedition as far north as central Labrador: E. F. McDonald, Jr., of Zenith, Sheldon Fairbanks of the North American Newspaper Alliance, and Leonard Ashton, a former pupil of MacMillan's.[14]

The Trip North

With great public ceremony, the *Bowdoin* left Wiscasset, Maine, for the Arctic on June 23, 1923. The passage north went by way of Cape Sable, Nova Scotia, with the first stop of several days in Sydney on Cape Breton Island. There, more provisions were taken on and several parties were held. MacMillan's journal noted hearing a "patriotic concert and news" on the evening of July 4 from WMAS in South Yarmouth, Massachusetts.[15] From Sydney, the *Bowdoin* headed north, passing to the west of Newfoundland island and through the Strait of Belle Isle between Newfoundland and Labrador. The expedition remained nearly a week at Battle Harbor, the unofficial capital of Labrador and the gateway to the Arctic. There, the expedition took on Arctic supplies and members of the expedition party wrote last letters home.[16] On July 10, McDonald and Fairbanks left on the mail boat for home. McDonald was very reluctant to leave as he had fallen in love with the North, vowing to return often. MacMillan's journal entry of July 10, 1923, stated: "McDonald divided up his shirts, towels, etc. among the men before taking boat for home. We missed him at supper very much as he was very popular with the men."

The *Bowdoin* then continued north along the Labrador coast and left Jack Lane's Bay, Labrador, bound for Godthaab, capital of South Greenland on July 25. They arrived there three days later and spent the next several days entertaining the Danish and Eskimo residents with the first movies ever shown in Greenland. They left Godthaab on July 31, proceeding north along the western coast of Greenland and made their way through the extremely dangerous Melville Bay ice pack[17] to Cape York, the northwestern corner of the island. On August 7, they arrived at nearby Etah, North Greenland, the northernmost community in the world.[18] On August 9, the Canadian Coast Guard ship *Arctic* arrived at Etah. As both ships lay at anchor, the *Arctic*'s radio operator monitored a broadcast which announced the death of President Warren G. Harding.

A Year in Refuge Harbor

For nearly a week, MacMillan surveyed the Greenland coast northeast of Etah looking for the most promising anchorage for the long winter that was rapidly approaching. On August 17, the *Bowdoin* steamed into Refuge Harbor where, to MacMillan's delight, all conditions for a winter home seemed ideal: proximity to Cape Sabine, good hunting grounds, fresh water, and near perfect protection from the pack ice in Smith Sound. By August 19th, they had unloaded the *Bowdoin*, taken the sails and running rigging down for the winter, laid the foundation for the magnetic observatory and begun the first of 286 uninterrupted days of meteorological observations. That day Don Mix used WNP to broadcast the news of their arrival to the world, but they received no response.

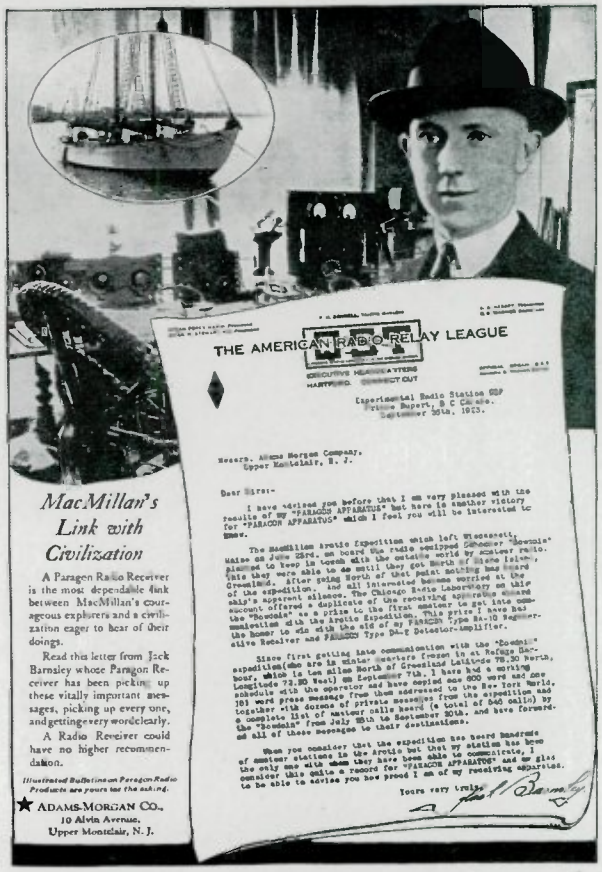
It was not until September 9 that MacMillan was able to note in his personal diary the first of many two-way contacts with the outside world: "Don [Mix] succeeded in reaching home last night through a man in Prince Rupert, B.C. on the Pacific Coast, a distance of over three thousand miles."[19]

This was also the first of many contacts between the MacMillan station WNP and amateur radio operator Jack Barnsley, 9BP, in Prince Rupert, British Columbia. Although Don Mix "worked" many other radio amateurs during the following year, there were many weeks that Jack Barnsley was the expedition's only contact with the outside world. Over the life of the expedition, Barnsley relayed literally tens of thousands of words of official cables, news reports, and press releases back and forth between the MacMillan expedition and North America. Barnsley discussed his early accomplishments in an article in *Radio News*, December 1923:

The crew of the Bowdoin *for the 1923 expedition. MacMillan is at far left and radio operator Don Mix is third from left in the knit cap.* Courtesy of Zenith.

The memorial tablet to the dead of the Greely expedition. The tablet was provided by the National Geographic Society and was transported to "Starvation Camp" on Cape Sabine by the crew of the Bowdoin. *Left to right: Eugene McDonald, Jr., Zenith Radio Corporation, Hiram Percy Maxim, ARRL President, unidentified woman, Fred Schnell, ARRL Traffic Manager, and K.B. Warner, editor of* QST. Courtesy of Zenith.

McDonald in the Bowdoin's *radio room.* Courtesy of Zenith.



McDonald in the far north. Courtesy Zenith.

I am located at Prince Rupert, British Columbia...about 500 miles north of Vancouver, B.C. and 100 miles south of Ketchikan, Alaska. My transmitter is of the vacuum tube type, using two 50-watt tubes in a self-rectifying circuit. My receiver is a three-circuit regenerative with audio-frequency amplification only, similar to the receivers of hundreds of other amateurs, yet I have worked with the Bowdoin dozens of times these other stations do not seem to have been able to pick him up once, although he has heard 486 American, 14 Canadian and one station in Mexico.

Amateur radio fans will appreciate how thrilled I was when I got a reply to my call (to WNP) about midnight on September 7, [sic.] and realized that I was spanning the great wastes of the arctic, later learning that my station was the first to successfully communicate with these hardy explorers after they went north of Disko Island; the first station in all of the thousands in the United States and Canada...

Radio propagation conditions began to improve as the Arctic day turned into night, and the importance of radio as a contact with the outside world became paramount. McDonald, now back home in Chicago, began making weekly broadcasts to the expedition every Wednesday night at midnight CST over Zenith's radio station, WJAZ. Other early broadcasting stations also produced individual programs for the expedition. Reception conditions were often less than ideal and the equipment, both transmitters and receivers, was rudimentary. The broadcasts did, however, make a very significant difference in the lives of each member of the party throughout that long dark winter. The importance of radio on this first such equipped expedition was clearly spelled out in MacMillan's radiogram[20] of November 12, 1923.

The details of many of the broadcasts from commercial stations were carefully recorded in MacMillan's diary, indicating how important this contact with the outside world was during the long Arctic night of 1923-24. Among his listings were reception of stations from Iowa, Texas, Nebraska,

HIRAM PERCY MAXIM, PRESIDENT
CHAS. H. STEWART, VICE-PRESIDENT

F. H. SCHNELL, TRAFFIC MANAGER

A. A. HEBERT, TREASURER
K. B. WARNER, SECRETARY

THE AMERICAN RADIO RELAY LEAGUE
INCORPORATED
HARTFORD, CONN.

RADIO STATION Can 9BP.
Prince Rupert, B.C. St.
PHONE 669

RADIOGRAM

Received

No.	FROM STN.	LOCATED AT	DATE	TIME	CHECK	OPERATOR
2	WMP	Schooner "Bowdoin"	Nov. 12/23	2.01 A.M.		JB.

Latitude 78.30 North Longitude 72.30 West

FROM Schooner "Bowdoin" Refuge Harbor, Greenland DATE November 12, 1923. VIA 9BP.

TO E.F. McDonald, Jr. Zenith Radio Corporation, Chicago, Ill.

Am very thankful that Arctic Exploring Ship Bowdoin is equipped with complete Zenith radio apparatus. You at home cannot fully appreciate what such an addition to my equipment means to me and my crew. Here at top of world in darkness of Great Arctic night isolated as we are from even outposts of civilization radio has conquered solitude banished anxiety over welfare of friends relatives at home. And has removed monotony during necessarily inactive periods. We have already listened to stations practically all over United States from Europe and even from far away Honolulu music, vocal, and instrumental, speeches, prayers, sermons are penetrating Auroral belt and reaching little Bowdoin fast frozen in ice eleven degrees and half from North Pole. We are almost as incredulous as Eskimos that this can be so. But here we are and nightly it comes to bind us intimately with great busy world to South of us. Radio has united the ends of the earth.

MacMillan,

Captain Schooner "Bowdoin"

Sent

No.	TO STN.	LOCATED AT	DATE	TIME	CHECK	OPERATOR

NOTICE TO ADDRESSEE: The station delivering you this message will be pleased to forward your reply without charge.

and of course, the WJAZ special broadcasts from Chicago. McDonald read the news and letters from relatives and friends to the Arctic exploration team every Wednesday night. On some occasions, McDonald brought in friends of the team, including MacMillan's sister, Lettie, to relay messages to the expedition.[21] The public was totally caught up in the adventure and large audiences listened to the special broadcasts.[22] For Zenith and McDonald, the experience was not only a labor of love but was also a powerful marketing tool for the usefulness of radio and Zenith Radio in particular.

As light returned to the North in the spring of 1924, MacMillan and his party, along with an equal number of Smith Sound Eskimo drivers, began to range widely by dog team and sledge; radio became less important for morale purposes as most of the men spent longer and longer periods away from the *Bowdoin*. With the returning and quickly lengthening days, radio propagation conditions deteriorated rapidly. In the following days, motion pictures were taken of musk oxen and other returning wild animals. Magnetic observations and a variety of other scientific studies were also undertaken.

The *Bowdoin* began preparations for the trip south in June 1924. Throughout July, MacMillan and the crew watched the ice in Smith Sound thin and finally break up; however, the ice in Refuge Harbor remained quite solid, holding the *Bowdoin* in its grip. Finally in early August, MacMillan and the crew were able to break the vessel loose. Using the *Bowdoin* as a battering ram, they escaped the harbor by the narrowest of margins. After a slow and often very dangerous trip down the Greenland and Labrador coasts, the expedition returned to Wiscasset on September 20, 1924, to a tumultuous welcome.

Summary of Radio Activities

When the *Bowdoin* went North in 1923, she was carrying the latest in "shortwave" equipment. It, and similar gear, was called "shortwave" because most other radio transmissions occurred on what we today know as "long wave." However, the *Bowdoin*'s radios, called "shortwave" in both radio amateur and radio fan magazines at the time the expedition left Wiscasset, were actually operating on what we today know as "medium wave" or the AM broadcast band. While radio transmissions on these frequencies do travel relatively long distances at night,[23] they are normally limited to well under 300 miles in the daytime. This latter limitation was a particularly serious detriment during the long period of total light of the Arctic summers and was the reason why the *Bowdoin* had such little radio success until the several-month-long Arctic night approached Refuge Harbor.

Bowdoin *iced in for the winter in Refuge Harbor, 1923/1924. Note the igloos (which served as air-locks over each hatch) on the deck.* Courtesy of The Arctic Museum, Bowdoin College.

Crew members of the Bowdoin *pose with Eskimo friends as the* Bowdoin *lies frozen in for the winter, 1923/1924. MacMillan is third from left.* Courtesy of Zenith.

Even with that frequency-based limitation, the first successful use of radio by an Arctic expedition was an important milestone in the history of both Arctic exploration and radio communication. The reception of numerous broadcast stations from North America, especially the weekly broadcasts of Zenith's WJAZ, did much to lift the psychological burden of isolation during the Arctic winter. The amateur-supported communications, although unreliable during some periods due to the relatively low frequency of the transmissions, did provide an important communications safety net for the expedition. Following this successful experiment in radio by the MacMillan Expedition of 1923-24, almost[24] all major polar expeditions were equipped with state-of-the-art radio gear.

The importance of this communications breakthrough was highlighted in MacMillan's lectures given across the U.S. in the ensuing months. His speech, "What We Northern Men Owe Zenith,"[25] closed with these two paragraphs:

> But how different with us, the first Arctic expedition to be equipped with radio! And how different from my fifth expedition, when we were cut off from the world for four years. And can you imagine our feelings upon our arrival at this very place six years later we hear the buzz—W.N.P.—WNP—our call—Wireless North Pole—Wireless North Pole. A small boy sending a message with his home made set from more than 2,000 miles away—from home—he tells us that President Harding is dead. Slowly with bowed heads we stand on the deck of the *Bowdoin* and raise the flag to half-mast—the most northern American flag in the world so raised in observance of the death of a President.
>
> And there under the snow, with only masts and rigging showing, in the depth of an Arctic night, with the wind howling, and shrieking over the ice, and up the valleys, and over the mountains, we sat in our electrically lighted warm cabins and heard the music of the operas, of Prima Donnas, the leading ladies, who sang for Zenith by request, for us spending a winter in the Far North. We heard the hearty laugh of Commander McDonald who read us letters from home, and who gave us all the important news of the day. There was no time for monotony, for

a feeling of loneliness. There was no lack of a topic for conversation. We were happy and friendly and companionable. We could talk with the great busy world to the south. We could talk with far off Honolulu, with ships in the Pacific. We were a part of the world. We were not forgotten. Every Arctic man is deeply in debt to Radio, and I personally to the Zenith Radio Corporation, a pioneer in one of the miracles of the century.[26]

The business relationship between MacMillan and McDonald was fortunate for both men. MacMillan tapped a source of significant financial support, especially for the 1925 Expedition, as well as a reliable source of state-of-the-art radio equipment. The relationship between Zenith and the most widely acclaimed explorer of the pre-Lindbergh era was a significant element in the swift metamorphosis of the Zenith Radio Corporation from a small regional radio manufacturer to a leader in the burgeoning American electronics industry. It is readily apparent that McDonald knew better than most of his peers how to exploit public relations and advertising. It is a measure of the character of both of these men that their close friendship lasted until McDonald's death twenty-five years after the business relationship ceased to be important to either.

THE 1925 MACMILLAN ARCTIC EXPEDITION

The three years of 1923, 1924, and 1925 saw stunning developments in all phases of radio, from the understanding of the physical principles of signal propagation to the techniques of network broadcasting. When MacMillan went North in the spring of 1923, he had carried the most modern Zenith "shortwave" equipment with him. By the time the Canadian Coast Guard ship *Arctic* arrived at Etah in the summer of 1924, radio science had re-defined those Zenith radio sets as operating on "medium wave" (around 1 MHz). The *Arctic*'s radio operator noted that had the *Bowdoin*'s radios been "shortwave," they could have communicated over longer distances (the *Arctic* transmitter used frequencies around 2.4 MHz, then defined as shortwave, now defined as within the medium wave spectrum). During 1923-24, radio amateurs were experimenting with shorter and shorter wave lengths and, by fall 1924, had determined it was possible to communicate both night and day over transcontinental distances with shortwave frequencies around 7 MHz or around 14 MHz. The implications of reliable long distance communications, even in daylight, were not lost on either the U.S. Navy or on Arctic explorers.[27]

The first five years after World War I also witnessed rapid developments in aviation. Arctic explorers had long dreamed of using aircraft to explore the vast expanses of both polar regions. The Arctic Sea, with large areas of wind and tide-driven ice floes often having pressure ridges reaching 30 feet in height, seemed particularly amenable to exploration by air. Balloon flights were attempted as early as 1897 and fixed-wing aircraft were in use experimentally in Spitzbergen,[28] Northern Canada, and Alaska by the winter of 1924-25.[29] The only questions which remained were which expedition would prove the use of aviation in the High Arctic and whether the craft used would be fixed wing or dirigible.[30] MacMillan thus made the goals of his 1925 expedition the proving of the full usefulness of radio and aircraft in Arctic exploration.

Race To The Pole

There were three different expeditions planned for the spring and summer of 1925. These activities were a constant source of news copy and rather sensational headline journalism. Some journals characterized the events as "the most picturesque sporting event in the history of mankind with the possible exception of the aerial race around the world in 1924."[31] A slightly less sensational headline led the front page of Section Nine of the Sunday New York Times of April 26, 1925:

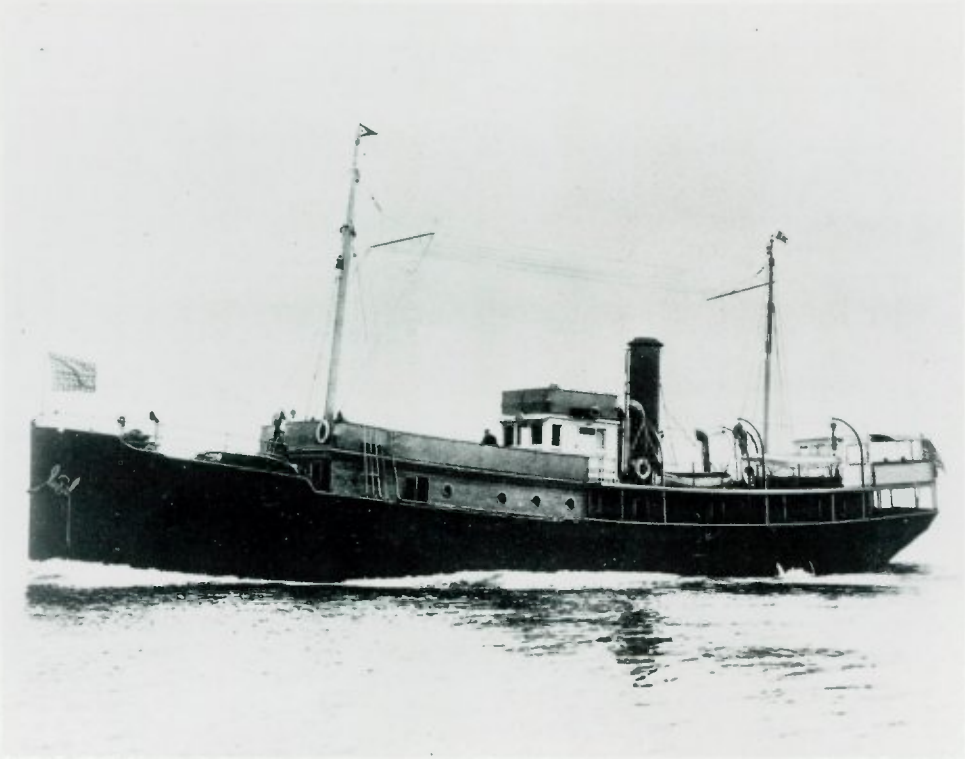
> Three Nations In Air Race For Polar Land. Uncharted Continent to Be Sought This Summer by America, Norway and Britain - MacMillan Has Support of U.S. Navy—Amundsen to Fly From Spitzbergen, Algarsson to Use Blimp.
>
> Three rival groups are speeding preparations to reach the North Pole by way of the air, to solve the secrets of The Top of The World and to bring back first, if they succeed in getting back, the solution of the Arctic mysteries that have always baffled science.
>
> The first is the MacMillan-United States Navy Expedition. The second, headed by Roald Amundsen, using airplanes and starting in May, will carry the flag of Norway. Another, led by Grettir Algarsson of Liverpool, using a blimp, starting in mid-June, will bear the British flag.
>
> Thus, with the American expedition starting in June, an international air race is in prospect. Aside from being the outstanding aeronautical event of the year, the competition promises to be the most thrilling — more spirited even than the round-the-world flight that the Americans won.

The article further detailed the plans of each of the three expeditions. A major goal of each expedition was the location of a possible "lost continent" lying between Alaska and the Pole. Today, it is not too difficult to visualize how the world strategic balance might have shifted had there, in fact, been a polar continent in that large area of unexplored territory, and had explorers from one of the three countries claimed the polar continent for their nation. Prophetically, the *Times* article noted that many aeronautical experts considered Amundsen's plans, using two giant Dornier "Val" (Whale) monoplane seaplanes, extremely risky and suggested that the much more thoroughly planned MacMillan Expedition, leaving a month later, might even have to become a rescue mission for the intrepid Amundsen.[32]

Early Planning

Formal planning of the expedition began during the winter of 1924-25. Commander McDonald[33] was made second-in-command of the expedition and placed in command of the *Peary*. McDonald was much more involved in expedition planning than has ever been previously acknowledged. Obtaining aircraft for the expedition, particularly the recently developed Loening amphibian aircraft, proved especially difficult. Eventually, Commanders McDonald and MacMillan traveled to Washington to appeal personally to Secretary of the Navy Curtis D. Wilbur for the use of several of the new Loening OL-2[34] amphibian aircraft. The Secretary initially refused their request. Two days later after McDonald and MacMillan appealed directly to President Coolidge, Wilbur assented. Wilbur created a new temporary unit, the Navy Arctic Unit, placed Lt. Commander Richard Evelyn Byrd,[35] USN (Ret.), in command and assembled an all volunteer force of Navy aviators to accompany the expedition North. During that spring, Byrd, younger brother of Virginia's powerful senator, Harry Byrd, had been attempting to organize his own first Arctic expedition with Captain Robert A. Bartlett, the master of *Peary*'s exploration vessel, the *Roosevelt*.[36] Secretary Wilbur's decision to combine the two Arctic expedition proposals led to some friction among the three principals during and after the 1925 Expedition.[37]

As the plans became formalized in the spring of 1925, MacMillan, McDonald and Byrd eventually focused on four main objectives for the 1925 expedition: 1) Utilize aircraft to prove the usefulness of heavier than air flying machines in Arctic exploration and to establish, by air, a forward operational base and food/fuel cache at Cape Thomas Hubbard, the northern tip of Axel Heiberg Land, 325 miles to the west-northwest of Etah in northern Greenland. This forward base would then allow exploration by air of the unexplored regions between Hudson's Bay and the Pole in hopes of finding "a new continent," the so-called Crocker Land that Peary thought that he had seen far to the west during his run to the Pole; 2) In conjunction with the Navy, utilize the new Zenith shortwave radios to prove the usefulness of these devices for reliable long distance communication in the Arctic and in ship-to-ship and ship-to-base communications over long and short distances. The usefulness of new battery-powered shortwave "trans-ceivers" which Reinartz and Zenith had designed for the aircraft of this expedition was also to be proved; 3) Extend knowledge of Arctic birds and fish under the guidance of Dr. Walter N. Koelz, the expedition's naturalist; 4) Gather further magnetic, tidal and meteorological data necessary for navigation in the Arctic regions. These efforts were to be led by Lt. Benjamin Rigg, a topographer from the U.S. Coast and Geodetic Survey.



The S.S. Rowena *prior to conversion to become the* Peary. *During conversion, the after deck house was removed to provide space for the Loening aircraft.* Courtesy of Zenith.

It became clear early in the planning process that a second vessel was needed. In order to transport the three aircraft, their eight-person Navy Arctic Unit crew, and all of their supplies and spare parts, this second vessel would have to be much larger than MacMillan's 85 foot schooner. Circumstantial evidence indicates that Commander McDonald purchased the second vessel for the expedition from his own pocket.[38] She was the 143-foot steam-powered yacht *Rowena*, which had very powerful engines and a massive 9-foot diameter propeller. The former French mine sweeper was partially refitted[39] at the Boston Navy Yard and christened the *S.S. Peary.*

The U.S. Navy And Shortwave

The needs of fleet communications and emergent naval aviation mandated close attention by the Navy to developments in radio communication. In fact, ships of the U.S. fleet had carried very bulky longwave equipment since just before America's entry into World War I. As radio science developed, amateur operators were relegated to a part of the spectrum outside the longwave band which was generally considered useless for long distance communications. This part of the spectrum was called variously: "below 200 meters," "the higher frequencies," or "shortwave" (all three terms refer to the same portion of the radio spectrum). It was commonly believed that shortwaves were only good for line of sight communication and were worth little, either militarily or commercially.[40]

The head of the Naval Radio Laboratory noted in later years that the bridging of the Atlantic by American and French amateurs operating on 100 meters (January 1923) was the beginning of naval interest in these shorter wavelengths.[41] As trans-Atlantic communication by amateurs became more routine in 1923-24, and as the phenomenon of shortwave signals "skipping" off the underside of the ionosphere was recognized, research at the Naval Radio Laboratory struggled to keep pace with the amateur community. As of the spring of 1925, however, the U.S. Fleet continued to depend on the now traditional, bulky spark-gap transmitters which operated in the longwave (low frequency) spectrum.

There are indications in the Zenith archives that Commander McDonald played an important role in the adoption of shortwave communication at the fleet level. Indeed, the founders of Zenith—McDonald, Mathews and Hassel—were all Navy men, and both McDonald and Mathews were very active in the USNR. A personal two-page memo from Staff Headquarters, Ninth Naval District, to McDonald, discusses the desire of the Chief of Naval Operations to enroll "several thousand of these amateurs as radio operators in Class 6 of the Naval Reserve Force," and went on to detail use of the 76 meter (shortwave) transmitter at Great Lakes Naval Training Station for the purposes of training operators in the Ninth District in proper naval communications procedures.[42]

The fragmentary Zenith files for 1925 do not contain the bulk of correspondence between McDonald and the Navy. Conjectural evidence published in *QST* magazine in 1925, and the Zenith corporate history published the 1950s, however, describe McDonald's personal role in convincing Navy brass to undertake fleet communications experiments in the summer of 1925. Both sources indicate that McDonald was personally responsible for ARRL Traffic Manager Fred Schnell being commissioned a naval Lieutenant and placed aboard the *U.S.S. Seattle* for the Pacific cruise of 1925.[43] The *Seattle* was the flagship of Admiral R.E. Coontz, Commander-in-Chief of the U.S. Fleet.[44] That spring and summer the Pacific Fleet had another amateur, Ed Willis, 6TS, aboard the *U.S.S. Relief,* operating as Navy station NEPQ. The fleet sailed from San Francisco on April 14, 1925.

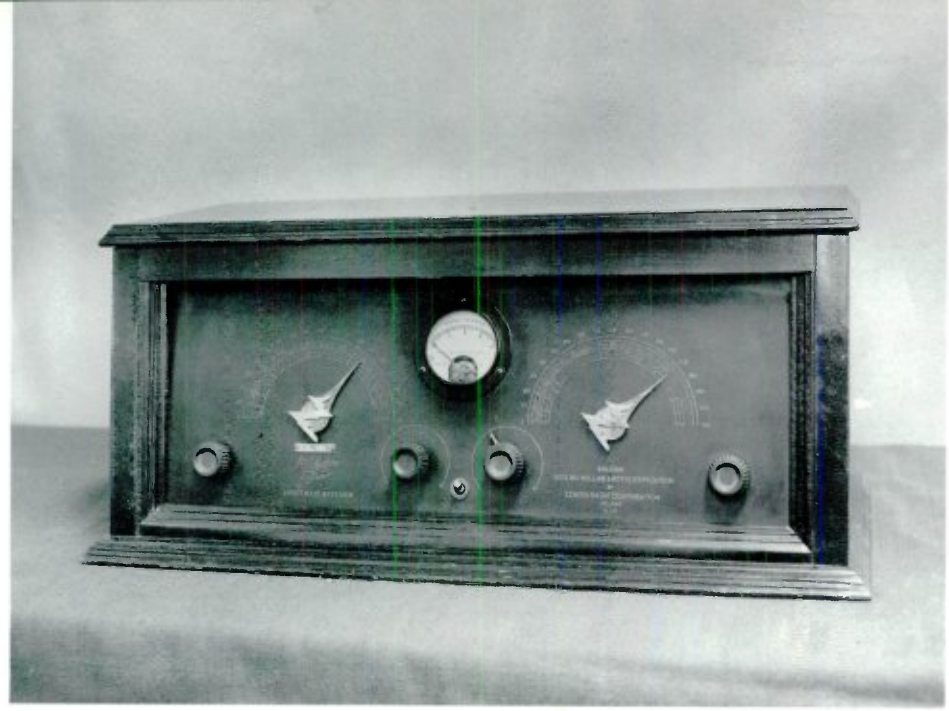
Radio Equipment For The Expedition

With shortwave equipment and techniques in their infancy, and with shortwave avionics being virtually unknown in 1925, Zenith engineers were challenged to develop the expedition radio equipment in less than two months. To assist the effort, McDonald hired John L. Reinartz, recognized as a brilliant young circuit designer and radio propagation theoretician, to assist both Zenith and the amateur community as they explored these new "short" waves. A Zenith press release that spring reports his salary as $1000 per month, "the highest salary ever paid to a radio operator."[45]

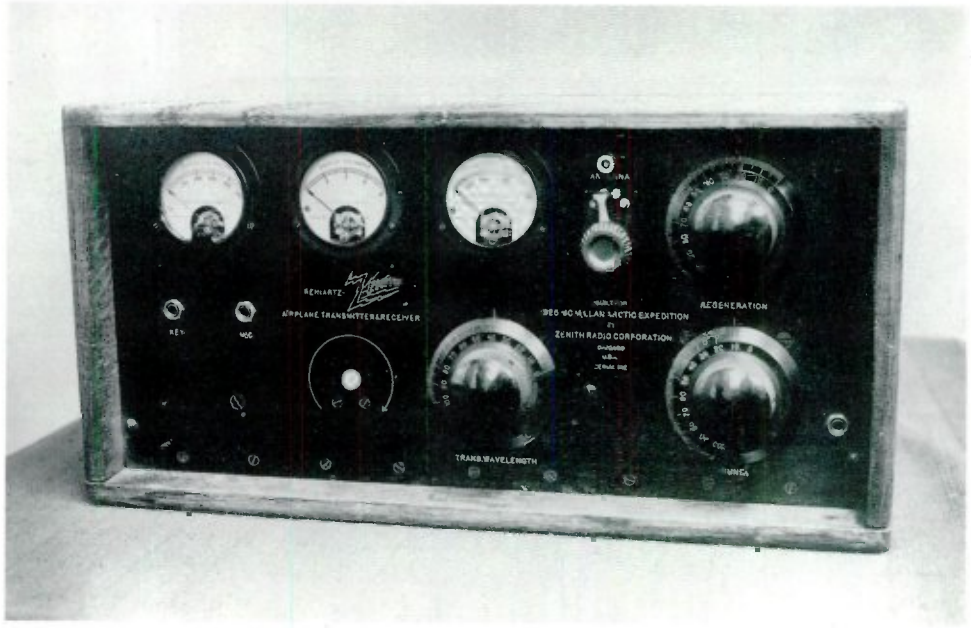
One of Reinartz' main responsibilities was to encourage his fellow amateurs to migrate from their former area of operations, now shared with AM broadcasters, to the new shortwave bands. The initial expedition-related Zenith press release of Spring 1925 noted that "during the last MacMillan Expedition ('23-'24) there were 17,000 American amateurs who could receive and transmit on 180 meters (medium wave) then, now (Spring 1925) there were only 20 American amateurs who could do so on shortwave."

A short time later, Zenith published another release which described in complete detail how to construct a "Reinartz-Zenith Shortwave Receiver" and a similarly named transmitter. Assistance to the amateur community continued after the return of the expedition, when Zenith published a second set of plans for constructing a more advanced shortwave receiver and transmitter. The November 1925 cover letter which accompanied these latter plans was signed by Karl Hassel, and spoke of Zenith's desire to share this knowledge with the amateur community and the lack of commercial interests in shortwave by Zenith. This letter also records the successful two-way communication between the High North and points in southern Australia and New Zealand.

March, April, and May of 1925 were a frantic time for the Zenith engineers responsible for the expedition equipment. Karl Hassel led the design team, with H.C. Forbes and John Reinartz also making major contributions. The shortwave transmitters were 250 watt and 2 kilowatt units (aboard the *Bowdoin* and *Peary* respectively) capable of transmitting on 20, 40, 80, and 275 meters.[46] It is important to note that the transmitting equipment aboard the *Bowdoin* was assembled and tested in Chicago before it was sent to Wiscasset, Maine, for installation. The size and configuration of the

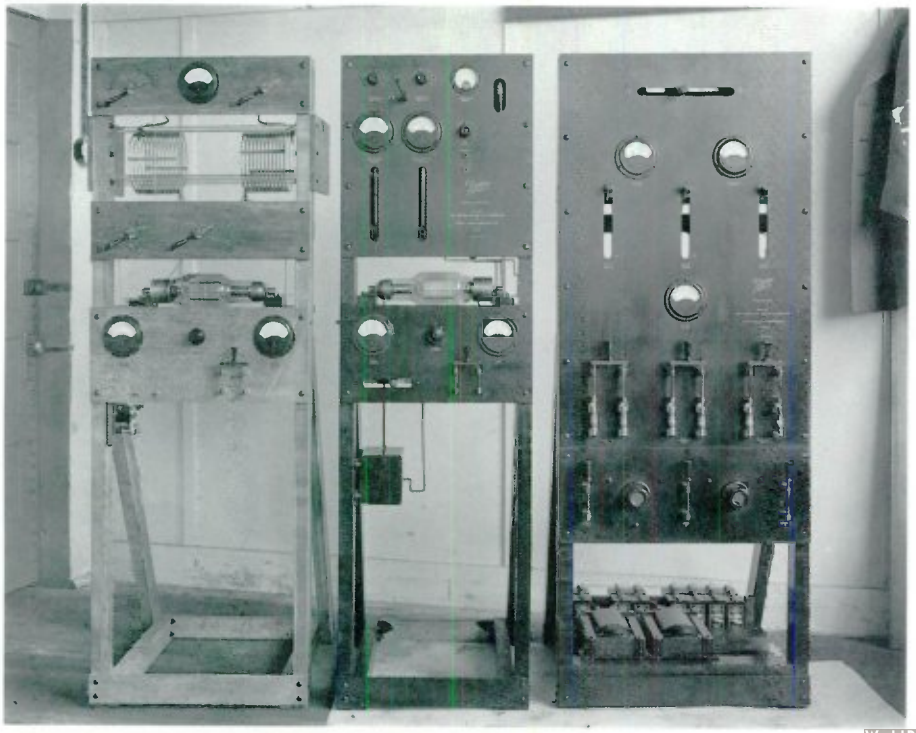


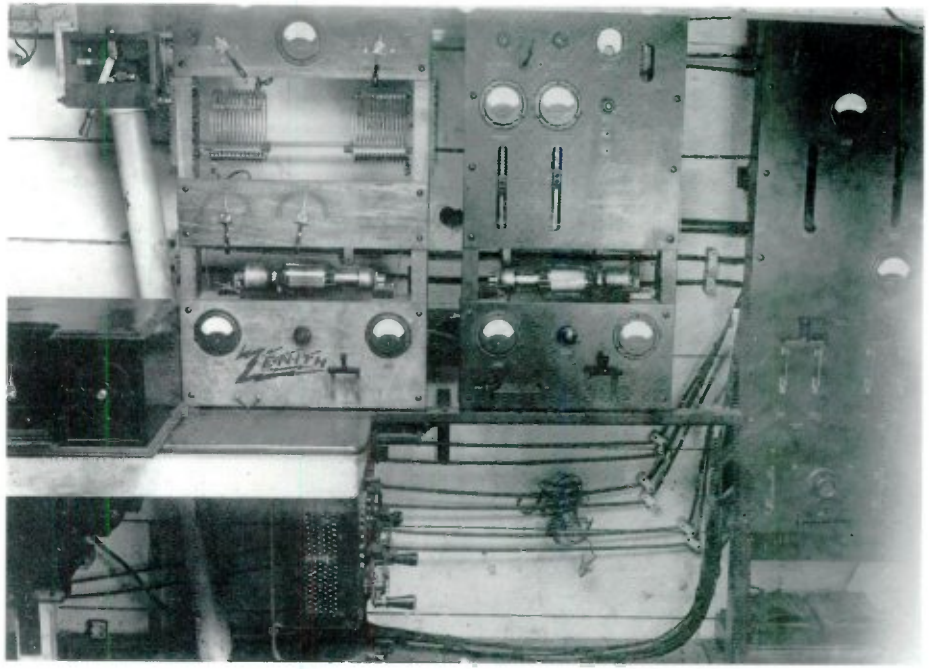
The Reinartz receiver built by Zenith for the 1925 MacMillan expedition. Courtesy of Zenith.



The Reinartz transceiver developed for the Loening amphibians. Courtesy of Zenith.

The Bowdoin's *radios rack mounted for testing at Zenith prior to installation.* Courtesy of Zenith.





Zenith radio equipment installed in the Bowdoin's *radio room.* Courtesy of Zenith.

radio room aboard the *Peary* was not known until rather late in the spring, due to the time it took to find and purchase the second ship. Reinartz constructed the *Peary's* transmitter aboard her as the refitting took place. Among the receivers taken along was a Super VII Zenith broadcast receiver, a longwave receiver for press messages and time signals, and two portable loop broadcast receivers for use by exploring parties or a plane in distress.[47]

John Reinartz was primarily responsible for the design of the innovative shortwave transceiver which the Loening amphibians would use. In mid-May, a prototype of the transceiver was placed aboard a Navy float plane and tested extensively during flights over, and landings on, Lake Michigan. A Zenith press release during those tests relates that this "Reinartz-Zenith" set was the first aircraft set able to operate whether or not the plane was flying. Previous aircraft sets had been powered by wind-driven generators, usually mounted on the wing. The Reinartz design operated exclusively on batteries. This was extremely important, since generators driven by the aircraft's slipstream would have been useless to power emergency communication had these new type aircraft been forced down in the Arctic.

By early June, a Zenith team led by Reinartz had installed the radio equipment aboard the *Peary* at Boston Navy Yard, and aboard the *Bowdoin* at her berth in Maine, just in time for the projected mid-June departure of the expedition. As with the 1923-24 expedition, many manufacturers contributed parts and supplies to this effort.

The Naval Arctic Unit

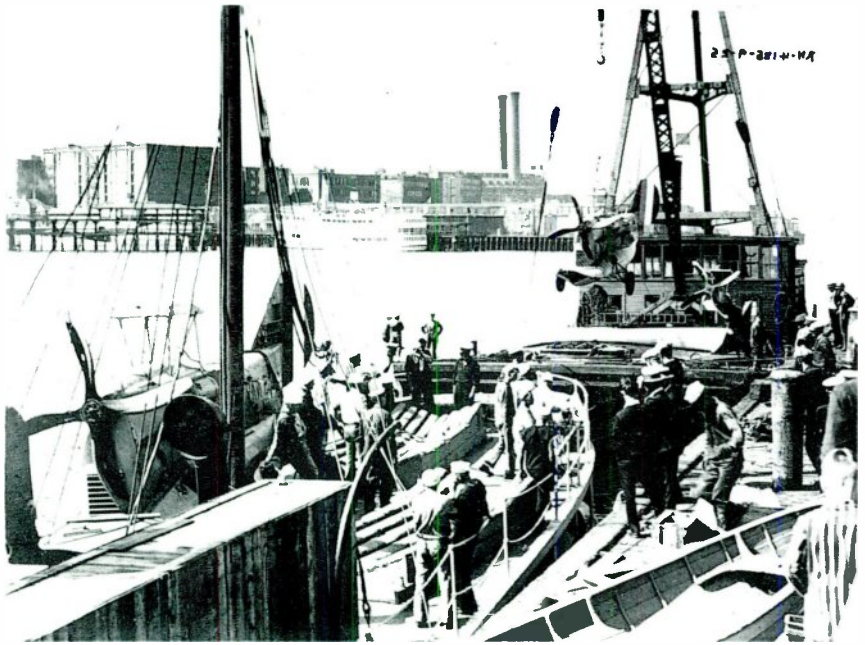
In April, Admiral W. A. Moffett, Chief of the Bureau of Aeronautics, determined that the personnel to serve under Lt. Cmdr. R. E. Byrd in the Arctic Aviation Unit should be selected from volunteers, due to the potentially hazardous nature of flight in the Far North. A request for volunteers was issued to all Navy air stations and squadrons. Within days there were over sixty volunteer officers and men to fill the seven remaining slots. After some deliberation, Moffett selected: Lt. M.A. Schur, a highly respected flyer and Navy racing pilot, Chief Boatswain Earle E. Reber, also a well respected Navy racing pilot, and five other non-commissioned naval personnel.[48] The group was headquartered at the Naval Aircraft Factory, then a part of the Philadelphia Navy Yard.

In mid-May, pilots Schur and Reber were authorized to proceed to the Loening factory in New York City to accept the first two production Loening amphibians and to fly them to the Naval Aircraft Factory at the Philadelphia Navy Yard. The next four weeks were a blur of plane modification, collection of engine and airframe spares, and purchase of lightweight camping and survival gear,[49] concentrated food, Arctic clothing, and medical gear. Reber paused long enough to return to New York to accept the third Loening, NA-3, and fly her back to Philadelphia. Schur wrote later that it was a pleasure to see how fast all the paper work was handled when the chips were down. He also noted that just about everyone was working night shifts.

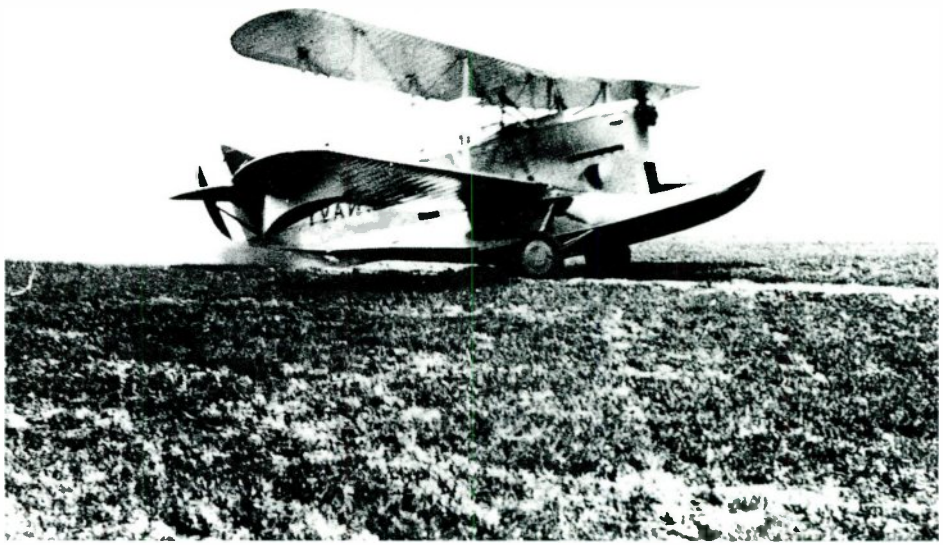
The Unit then flew all three Loenings to the Boston area for final instrument calibration. The amphibians were then flown to the Charles River and Boston Navy Yard where, in a final frantic 36 hours, they were disassembled and loaded on the afterdeck of the *Peary* for the voyage North.

Above right: *MacMillan, Reinartz, and McDonald review radio plans for the expedition.* Courtesy of Zenith.

Right: *Most of the members of the MacMillan Arctic Expedition of 1925. Standing (left to right): Hosmer L. Freeman, mate; Captain George F. Steele; Commander E.F. McDonald, Jr., unidentified chief engineer; Commander Donald B. MacMillan; unidentified; Henry Forbes, engineer; Commander U.J. "Sport" Herrmann; unidentified. Front row (left to right): Charles F. Rocheville, AMMlc, USN; Lieutenant M.A. Schur; E.E. Reber, Chief Boatswain, USN; "Sport" Herrmann's dog "Rowdy"; Harild Gray, 2nd radio operator of the* Peary*; last three men unidentified.* Courtesy of Zenith.



A Navy Loening, not yet identified with NA numbers, taxis for take-off from Mitchell Field New York on its way from the factory to Philadelphia Navy yard for fitting out. Courtesy of the Schur family.



Loading the Loening fuselages aboard the Peary *in Boston Navy Yard. The fuselage already in the port side cradle is Schur's NA-2.* Courtesy of the Schur family.

The Farewell Celebrations

Looking back across almost three-quarters of a century of exploration and conspicuous bravery—from Lindbergh's flight to Lunar landings and space shuttle missions and beyond—it is hard for us to realize how important the sailing of an expedition such as this was in those simpler days, and in what high regard these intrepid explorers were held by the general public. The sailing from Boston was a public event of national importance, attended by literally thousands of well wishers and heavily covered in the press. On behalf of the state of Massachusetts, Governor Fuller began the celebrations with a joint breakfast for the MacMillan party, and for the committee which arranged the national Bunker Hill Day, at the Copley-Plaza Hotel. Among the dignitaries present were the Governor, the Lieutenant Governor, Rev. C.W. Lyons, president of Georgetown University, ex-Secretary of State Charles Evans Hughes, Senator Fess of Ohio, ex-Governor E.N. Foss, Major C.D. Perkins (representing the Governor of Connecticut) and others. After the lengthy breakfast, the dignitaries traveled the short distance to the Navy Yard for the public departure ceremonies[50] which were held on the deck of the *U.S.S. Constitution*.

Late in the afternoon of June 17, the *S.S. Peary* sailed from Boston, bound for MacMillan's home port of Wiscassett, Maine, where the *Bowdoin* was being readied for the trip. After two more days of loading and another day-long public celebration, again with crowds of well-wishers led by a bevy of dignitaries, the *Peary* and *Bowdoin* stood down the Sheepscot River for the North Atlantic. They were escorted by sailboats, steam yachts. and two Eagle patrol boats of the U.S. Navy.

On The Way

The two vessels made their way east and north in fair-to-poor weather, pausing several days in North Sydney, Nova Scotia[51], for provisions, and to weld steel plates over the forecastle portholes of the Peary as further protection from the ice fields. They then passed west of Newfoundland, crossed to the Labrador coast and paused for several days each in Battle Harbor, Hopedale, and finally, Jack Lane's Bay.

As the Expedition moved up the Labrador coast, the importance of radio to these isolated people was made abundantly clear. McDonald learned that the old fashioned battery-operated receiver at the Moravian mission at Hopedale had run out of batteries in the fall of 1924; the last news of the world had come in via dog sled in April 1925! McDonald set the radio operators to work modifying the circuitry and changing out obsolete tubes and batteries for state-of-the-art units. He reported that the old receiver and batteries would provide only 24 hours of total service; the new setup would provide at least 300 hours of continuous service on one set of batteries. McDonald left multiple sets of batteries and tubes behind.[52] Other records indicate that McDonald provided battery-powered sets for the isolated Moravian missions for years to come.[53]

Farewell celebration aboard the U.S.S. Constitution *in the Boston Navy Yard.* Courtesy of the Schur family.

The Peary, *with all Loenings cradled on her afterdeck, stands down the Sheepscot River bound for Etah.* Courtesy of the Schur family.

On July 9-10, the expedition journeyed north to Windy Tickle at the mouth of Jack Lane's Bay, soon to be their departure point for the hazardous crossing of Davis Strait to Greenland. While at Windy Tickle, they made the first of a number of "broadcasts to the world" over the powerful transmitter aboard the *Peary*. Commander McDonald's report to the National Geographic Society of July 12 best tells the story of that evening:

> Between the hours of ten and eleven last evening there was broadcast a radio vocal and instrumental program the entire concert being supplied by the venerable Samuel Bromfield, the Game Warden, Governor, Mayor, Chief of Police, Fire Marshall, Post Master and also one seventh of the population of Jack Lane's Bay in other words the population of Jack Lane's Bay totals seven period Sam hearing we were in port came down with his high hat and fiddle and played jig after jig in which his heels knees and legs were as essential a part to the music as his fiddle he sang and he posed for his photograph Period Commander MacMillan gave a short address over the radio period Mr. Bromfield's son Abram again accompanies us as Eskimo interpreter he having been north on previous trips with MacMillan. Communication between the Bowdoin and the Peary is now by schedule maintained on forty and eighty meters at the hours of eight [in the] morning, one and seven [in the] afternoon."

Godhavn, Coal, and Bureaucracy

The *Peary* arrived in Englishmen's Bay at Godhavn on July 16, 1925, seven days ahead of the *Bowdoin*.[54] Lt. M.A. Schur, second-in-command of the Navy fliers, described a rather desolate scene, with the mountains and shore mostly rock, very little vegetation and lots of snow. Schur recorded that the homes of the Danish officials were built of wood, painted red with white trim and had gray roofs and that nearby Eskimo homes were constructed of sod and wood.

Soon after the *Peary* arrived, the Governor of Godhavn, Mr. Malmquist, the Governor of North Greenland, Mr. Rosendahl, and the local doctor came aboard. They were all Danes; only the physician spoke a little English. With a great deal of difficulty, McDonald was able to make clear that the *Peary* was part of the MacMillan Expedition. That hurdle cleared, the Governor of North Greenland expressed surprise that the expedition was headed north to Etah. He had been told only that MacMillan was coming to inspect old Norse ruins in southern Greenland, and no mention had been made of the *Peary*, at all. This was doubly serious for the expedition because, though the *Bowdoin* burned oil and was self-sufficient, the *Peary* had to acquire additional coal either to be able to return home or to continue north. An extended discussion revealed that there was a quarantine on the village due to whooping cough (no one could go ashore), and the *Peary* would not be able to obtain coal. Although the discussion was friendly—in fact the two officials had breakfast aboard—there was to be no liberty and no coal. The governors explained that a ship had called recently, taken aboard most of the coal available, and that there was not enough coal in Godhavn for the coming winter.

Samual Bromfield plays the fiddle for a broadcast to the world, Windy Tickle, Jack Lane's Bay, July 11, 1925. A Zenith Model IX is on the left. The Peary's *transmitters, operating as WAP, were used for a number of broadcasts during the expedition, as well as for routine communications.* Courtesy of the Schur family.

Commander McDonald began at once to solve the problem by making maximum use of both diplomacy and shortwave radio. On the diplomatic front, he maintained cordial relations with the Danes, meeting with them daily and drafting an almost continuous stream of notes and letters to Governor Rosendahl. Commander McDonald expressed understanding and sympathy for the problems caused the local community by the coal shortage. He then proposed moving the *Peary* some 60 miles to the coal mines at Umanak and suggested using the entire crew to mine the 80 tons necessary for the *Peary*. He even assured the Governor that they would be glad to pay full price for the coal that they, themselves, would mine. Using the new shortwave transmitter (which was able to span long distances in full daylight), he communicated with MacMillan back in Hopedale, Labrador, with the National Geographic Society, and the U.S. Navy in Washington, and with numerous contacts in Chicago.

For the first time on the voyage, Lt. Schur's journal shows the stress the men were under. His usually voluble and extensive daily entries soon were reduced to a few terse lines per day to record the passage of time:

> July 16: ...There certainly are a downhearted bunch on board tonight. After enduring a trip upon the rocks, seasickness and hard work so far, here in little Greenland a man of foreign birth informs us that he can not give us any coal unless the crown of Denmark says so. So here we are, anchored in Disko Bay, two months food supply, 70 tons of coal, no liberty and a few hundred tons of the much needed coal at Umanak a few miles north of here. The radio sure will be hot for the next few days to Washington. There being no darkness it is hard to sleep now, it is not unusual to find us up around one AM in the morning.
>
> July 18: Still at Disko Is. Just awaiting developments. No coal, No liberty, No pictures, No MacMillan. Bowdoin still at Hopedale, Labrador changing propellers. MacMillan said he would leave Hopedale at 1:00 am Sunday.

McDonald was one of the few whose morale was unaffected by the *Peary*'s predicament. He used the time to answer other correspondence, to purchase an authentic skin kayak from a local artisan, and to become proficient at maneuvering the fragile and unstable craft. In one note to a friend, McDonald told of a race in the harbor between a local resident in his kayak, two sailors pulling oars in a dory and McDonald in his new and highly prized craft—McDonald won.[55]

It is obvious, however, that McDonald was very concerned. He wired his friend Sport Herrmann in Chicago and asked him to help the National Geographic Society organize a "relief ship" by chartering a steamer to bring 120 tons of coal directly to Etah, from either Sydney or from St. Johns, Newfoundland. He told Herrmann that local banker Kenneth Rawson, whose son was aboard the *Bowdoin*, was "ready to cooperate in raising the necessary private capital" and asked Herrmann to begin calling various ports to determine the cost and availability of a relief ship. McDonald was very specific that he did not want MacMillan to have to pay these costs. If all else failed, he assured Herrmann that he was already "an expert with a kayak."[56]

At some point on the seventh day spent swinging around the anchor, it became clear to McDonald that Governor Rosendahl could supply coal, or at least permission to mine it at Umanak, if only the Danish government gave its permission—and that could be gotten via their Embassy in Washington. It was not possible, of course, to contact the Embassy with the local longwave transmitter until nightfall, and nightfall was several months hence! There are several versions of what happened next. One version, which appeared in print several places. is that Rosendahl and McDonald contacted the Danish Embassy in Washington using the shortwave equipment of the *Peary*. The message was received by a young ham in Washington who relayed it to the Embassy. Another version is that Byrd and McDonald used the shortwave equipment to contact the Navy in Washington. The Navy (and perhaps the State Department) then contacted the Danish Embassy asking for permission to sell coal to the *Peary*. In either story, the permission was granted and the message returned to Godhavn in about four hours.[57]

It is quite possible that all versions of this incident are based on fact. Certainly after McDonald understood that all which stood between the *Peary* and coal was permission from the Danish government, he and Byrd would, as Lt. Schur said, both have been making the *Peary*'s radio "hot" sending a flood of messages to Washington. Worrying about just which version of this story is the most accurate simply clouds the main issue: this incident. by itself, demonstrated the vast superiority of shipboard communications *using the shortwave spectrum* over both the long and medium wave spectrums then in standard use.

As soon as the coal was loaded at Umanak, cordial farewells were said and the *Peary* put on steam to catch up with the *Bowdoin*, already well up the coast, heading for the village of South Upernivik. MacMillan had taken the *Bowdoin* north soon after the *Peary* left Godhavn, believing that the more powerful engines of the *Peary* would enable her to catch up. MacMillan, McDonald, and Byrd were very anxious to reach Etah by August 1. MacMillan knew that the three-week-long "summer season," at Etah and nearby Smith Sound, almost always began on August 1; they needed every minute of those three weeks if all of the goals of the expedition were to be achieved before the ice closed back in for the year.

At "The Top Of The World"

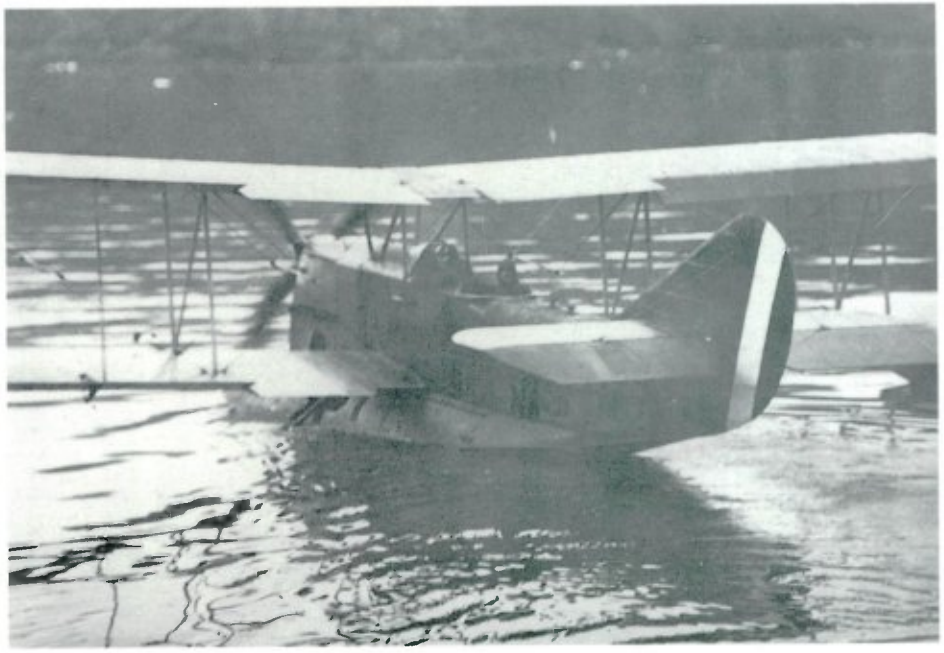
After an eventful trip through the very dangerous icefields of Melville Bay, the Expedition arrived at Etah on August 1 and began the long and arduous process of unloading the aircraft and reassembling them on the rocky shale of the only sliver of beach in Etah fiord. The fuselages were floated ashore one at a time and the wing sets were then assembled and attached. The back-breaking difficulties of this work in 30 degree sea water is not even remarked upon in the private papers of these hardy men, though Lt. Schur lost two toes from each foot to frost bite and others must have suffered similarly.

Above: *McDonald (l) and Schur (r) watch the off-loading of the fuselage of NA-2 at Etah, August 1, 1925.* Courtesy of the Schur family.

Below: *Hauling the fuselage of NA-2 up on the rocky beach for assembly at Etah. Figures from left: Schur, Byrd, unidentified, unidentified, In-you-gee-to, remaining figures unidentified. Facing camera in right center is McDonald.* Courtesy of the Schur family.

At Etah. In the foreground is NA-2 being readied for the first flight, in the midground is the S.S. Peary, *and in the background is Brother John glacier.* Courtesy of the Schur family.

Schur, Rochville, and MacMillan taxi in NA-2 for the historic first flight. Courtesy of the Schur family.



Late on August 3, Lt. Schur took NA-2, the first Loening assembled, up for a 30 minute test flight. He was accompanied by Rocheville as mechanic and Lt. Cmdr. MacMillan as observer. They flew out across Smith Sound and then returned to the Greenland coast to venture over the great ice cap for a brief time. Thus, Lt. M.A. Schur, USN, became the first American pilot to fly in the Far North and the first person in the world to overfly the ice cap of Greenland.[58]

The following day other exploration flights confirmed MacMillan's and the flyers' worst fears: the coldest winter and spring on record meant that there was much less open water in the area than expected. Further, everyone had underestimated the extent of pressure ridges in the ice fields. The specially fabricated aluminum skis for the Loenings would be useless when faced with these often thirty-foot high ridges.[59]

It was very clear to the aviators that on flights away from the open water of Smith Sound, severe engine trouble with the newly inverted Liberty engines or any other major problems with the new Loenings would mean certain death for the flyers involved. There were no safe landing areas. In fact, the conditions were so much more hazardous than expected that Lt. Comdr. Byrd called a meeting of the air crew and told them that though he would continue with air operations, all others were excused and would only fly as absolute volunteers. It is a great credit to all concerned that air operations continued by all hands and, though not all goals were accomplished, significant research and exploration was carried out.[60] The weather continued to be very uncooperative. Byrd later reported to Secretary Wilbur that of the next 15 days, only 3 3/4 offered even marginal flying conditions.

The cold and poor weather did not seriously hamper the other activities of the expedition. Scientific personnel and the still and motion picture photographers ranged widely along the coast. National Geographic photographer Gayer took the first ever color photography, both stills and "movies," of the flora and fauna of the Far North, one of the highlights of this expedition for MacMillan and the National Geographic.

The World's Most Northern Community

The Smith Sound Eskimos, also known as the "Thule People," were not even "discovered" until early in the 19th century. Migrating to Greenland much later than their southern Greenland cousins, they were isolated for so long that it is said that they had lost the knowledge that other people existed on the planet. They were also so isolated that, in the 1920s at least, their culture was largely untainted by Western contact. Their southern cousins had been impacted first by Erik the Red, and then more profoundly by several centuries of Danish colonization and over 200 years of whaling by European and North American fleets.

The Smith Sound community, about 200 people scattered widely along the northwestern coast of Greenland, probably represented the last almost pure Ice Age culture and technology. They, like the Sherpas of Everest a generation later, were the key to the final success of the early Western explorer-visitors in their world. While they certainly did not carry Peary to the Pole in 1909, he learned their ways, used their technology and dogs, and won the Pole only with their active support. The heroics of the Smith Sound sledge drivers—nearly equal partners in each of their exploits—is well documented in the books of both Peary and MacMillan.

McDonald and the Navy flyers were as fascinated and charmed by the Smith Sound people as had been the few other visitors to this most northern community. The Eskimos remained their usual jovial selves, even as they watched with seeming equanimity, the dawning of the ages of polar flight and of wireless communication in their midst.

Lt. Cmdr. Byrd penciled notes on the back of his personal copy of his final report to the Navy which recorded another dimension of these historic events:

> When Lt. Schur took the first flight at Etah, all the inhabitants of [the] small village collected in one tupik [summer tent of hides] because, should the plane fall in the village, they wanted to die together.[61]

Schur and Reber observe air operations from the bridge of the Peary *at Etah.* Courtesy of the Schur family.

One of the most poignant photographs from the expedition depicts MacMillan's great Eskimo friend In-you-gee-to, standing in his polar bear pants and watching from the rocky shore, as Schur, MacMillan, and Rocheville taxi out for that first flight in the High Arctic.

Radio Activity At The Top Of The World

Radio activity was particularly dense during the three weeks at Etah with the two main tasks being standing radio watches in support of flight operations and arranging a series of broadcasts featuring the Eskimos of Smith Sound. The first of several broadcasts was arranged when WAP (the *Peary*) notified Zenith, the press and the amateur community that the first broadcast from the Far North would take place on Saturday night, August 1. The notice was sent out on Thursday, July 30, from WAP. An August 15 article in *The Talking Machine World* detailed the first two of these broadcasts as follows:

Byrd in Arctic flying suit made by Eskimos. Courtesy of the Schur family.

> The press of the country and the higher powered broadcasting stations notified the public of the amazing event and at the appointed time both amateurs and the Zenith experimental station 9XN with its two operators[62] stood by and waited. WAP sent out their CQ call, signalling their going on the air, and faintly came the voices of McDonald and MacMillan, gradually increasing in volume, until, within one-half hour, the Arctic voices were as clear and distinguishable as continental stations. Music and songs were reproduced with such faithfulness as to make even the hardened operators stand aghast. Radio had penetrated the Auroral bands, a feat heretofore never accomplished during the six months of Arctic daylight.[63]

On Sunday, McDonald radioed the Zenith offices that they had received reception reports not only from various parts of the U.S., but that they had been heard in London, as well. McDonald was so excited that his predictions about shortwave in the Arctic had borne fruit that he announced that he and MacMillan would submit to a "real time" press conference via radio on the following evening, August 3rd, at 11:30 PM. That evening, various Zenith officials, guests, representatives of Chicago newspapers, and the Associated Press, gathered at the little transmitter shack of 9XN, in Arlington Heights, some forty miles from the Loop. S.I. Marks, then General Manager[64] of Zenith and McDonald's normal business contact at headquarters during this trip, briefed the guests on the procedure for the press conference. Each reporter was asked to draft a single question. These were then sent to McDonald and MacMillan, apparently via Morse code rather than voice. In all, five questions were sent to WAP during the press conference, with the answers coming back very rapidly. The press conference was so successful that other messages were exchanged that evening which resulted in McDonald's promise to broadcast a program of Eskimo music from WAP to 9XN. The program was then to be relayed to the country on medium wave by WJAZ. The broadcast was to occur "within the next thirty days."

For Zenith and most radio fans, the most memorable radio events of the 1925 Expedition were the next two radio broadcasts made from the *Peary* during that three weeks at anchor in Etah fiord. The first of these broadcasts occurred on the evening of August 12 and was noted in MacMillan's diary as "our Broadcast to America." MacMillan listed the program as: "1) Accordion played by Bromfield and Gayer, 2) Music of the Eskimo by Myself (MacMillan), 3) General introduction and remarks by McDonald, 4) Singing by Eskimos and beating of Kilante via Eskimo drum."

The second broadcast was heard aboard the *U.S.S. Seattle*, then at anchor in the harbor at Wellington, New Zealand. This broadcast was described in MacMillan's biography by Allen and referred to several times in reports to National Geographic. It was also mentioned on many occasions in personal letters between MacMillan and McDonald, and in later years was discussed in detail by Admiral MacMillan in a nation-wide "Omnibus" television program in 1955. Unfortunately, none of these sources gives the exact date of the broadcast, though some evidence suggests that it was made sometime between August 16 and August 21.[65] This broadcast was described in the most detail in the internal news magazine *Zenith Radio Log* of June 1943:

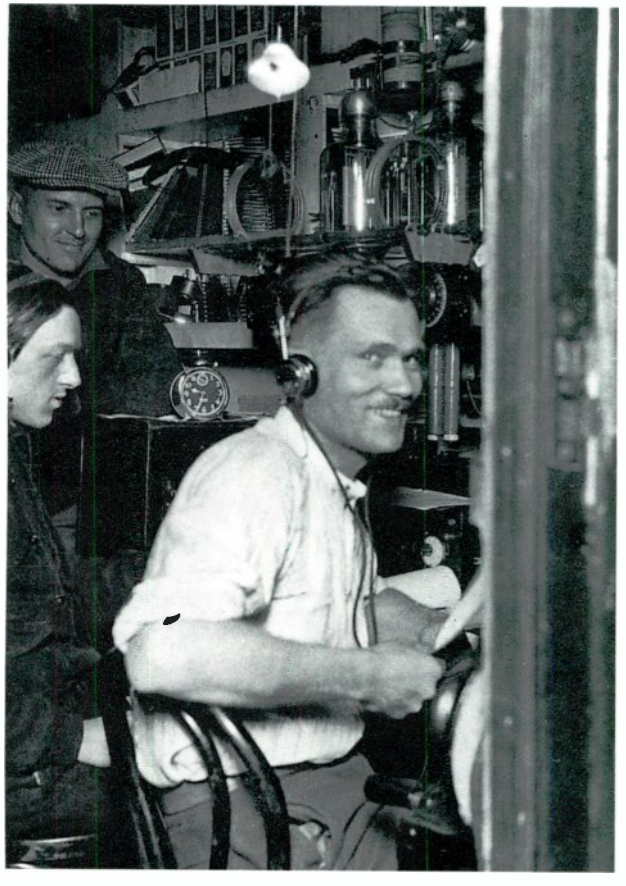
> On an August day in 1925 six Eskimos from the world's most northerly settlement gathered before a microphone on the S.S. Peary as she lay at anchor near Etah, Greenland, less than 700 miles from the North Pole. They sang some of their song for Admiral Coontz of the United States Fleet, which was cruising off the shores of Tasmania, south of Australia, half the world away.[66]
>
> "That's not singing," exclaimed the Admiral. "It sounds like college yell to me." "Perfect!" exulted Commander McDonald, president of Zenith. "That's what Eskimo songs sound like. It proves that our transmission is getting through to you okay."

In fact, there was quite a volume of communications between the *Peary* at Etah and Down Under during the three week stay at Etah. Schnell reported, at the time, that the signal from the *Peary*'s transmitter was almost always a significantly stronger signal in Wellington than that of 9XN in Chicago. McDonald summarized most aspects of their Etah radio activities in similar messages to National Geographic and to *The Talking Machine World*:

Above: *Eskimo broadcast from the* Peary *at Etah. MacMillan and McDonald are at right.* Courtesy of Zenith.
Below: *Etah women and children listening to the outside world from the wardroom of the* Peary *with Commander MacMillan. The radio is a Super Zenith Model IX with a special-built Zenith shortwave receiver and a horn speaker.*

We consistently maintained communication not only with the United States, but with England, Scotland, France, Holland, Italy, Hawaii, New Zealand and Australia, the greatest distance having been a two-way communication with Box Hill, Victoria, Australia, nearly halfway around the earth on 37.5 meters. We transmitted the voices of the Eskimo singing his primitive songs within 11.5 degrees of the North Pole, and these songs were heard in Australia and New Zealand, and we received an official radiogram of congratulations both from the Governor-General of New Zealand and the Governor General of Australia. Lieutenant Fred Schnell, with his short-wave apparatus on the U.S.S. Seattle, desiring to send a radiogram extending his compliments to the Convention of the American Radio Relay League [being] held in Chicago, on August 16, being unable to reach Chicago direct, was forced to send it from his ship laying off Wellington, New Zealand, to the MacMillan Arctic *S.S. Peary*, within 11.5 degrees of the North Pole, and we in turn relayed back to Chicago, consuming less than five minutes.[67]

Along with their duties related to the air operations and to the broadcasts, radio operators Reinartz aboard *Bowdoin*, and McGee and Gray aboard *Peary*, continued to produce the daily "newspaper" that was so important to all hands and to transmit daily reports to the National Geographic and the Navy. They were also quite active in communicating with many radio amateurs from a number of countries.[68] Commander McDonald even found time to answer personal correspondence and to salute many of his close friends "from the top of the world."



McGee at the operating position in the radio room of the Peary *while at Etah.* Courtesy of Zenith.

Eskimo broadcast from the Peary *at Umanak, August 26, 1925.* Courtesy of the Schur family.

Air Operations End

On August 17, 18, 19, air operations were suspended due to very high gales and low visibility. MacMillan, noting that Etah fiord itself was beginning to freeze over at night, decided to terminate the air operations entirely and return south, while that was still possible. The flyers protested and were eventually allowed two more days of air operations while the remainder of the expedition packed equipment. On the 21st, while the other planes were being disassembled and loaded aboard the *Peary*, Byrd, Bennett, and Francis flew Loening NA-1 about 50 miles down the coast and established a camp on a beach near the Smith Sound community of Igloodahounay. The next day, they flew far into the interior of Greenland and confirmed that, away from the coast, the ice cap was smooth and featureless and appeared to crest at about 11,000 feet elevation in the center of the island. In recording that flight in his official report, for the first time Byrd mentioned the extreme discomfort of flying at altitude in the High Arctic in an open cockpit. That flight and one short hop the next day closed the air operations of the Navy Arctic Unit.

The Trip South

The expedition left Etah on August 22, just ahead of the freezing of Etah fiord. After picking up Byrd, his crew and the Loening NA-1 on the way south, the *Peary* paused for the evening of August 26 at Umanak, where no coal was loaded but one final two-hour long broadcast of Eskimo music was made. Records indicate that this broadcast was also heard in Australia and New Zealand. It was also very well received in Chicago, where a special radio concert was arranged. Included at the concert were a number of Zenith executives and their wives, along with various Chicago dignitaries, including Mr. & Mrs. Frederick H. Rawson, whose son Kennett, was the youngest member of the Expedition. There were also several members of the local and national press in attendance. *Talking Machine World* covered the event as follows:

Eskimo Music Thrills Recipients: Popular songs and Eskimo music broadcast from the MacMillan Arctic expedition, while it was anchored off Etah (sic.), Greenland, 3700 miles away were heard by a thrilled audience of twenty-five people in the Zenith experimental station, 9XN, at Arlington Heights, Ill., on the evening of August 26.

Both voice and instrumental selections were heard but the phonograph numbers were most clearly received. The reception marked the first time that an assembly has heard entertainment broadcast from the Arctic. The first selection was heard at 10:35 PM, when the strains of "What'll I Do?" came floating through 3700 miles of space, followed soon after by "Marchetta." The Eskimos then took their places before the microphone, with various instruments made of bones and skins of wild animals, accompanied by their voices. Limited time curtailed the further broadcasting of their program.[69]

On August 27, the *Peary* proceeded south to Holsteinsborg where it paused for almost a week. The *Peary* arrived at Godthaab Harbor on September 6 and anchored for ten days of rest, relaxation, and reprovisioning. After dinner in the home of His Excellency Governor Simony, Governor of South Greenland, Commander McDonald presented him and his family with a Zenith radio, which he installed himself. While McDonald was installing the set in Governor Simony's home, an incident occurred which gave him his "Eskimo name." He completed the installation just as an Eskimo maid came through the room. McDonald turned on the set and almost immediately, out boomed Herbert Hoover's voice. The maid, never having seen a "talking box" before, dropped her tray in fright, shouted "Ange-kok!!!" and ran from the room. McDonald was told that "Ange-kok" meant "medicine man" or "miracle man" and that was how he was greeted by Eskimos throughout the remainder of his stay in the North.[70]

The first radio concert in a southern Greenland home occurred the next evening and was a great success. The guests enjoyed a special broadcast from Chicago, at least partly due to the maintaining of radio silence by the two Danish vessels in the harbor; they were using very poor spark gap equipment which emitted a great deal of interference at many frequencies.[71]

McDonald and members of the Naval Aviation Unit formed friendships with the crews of these two ships. This was particularly true of the Danish Royal Navy vessel *HMS Island Falk*, probably due to the fact that, during a savage storm which penetrated the fiord late one night, the *Peary* saved the 10-man crew of the *Island Falk*'s steam launch as she was sinking. The *Peary* was "quite safe" herself, spending the night with two anchors out and the engines turning over to relieve the strain on the anchor chains.[72] That savage storm was the first of several, apparently the northerly remainders of an active hurricane season, that would plague and endanger the ships and men of the expedition right back to the harbor in Wiscasset, Maine.

McDonald gave the captain of the *Island Falk* the *Peary*'s set of Admiralty charts for the Northwest Greenland coast and wanted to present the officers with a Zenith radio for the wardroom. Apparently out of 'gift radios', McDonald sent a radiogram to the factory with orders to ship a Model VII Super Zenith to the *Island Falk* at Reykjavik, Iceland. He also arranged for the captain of the *Island Falk* to receive a subscription to *QST* magazine and for Governor Simony to receive multiple copies of *The Citizens Radio Call Book* so that he might more easily tune in stations.[73]

On September 14, the *Bowdoin* arrived in Godthaab, having been delayed both by the hospitality and by a storm in the town of Sukkertoppen further up the coast. The *Peary* was now fully provisioned, had full bunkers and was ready to sail for home. MacMillan wished to remain in Godthaab and sail some 45 miles further to the head of the fiord to inspect the ancient Norse community there. The scientific party aboard the *Peary* was transferred to the *Bowdoin* for that purpose, and the *Peary* sailed at 3:00 PM on September 16, 1925, making directly for Battle Harbor, Labrador.

Left: *McDonald and kayak, Godhavn Harbor.* Courtesy of the Schur family.

Below: *McDonald and In-you-gee-to's family at Etah.* Courtesy of the Schur family.

McDonald's bedroom on the Peary. Courtesy of Zenith.

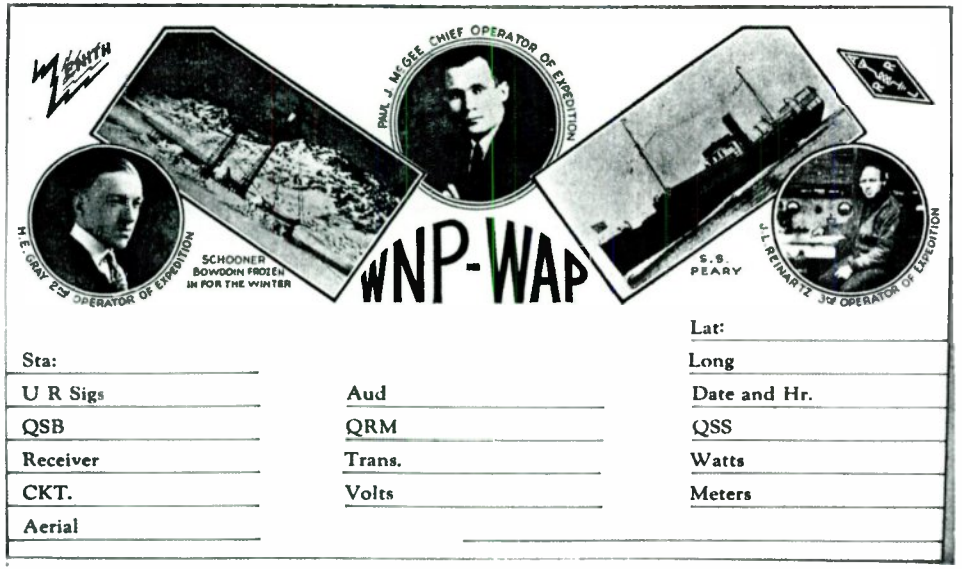
Across To Labrador And Home

Crossing Davis Strait to Labrador at this season in any year is dangerous. In 1925 it was downright perilous. By mid-September, what was to be an active hurricane season was well underway and the remnants of several were to plague the expedition as it fought its way west and south toward home. One major storm caught the badly overloaded *Peary* crossing Davis Strait and she "heeled over like a schooner in a blow," thanks primarily to the Loenings high on the aft deck. Due to the curtailed flight schedule, she was also still carrying quite a deck load of Navy aviation gasoline. After finally reaching Battle Harbor, Commander McDonald reluctantly off-loaded the aviation gas, with full documentation for Navy Secretary Wilbur.

The *Peary* anchored in Battle Harbor for the next four days, awaiting the *Bowdoin*'s crossing. It is evident that McDonald spent much of his time in business activities, as numerous radiograms were exchanged with Zenith headquarters in Chicago. One of the first asked S.I. Marks, then a Zenith executive, to make sure that Sport Herrmann had the $20,000 to $30,000 capital necessary to fund the upcoming Chicago Radio Show. If he did not, McDonald's mother was to go to the First National Bank, sign for herself and McDonald, and borrow the money.[74] In another radiogram to Marks, he said, "Radio me what took place at New York show—who had the sensational models? McDonald"[75].

When McDonald left Zenith's Chicago headquarters in early June, he had challenged Karl Hassel, co-founder of Zenith, to design "the best radio set that it was possible to make, regardless of cost."[76] Hassel and the other engineers had spent most of the intervening months working on what would become the superb 10-tube DeLuxe chassis. This radio, in various ornate cabinets, would soon become the most expensive line of consumer radios that Zenith ever manufactured.[77] McDonald radioed Hassel: "Well Karl are you knocking them cold with your new model. I have no reports and wish you would give me your honest opinion. Have some great movies of the arctic and will have you out on the ship to see them as soon as I return. My kindest to you and yours. Gene"[78]

MacMillan and the *Bowdoin* party had an even more perilous crossing of Davis Strait into the teeth of a dying hurricane. Further, for reasons he never explained, Radio Operator Reinartz ceased keeping the thrice a day radio schedule between the *Bowdoin* and the *Peary* for over 48 hours during the crossing. McDonald and the *Peary* radio operators were not unduly worried when Reinartz missed



QSL (verification of communications) card for stations WNP-WAP for the 1925 expedition. Courtesy of the Schur family.

QSL card for station NRRL, the U.S.S. Seattle, *for the 1925 Pacific Cruise.* Courtesy of Zenith.

the first scheduled contact, thinking that the *Bowdoin's* wire radio antenna may have parted in the storm, as had the *Peary's* twice during their crossing. But after missing three scheduled contacts in a row, the *Peary* had to assume that the *Bowdoin* was lost. A day later, with still no response to the *Peary's* now hourly calling, the ship was preparing to sail out into the storm to search for the *Bowdoin* when Reinartz casually radioed that *Bowdoin* was across and safe, far to the north above Jack Lane's Bay.[79] With MacMillan and the *Bowdoin* safe, the *Peary* proceeded on down the coast, pausing in both Newfoundland and Nova Scotia for periods of rest, and to dodge yet more gales before meeting the slower *Bowdoin* outside Halifax harbor for the final leg home.

Late on the afternoon of October 9 the *Bowdoin* and *Peary* arrived at Monhegan Island, a few miles off shore from South Booth Bay Harbor, Maine. A number of family members had come out to Monhegan Island by ferry for a private reunion before the tumultuous public welcome expected at Wiscassett. Yet one last hurricane, still remembered on the Maine coast as the "Great Gale of October '25," pinned the expedition in the Monhegan harbor for almost three days. When finally arriving at Wiscassett, the expedition was met by a multitude of well-wishers headed by Gov. Brewer of Maine, high-ranking military officers of both services and numerous members of the press.

Conclusion

The science and technology of radio had matured significantly in the years between the 1923 and 1925 MacMillan expeditions. Nevertheless, true "shortwave" radio was in its infancy. Even in the amateur ranks, very few operators had shortwave capabilities in the summer of 1925. The Zenith-funded efforts of John Reinartz, R.H.G. Mathews, and Karl Hassel to popularize the shortwave spectrum among amateurs via this expedition have gone largely unrecognized. Circuitry for both receiving and transmitting shortwave signals was made available, gratis, by Zenith to the amateur community. The opportunities that this expedition provided to radio amateurs all over the world to "work" such exotic locations as the various ports of call of this expedition must have been a major stimulus to the migration of amateurs to the shortwave spectrum.

The ability of powerful shortwave equipment like that aboard the two MacMillan ships to communicate almost at will over planetary distances, day or night, was a real breakthrough in the history of both exploration and communications. Even had the expedition turned back after the coaling incident at Godhavn, Greenland, the fact that McDonald and Byrd could easily communicate with MacMillan, almost 1000 miles away in Hopedale, Labrador, and with the Navy and National Geographic Society 2300 miles to the south, would have revolutionized polar exploration. The fact that both ships communicated with the U.S. Fleet, then in New Zealand, and with radio amateurs in southern Australia, played a significant role in the Navy's decision to adopt shortwave radio for fleet communications.[80] MacMillan's personal diary however, largely focuses on the use of the new equipment to provide instantaneous voice communication between the two ships. Freed from telegraphic code and specialist radio operators, the new ability of one ship's captain to talk to the other proved to be immensely useful in heavy weather, and especially in the ice fields.

McDonald, himself, was particularly impressed with the potential of using shortwave transmissions to conduct business and commerce over long distances. He was in daily contact with either S.I. Marks, then General Manager, or H.H. Roemer, Director of Sales Promotion for Zenith. Upon his arrival in Chicago, a reporter remarked to McDonald "You are probably very anxious to get to your office to see how your business has been doing in your absence." McDonald answered:

> What do you mean by "my absence?" I have been in constant communication with the Zenith offices by our short wave apparatus. In fact, I believe that I was in closer touch than when I am actually in the office. That is true, at least when one considers the thousands and thousands of words which passed between us each week. In one instance, the department executives were in session and a question of considerable importance arose which necessitated information which I alone knew about. While these men were in conference, they telephoned the Zenith Arctic experimental station 9XN, which in turn radioed WAP aboard my ship, the S.S. Peary. In less than twenty minutes, I understand, my reply reached the Zenith offices, before the conference was concluded and changed their decision completely..."[81]

The entertainment aspects of radio—hearing programs from the United States, receiving daily news broadcasts from the United States and Europe to produce a daily ships' newspaper, broadcasting Eskimo singing to the U.S. and elsewhere, and providing radio concerts for local residents in northern ports—played an important role in this expedition. Most of these aspects of radio, however, had become almost routine in the two years between the two Arctic expeditions. So routine, that they were almost totally ignored in the logs of all three radio operators. These uses of radio were only mentioned briefly by MacMillan in his diary and were mentioned in a bit more detail by Schur in his journal. McDonald's notes, though confirmed by the other two, are quite naturally the most complete account of this dimension of the expedition.

The MacMillan Arctic Expedition of 1925 has actually *gained* in historical significance over time. It marked the first mature use of radio communication by a polar expedition, and it marked the first reasonably successful use of aviation for polar exploration. No one realized it at the time, of course, but this expedition also marked the "changing of the guard" of polar exploration. Although Donald B. MacMillan would make dozens more trips to the Far North, and would fill in many blank spots on northern maps, this expedition was his last one in the spotlight; the expedition marked the hand-off from the seaborne, sledge-based, terribly isolated expeditions of Amundsen, Nansen, Greely, Peary, Scott, and Shackleton to the airborne, machine-driven, communications-linked worlds of Byrd, Lindbergh, and eventually Neil Armstrong

At the press conference upon his return to Chicago, Commander McDonald was perhaps speaking for them all when he said, "The Arctic explorers' life ain't what it used to be" now that radio and aviation had arrived in the Arctic.

Above: *McDonald and MacMillan demonstrate kayaking techniques on the Chicago lakefront after the expedition.* Courtesy of Zenith.
Below: *McDonald presents an Eskimo fur suit and toy boat to his nephew Eugene Kinney as McDonald's sister Loretta looks on.* Courtesy of Zenith.

THE MCDONALD-MASSEE ISLE ROYALE ARCHAEOLOGICAL EXPEDITION—SUMMER 1928

During the Summer of 1928, Commander McDonald financed and led an expedition to Isle Royale, then the northernmost island in the United States. The objectives of the expedition, which was under the auspices of the Milwaukee Public Museum, were summarized in a press release to the *Detroit Times* and The Detroit News[82] as: 1) to survey the island to determine its significance for archeological study; 2) to outline the work to be done and make preparation for further investigation; 3) to locate remains of early human life; and, 4) to determine as far as possible who such people were and what they did. McDonald had been drawn to the project in Lake Superior by Dr. George R. Fox, President of the Michigan Archeological Society and the Director of the Edward K. Warren Museum. Isle Royale had been a mystery for many years: it was the site of ancient copper mines, yet exhibited no evidence of the village sites and cemeteries of the original miners.

The scientific party included Dr. Fox, who was considered the foremost expert on Indian mounds and Indian culture in the Great Lakes region, Dr. Alvin LaForge, a prominent Chicago physician and amateur archaeologist whose job it was to analyze skeletal remains, and George A. West, President and founder of the Wisconsin Archaeological Society, representing the Milwaukee Public Museum. In addition to the Commander's yacht *Noroca*, the expedition was accompanied by Bert Massee, in his yacht *Margo,* and U.J. "Sport" Herrmann, in his yacht *Swastika*. A writer from Northwestern University, Dr. Baker Brownell, completed the expedition party.

The Zenith broadcasting apparatus originally used on the *S.S. Peary* during the 1925 MacMillan Arctic Expedition was used on the *Noroca*. Radio operator Ray Wilcox of Chicago maintained a regular 10:00 AM and 8:00 PM broadcast schedule under Zenith's experimental call 9XN, the same call letters used for the base station in Chicago during the MacMillan expedition. In addition to the regular schedule, experiments were conducted in extremely low frequency propagation. A schedule of communications was also maintained with Commander MacMillan, who was studying the Norse ruins in Labrador, since it had been theorized that Isle Royale might be a Norse site.

The expedition report indicated that the group found pottery, spear and arrow points, fire platforms, copper beating stones, and eight skeletons in an ossuary. The evidence showed that Isle Royale had been frequently visited by prehistorics from the Ohio and Yellowstone regions as well as the Algonquin peoples. The expedition, in addition to answering many questions, raised many others. The participants were captured by the uniqueness of the area and on August 10, 1928, McDonald sent the following Radiogram to President Calvin Coolidge:

> As members of the Isle Royale Archaeological Expedition and as Americans, living in the Middle West, we suggest that federal action be taken in cooperation with the State of Michigan to make Isle Royale a national park or monument, to preserve forever this Northern land of woods and lovely waters for the people of this country. What scientists call "the riddle of the North" with its ten thousand ancient copper mines, sunk into the rock before the white man came, with its untouched wilderness of evergreens and birches, and its scores of inland lakes, with its rugged shores, and its bewilderingly beautiful estuaries reaching deeply into the interior of the island as in no other place in the United States, with its mountains and its wild life and its lowlands, where thousands of moose are found tamer and more plentiful than anywhere in the country—all this be preserved inviolable for the present and future generations of Americans, and of the world. It should be preserved in the interests of archaeological and geological science. It should be preserved for its natural grandeur and the beauty of its waters. In these fields it is unique. Though the Northernmost Island in the United States proper, Isle Royale, is easily accessible by steamship from Buffalo, Cleveland, Detroit, Chicago, Houghton and Duluth, and by rail and steamship from all parts of the continent. Its profound archaeological, geological and historical interest, its unique scenic beauty, its unparalleled wild life, its value as a health refuge from the heats and fevers of the country, and its accessibility, to millions of people give weight to our suggestion. We submit this proposal respectfully to the president and the people of the United States.
>
> The Isle Royale Archaeological Expedition
> E.F. McDonald, Jr. of Illinois
> B.A. Massee of Illinois
> George A. West of Wisconsin
> George R. Fox of Michigan
> Alvin LaForge of Illinois
> Baker Brownell of Illinois

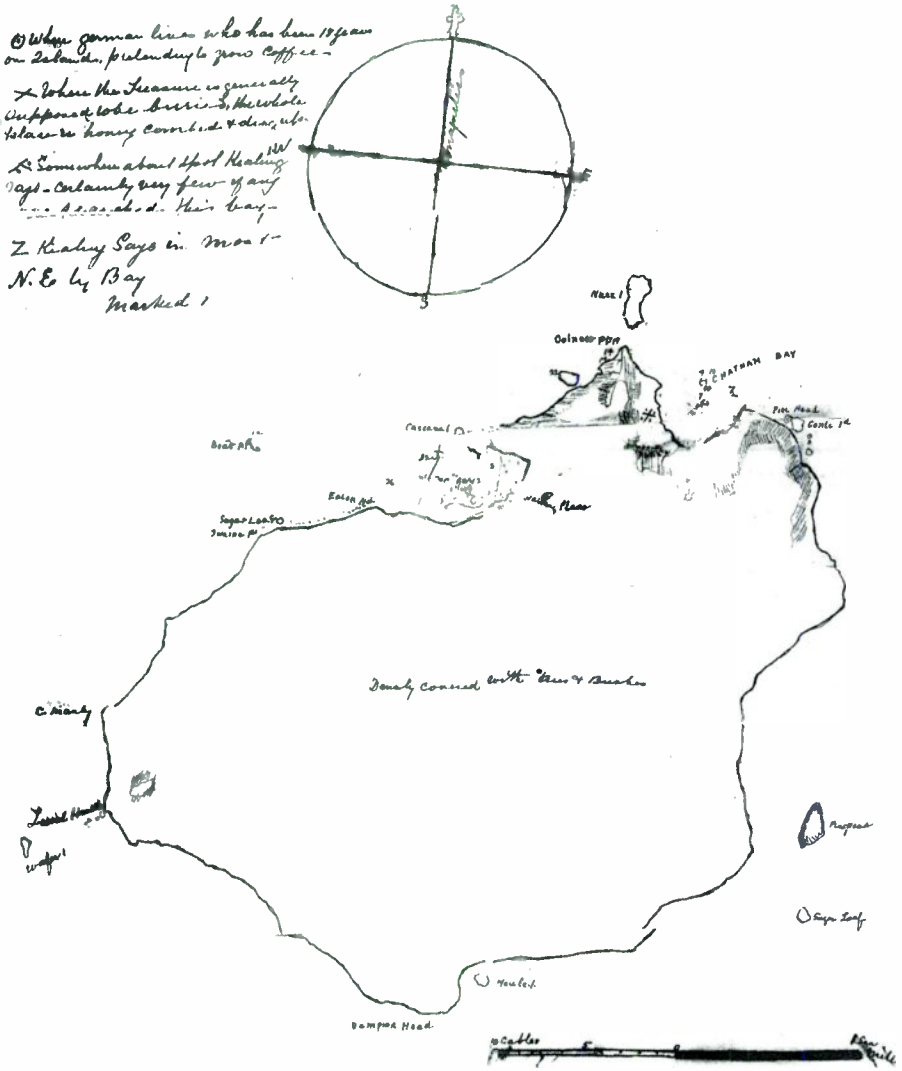
One of the most important findings of the Expedition was published by West in "Copper: Its Mining and Use by the Aborigines of the Lake Superior Region—Report of the McDonald-Massee Isle Royale Expedition 1928."[83] West's report for the first time detailed the extensive aboriginal copper mining methodology on Isle Royale and stimulated the Michigan State Legislature in its 1929 Session to pass an appropriation for a general survey of Isle Royale, its flora and fauna, geology and archaeology. The interest generated by this study,[84] along with the McDonald-Massee Expedition Radiogram to Coolidge, stimulated Congress to consider Isle Royale as a National Park: Isle Royale was made a national park on March 3, 1931. The McDonald-Massee Expedition, therefore, played an integral part in the acquisition of this unusual park.

COCOS ISLAND TREASURE CRUISE AND GALAPAGOS ADVENTURE—1930

Cocos Island, off the coast of Costa Rica, is said to be the most treasured island in the world. The treasure allegedly came from three major sources. The first is that of Captain Edward Davis, a privateer who blockaded the Bay of Panama and sacked the City of Leon, in Nicaragua, in 1685. The second is that of Benito Bonito—"Bonito of the Bloody Sword"—a pirate of the early 1800s who was reputed to have made numerous trips to Cocos to bury treasure. The third, and most famous, is the treasure of Peru, the multi-year tax payment of gold, silver, jewels, and gold icons, acquired by a Captain Thompson by duping the Spanish authorities in Lima; the treasure was buried on Cocos in 1821 and became known as the *Mary Dear* treasure. Over the years, a number of maps were discovered, all said to be authentic, usually leading to ill-fated treasure hunting expeditions, often by celebrities, that came up empty handed.[85]

In Autumn 1929, Commander McDonald acquired the original documents of the Pacific Exploration and Development, Ltd., a treasure hunting group formed to find the Cocos Island treasure. Among the sworn testaments and historical information was a map purported to show the location of the *Mary Dear* treasure. On December 27, 1929, the *Mizpah* left New York for Miami, Havana, Panama, Cocos, and the Galapagos Islands. The crew consisted of Doctor Baker Brownell of Northwestern University; Major Charles Hanna, former Mayor of Syracuse, New York; Dr. George Fox, President of the Michigan Archaeological Society; and McDonald's friends "Reverend" Fitzgerald and "Sir" John Locke. They were joined by U.J. "Sport" Herrmann in Miami.

After a short stay in Cuba and Panama,[86] the *Mizpah* anchored in Chatham Bay, Cocos Island, on Thursday, January 14. The group explored the island and hunted for treasure for five days without success, in spite of using large quantities of dynamite. McDonald experimented with a self-invented treasure hunting device for use on this expedition that used radio waves to detect gold. The humidity of the island, however, saturated the coils of the device, rendering it useless to detect gold. McDonald then perfected a method of protecting the coils from the humidity so that the device would work on future expeditions, and thus developed humidity-proof coils.[87] While anchored in Chatham Bay, the



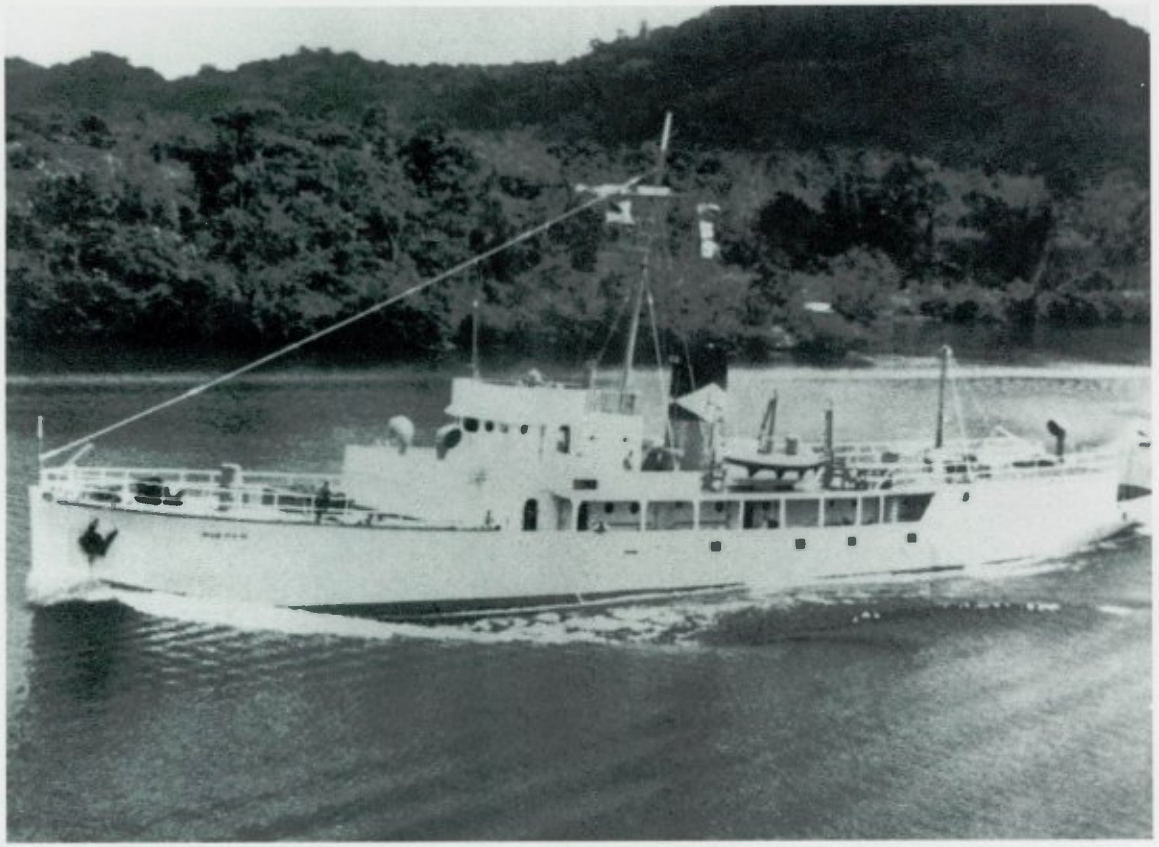
Copy of McDonald's treasure map for Cocos Island. Courtesy of Zenith.

Mizpah was joined by the Fleischman yacht, *Camargo*, and the Kettering yacht, *Olive K.*. At 5:00 AM on Monday, January 20, the *Mizpah* left Cocos Island for Tower Island, 360 miles to the south, in the Galapagos.

On Tuesday, January 21, the *Mizpah* dropped anchor in Darwin Bay, Tower Island, after a perfect run from Cocos Island. The next morning the *Mizpah* crossed and recrossed the equator and anchored in Tagus Cove, Albemarle (Isabela), for two days of exploration. On Friday morning, January 24, the *Mizpah* moved to Charles Island (Santa Maria), and anchored in Post Office Bay. The unusual name for the Bay came from the presence of a post office barrel on shore. Mail was left in the barrel by any passing ship and picked up by another for forwarding.

By visiting the post office barrel, McDonald stumbled onto a plea for help from a reclusive German couple[88] who had come to the Galapagos to establish Eden. His unintentional discovery of the couple electrified the world and touched off a five year series of events which rivaled any story found in modern tabloids and kept McDonald's and Zenith's name before the public constantly. The full story is found in "Satan Came to Eden" by Dore Strauch (Koerwin).[89] The events of Sunday, January 26, the day the couple was found, are best recounted by McDonald himself, as he did in the foreword to "Satan Came to Eden":

> While on a cruise to the South Seas in my yacht *Mizpah* in the winter of 1930, I put in for a day or so at Post Office Bay on the rocky coast of Floreana, or Charles Island in the Galapagos group. This island, just a few miles south of the equator, was supposed to be uninhabited. The bay was empty. A barrel, which has served this part of the Pacific as an unofficial post-office since early whaling days, stood on the shore. I had heard of this famous barrel, so went ashore with my guests to investigate. In the barrel we found a note in German directed to the master of any vessel that might anchor. Two people were on the island, we learned from the note. They were short of food and had been forced to move inland for water. One of them was injured. They requested the master to sound his whistle or fire a gun and they would come to the shore. We blew out whistles and sirens, fired our one pounder, and played our searchlight over the island during the first night, but no one appeared.
>
> The following morning I organized four searching-parties made up of my guests and ship's officers and started them out in different directions to search the island. One of my searching parties headed by Baker Brownell of the Northwestern University faculty, who incidentally was the only man among my guests who knew German, found Dr. Frederick Ritter and Dore Strauch. They were well inland, about an hour's march on a faint trail through the desert brush and over broken lava rock, but had heard our gun and were headed towards the shore. They were dressed in ragged clothes and their shoes were cut to pieces by the rocks. They greeted joyfully the little group headed by Mr. Brownell.
>
> Mr. Brownell brought them out aboard the yacht. We had a long talk with them and got part of their story. They had come to the island about five months before, well supplied with food, but they had been forced to move inland to the mountains because of the shortage of water. They had left most of their stores in a cache near the beach. These stores had been stolen by men from some vessel, perhaps a fishing boat. Without medicines or antiseptics, with no guns, very few tools and almost no food, Dr. Ritter and Dore were in a bad way. She had fallen on the sharp lava rocks and had cut her knee to the bone. This almost disabled her. He had injured his arm and side in a fall through the branches of a tree. The red-bearded doctor, about forty years old, and the young and beautiful girl could probably not have kept going much longer. We gave them enough supplies for a year or more-food, medicines, tools, a rifle, pickaxes, shovels, even dynamite, for among our other adventures we had been digging for treasure on Cocos Island; and then we sailed away.
>
> As we left the island I sent a radio gram from my yacht to Jim Foster of the Associated Press, telling him of our experience. This was the first news that came to civilization from the Galapagos Islands about the Ritters...[90]



The Mizpah *on Gatun Lake, Panama Canal.* Courtesy of Zenith.

Frau Dora Strauch (Koerwin) and Dr. Frederick Ritter on the day of their discovery by McDonald. Courtesy of Zenith.

The treasure hunting crew on Cocos Island. Left to right: Gene McDonald, Syracuse Mayor Charles G. Hannah, Dr. Baker Brownell, L.C. "Rev." Fitzgerald, Dr. George Fox and "Sir" John Lock. Not shown is U.J. "Sport" Herrmann; his dog "Rowdy" is shown in the center. Courtesy of Zenith.

Drawn by the publicity associated with finding the Ritters, a number of visitors came to Ritter's Island, including Viennese Baroness Bousequet de Wagner. She brought with her three young men to start a nudist colony and proclaimed herself the "Empress of the Galapagos." The baroness, who was said to manage her young men "with a whip and a gun," was largely ignored by the Ritters, who were pursuing their harmony with nature plans and the development of "Friedo", their Eden. The "Kingdom of the Galapagos" grew to nine people before the baroness and three of her companions were eventually found dead on other islands. At nearly the same time as the baroness' death, Dr. Ritter, a committed vegetarian, died from eating a diseased chicken. With Ritter dead, Dora Strauch (Koerwin) returned to Germany after five years on Charles Island, to find she was not well received by either her family or Ritter's family.

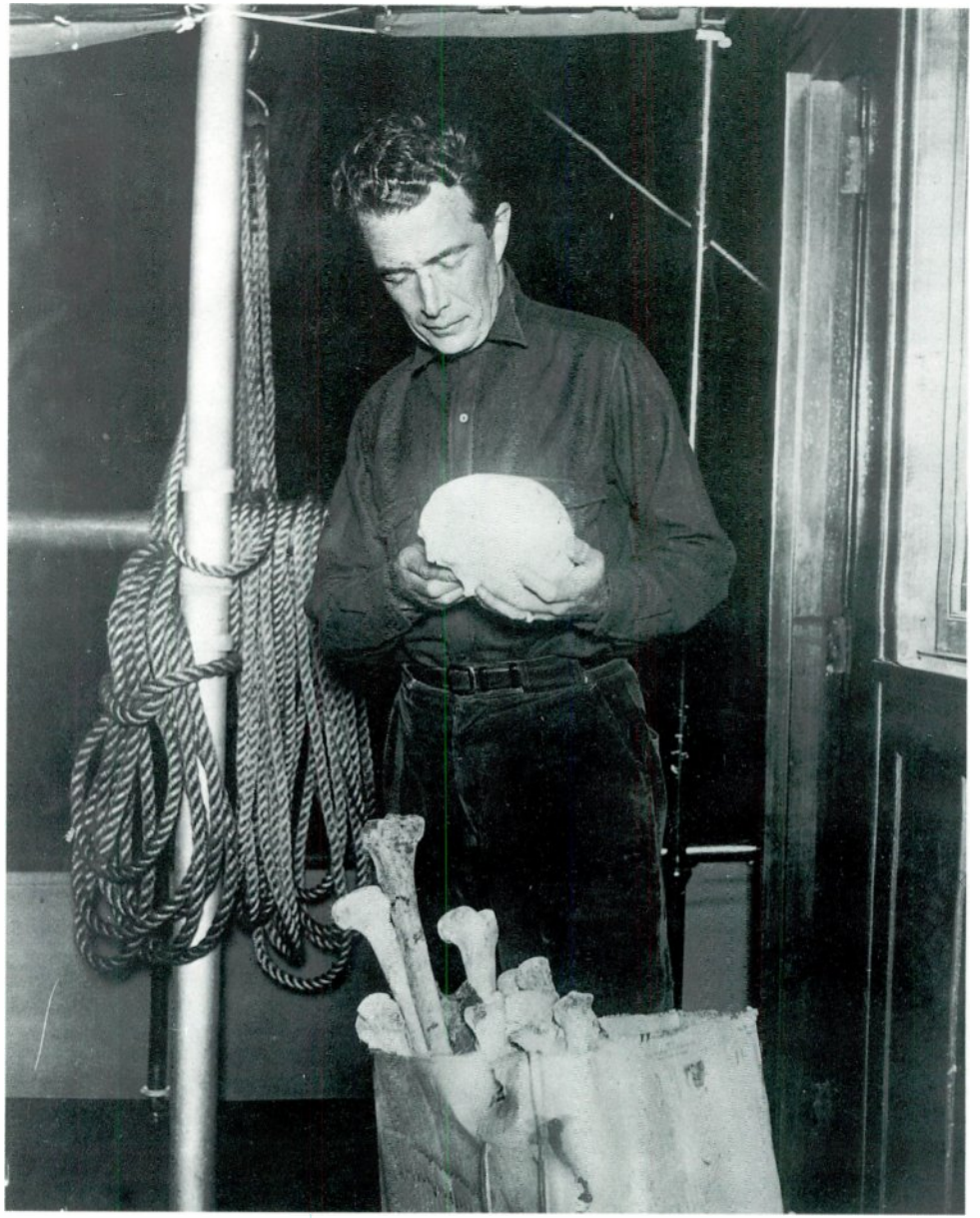
Unaware of what his discovery would bring to the small island, McDonald and his party left Charles Island on the *Mizpah* on Sunday, January 26, and landed at Havana on February 6 and Miami on February 8. At each stop they were stormed by reporters. On the trip from the Galapagos, a penguin, dubbed Charlie Chaplin, was captured for the Chicago Zoo.[91]

McDonald was taken by the beauty and variety of wildlife in the Galapagos. In May 1930, the Commander, along with C.F. Kettering, head of research for General Motors and Gifford Pinchot, a well known forester from Pennsylvania, proposed that the Galapagos Islands be purchased by a consortium of 400 businessmen and sportsmen and preserved for all times as a wildlife refuge.[92] Although this proposal received editorial support in the United States,[93] the idea was not acceptable to Ecuador, which, although interested in selling the islands, was not interested in selling them to individuals in the United States; they deemed it a form of "Yankee Invasion."[94]

THE GEORGIAN BAY ARCHAEOLOGICAL EXPEDITION—1930

The Georgian Bay Archaeological Expedition departed Chicago on the yacht Mizpah on Friday, August 1. 1930, under the auspices of the Edward K. Warren Foundation Museum of Three Oaks, Michigan. The party was composed of Commander McDonald, Dr. George Fox of the Edward K. Warren Foundation, Dr. Alvin LaForge, a Chicago physician, Dr. Hiram Hawley, and Harold Strotz. For hundreds of years the Jesuits in the Georgian Bay District guarded the multitude of Indian Mounds in their district and in 1930, Father Papineau gave McDonald and his expedition permission to perform archaeological studies. The expedition made its headquarters at Little Current, the major city on the northeastern end of Manitulin Island, Ontario, Canada. Dr. R.B. Orr of the Toronto Museum joined the expedition at Little Current. The extensive archaeological materials unearthed during the expedition were returned to the Warren Museum Foundation and the Toronto Museum for study and cataloging.

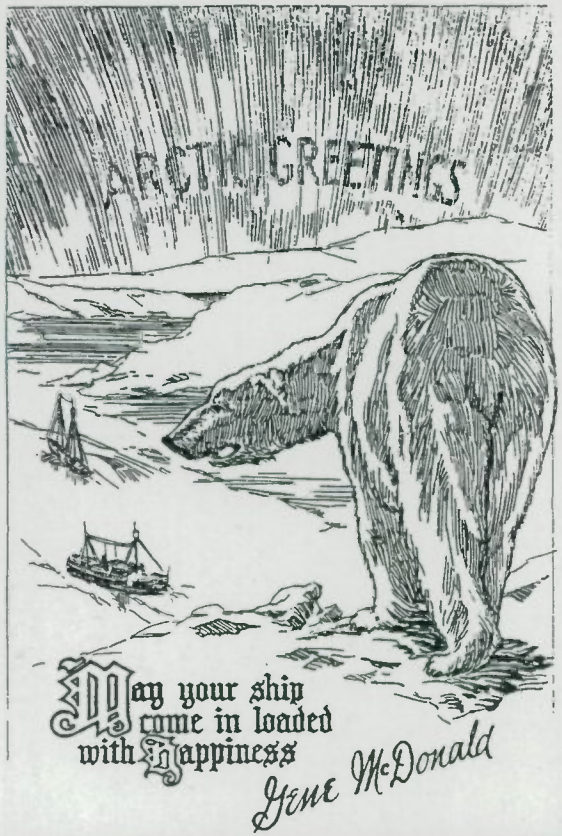
E.F. McDonald, Jr. was fascinated by geography and exploration. His adventures in pursuit of the unknown were not only rewarding to him, but also to science and to humankind. His flamboyance resulted in Zenith Radio Corporation receiving maximum publicity from each event. As McDonald's life became too full for long expeditions, he supported the adventures of others. His quest for answers to the unknown most likely carried over to Zenith product development, McDonald feeling that most everything was possible if enough work was put into it. Reflecting his interest in exploration, McDonald was a fellow of the Royal Geographic Society of London and a member of the Explorer's Club of New York.



McDonald and relics from the Georgian Bay dig. Courtesy of Zenith.

MCDONALD'S YACHTS

Many of McDonald's adventures were undertaken on his yachts. The most famous, the *Mizpah*, was tied up in the Chicago River and served as McDonald's home; a home ready to leave with short notice.

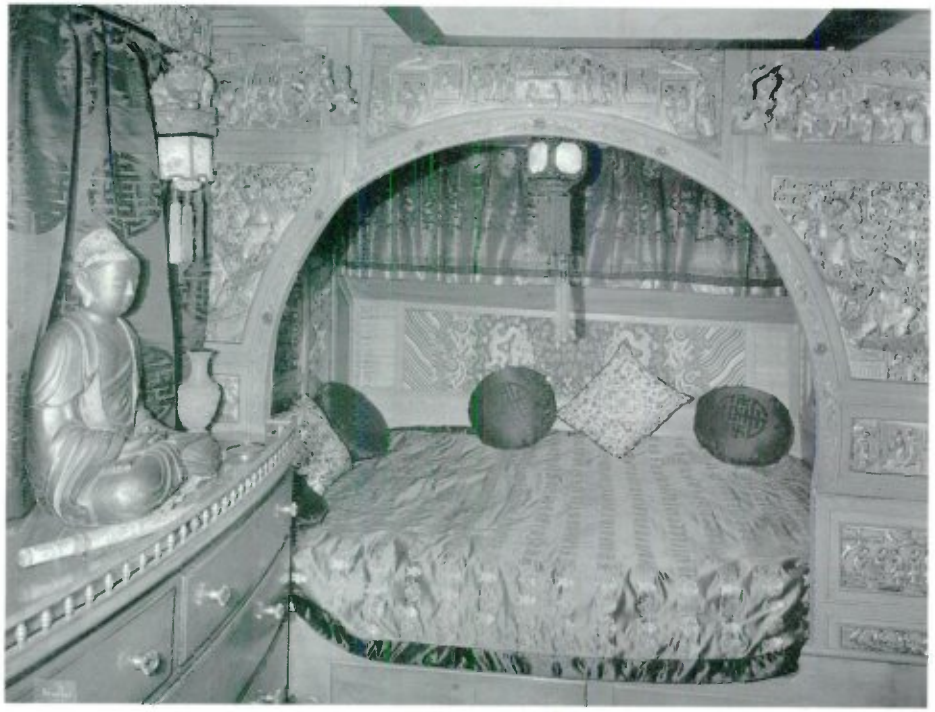


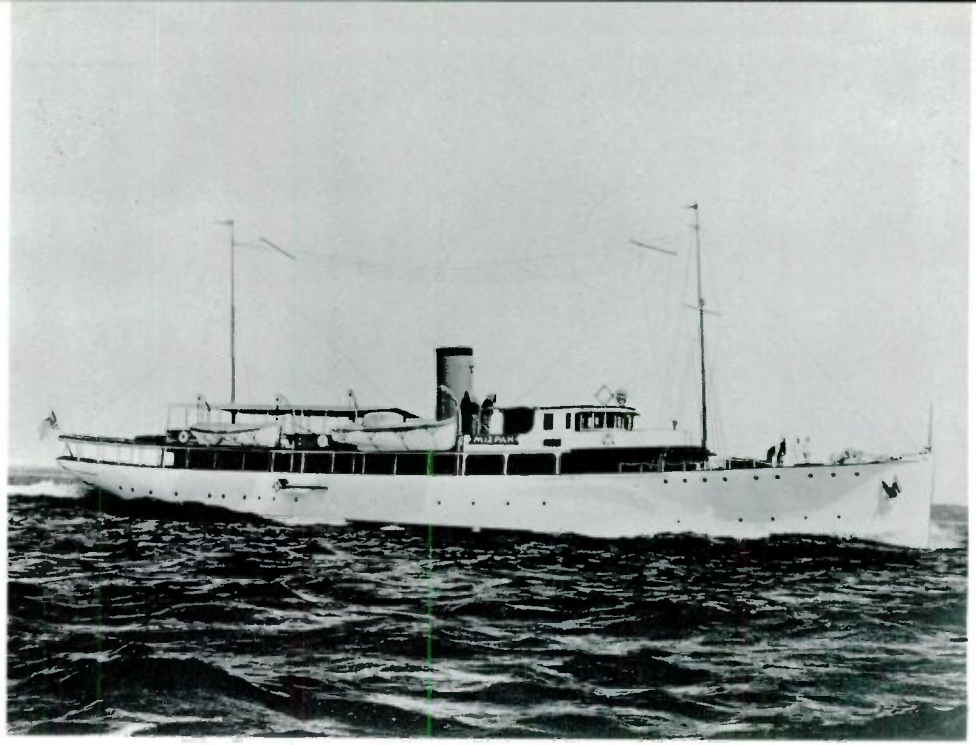
McDonald's Christmas cards often reflected the current events in his life. The 1926 card highlighting the Arctic adventure is shown at left and the 1930 card showing the Cocos Island trip is below.

Above: Zenith, *McDonald's first large yacht, 1925. It is reported that McDonald owned a series of 23 boats during his life.* Courtesy of Zenith.
Below: *McDonald and friends on board the* yacht Zenith. Courtesy of Zenith.

Left: *The yacht* Zenith *had three staterooms, each with a different decor, designed by McDonald's lifelong artist friend Pierre Nuyttens. One bedroom was designed with an Arctic theme, one with a yachting theme and one with a Chinese theme. This is the Chinese bedroom. The two large beds mimic the bed of the Dowager Empress Tsu Hsai in the later half of the 19th Century.* Courtesy of Zenith.

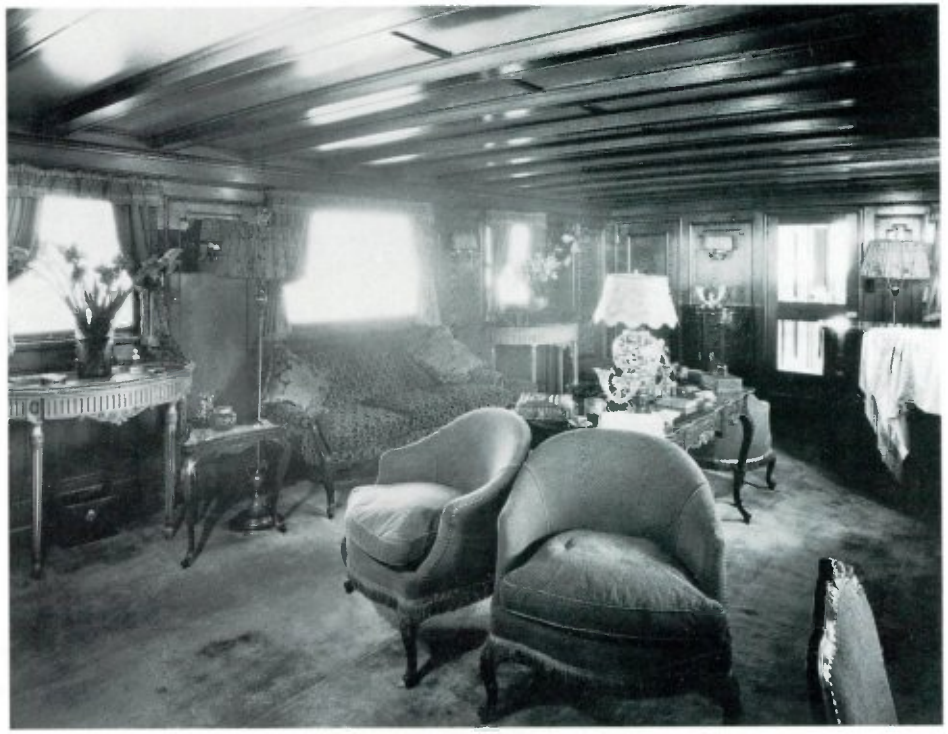
Below: *The Chinese bedroom, yacht* Zenith. *This view highlights the handcarved wooden screens.* Courtesy of Zenith.





Above: *The 185' yacht* Mizpah. *When the U.S. Navy abandoned plans to build a group of new destroyers at Newport News Shipbuilding and Drydock Company, Newport News, Virginia, after the Washington Naval Conference in 1921, the shipyard turned the already acquired materials into other ships. One of the ships was the 185 foot Yacht* Savarona, *launched in 1926. McDonald purchased the* Savarona *in 1929, renamed it* Mizpah, *and cruised world wide until he gave it to the Navy in 1942 for wartime use.* Courtesy of Zenith.

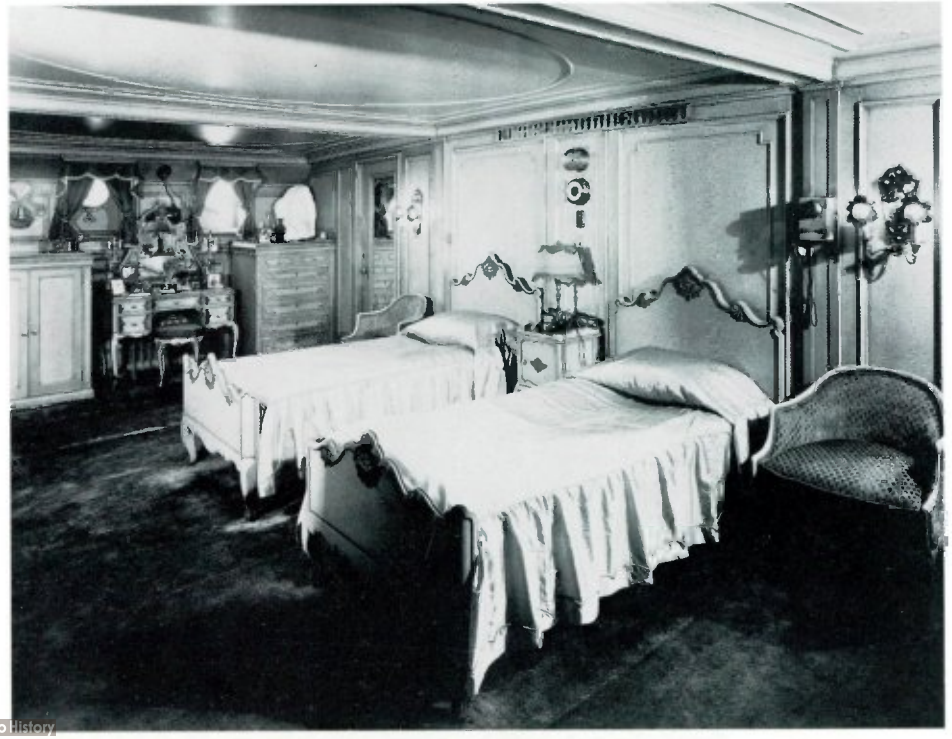
Below: *Yacht* Mizpah *and Chicago skyline. The Yacht typically carried a 20-man crew.* Courtesy of Zenith.



Above: *The Living Room, yacht* Mizpah. Courtesy of Zenith.
Below: *Master stateroom, yacht* Mizpah. Courtesy of Zenith.

Above: *Although the expenses of the* Mizpah *were paid out of McDonald's private funds, not those of Zenith Radio Corporation, the yacht was used frequently for employee and distributor cruises, often resulting in souvenirs such as this photograph.* Courtesy of Zenith.

Left: *Commander Eugene F. McDonald, Jr., aboard the* Mizpah. *This picture was used frequently to illustrate articles in boating magazines about McDonald and the* Mizpah. Courtesy of Zenith.



Chapter 6

SURVIVING THE DEPRESSION

The Depression and its ramifications had profound effects on virtually every aspect of the American social and economic fabric. Understanding what led to this major economic collapse is not easy; the causes were many and convoluted. One of the most significant factors was the change in levels of productivity due to the smooth flow of materials and the role of the worker brought about by the new moving assembly lines. Packaging and distribution moderated uneven production and workers were better trained for their tasks. With factory output greatly increasing and goods becoming more plentiful, prices began to fall in the mid-twenties. The National Manufacturers Association announced in January 1929 that nearly half the country's factories were operating at a loss, with manufacturers producing far more than consumers could buy. Although a problem, it was generally felt that consumer demand would rise and increasing production would become a blessing rather than a curse. Experts reasoned that many markets still needed to be satisfied: nearly all farms lacked electricity, two-thirds of homes lacked washing machines, 95 percent lacked refrigerators, and 70 percent still had no radio.[1]

Many consumers were reluctant to spend money, realizing that wages and interest were not rising at the same rate as the economy. Prior to the twenties, average people, no matter how wealthy or poor, kept their money in bank accounts earning very modest interest. As earning power dropped, people began seeking investments that paid higher interest, rather than spending surplus income on goods and services. A general mood of speculation swept the country, fired by the California land boom of the early twenties and the Florida land boom of 1925. Land speculation often led to wealth (or bankruptcy) and the thrill of such ventures was still fresh when a 1926 hurricane put an end to the Florida land boom. Investors looked for other "get rich quick" schemes and turned to the stock market; and there was money to be made dealing in stocks. Stock genius Michael J. Meehan, for example, drove the price of RCA stock from $90 to $109, quickly sold out and netted $5 million for his investors. The stock then returned to $87.

Stock market transactions began an upward spiral of dizzying proportions and by 1928 the Bull Market was frenzied—in 1927, 577 million shares were traded on the New York Stock Exchange, by 1928, the figure rose to 920 million.[2] Zenith Radio Corporation increased its number of stockholders from 250 in April 1928 to 2750 in April 1929.[3] RCA stock, selling for $85.25 in early 1928, rose to $114.75 by September 1929, splitting 1 for 5 along the way, resulting in a 600% increase in value in 18 months.[4] In addition to a number of relatively low cost "regular" stocks, the market of 1928-1929 carried a large number of stocks selling for $400 or more. The frenzy was intoxicating and average citizens were drawn into the market in ever-increasing numbers. Stock was bought on "margin", requiring a buyer to put up only 10% of the selling cost, the remainder paid through broker's loans: broker's loans had reached $8.5 billion by September 1929. Over 500 bogus companies that did nothing—existing only on paper and stock certificates—were listed in 1929 and their value soared along with that of the legitimate companies. A significant portion of the world's capital was drawn into the highly speculative U.S. stock market.[5]

The market started to slide in September 1929, foreshadowing what was to happen in October, but the indicators were generally ignored by investors. On the morning of Thursday, October 24, 1929, however, brokers opened their doors to overwhelming sell orders: 12.9 million shares were traded and stock prices were in a major slide by the end of the day. The following Friday and Saturday were calm, but on Monday morning, 9.9 million shares were traded for a loss of $14 billion; on Tuesday, 16.4 million shares were traded for a $16 billion loss, bringing the monthly loss to $50 billion. Historians would herald October 24, 1929, as the day the stock market crashed. Brokers could not repay their loans and many thousands who were wealthy at the beginning of October were destitute by its end.

The repercussions of the Crash affected virtually all facets of the economy and all but the very lucky found themselves with less purchasing power and fewer goods from which to choose. As companies closed and massive unemployment resulted, consumer purchasing power was further reduced: the "Great Depression" had arrived.

The radio industry, with many young companies still juggling for position, was thrown into chaos. The radio market bottomed out and many marginal companies closed almost at once. More stable companies had to reduce production to meet the greatly decreased demand. Zenith's Michigan Avenue offices were closed, all operations were consolidated in the plant on Iron Street and product planning was regeared to meet the austere times. Large sets were gradually replaced by smaller, lower priced models. Employees were asked to tighten their belts along with management.

At the annual meeting of Zenith stockholders held on June 24, 1930, Paul Klugh explained to those present the impact of the first nine months of the Depression on Zenith. The text of his speech is presented here in its entirety since it not only explains its topic, but also reveals much about the Zenith marketing philosophy, how the Corporation viewed itself, and the reasons for introduction of a "lesser Zenith":

> The past is, of course, an open book. You have all been mailed copies and, I assume, have read President McDonald's Annual Report. If you read it with some care you know that we have been through a tough year. In fact, it was a whole lot tougher than the report would indicate. I recall very distinctly, and I don't think that I will ever forget, that on the 23rd of October we turned out 2300 sets. On that day we had a number of our wholesale distributors living in hotels here in Chicago who believed that the greatest service they could perform for their respective corporations was to get radio sets shipped from the factory to them. There was a great shortage—everybody wanted radio sets. I don't think these gentlemen accomplished anything by living here and trying to induce our Sales and Shipping Departments to ship them more radio sets than they would normally have received, but at least they thought they did. On the 24th of October came the crash in the stock market and on the 25th we looked around for these distributors. They had folded their tents, like the Arabs of old, and stole away during the night. From then on it was just a hard "row to hoe". We had intended to reach 2500 sets a day on the 1st of October, but due to one thing and another we didn't get there. As I have said we finally got to 2300 sets on the 23rd of October and in the meantime we had accumulated a little surplus of raw materials—the difference between what we had purchased and what was being shipped in radio sets. We had ordered the raw materials on the basis of 2500 sets a day, starting October 1st. The resulting small accumulation did not worry us.
>
> After the 25th our distributors started to hold up shipments and, within a short time, we were reduced to 300 sets a day. Materials were, however, coming in on the basis of 2500 sets a day and this resulted in a very serious situation and one that took all of the resources of the company and the ability of its officers to meet. We went into the end of November with an inventory so large that it was just staggering, and very little going out. Fortunately, this inventory was all made up of raw materials, lumber, veneers, steel, copper, wire, et cetera, because, as you probably know, we manufacture our cabinets and most of the important elements going into Zenith sets. Thru great care in the making of our parts, we are able to control the quality of our sets which, of course, is our paramount purpose. Zenith holds a high position with the public, based upon good products, well made, satisfactory operation and highest possible grade. We have accumulated in the years that we have been in business, and I may say that we are one of the oldest in the radio industry, a lot of prestige and public esteem.

At the end of October our inventory and commitments amounted to $5,227,621. Some of our smaller suppliers would have been forced into bankruptcy if we had refused to take delivery of their products. We did the best that we could under the circumstances and gave everyone a square deal. It was decided to stop manufacture of our "50 Series" receivers on December 12, 1929, and to start on December 15, a new line of "60 Series" sets which we had in preparation and to make our lowest retail price $155.00 on a standard sized receiver. This was a lower price than the class in which Zenith belonged, but it was considered by your officers good judgment to do anything and everything within our power to make sure of liquidating the inventory and our bank loans, indebtedness and liability on commitments which was $6,603,909.

Our "60 Series" was a big success and, as the result of shipping this series starting January 1, we were enabled to complete the payment of our bank loan of a million dollars by March 15, which was fifteen days before it was due, and to end our year with an inventory of a little over a million dollars, which is a normal inventory for a business of the size and magnitude of Zenith. All of this was paid out of our regular business and not out of the sale of 100,000 shares of stock, the proceeds of which came into our hands in late May, 1930, and which will be available as needed in financing the business which we expect during the coming year.

While our fiscal year was not good from the standpoint of profits, the year was finished in a manner which, we believe, was creditable. Inasmuch as the year was a bad one, we thought that we had better get everything behind us, so we charged off and depreciated everything we could. Those charge-offs and depreciations were substantial. Among other things, the broadcasting station was reduced to one dollar on our books, as an examination of our annual statement will show. We are preparing for a year which we believe will be very good for Zenith and we want to give it every advantage. Of course, when I say this, it is predicated upon the theory that general business will be satisfactory this year. Some of the best informed people believe that a major revival of business will take place this fall. If this be true, such revival will occur just when the radio business is at its best. We will, therefore, be in step with it, in which respect we are more fortunate than the automobile business which has its peak in the spring. Whatever the volume of radio business, you may be sure that we will get our share.

We have 54 wholesale distributors in the United States. They are the pick of the jobbing trade and the envy of other manufacturers. We seldom make a change and are noted in the trade for our loyalty to our jobbers. Most of them have been with us for years. These 54 jobbers sell to 6000 franchised Zenith dealers. Our wholesale distributors give us firm and non-cancelable [*sic*] orders for their requirements. We, however, have learned from experience that a jobber's orders are only as good as the purchasing power of the public. At the time of the stock market crash last October, we had orders from our jobbers for many thousands of Zenith sets. Soon, however, cancellations [*sic*] came in. You can't make a jobber take what he can't sell. Therefore, in operating our factory, we treat jobbers' orders as an index of their requirements, but we make up our own minds as to the amount of merchandise which we will make and it is always much less than the jobbers' orders. This conservative policy has worked out satisfactorily and Zenith has never had overstocks and distress stocks to sell after the close of the season. Zenith models are, therefore, never reduced in price. Our prestige is maintained and our quality never reduced. We have preserved our good reputation and trade standing and have our best year ahead of us.

Other manufacturers had a stormy career last year. A large number became bankrupt. Others carried stocks of manufactured sets over January 1st which were properly called "distress". It is said that one prominent manufacturer carried more than 300,000 sets over and had liquidated them far below actual cost at a loss estimated to be approximately six million dollars.

Zenith has no stock of manufactured sets to carry over. Our inventory is composed of raw materials. All obsolete materials have been charged off, we have dies and tools. We have depreciated all of our machinery.

Dealers look with favor upon Zenith merchandise for three principal reasons. First, they have found that it costs an average of $43.00 to sell, install and service a radio set. They now know that they cannot make a profit selling $100.00 outfits. This leads them to Zenith because with its minimum price of $185.00 they have a profit. Secondly, dealers are sick and tired of going to bed with their stock of radio sets worth what they paid only to awaken the next morning to find that they are worth fifty cents on the dollar because of price reductions by manufacturers. And third, imagine the embarrassment of a dealer when confronted by one of his customers who has bought his radio upon installments and finds that after making his down payment and several monthly payments, that he still owes a larger balance than he could buy his same set new, after it had been cut in price by the manufacturer. How can that dealer square himself with the customer? It can't be done. But with Zenith, the dealer is never placed in this position. Zenith does not overproduce and does not reduce prices. The dealer, therefore, turns to Zenith.

Your officers and directors have not been unmindful of the desirability—in fact, I may say the necessity of having a more moderate priced line of radio sets than the Zenith line, but which will sell at a high enough price to enable the dealers to make a profit. We are aware that a large market exists in the price field I am now discussing, but the problem has been how to reach it without interfering with or injuring the volume of Zenith business. We know that no manufacturer can produce radio sets of Zenith quality and sell them at a lower price than we sell Zenith sets. In this moderate priced line, therefore, it is not our intention to attempt to give Zenith quality or Zenith performance because it can't be done. It is our intention, however, to offer to the public a grade of radio which is above its price class in performance and tone quality. It will not be a Zenith set, but it will be the best set in its price class. We have an insistent demand from our wholesale distributors and dealers for a Zenith Junior line and we are of the opinion that our business can be augmented by the addition of this line without interfering with our regular business.[6] We are, therefore, negotiating for the acquiring of facilities to produce our Junior Line. It will not be sold under the Zenith name, but will bear a new trade-mark and the statement "Made by Zenith". It is proposed to have these sets ready during August and I may say, ladies and gentlemen, that if we had these sets ready today, we could start shipping in large volume and without adding one cent of extra expense in overhead for the selling and distributing of this Junior Line.

Your officers have also devoted considerable attention to another matter having to do with an extension to our line during the coming year. It is our ambition to provide Zenith dealers with Zenith products, other than radio, of a character which will permit the dealer to operate the year around on a profitable basis. While we are not prepared to make any announcement at this time, we are prepared to state that we have been negotiating for what we consider to be a very satisfactory device for this purpose.

I have said that we have 6000 Zenith dealers in the United States. Naturally, they may be cataloged as good, bad or indifferent. Many of these dealers handle other makes of radio sets besides Zenith. It is our hope, within the next few years, to develop 3000 Zenith dealers to handle Zenith products exclusively.[7] It is, therefore, our intention to add to the Zenith line of products, as the opportunity presents itself, so that we may accomplish this end. We want Zenith dealers to be exclusively Zenith—to sell nothing but Zenith products and to make their profits out of Zenith.

Before I conclude, I want to mention one other point. It has come to our notice that certain concerns having stock to sell (frequently of a questionable character) have circularized some of our stockholders, advising them to sell their Zenith stock and to buy the stock which they are offering. Just how these wily fellows came into possession of our stocklist, we do not know, but we do want to caution our stockholders against being impressed by statements made by concerns whose motive is to sell their own stock. It is an old device to speak in disparaging

terms of some stock for the purpose of unsettling the stockholder and with the hope of selling some other security which frequently is of much less value than the stock paid.

In conclusion, and on behalf of our officers and directors, I want to thank you for the fine support which you have given Zenith during the past year. No better demonstration can be given of the confidence which our stockholders have in our Company than their subscribing and paying for 94,000 shares out of the 100,000 shares of new stock offered a short time ago. The remaining 6,000 shares were taken by the underwriters.

We appreciate your coming to this meeting and we hope you have a better understanding of the property in which you have invested your money than before you attended.[8]

Zenith was first listed on the Chicago Stock Exchange in March 1928[9] and on the New York Stock Exchange in July 1929. The sale of 94,000 shares of stock near the onset of the Depression provided Zenith the necessary capital (about $1,000,000 according to Hugh Robertson[10]) to, with proper management, ride out the rough times. Employees and management were asked to take two salary cuts and a major layoff was averted, allowing many Zenith employees to ride through the tough times.

As a consequence of the Depression, rumors of mergers began at once to sweep the radio market.[11] In late 1929, it was Zenith, Crosley, Majestic, and Atwater-Kent that were rumored to be merging; in late 1930, it was Zenith and RCA that would merge. In a letter to the *Chicago Herald & Examiner* reporter that "leaked" the RCA merger story, Commander McDonald said, "I am seriously considering leasing the Stevens Hotel for the Zenith Radio Corporation to house its 'rumors'."[12] None of these rumors, of course, were true, although Zenith's enviable financial situation, with a million dollars from the sale of stock, most likely was coveted by other radio manufacturers.[13]

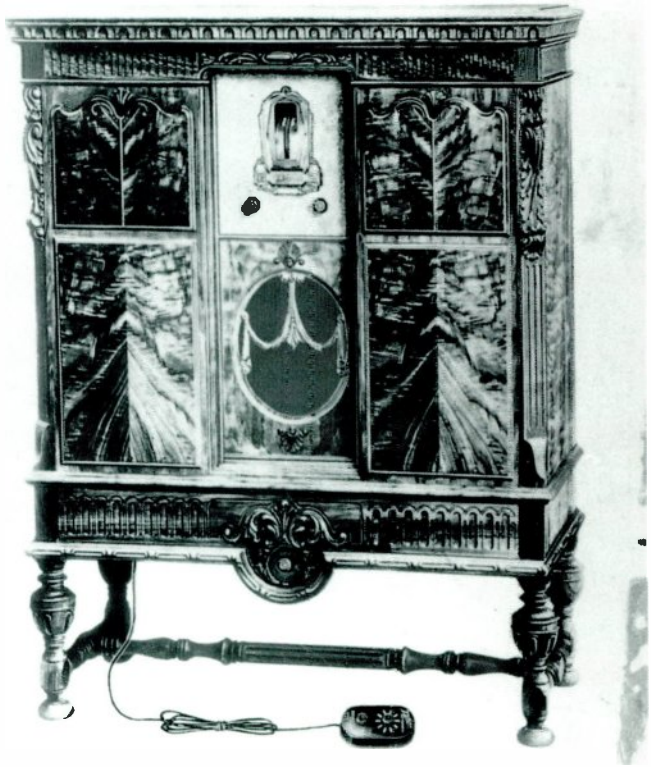
In an effort to stimulate sales, McDonald personally launched a campaign to convince the public that radio was not a luxury during the Depression but a necessity. Through a series of letters to other executives and articles written for the public, McDonald argued that radio was "the most economical entertainment known."[14] McDonald sent free tickets to the Ninth Annual Chicago Radio Show to a number of friends and business leaders during October 1930 and included a letter stating his philosophy:

Enclosed you will find a ticket admitting two to the Ninth Annual Chicago Radio Show, which I wish you would accept with my compliments.

In the past year, financial editors and statisticians writing for such well-known periodicals as The Wall St. Journal, Chicago Journal of Commerce, Barron's Weekly, Standard Statistics, and other financial publications have insisted on listing radio among the luxuries. These articles have been quoted generally but the newspapers throughout the United States. In truth and in fact, radio is the world's greatest and most economical form of entertainment and brings important and much needed information in the form of spot news instantly to our people. It is a necessity and not a luxury.

There is no time that the American public demands diversion and entertainment more than in a period of general depression. Not only does radio contribute to the satisfaction of human desires and requirements for diversion and entertainment, which, in itself, would import its necessity, but it is a most potent factor in the world of progress. Progress is dependent upon the interchange of intelligence. Radio, with its unseen voice, reaches into isolated as well as congested communities, exerting on everyone an influence, humanitarian, educational, cultural and social that is just beginning to be understood. It even reaches those who can neither read nor write. It is a fallacy indeed to think of radio as a luxury or mere amusement.

Seventy-five Million Dollars worth of entertainment per annum is flowing over the roof of everyone's home here in America. What greater economy than to have the highest paid artists come into our homes for less than one cent an hour, which is the actual cost of operation of



Zenith Model 55 with remote control, the top of the Zenith line at the beginning of the Depression. Courtesy of Dale Goodwin.

radio sets. One evening at the theater with the average family costs more than one year's entertainment with your radio at home.

Radio sets purchased today are permanent investment which will pay greater dividends in the form of education and entertainment than anything else.

I sincerely trust that you can attend the Chicago Radio Show, personally, but if you cannot, I would like to have you send some representative that will report to you, both the progress that has been made in radio and the interest of the public in this show.

Radio is a necessity.[15]

In September 1930, probably in response to tight money, Zenith announced that it would begin licensing its patents governing the design and manufacturing of automatic and remote control apparatus.[16] The royalty plan ranged from $2.50 per unit to $1.00, depending on the quantity of the radio. The first licensee was Utah Radio Products, who then marketed a remote control unit that could be installed in a variety of radios. McDonald's letter to Zenith distributors explained, "Zenith's engineers have had submitted to them by various manufacturers, numerous devices for automatic remote tuning and have found the remote automatic tuner produced by the Utah Radio Products Co. to be of superior construction, correct design, simple in operation, reasonably free from service and adequate for the purpose. This, and the fact that the Utah Radio Products Co. is in production and prepared to supply all other manufacturers with remote control units, are our reasons for licensing Utah first."[17] Zenith's press release stated:... "The Zenith Radio Corporation, for a number of years, has been purchasing and acquiring every patent recommended by its patent council, and now feels that it has secured the group of patents which dominate all forms of automatic and remote tuning...[18]

Zenith stock dropped to a new low of $2/share on the Chicago Stock Exchange in response to generally lower national sales in late 1930; however, according to the *Chicago Daily News*, the market price was high enough for the probable gross sale volume expected by Zenith.[19] McDonald received a number of letters[20] from worried stockholders urging him to support the stock by purchasing additional shares himself, but Zenith's financial stability caused stock values to rise naturally.

In a letter to his friend Norbert Baumer, Vice President of the A. Gross Candle Co., Inc., Commander McDonald commented on Zenith's financial state at the end of December 1930:

I am glad to know that your business was good. Ours was not, but we finished up the year in the most wonderful liquid cash position of any of the radio companies. The statement we put out in December was as follows:

Cash in bank	$1,014,105.00
Receivables	407,661.00
Inventories (Materials only)	475,725.00
Total Current assets	$1,897,491.00
Accounts payable for merchandise (not yet due)	131,358.00
NET CURRENT ASSETS	$1,776,133.00

The Company has no bank loans, preferred stock or bonded indebtedness.[21]

During the first 18 months of the 1930s, Zenith introduced five separate lines of radio receivers: the 40 Series, 50 Series, 60 Series, 70 Series, and the little known "Super 8" Series. The 40 Series was a truncated series of only two radios (41 and 42) with a transitional seven-tube "F chassis" containing a mixture of traditional TRF and TRF/screen grid tube amplification. The new 50 and 60 Series shared a common chassis and several massive console cabinets and sold from $188 to $750.[22] These two series contained such features as "specially built screen-grid circuit, automatic tuning, double push-pull audio, remote automatic control, super-sensitivity for long distance and super-selectivity for city use." The 70 Series introduced Models 71, 72, 73, 74, and 75. Models 72 and 73 had automatic tuning and Model 74 had remote control tuning. Model 75 was a radio-phono combination incorporating an automatic record changer; it sold for $575. In late 1930, Super 8 console Models 10, 11, and 12 were produced and priced from $155 to $175. Zenith also began production of its own power transformers in 1930.

What Was Everyone Listening To?

Radio sales soared almost from the very inception of radio. What was everyone listening to? The earliest radio shows were primarily an exhibition of radio's novelty—the reading of a poem, a brief speech, an instrumental selection, or a song—just to show it could be done. At first, entertainers were unpaid, especially at the small rural stations, and frequently just about anyone in town who had talent was drafted into radio. Since these volunteers often came from outlying areas, weather could affect scheduling as much as electricity. Soon to join in the radio broadcast boom were educational institutions that delivered a steady diet of lectures, extension courses, newscasts, weather reports, and farm news. Chain or network broadcasting (which is generally agreed to have started when WNAC-Boston and WEAF-New York both broadcast a saxophone solo from WEAF in January 1923) greatly diversified programming by broadening its base. Sporting events, which often originated from "remote" locations, were popular fare. By the mid-1920s, radio programming consisted of talks, music, and an occasional celebrity, but had improved enough, and was beginning to develop enough variety, that people were listening to radio for actual program content rather than just for novelty. J. Fred MacDonald, in *Don't Touch That Dial*, attributes the appearance of *Amos 'n' Andy* in August 1929 with the general realization that audiences wanted a change from music and speeches to innovative programming. There is no doubt that radio was an escape in the early days of the Depression and the knowledge that a vast audience was involved helped to spur innovation. With innovation came radio theater, comedy (often in teams), orchestra and dance music, and the slow emergence of Radio's Golden Age.

A letter to Zenith stockholders from Commander McDonald, dated June 6, 1931, stated:

Although we are primarily producers of quality merchandise, at prices that have heretofore earned fair profits, the trend in radio prices during the past year has been decidedly down, regardless of quality and the low priced so-called "Midget" receivers have more or less dominated the market. To meet this competition, we brought out a line of low priced, quality receivers during January, 1931, under the trade name "Zenette". This enabled us to operate during the last quarter of the fiscal year without loss, which is unusual in the radio business for this period.

A new line of Zenette receivers ranging in price from $49.95 to $125.00 is now in production, as is our Zenith line priced from $155.00 to $229.00. These give us access to wider markets than we have enjoyed heretofore and will, we feel, enable us to operate our factory to at least normal capacity throughout the year and at a profit.

Our new Zenith and Zenette models employ the very latest type of superheterodyne circuits with many special features, developed in our own laboratory.

We have recently made an arrangement whereby all our receivers are now shipped with our own "Zenith Quality Tubes". This provides additional revenue without any investment in equipment or raw materials.[23]

In the eighteen months after the Crash, Zenith had essentially redefined itself, away from being a supplier of radios to the newly affluent and toward being a supplier of quality radios to the full spectrum of the American public. The next three years were a period of intense experimentation as McDonald and the corporate leadership struggled to find a successful combination of quality, models, and pricing by which to prosper in the profoundly different culture of the Depression. In interviews toward the end of his life, McDonald would list this redefinition of the corporation as one of his most important contributions to Zenith.

The new Zenette line was introduced as the focus of the 1931 line. It consisted of two large table model sets (Models A and B) and two modest consoles (Model C and the rare Model D), all based on a common six-tube TRF chassis. A third table model, Zenette Model L, was also introduced with a five-tube TRF design. Two large consoles, Zenith models 78 and 79, were added to the 70 Series Line which continued through the 1931 model year.

The Eighth Annual Radio-Electrical World's Fair in New York in September 1931 reflected the effects of the Depression on the radio industry. *Radio Retailing* for September 1931 reported the show as "less radio for less money...many concerns are out with still smaller midgets—usually embodying 4-tube circuits, including a pentode...the consolette idea is growing, utilizing the midget chassis, priced particularly low, and in cabinets 'not so good'." The article further states that there was still an interest in the high end models and predicted that fall business would be "in the low and high-priced models."[24] The National Federation of Radio Associations gave additional publicity to its fourth annual National Radio Week, held September 21-27, 1931, to help stimulate additional public interest in radio.[25]

By late in the 1931 model year, Zenith had acquired rights to the superheterodyne circuit and began offering Zenettes with this more effective circuit. These models were identified by a trailing "H" added to the model nomenclature: AH, BH, CH, and so on. In an apparent attempt to maintain a position at the top of the market, Zenith added large consoles to the 1932 Line, the models 82 and 89 "Hypermetron" sets[26] and the magnificent 14-tube model 103 "Zenith Ultra." Three other new consoles, each with the newly licensed superheterodyne circuit (Models 90, 91, and 92), completed the 1932 Line.

Zenith, through conservative accounting practices, ended fiscal year 1932 with a ratio of current assets to total liabilities of about 6:1 and cash reserves of $632,424.81. The company had no bank loans and attributed its success to limiting production to sales (the inventory control system initiated by Robertson in 1924).[27] McDonald, Klugh, and the corporate leadership liberally experimented in developing the 1933 Line. The 1932 Line had consisted of just over 20 models, counting Zenettes, based on eight chassis. The 1933 Line consisted of about 140 models based on 19 different chassis. The nine-tube 2031 chassis was used in a bewildering 19 different models, while the two stock chassis, 2037 and 2056, were each used in 16 different models!

The main Zenith 1933 "All-Star Line" consisted of only 15 models based on four or five separate chassis. These units were the only models which received extensive advertising and which, apparently, were produced in significant number. McDonald and Klugh also undertook another experiment by introducing another manufacturing name, the Interocean Radio Corporation, to the public. Radios appeared on the market carrying the Interocean brand name and schematics appeared in the Zenith Corporate Service Manual which carried the Interocean name. All of these sets fell into the Zenith model number series 500s and 600s. It appears that the only difference between Zenith and Interocean models bearing the same number is the small brass plate carrying the "corporate" name and the chassis nameplate. It is pure supposition, but the most logical explanation for this unique strategy was to be able to reduce the price of some models (the Interocean label) while not reducing the price of the Zenith models themselves. In any case, surviving examples of the 500 and 600 series models of either marque are among the rarest Zenith sets.[28]

David Sarnoff, Gugielmo Marconi, and Eugene F. McDonald, Jr. aboard the yacht Mizpah, *1933.* Courtesy of Frank Turano and Zenith.

Zenith also introduced its first automobile radio, the Model 460, in spring 1933 for the summer season. It was an innovative design which placed the dial controls in a small unit mounted on the steering column with the main chassis located elsewhere. The auto radio market remained an important one to Zenith throughout the remaining pre-war years.

The real turn for Zenith began in 1933 when deficits, which had been running at the rate of about $500,000 a year were changed to a $50,000 profit for the fiscal year ending April 30, 1934.[29] At the beginning of 1934, Zenith was the lowest priced radio stock quoted on the New York Stock Exchange; by the end of 1934, it was the highest.[30]

The industry (actually the Radio Manufacturers Association), launched a major recovery program in 1933 to stimulate radio sales and service and help lift the industry out of the Depression. Public interest in radio declined in 1932 and 1933 in response to high unemployment and mediocre programming. The "Radio Prosperity Campaign" occurred September 1-30, and was an awareness campaign designed to reach every set-owner to determine need and sell services. It was followed by "Radio Progress Week", October 2-7. "...Radio Progress Week will serve as a bait for sales. People will be urged to get ready for this week of special broadcasting and it will be a strong incentive right up until the end of September."[31] Radio manufacturing fell under the National Recovery Act and the codes of the National Electrical Manufacturers Association in August 1933 but the affiliation did not interfere with participation in the Prosperity Campaign.

Shortwave

Shortwave programming was being discussed in the radio magazines as early as 1925 but quality shortwave receivers, such as the Norden-Hauck Super DX-5, only became available to the general public around 1930. The market grew slowly at first because of a general lack of knowledge of shortwave programming by the public. By February 1932, however, a *Radio Retailing* article titled "Now Shortwaves are Salable" gave guidelines for selling shortwave and suggested that the market was rapidly growing. The real boost for home reception of shortwave came in November 1933 when the Byrd expedition went to Antarctica. The Columbia chain stations carried broadcasts every Saturday night and, as with the MacMillan/McDonald broadcasts of 1925, the public was enthralled. At the same time as the Byrd expedition, "The Cruise of the Seth Parker," sailed from Portland, Maine, to Miami, Florida, with Captain Phillips Lord broadcasting from the after cabin of the four-masted windjammer, further concentrating public interest in shortwave. Demand for "allwave" receivers greatly increased. By August 1934, a *Radio Retailing* article said it all: "If It's Not Allwave It's Obsolete." The hobby of DXing sprung up again, ten years later, only the stations were international, and QSL cards and stamp collecting swept the country. There is no doubt that this new interest spurred the sales of new receivers and helped lift the manufacturers out of the Depression.[32] In an effort to promote allwave radio sales in fall 1935, Zenith packed a sample bulletin from the Chicago Shortwave Radio Club in the instruction book of every shortwave equipped receiver they sold in an effort to promote sales.[33]

Zenith introduced their first "allwave" radios late in the 1933 Line with a special brochure, "The New Special Models; All Star; The Long and Short of Radio." The brochure featured one new Zenith console, Model 260 (short and standard wave set), two new Zenettes, Model 250 ("The World in a Clock Case," short and standard wave bands); the Zenette Model 210-5 ("For the Air Adventurer", standard and longwave bands); and a new relatively inexpensive radio-phonograph combination, Zenith Model 270.

The first national print advertising campaign which headlined "All Wave" Zeniths featured Models 288 and 293 of the transitional 1933-1934 Line. The Model 288 was an Art-Deco "tombstone" table radio and the Model 293 was a medium-sized, more traditionally designed, console.

The 1934 Line marked a return to fewer chassis and models than the frantic year of 1933. Most of the 1934 Zeniths were part of the 1934 "Challenger" series, which contained one final corporate experiment at the low-priced end of the line: placing the Zenith marque on inexpensive radios which were actually produced by another manufacturer.[34] McDonald's correspondence from this era indicates that the Zenith leadership did not feel that they could manufacture extremely inexpensive ($25 to $35 retail) radios with the same production lines and people that were producing the much more quality-oriented main Zenith line. As far as is now known, this experiment marked the only time that the Zenith brand appeared on radios not designed and manufactured by Zenith.

The main 1934 Line featured large consoles falling into the 700s range as well as a beautiful radio-phonograph in an Art Moderne cabinet, the Model 476-A. The most memorable radios, however, were the Models 725, 767, and 777, known as the "Aviatrix" and housed in a radical vertically striped Art-Deco cabinet.

Although several lines of low price receivers were emphasized in the Depression years, the quality was held high and Zenith retained its reputation for "The Quality Goes In Before The Name Goes On." As a result, Zenith continued to sell more costly lines of receivers during the Depression, but most important, as consumers began to return to the market in 1935, they turned to the quality reputation of the new line of feature-laden Zeniths.

During the first four full years of the Depression, the design and production of sets did not fall into a regular pattern and sales brochures featured just a few models rather than an entire annual "Line." With the 1935 Line, Zenith returned to the annual cycle, producing a single large sales brochure titled "1935 Zenith Long Distance Radio" and featuring models in the 800s range. The latest features were proclaimed in large type: "Triple Filtering," "All-Wave Reception," and "Split-Second Tuning." The brochure was headlined "Zenith Presents Every Advanced Feature of World's Finest Radio Reception." Later in the year, Zenith introduced sets in the 900s model range and still later, the little-known 1100s models reached the market.

Among the new 1935 Zenith radios was the Zenith Stratosphere, a 25 tube model with a 50 watt audio amplifier set in a massive cabinet.[35] The Stratosphere sold for $750 and introduced the development that probably had the most consumer impact in Zenith history, The Big Black Dial. Prior to 1935, receivers had either etched numerical or very small and difficult to read dials faces. The Zenith Big Black Dial was not only large, but also contained figures that were so distinct they could be read even without glasses by most people. The dial became an important sales feature and was quickly copied by other manufacturers.

The Depression recovery assumed spectacular proportions for Zenith in 1935 when net earnings returned to the pre-depression high of just over a million dollars.[36] This turnaround was detailed in the June 1945 *Fortune*: "[Zenith] not only retrenched enough to pull through five years of deficits without borrowing money, but it rose from the depths almost perpendicularly. For the year ending 1935, sales were about $8 million; the next year they nearly doubled; and for the year ending April, 1942, the last devoted to civilian manufacture, they were some $33 million. Zenith claimed second place in the set business."[37]

This recovery was made possible by conservative management, inventiveness, and finding new markets for Zenith products. Much of the credit for Zenith's financial survival was given to Hugh Robertson, treasurer since 1926 and Zenith vice president since 1934. McDonald also credited Zenith's steadfastness in its commitment to produce a quality set regardless of cost, its early role in shortwave, and the introduction of a line of farm radios to the product line as important in Depression survival.[38]

Perhaps the greatest indication of the return of good times to Zenith came in 1936, when employees, responding to a loyalty bonus instituted by McDonald for Depression sacrifices, surprised the management with the presentation of a bronze plaque which read: "TO THE DIRECTORS AND OFFICERS OF ZENITH RADIO CORPORATION, We believe in your wisdom and fairness. We assure you of our loyalty and effort. We are proud of this partnership. THE EMPLOYEES of the ZENITH RADIO CORPORATION, December 1936."

Boston area distributors at Chicago's Soldier's Field, in town for a Zenith distributor's meeting. Courtesy of Zenith.

From the North Pole to Tasmania

ZENITH

has pioneered short-wave radio!

YOU can bet on Zenith short-wave performance, because there's 12 years of DX pioneering back of this line—and no one else in the industry can match that experience, or what it means to you.

Remember, short wave radio that doesn't deliver is a bad sale. Disappointed customers are a long-time liability.

Beginning in 1924 when Commander MacMillan took Zenith short-wave equipment to the North Pole, and in 1926 when the U. S. Navy took it to Tasmania, Zenith has gathered a wealth of knowledge through long years of actual trial under fire that is a definite asset to every dealer. Here's short wave radio you can count on to perform.

Get in touch with your Zenith distributor today. Or write us for his name.

Model 203 (left)—Standard and Short Wave. Many women prefer a console model, and this handsome cabinet should intrigue any woman; same chassis as model 288. $81.95.

Also **Model 725** (not shown)—A beautiful modern console. Standard and Short Wave. Same chassis as 288. $99.95.

Model 288 (right)—A standard and short wave radio for the ait waves of the world. Radio superheterodyne—full size dynamic speaker—automatic volume control—wave band selector—15 to 25,000 kilocycles (12 meters) $69.95.

ZENITH

THE MONEY FRANCHISE

ZENITH RADIO CORPORATION, 3620 IRON ST., CHICAGO, ILL.—EXPORT DIVISION—CABLE ADDRESS: ZENITHRAD—ALL CODES

NEW! SENSATIONAL! REVOLUTIONARY

ANOTHER ZENITH TRIUMPH

A HIT!

ZENETTE

Made by the ZENITH RADIO CORPORATION

A sensational NEW LINE of radio receivers, without precedent in value giving..

$57.50 LESS TUBES TO $94.00 LESS TUBES

Sold with RCA or Cunningham Tubes. Prices slightly higher in Far West

THE BIGGEST NEWS OF THE NEW YEAR!

Don't wait a minute... get in touch with your Zenith distributor NOW!!

MADE BY THE MAKERS OF

ZENITH RADIO

3620 IRON STREET, CHICAGO, ILL.

ZENITH

again.....the outstanding **LEADER!**

14-Tube

NEW 1932 HYPER-HETERODYNE

Model 103—Magnificent highboy console. Complete, with Zenith *Quality* Tubes, $290.

Highspots

OF THE NEW 1932 ZENITH RECEIVERS

- 10-tube Super-Heterodyne
- 14-tube Hyper-Heterodyne
- Automatic Volume Control
- Automatic Line Voltage Regulator
- Automatic Tuning
- Tuning Meter
- Antenna Balancer
- Light-Focus Dialing
- Multi-Mu Tubes
- Between-Station Silencer

Zenith promotional picture: Wallace Ford and Zenith Stratosphere.
Courtesy of Zenith.

ZENITH AUTOMATIC RADIO

THE WORLD'S HIGHEST QUALITY RADIO . .

A QUALITY LINE AT COMPETITIVE PRICES

Zenette

no sale need escape the Zenith Dealer

MODEL 71 ILLUSTRATED ABOVE

ZENITH prices complete with tubes range from $155.00 to $2,500.00

YOU can't miss with the Zenith Franchise. For here is Quality and outstanding Value in EVERY price class. You can't miss meeting the wants of every prospect who enters your store. You can't miss making real profit every time you make a sale. Zenith . . . leader in the high-price field. Zenette . . . leader in the low-price field. BOTH Zenith-designed, Zenith-built . . . BOTH known, proved Quality. Get in touch with your Zenith Distributor TODAY . . . and sign up.

MODEL 6H ILLUSTRATED ABOVE

ZENETTE prices complete with tubes range from $49.95 to $125.00

See the complete line at the Radio Shows.

NEW YORK: Section J 1 and 3, Arena Floor, Radio World's Fair, September 21st to 26th.
CHICAGO: Space M 1, Radio Show, Coliseum, October 19th to 25th.

ZENITH RADIO CORPORATION, CHICAGO, ILL.
WORLD'S LARGEST MAKERS OF HIGH GRADE RADIO SINCE 1914

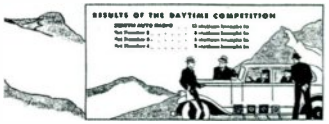
"That mountain will lick any Auto Radio built!"

. . . Challenged a California Dealer!

ZENITH'S ANSWER!

15 Stations brought in!

. . . and the best of the other sets only 4



SIX TUBES $49.95 retail

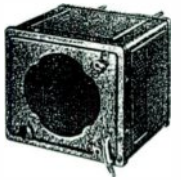
Talk about your gruelling tests! Here was a challenge that no one ever had licked. A mountain near San Bernardino where they said no auto radio would perform. One dispatcher that screamed out angrily every station in the country.

So, one morning (daylight test), a group of dealers took the Zenith 'auto Radio and three other sets to try it once more 'and to the utter amazement of everyone the Zenith brought in 15 stations. The second best set of the group only brought in four.

Zenith performance will surprise you. Just as it astounded those skeptical Californians. Tune superior to that of most home sets. Six tube-types taken, insuring a world of range and clarity. Airplane dial in keeping with tube-type instrument panels. And performance such as the industry has never seen before.

Zenith Radio Corporation • 3620 Iron Street, Chicago, Illinois

"MUSIC AT THE WHEEL"



ZENITH Auto Radio

a Challenge

● We challenge anyone to name a single demonstrable improvement in radio which is not found in the new Zenith 1933 line; and we further challenge anyone to name another radio line which contains all the improvements found in the new 1933 line.

by ZENITH RADIO

AVIATRIX

AGAIN! ZENITH ROCKS THE INDUSTRY

WITH the whole world going modern, Zenith again sweeps to the front of popular fancy with a sensational new model—Aviatrix! As smart, as fast minute, as daring and beautiful as the name itself implies.

The richly styled modern cabinet blends the beautiful striped rosewood of East India with the Madrone Burl of California. Bright, figured American Walnut forms the body of the cabinet, whose severely simple lines make it a harmonious piece with either modern or period setting.

Other Zenith features making this the sensation of the season—9-tube superheterodyne chassis; automobile (dash-type) escutcheon. Advanced type automatic volume control. Twin 8" dynamic speakers. New type tubes. Size 40½" high, 25½" wide; 15⅜" deep. Get in touch with your Zenith Distributor!

ZENITH

The Best Advice Of 1935

SEE THE NEW 1936 ZENITH LONG DISTANCE RADIO LINE BEFORE YOU DECIDE

ZENITH

LONG DISTANCE RADIO

ZENITH RADIO CORPORATION

3620 IRON ST.

CHICAGO, ILL.

AUTHORS' AFTERWORD

Having studied the first two decades of Zenith for nearly four years, we feel we can finally answer the question that we are most often asked: Why did Zenith survive and prosper when literally hundreds of other radio manufacturers did not?

We think most Zenith people would list "good fortune" or "providence" as major elements in Zenith's success. Indeed, had several almost random events not occurred, early Zenith and radio history would have been different. The fact that Sport Herrmann's yacht was built beside MacMillan's *Bowdoin* led directly to the McDonald/MacMillan friendship and all that flowed from it. Had McDonald not heard an early radio broadcast on New Year's Eve, 1920, and had he not been introduced to Mathews and Hassel by his friend Herman Stabler, the future would certainly have been different. Had not Pletcher, Klugh, and Robertson cast their lots with McDonald, Zenith almost certainly would not have survived and prospered, despite McDonald's acknowledged genius.

Obviously, more than providence was involved. All the participants would agree that McDonald's own character, energy, and, above all, vision were central to the Zenith story. McDonald's vision—his ability to see the future of consumer electronics—was remarked upon in interviews by all of the people who worked closely with him and by his competitors. There would be a few times later when his vision would outstrip the available technology: the ill-fated bakelite chassis of 1940 prefigured printed circuits by 25 years and Phonevision pay-TV system were equally ahead of its time. However, most often, the Commander's vision of the possible future was uncannily accurate.

McDonald also saw the "big picture" of the future of the broadcasting and consumer electronics industries and had the conviction and energy to act upon that broad vision. His role in the creation of the FCC and his role as organizer and founding president of the National Association of Broadcasters is a matter of public record. The fact that his pivotal role in organizing both electronics and broadcasting industries has been ignored is both perplexing and unfortunate.

Eugene Kinney, retired senior vice president of Zenith and lifelong associate of McDonald, said in a 1985 interview, "He never did anything half way. When he had a vision he went with it now. He was 100% gung ho on anything he got involved in, to the exclusion of anything else...He had an uncanny ability to make the right decisions but he also had the ability to listen to trusted people...he was absolutely dedicated to the company..."

McDonald's leadership abilities were also central to the success of Zenith. He understood the emerging consumer electronics industry from the viewpoint of the wholesale distributor, the retailer, and the consumer, and he and Zenith acted on that understanding. At the depth of the Depression, most Zenith wholesale advertising did not feature radios, but were text advertisements, speaking to distributors and dealers about Zenith's commitment not to cut factory prices at mid-model year as many others were doing. Such a price cut would certainly empty the factory warehouse, but it would also degrade the worth of the wholesaler and retailer's on-hand inventory over night. Throughout the McDonald years at Zenith, the corporation showed particular sensitivity to the needs of distributors and retailers. This kind of concern by Zenith built a fiercely loyal distribution and sales network that was a key element of Zenith's success.

McDonald's leadership was also evident in Zenith's long-standing commitment to quality. Zenith's initial move to the top of the market with the Deluxe sets was engendered by McDonald's understanding of the wide market for opulence that existed in the Roaring Twenties. His personal understanding that many common American citizens could see beyond purchase price to the real value of products, however, was a major element in Zenith's success.

Finally, McDonald's personal character played a key role in his leadership of Zenith. Definitely a tough business man, the personal man we found in the written record is almost entirely opposite to that promulgated by a few hobby writers over the past decade. The records reveal that McDonald was generous to a fault and also seemed to care very little whether he ever gained recognition for many of his personal accomplishments and his generosity. He served on many charitable boards and even personally bought and staffed a boys camp to insure that Chicago's underprivileged children would be able to escape the city for part of the summer. His files contain literally hundreds of instances of his personal generosity; his accountant berated him several times for not keeping records of his personal loans to acquaintances. When he finally began writing them down, they totalled over $30,000 in the first three years of the Depression. The large number of insurance receipts in his file show that he was paying for the fire insurance for many elderly women in Chicago and Syracuse. We encountered time and time again evidence of his literally life-long support of the wives and children of his deceased friends and colleagues. Eugene F. McDonald, Jr., was much beloved by those who knew him personally and by those whose lives he touched. We have heard from many still surviving today who are shocked that he would be characterized so slanderously by ill-informed individuals, writing chiefly from the sixty year-old remembrances of a single individual with an axe to grind.

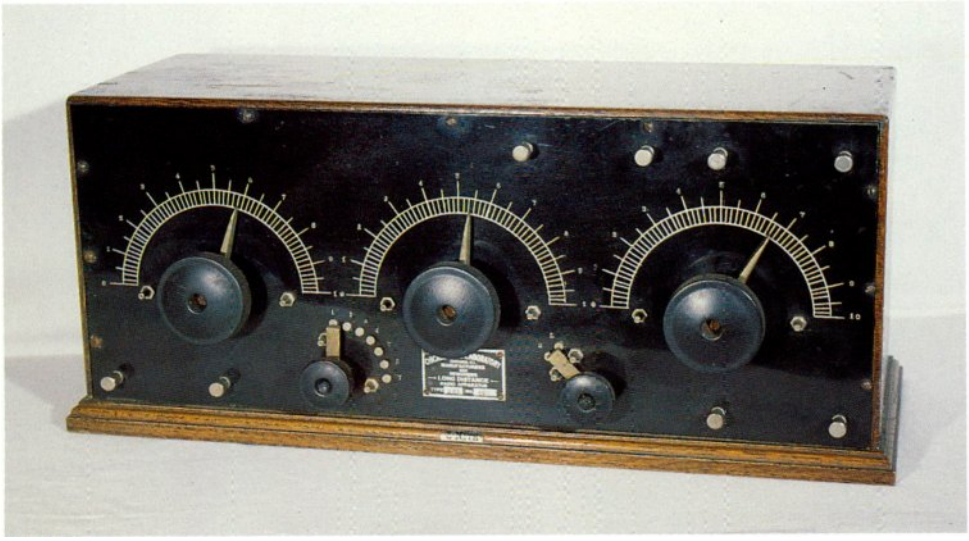
We would be completely remiss, however, if we did not spotlight the group of extraordinary men who joined with McDonald to lead the Zenith Radio Corporation. Tom Pletcher was an early major investor, to be sure. We believe that the Commander would point to Pletcher's wisdom, advice, and understanding of the music industry as being much more important than his cash.

Paul Klugh, originally enticed out of retirement by McDonald to run the National Association of Broadcasters, became a very active General Manager of Zenith during the critical 1925-1935 period. His sales acumen and day to day internal leadership at 3620 Iron Street have never been fully recognized.

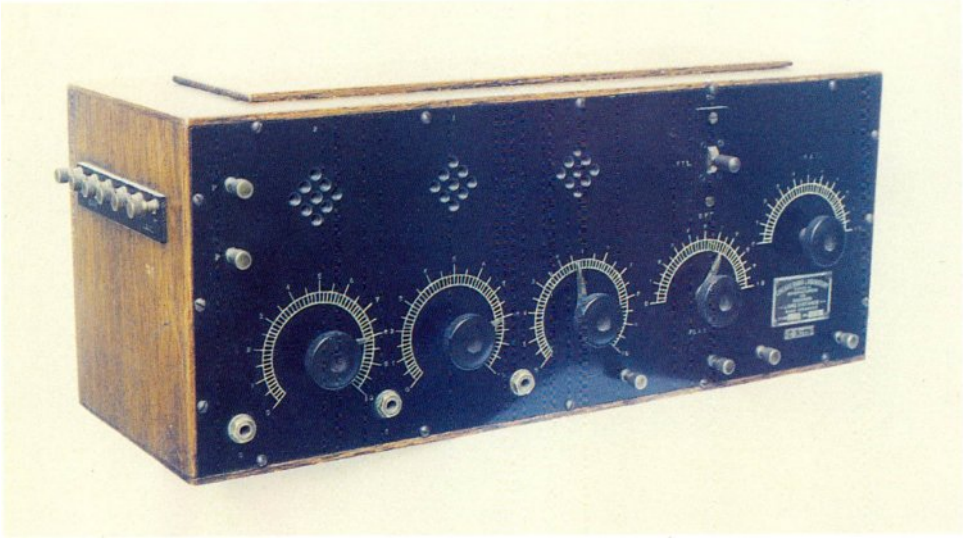
All who were close to the management team at Zenith point to Hugh Robertson as the second key figure in Zenith's success. Virtually unrecognized outside the company, Robertson was known in the board room and on the factory floor as "Mr. Zenith." David Packard of Hewlett-Packard is known today for having invented "Management By Wandering Around" (MBWA) as he led H-P to success. Hugh Robertson perfected MBWA a generation earlier. Blessed with a phenomenal memory, he spent a great deal of time wandering the offices and the plant floor; he not only knew the names of most of the employees, he could and did inquire by name of the children of the women on the production line. "Mr. Zenith" was a very frugal and astute financial manager who invented the inventory control system; his most important contribution, however, may be his coalescing of the human chemistry that formed the loyalty and lofty morale of the Zenith family.

Finally, we must remark on two other things. First, each of the leaders of the early days at Zenith was known to his contemporaries as a person of very high personal integrity. Transcripts of interviews of their now-departed contemporaries indicate this fact, as do the testimonials of the surviving members of Zenith. Secondly, we are very gratified to learn how important any single individual (and in Zenith's case, *many* single individuals) can be in the life of major industrial concern. We wish space would have allowed us to tell more about those who played such significant roles in the foundation years of the Zenith Radio Corporation.

SECTION II:
COLOR PORTRAITS OF ZENITH AND CHICAGO RADIO LABORATORY RADIOS

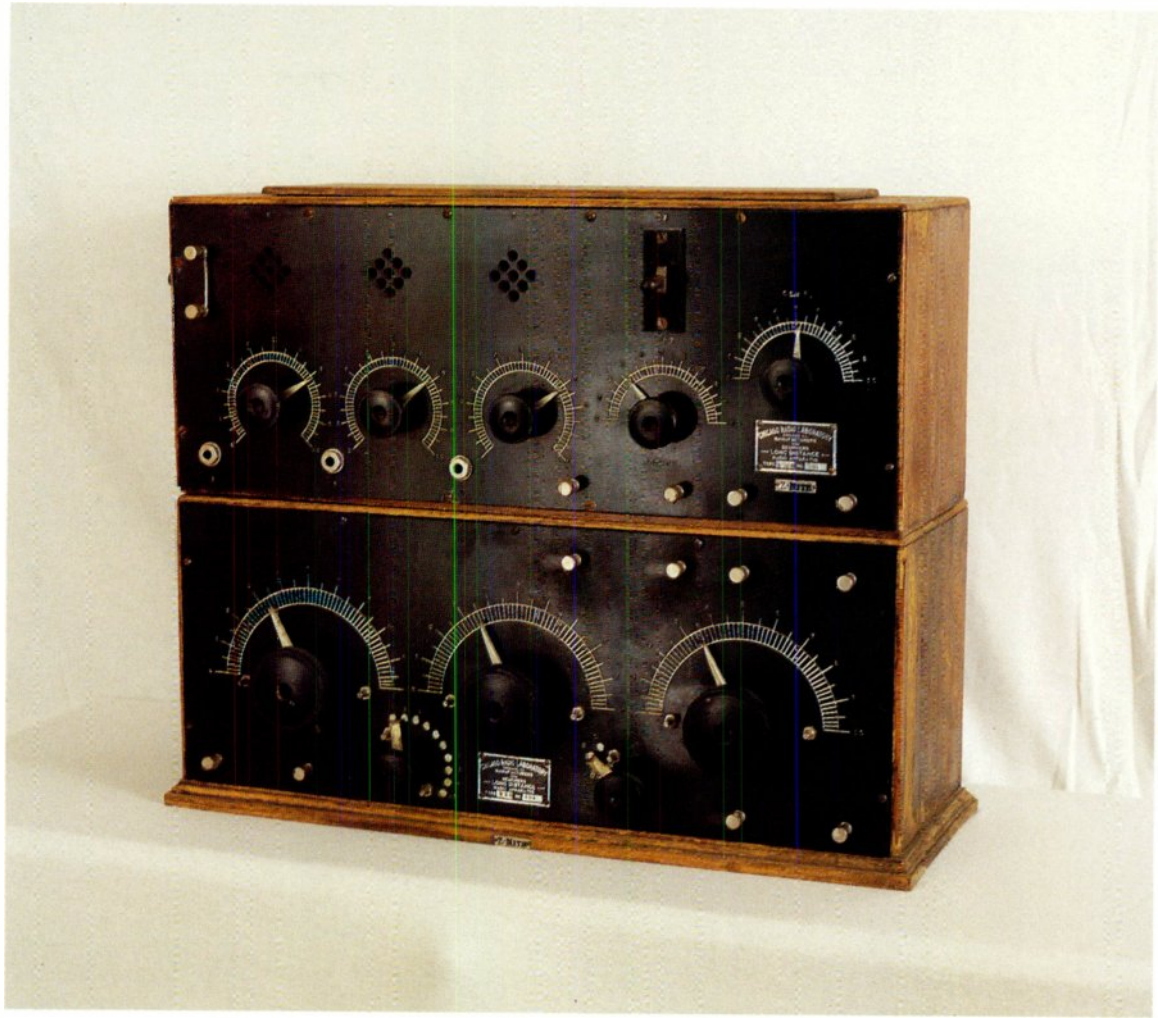


Z-Nith Regenerator, Type REG. Radio: B. Wade.

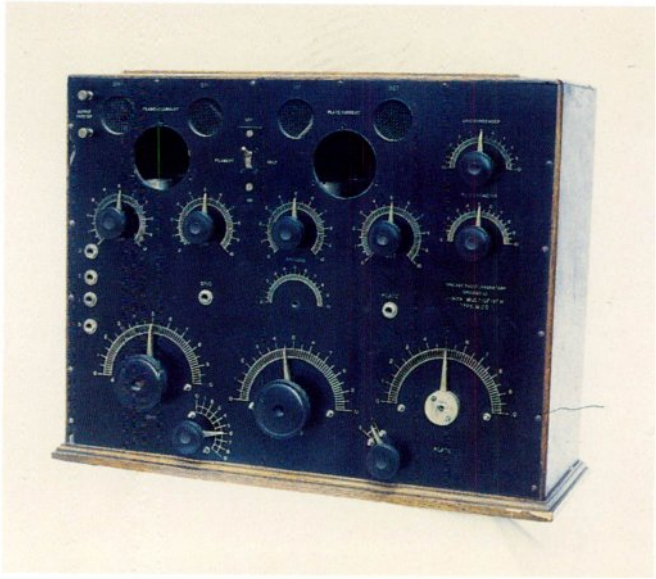


Z-Nith Amplifigon, Detector-Amplifier, Type AGN-2. Radio: B. Wade.

CHICAGO RADIO LABORATORY



Z-Nith Apmlifigon, Type AGN-2 + Z-Nith Regenerator, Type REG. Radio: M. Blankinship.



Z-Nith Multiceiver, Type MC-3. Note two missing meters. Radio: Zenith.

Z-Nith Multiceiver, Type MC-3. Rear view. Radio: Zenith.

1921

THE FIRST ZENITHS

Model 1-R. Radio: C. Knipfel.

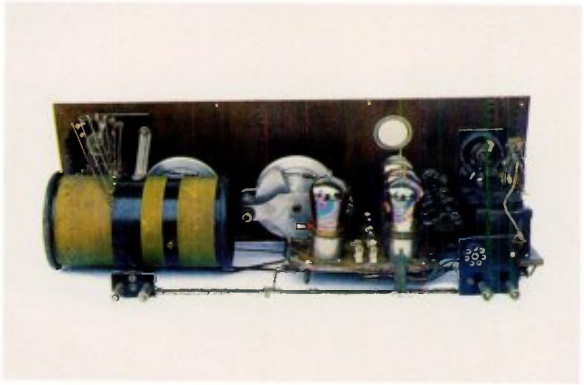
Model 1-R receiver and Model 2-M amplifier. Radio: C. Knipfel.

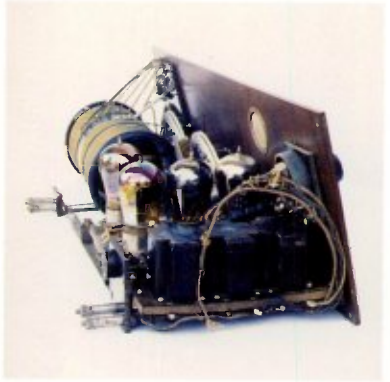
Model 2-M. Amplifier: C. Knipfel.

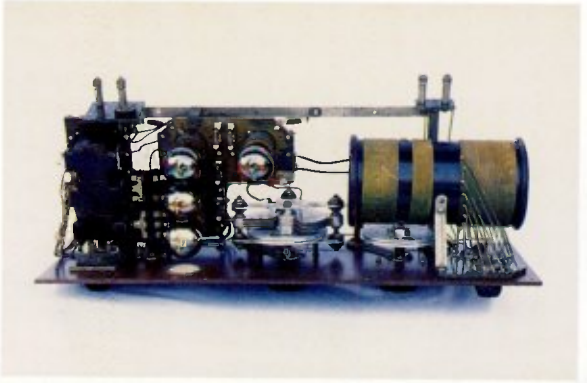
Model 3-M. Amplifier: C. Knipfel.

Zenith Tuner of unknown type. Tuner: C. Knipfel.

Model 3-R (Early). Radio: J. Collings.







MODEL 3-R

Model 4-R (Early). Radio: B. Wade.

Model 4-R (Early). Radio: B. Wade.

Model 4-R (Late). Radio: J. Collings.

Model 4-R (Late). Note the brown face plate. Radio: M. Blankinship.

Model 4-R (Late). Radio: J. Collings.

MODEL 4-R

Zenith "Phono Panel." For insertion in various Victor cabinets. Radio: R. Muchow.

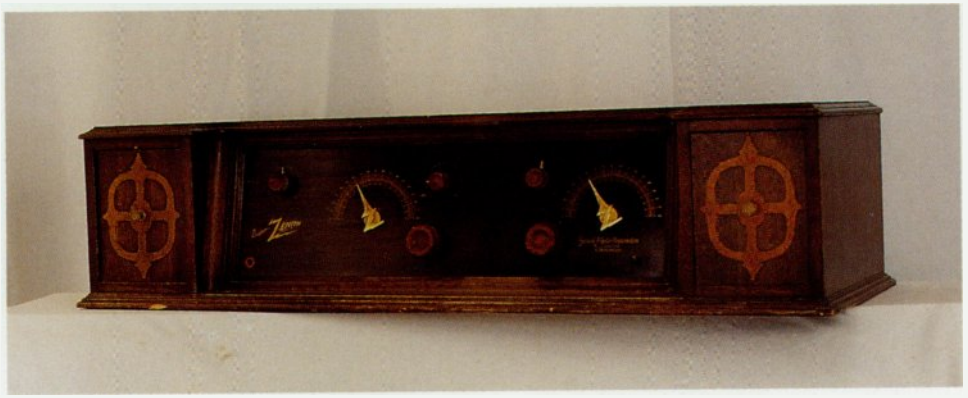
*Early Zenith neon window sign.*C. Knipfel.

Zenith Companion portable. Radio: J. & K. Peters.

Zenith Companion portable. Radio: J. & K. Peters.

Zenith Companion "ZEV" portable. Radio: B. Wade.

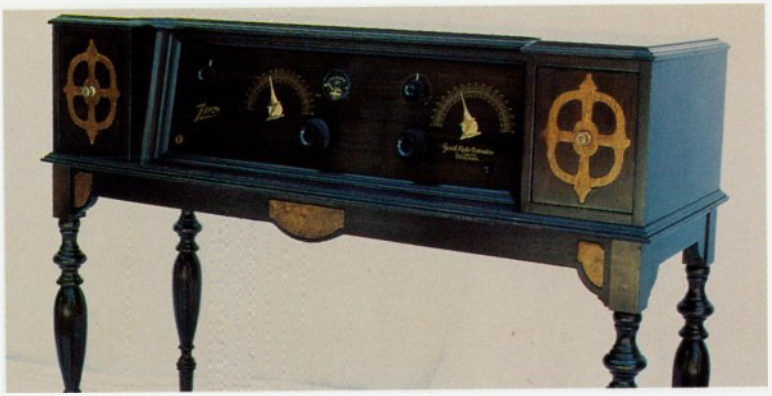
THE SUPER ZENITHS



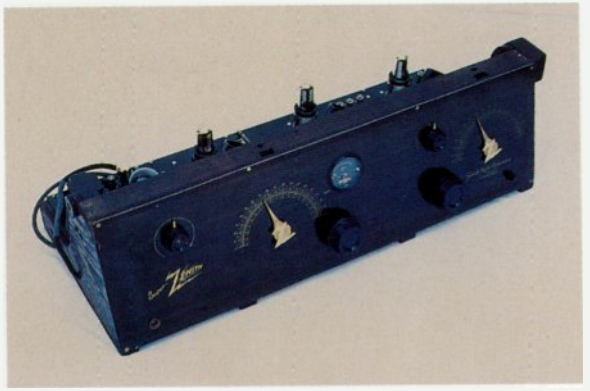
Zenith Super VII. Radio: M. Blankinship.

Zenith Super 27. Radio: M. Blankinship.

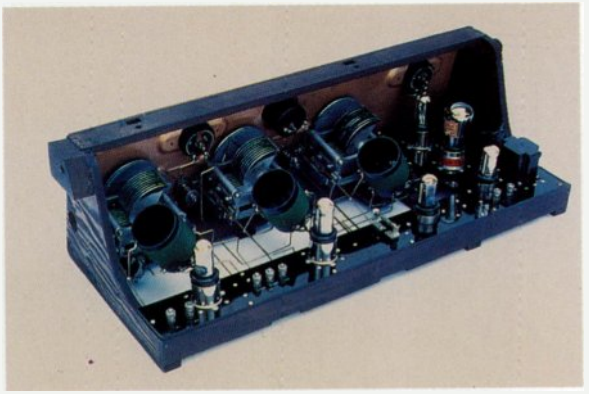
Zenith Super 28. Radio: G. Hale.



Zenith Super 28. Radio: G. Hale.



Zenith Super 28. Radio: G. Hale.



Zenith Super 28. Radio: G. Hale.

Zenith Super 29. Radio: M. Blankinship.

Zenith Super X. Radio: M. Blankinship.

THE DELUXE ZENITHS

Colonial Deluxe. The writing table below dial is missing. Radio: M. Blankinship.

Colonial Deluxe. Note twin speakers behind grille. Radio: M. Blankinship.

English Deluxe. Radio: M. Blankinship.

English Deluxe (Closed). Radio: M. Blankinship.

English Deluxe detail. Radio: M. Blankinship.

Spanish Deluxe. Radio: R. Muchow.

Spanish Deluxe. The inlaid speaker grille in lower panel is believed to be a factory variant. Radio: R. Muchow.

Spanish Deluxe. Partially restored dial.
Radio: R. Muchow.

Spanish Deluxe Factory Variant. Radio: J. & K. Peters.

Spanish Deluxe (Closed). Radio: J. & K. Peters.

SPANISH DELUXE FACTORY VARIANT.
The Peters Spanish Deluxe variant was produced by Zenith with a 39A chassis installed. The factory papers attached to the cabinet attest to its authenticity. Most likely, the more modern 39A chassis was installed in the Spanish cabinets which remained in stock after the Deluxe was discontinued.

CHINESE DELUXE FACTORY VARIANT.
The only Chinese Deluxe known to have survived is in the Zenith Collection and was originally owned by Commander McDonald's mother. A 1936 memo in the McDonald files requested that a "modern chassis" be installed, since his mother "would not give the Chinese set up." Refer to the photo of a Chinese Deluxe at the end of the "Adventure" chapter.

Chinese Deluxe Factory Variant. Radio: Zenith.

Chinese Deluxe (Closed). Radio: Zenith.

Model 11. Radio: M. Blankinship.

Model 12. Radio: M. Blankinship.

Model 14E. Radio: M. Blankinship.

Model 15. Radio: R. Muchow.

Model 15. Note loop folded into cabinet top. Radio: S. von Talge.

Model 15 detail. Radio: S. von Talge.

MODEL 15.
The Model 15 was the only Zenith model which used an external cabinet-top loop antenna. This configuration was common among other manufacturers. When the set was not in use or when the set was operating with an external long wire antenna, the loop could be folded away in the top of the cabinet.

Model 37A. Radio: K. McCoy.

Model 37A (Closed). Radio: K. McCoy.

Model 39A. Radio: M. Blankinship.

Model 39A. Rear view. Radio: M. Blankinship.

Model 40A. Radio: M. Blankinship.

MODEL 40A.
The Model 40A with "Italian Renaissance Styling" is surely one of the most beautiful Zeniths ever built. This radio-phonograph sold for $850.00 in 1928-29.

Model 40A. Note record turntable. Radio: M. Blankinship.

Patented "Automatic Tuning".

50/60/70 SERIES

Model 522. Radio: M. Blankinship.

Model 54. Radio: M. Blankinship.

Model 78. Radio: M. Blankinship.

Model 78 detail. Radio: M. Blankinship.

Model 61. Unrestored. Radio: M. Blankinship.

Model 75. Radio: M. Blankinship.

Model 71. Radio: M. Blankinship.

Model 78. Radio: M. Blankinship.

Model 79. Radio: Karen McCoy.

THE ZENETTES

In response to the deepening Depression, Zenith introduced the inexpensive "Zenette" Line in 1931. The first four models ranged in price from $57.50 for the Model A table set to $109.80 for the Model D console. This price range represents roughly a two-thirds price reduction from the previous Zenith line.

Zenette Model A. Radio: M. Blankinship.

Zenette Model B. Radio: J. & K. Peters.

Zenette Model D. Radio: J. Gianacos.

Zenette Model D detail. Radio: J. Gianacos.

Zenette Model L. Radio: M. Blankinship.

Zenette Model BH. Radio: M. Blankinship.

Zenette Model LH. Radio: M. Blankinship.

Zenette Model MH. Radio: M. Blankinship.

Zenette Model LH detail. Radio: M. Blankinship.

Interocean Model C-10. Radio: M. Blankinship.

Zenith Portola. Radio: J. & K. Peters.

The little-known Zenith "Portola" was produced for Zenith by United Air Cleaners.

The Interocean brand name was introduced by Zenith in 1933, apparently to market Zenith-produced sets at lower prices.

1932

Zenith Ultra, Model 103. Radio: M. Blankinship.

Model 92. Radio: M. Blankinship.

Model 92 (Closed). Radio: M. Blankinship.

Zenith Ultra, Model 103 detail. Radio: M. Blankinship.

1933

Zenette Model 210. Radio: B. Wade.

Zenette Model 216. Radio: M. Blankinship.

Model 250. Radio: M. Blankinship.

Model 288. Radio: M. Blankinship.

Model 293. Radio: M. Blankinship.

Master Zenith, Model 440. Radio: M. Blankinship.

Model 610. Radio: M. Blankinship.

Model 612. Radio: M. Blankinship.

Model 616. Radio: J. & K. Peters.

1933

Model 617. Radio: M. Blankinship.

Model 617 detail. Radio: M. Blankinship.

Model 701. Radio: M. Blankinship.

Model 705. Radio: M. Blankinship.

Model 706. Radio: M. Blankinship.

Model 707. Radio: M. Blankinship.

Model 711. Radio: M. Blankinship.

Model 712. Radio: M. Blankinship.

THE CHALLENGER LINE

1934

Model 715. Radio: M. Blankinship.

Model 730. Radio: M. Blankinship.

Aviatrix Model 725. Radio: M. Blankinship.

1935

Model 750. Radio: M. Blankinship.

Model 760. Radio: M. Blankinship.

Model 770. Radio: M. Blankinship.

Aviatrix Model 767.
Radio: M. Blankinship.

Model 775. Radio: M. Blankinship.

1935

Model 801. Radio: M. Blankinship.

Model 807. Radio: M. Blankinship.

Model 805. Radio: M. Blankinship.

Model 808. Radio: M. Blankinship.

Model 809. Radio:
M. Blankinship.

Model 811. Radio:
J. & K. Peters.

Model 829. Radio:
M. Blankinship.

Model 835. Radio:
M. Blankinship.

1935

1935

Model 847. Radio: M. Blankinship.

Model 861. Radio: M. Blankinship.

Model S871. Radio: M. Blankinship.

Model 870. Radio: M. Blankinship.

Model 885. Radio: M. Blankinship.

Model 945. Radio: M. Blankinship.

Model 950. Radio: M. Blankinship.

Model 980. Radio: M. Blankinship.

1935

Model 985. Radio: M. Blankinship.

Model 990. Radio: M. Blankinship.

1935

Zenith Stratosphere, Model 1000-Z. Radio: J. & K. Peters.

SECTION III:
ILLUSTRATED CATALOG AND DATABASE OF CRL AND ZENITH PRODUCTS

1919-1935

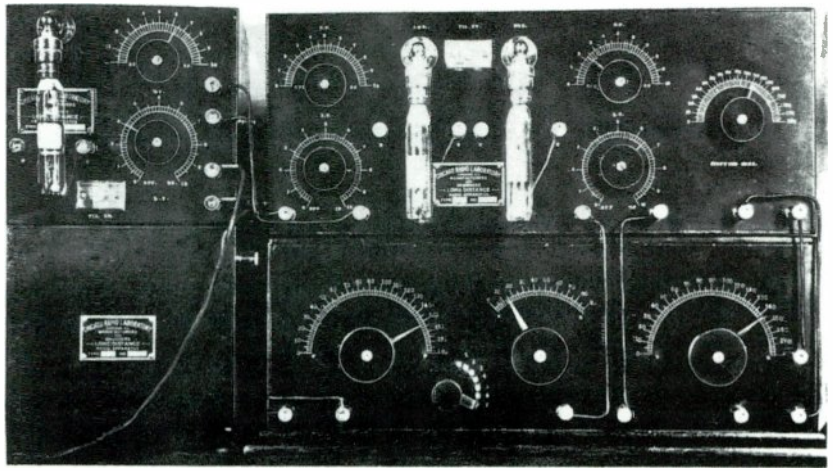
ZENITH
TRADE MARK

Chicago Radio Laboratory

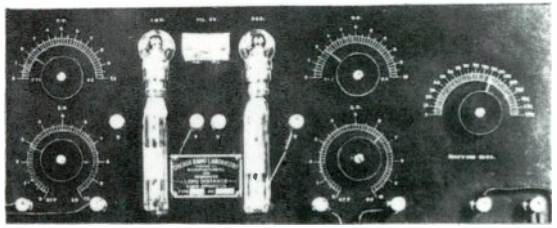
LICENSED UNDER
ARMSTRONG
U.S. PATENT Nº 1113149 - OCT. 6 - 1914

ZENITH
TRADE MARK REG.
→ LONG DISTANCE ← RADIO
TRADE MARK REG.

Chicago Radio Laboratory 1919



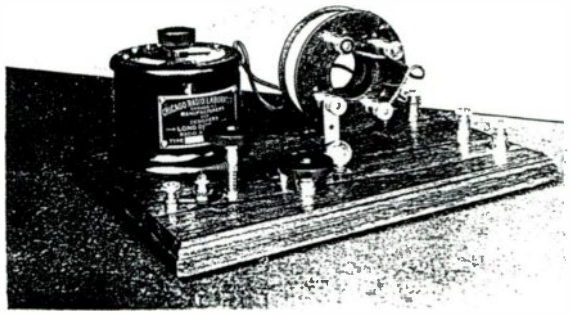
The most sensitive receiving set made: a Paragon RA-6, an Amplifigon, type AGN-1, a second step amplifier, type AMP-1, and a special battery box. We can only think of one way to improve this set—add another amplifier.



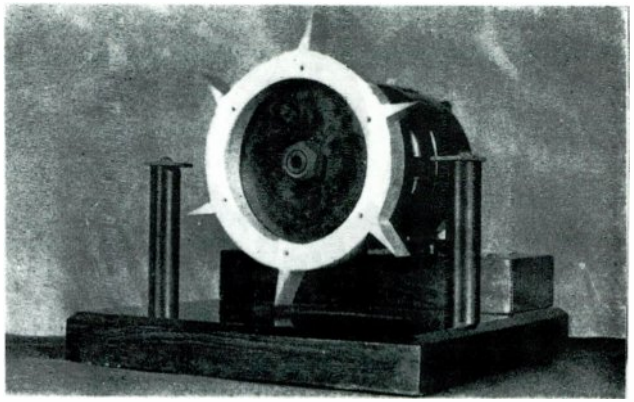
AMPLIFIGON AUDION CONTROL CABINET—TYPE AGN-1.

ONE STEP AMPLIFIER CABINET
TYPE AMP-1

SPECIAL APPARATUS



SHORT WAVE WAVEMETER—TYPE WV-700



HY-RAD ROTARY GAP—TYPE HR-1

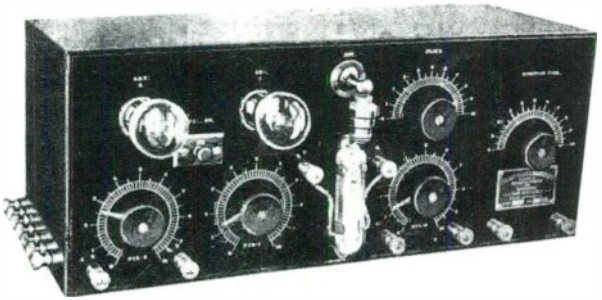
In 1919, Chicago Radio Laboratory also offered an Amplifigon with two stages of amplification and various accessories and components such as variometers, copper braid, etc.

MOTOR BOAT RECEIVER—TYPE MBR-1

The most sensitive receiving set made—a Paragon Tuner, and an Amplifigon, type AGN-2. We can only think of one way to improve this set—add another amplifier.

PARAGON SHORT WAVE REGENERATIVE RECEIVER.

AMPLIFIGON AUDION CONTROL CABINET—TYPE AGN-1.



AMPLIFIGON AUDION CONTROL CABINET
TYPES AGN-2 AND AGN-3.

AUDION DETECTOR
TYPE AD-1

AUDION DETECTOR
TYPE AD-2

AUDION AMPLIFIER—TYPE AM-1.

AUDION AMPLIFIER—TYPE AM-2.

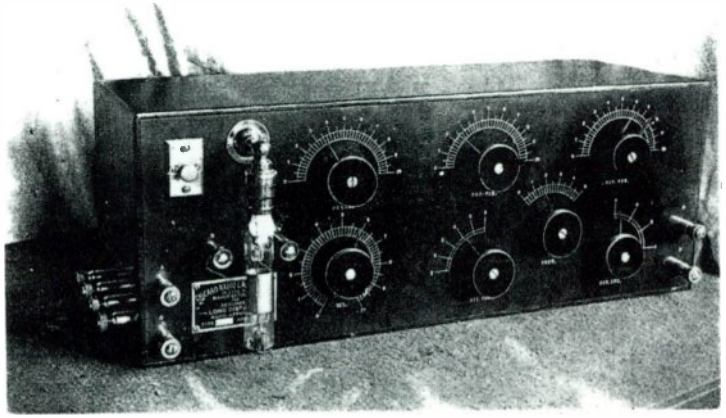
Chicago Radio Laboratory 1920

Chicago Radio Laboratory 1920

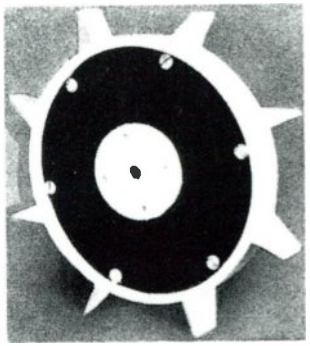
PORTABLE RECEIVER—TYPE PR-1.

JEWELER'S TIME RECEIVER—TYPE TR-1.

In 1920, Chicago Radio Laboratory also offered several accessory products by Radisco: coils, dials, batteries, as well as additional batteries, meters, switches and other accessories by several other manufacturers.

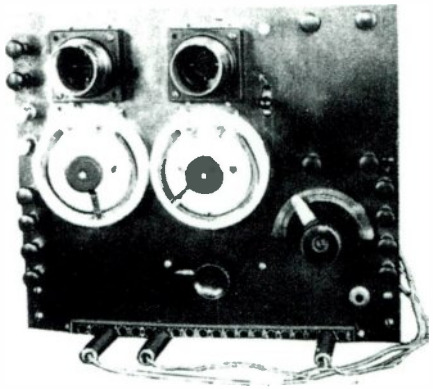


MOTOR BOAT RECEIVER—TYPE MBR-2.



HY-RAD ROTARY GAP—TYPE HR-1.

UNDAMPED WAVE RECEIVERS
TYPES CW-1 AND CW-2.



SPECIAL APPARATUS.

NAVY TYPE.

TRANSATLANTIC TYPE.

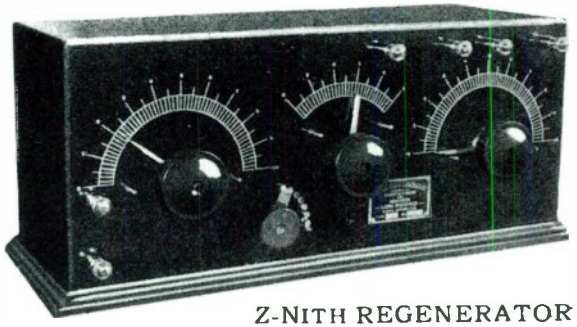
SUPERIOR TYPE.

HI-VOLT STORAGE BATTERY.

"Z-NITH"

"LONG DISTANCE" RADIO APPARATUS

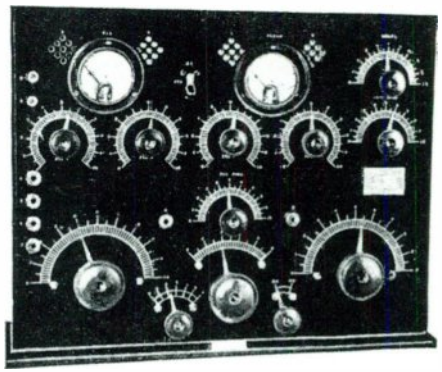
These images are taken directly from the 1921 catalog. However, all *except* the MC-3 & CW-3 are 1920-style equipment. Refer to the Portraits section for 1921-style equipment.



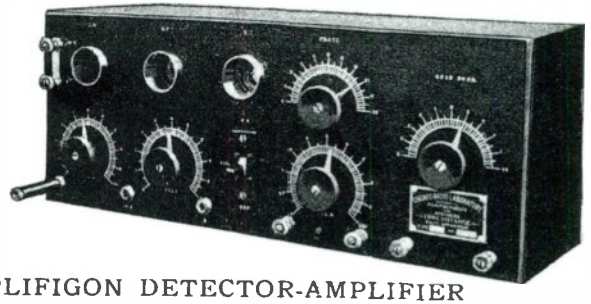
Z-NITH REGENERATOR

PORTACEIVER—TYPE PR

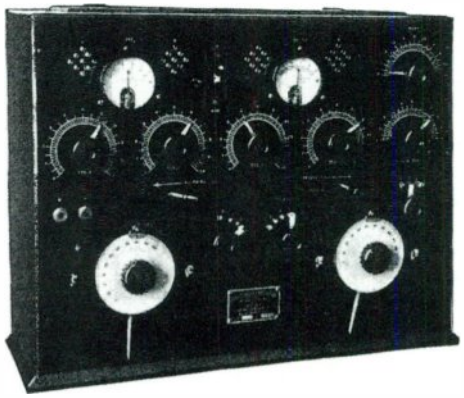
AMPLIFIGON DETECTOR-AMPLIFIER
TYPE AGN-1



MULTICEIVER TYPE MC-3

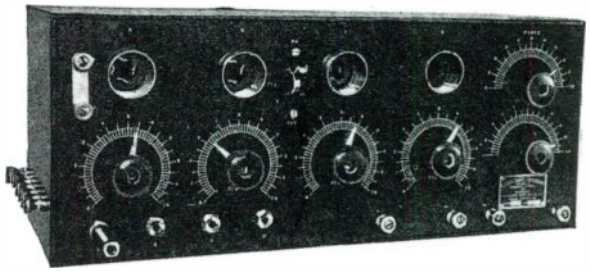


AMPLIFIGON DETECTOR-AMPLIFIER
TYPE AGN-2



ALTACEIVER—TYPE CW-3

JEWELER'S TIME RECEIVER
TYPE TR



AMPLIFIGON DETECTOR-AMPLIFIER
TYPE AGN-3

Chicago Radio Laboratory 1921

Chicago Radio Laboratory 1921

AUDION AMPLIFIER
TYPE AM-1

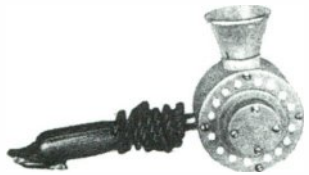
AUDION AMPLIFIER
TYPE AM-2

AUDION DETECTOR
TYPE AD.

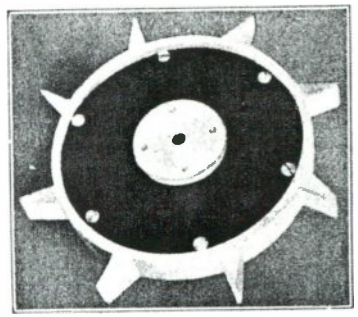
20 WATT RADIOPHONE
AND
CW TRANSMITTER

AUDION DETECTOR
TYPE ADP.

CRL REGENERETTE.

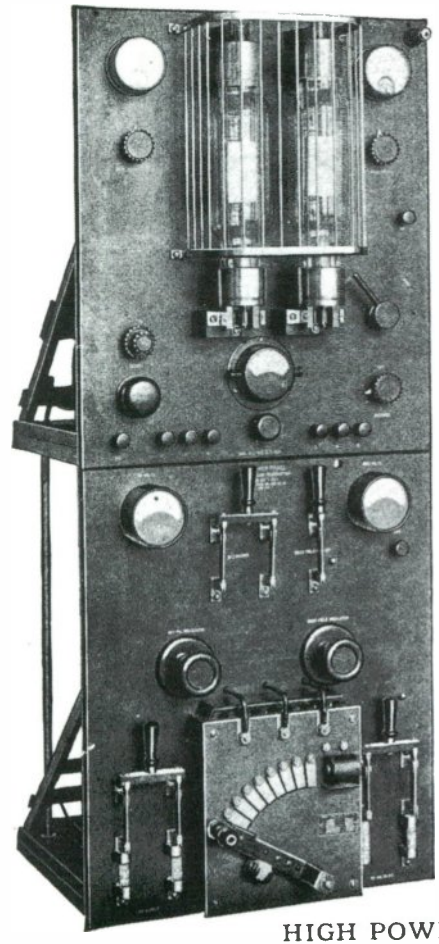


SUPERPHONE
TRANSMITTER



HY-RAD ROTARY DISC.

In 1921, Chicago Radio Laboratory also offered a wide variety of accessories and components including batteries, headphones, radio tubes, transformers and meters for the radio amateur. These items were identified in the catalog as being manufactured by other well known manufacturers.



HIGH POWER
RADIO TELEPHONE TRANSMITTERS

ZENITH

Long Distance Radio

Radio Needs No Explanation

Daily newspapers — the magazines—every kind and type of publication in the country has run column after column — page after page, explaining radio more thoroly and exhaustively than it would be possible to do in any catalogue.

For our purpose, it is sufficient to recognize the fact that the air now carries sound and that anybody anywhere, with proper receiving apparatus, can in his own home "listen in" on anything and everything from grand opera and market reports to dance music.

This booklet is issued for the people for whom the Zenith Long Distance Radio Receiving Apparatus is built—

—namely—people who are not particularly interested in the technique of construction or the scientific side, but who want to own an instrument which can be easily operated and which will function efficiently and continuously.

What the Zenith Is—

The Zenith should not be confused with the small "crystal detector" sets which function only in the immediate vicinity of a sending station.

The Zenith is a *long distance* audion set, licensed and manufactured under the now famous Armstrong Regenerative Circuit Patent No. 1,113,149.

Zenith design combines electrical and mechanical efficiency with artistic finish and appearance. All of the Zenith wireless telephones are complete, practical instruments designed by experts and built to be ornaments to the home. Every Zenith instrument is of the three circuit type which allows the elimination of interference from radio telegraph and radio telephone stations other than the one whose signals are desired.

When you purchase a Zenith, you can *safely* forget what's "in the cabinet."

Skill, care, technical knowledge, proper design and great care in manufacturing are all combined to give you an apparatus which works continuously, efficiently and without the necessity of adjustments or tinkering.

It is designed, built and marketed for the man who wants to listen to the voices of the air without being obliged to become an electrician to do so.

The electrical engineer will recognize in the Zenith a marvel of sound construction and workmanship combined with scientific design.

The average owner sees an instrument which, simple in operation, gives efficient results without trouble or repair necessity.

What the Zenith Brings You—

The tremendous number of receiving sets in use together with the ever growing nation-wide interest and enthusiasm in radio, have led to the establishment of what are known as broadcasting stations.

Through these stations, daily programs are available at stated hours for every owner of a set sufficiently sensitive to receive them.

Daily market reports—local and international news items—concerts—speeches—market reports—music—lectures—church services and weather reports—financial news and grand opera—music for dancing—anything and everything that the human ear can receive is open to all.

The farmer—miles from the nearest town—can not only get late live stock and grain market reports which have a distinct and favorable effect upon the profits from his shipments, but can "listen in" on exactly the same concerts and music and lectures as his brother in the city.

The owner of a sensitive radio, like the Zenith, is not confined to any one program. If what is coming in on one wave length fails to please—he can "tune in" to another program which suits him better.

1922-23

How Far Can You Hear?

One of the commonest questions in connection with the Zenith—or any other radio receiving set—is "How far will it receive?"

This question will have to be answered approximately rather than accurately because of the many varying conditions under which radio is installed and operated.

Zenith apparatus is manufactured in two sizes—this means two degrees of receiving sensitiveness.

The first model is our 1R set—the smallest.

The second model is our 2R set—the largest.

The 1R model, in use in Chicago, in the hands of novices, experiences no difficulty with proper amplification, in picking up concerts sent out from Schenectady—seven hundred miles away.

The model 2R—the larger instrument—has even a greater efficiency.

Both sets are real long distance instruments—designed for continuous and efficient service in the hands of people who want results and have no knowledge of electricity.

Operation and Installation of the Zenith—

Full directions are given with each apparatus sold. These directions are simple and easy to follow.

They consist of instructions on the proper use of the indicating dials to "tune in" on any wave length where a desired program is being sent out.

Printed programs are issued by the various "broadcast stations" and in many sections, the newspapers daily print these programs.

In every case the key letters upon which the program can be received is printed.

The various sending stations are indicated usually by a combination of "letters." ..... is one station in San Francisco. ..... is a Chicago station. "KDKA" is a very powerful station in East Pittsburg, Pa. These are only given as examples, as there are hundreds of broadcasting stations all over the country.

If the program you want to listen to is being sent out from "KDKA," for instance, and you are in range, you simply manipulate your indicators on the dials to pick up the "KDKA" program. The instructions make this very simple.

Manipulating the various dials to "tune in" with various programs corresponds in a general way to turning the knob on a safe to the proper numerical combination to open it.

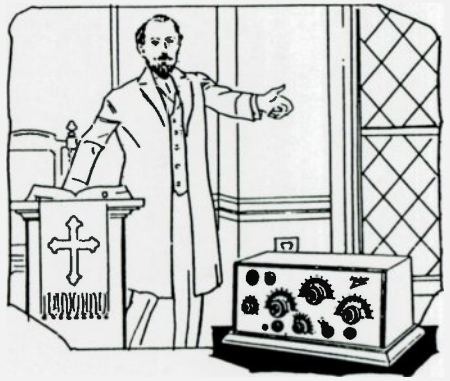
It is very little more difficult to operate a Zenith radio, than it is to open a safe when you have the proper combination.

And there is a decided similarity in procedure.

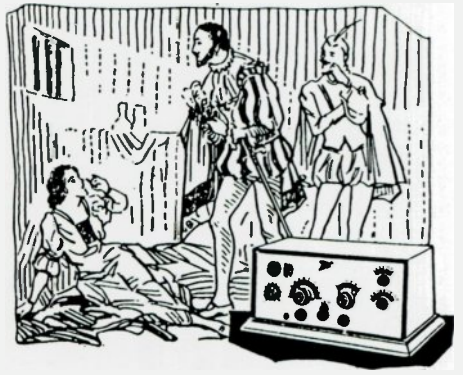
After a week or two, you can operate the instrument with your eyes shut—by "ear" alone.

Chicago Radio Laboratory

The maintenance or service required after installation is practically nil if the instruments are not dissected. The only parts of Zenith instruments that need replacement from time to time are the dry or "B" Batteries which are included in each set, and the audion tubes. Audion tubes, like electric lights, have an indefinite life, but if not abused should last a year. "B" batteries, like all dry batteries, have indefinite life, but should last at least three months.



The installation of a Zenith is simplicity itself—about equivalent to putting in a reading lamp, and is usually done by our dealers, at a standard charge of fifteen dollars.



It consists mainly in putting up an aerial, which may be roof antenna or wires or whatever is most suitable.

At the same time it is possible to receive on short range by merely connecting the set to a bed spring or a small wire concealed behind picture moulding.

If roof aerial is to be used there is needed only a single copper wire which in no case should exceed 175 feet in length.

ZENITH

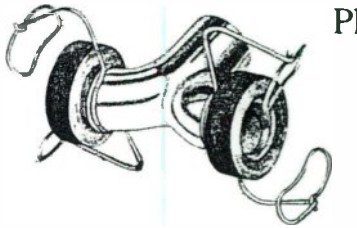
TRADE MARK

Model 1-R

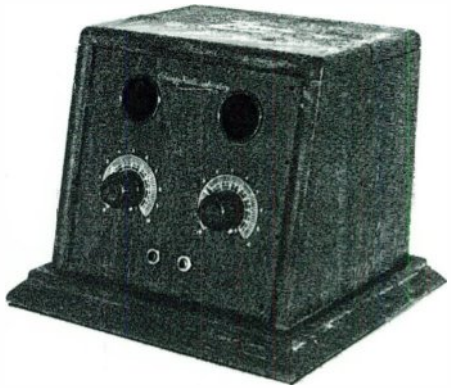
Model 2-R

the
First Zeniths

Headphones

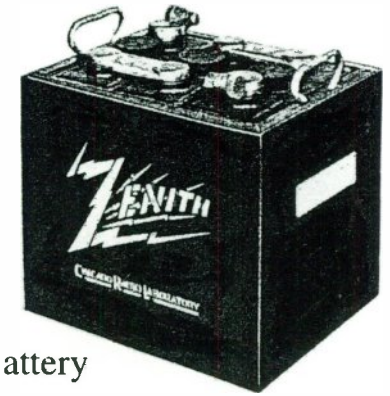


Phono Adapter



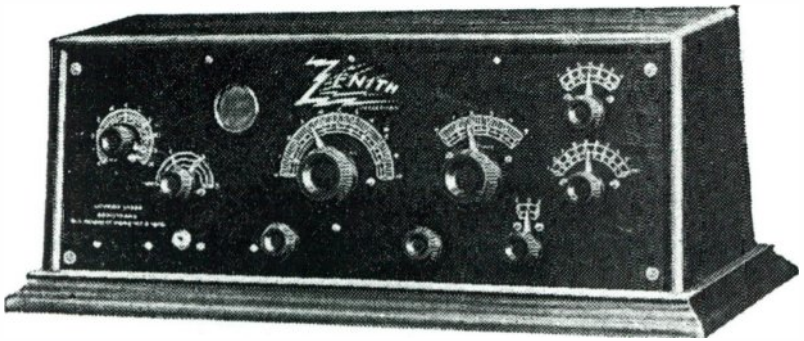
Model 2-M

Model 3-M



Storage Battery

1922-23



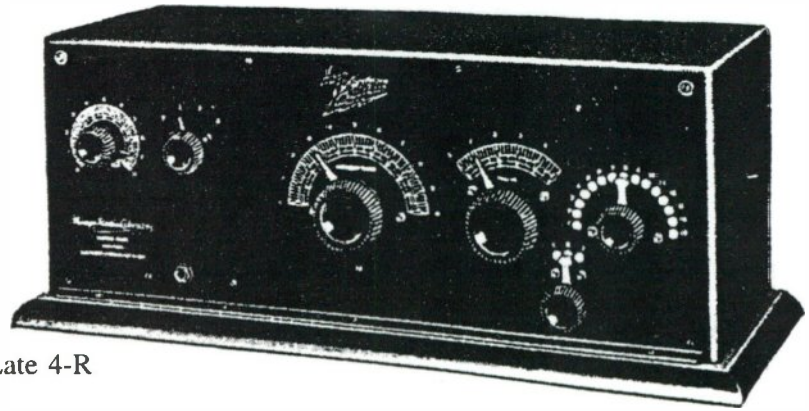
Early 3-R

Model 3-R

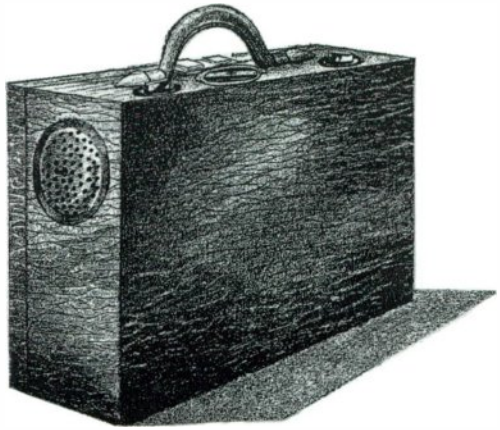
Late 3-R

Early 4-R

Model 4-R

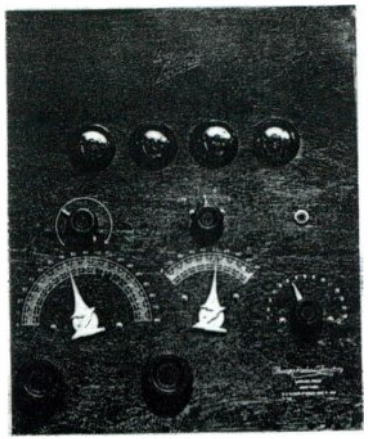


Late 4-R



Zenith Companion

ZENITH
-LONG DISTANCE- RADIO
in the home

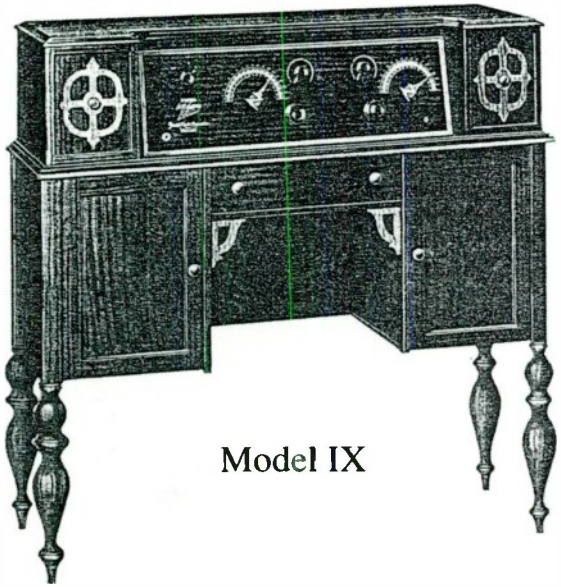


Phonograph Set

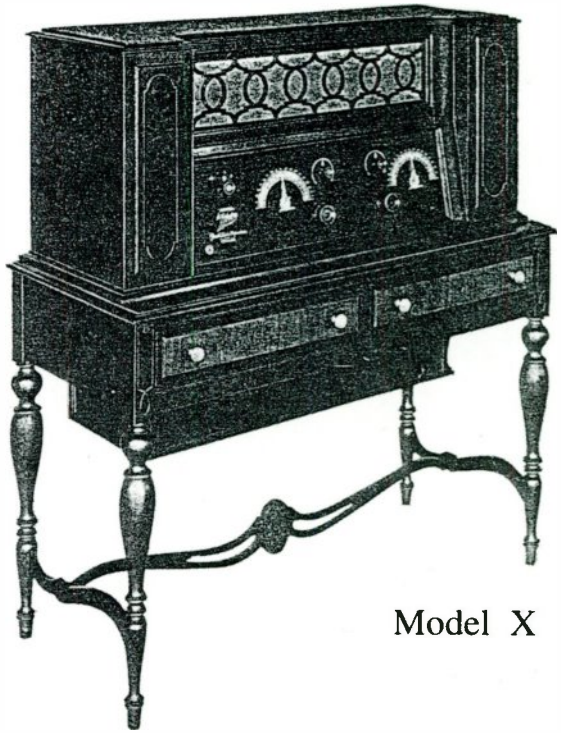
Model VII

Model VIII

the
Super Zeniths



Model IX



Model X

1927-28 Super Zenith Models 27, 28 & 29
are very similar in appearance to Models XII, XIII & IX

1925-26

1927-28

AC Sets

1926

Battery Sets

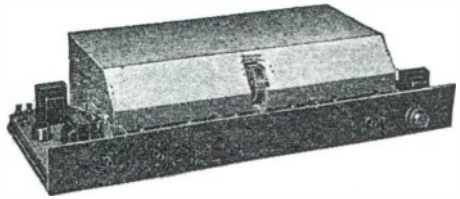
Deluxe Colonial

Deluxe Chinese

Deluxe Italian

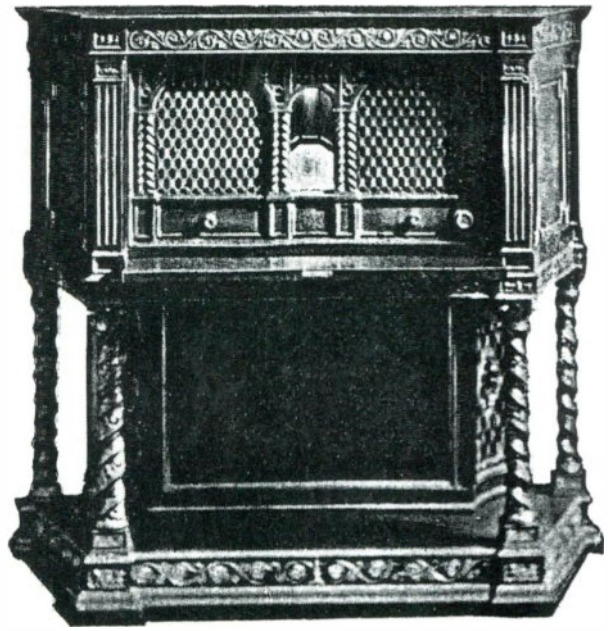
Deluxe English

All-Electric Model "G" Chassis

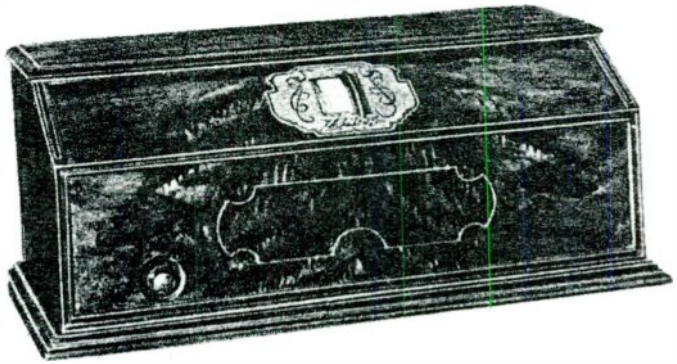


the

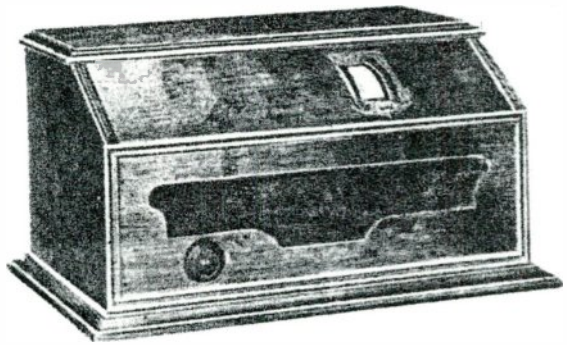
Deluxe Zeniths



Deluxe Spanish

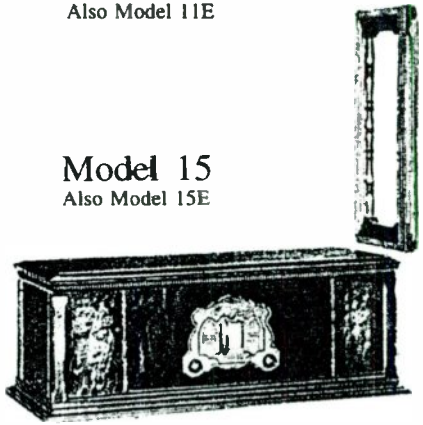


Model 11
Also Model 11E



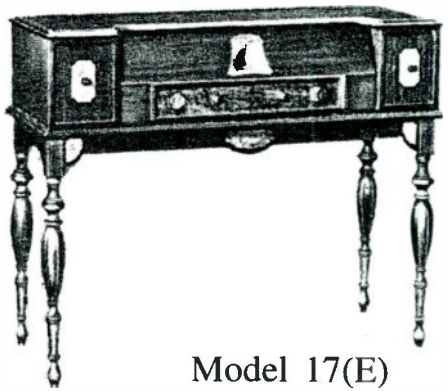
Model 12

Model 14
Also Model 14E

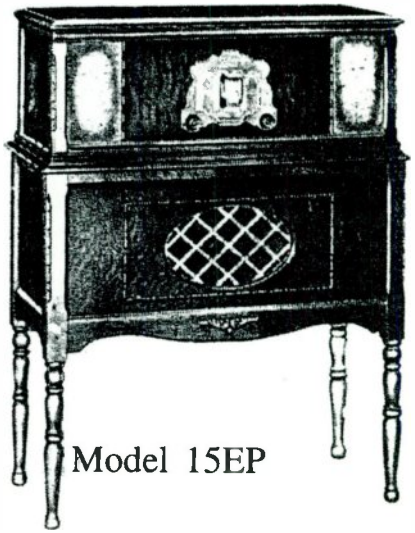


Model 15
Also Model 15E

Model 16
Also Model 16E, 16EP



Model 17(E)



Model 15EP

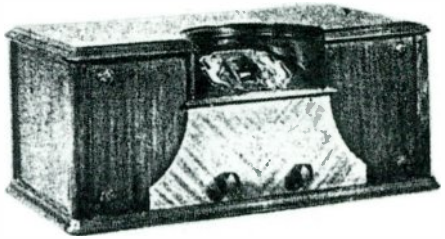
Model 18E

Model 17
with
Console Base

For Super Zenith Models 27, 28, & 29,
See Models VII, VIII & IX of 1925-26.
For Deluxe Models, See 1926.

1927-28

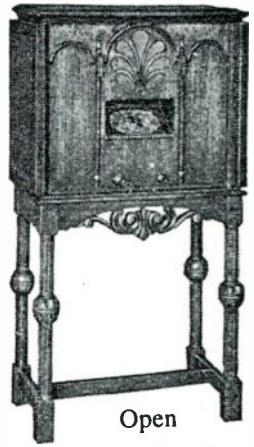
1928-29



Model 31
Model 33
Also Models 33X, 333, 333X

Model 32
Model 34
Also Models 34P, 342, 342P

the 30 Series

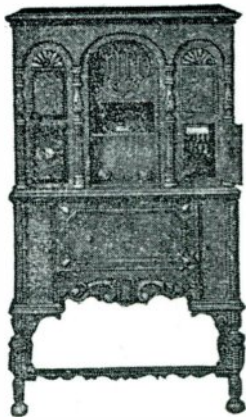


Open

Closed

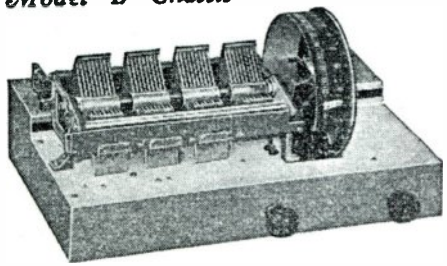
the 35s

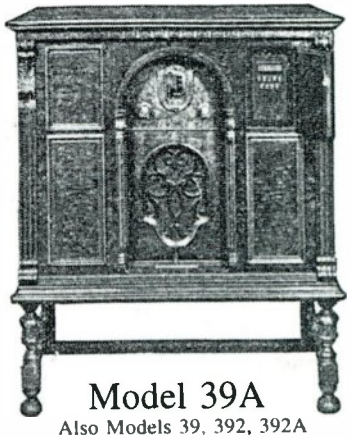
Models 35, 35A, 35AP, 35APX, 35P, 35PX
352, 352A, 352AP, 352APX, 352P, 352PX, 353A, 353AX



Model 37A

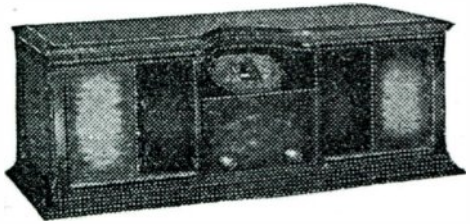
Model "E" Chassis





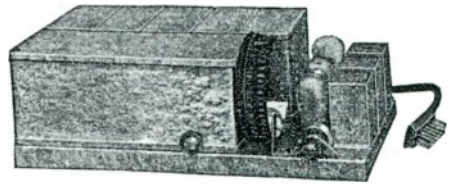
Model 39A
Also Models 39, 392, 392A

Model 40A



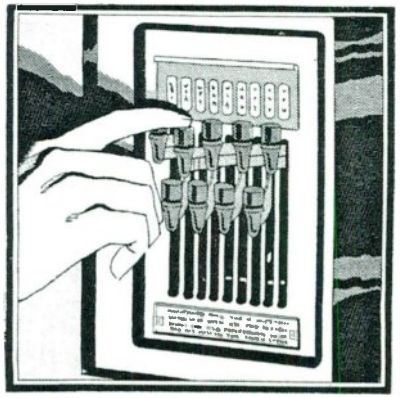
Model 362
Also Model 362X

Model "F" Chassis



Press the Button
There's Your Station!

ZENITH RADIO
LONG DISTANCE AUTOMATIC

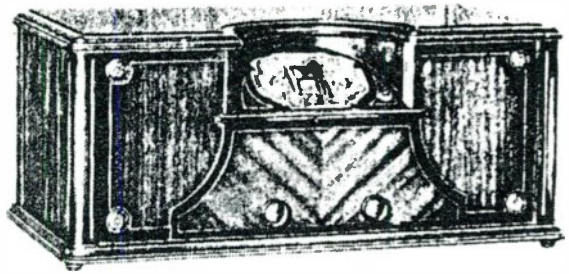


AUTOMATIC Tuning, Zenith's new 1929 presentation, holds at the touch of buttons, the stations of your choice. You set the automatic levers for the stations you prefer and they will always return at a touch of the buttons, instantly, accurately, clearly — *automatically*, thereafter until you again change them for other stations. The dial is at all times free for the old-fashioned method of hand-tuning. Zenith Automatic Tuning is available on Models 35 and 39 described herein.

ZENITH RADIO CORPORATION, CHICAGO, ILL.
The World's Largest Manufacturers of High Grade Radio

Zenith Automatic Tuning

Used on the more expensive models
in the 30, 40, 50, 60 & 70 Series radios



Model 41

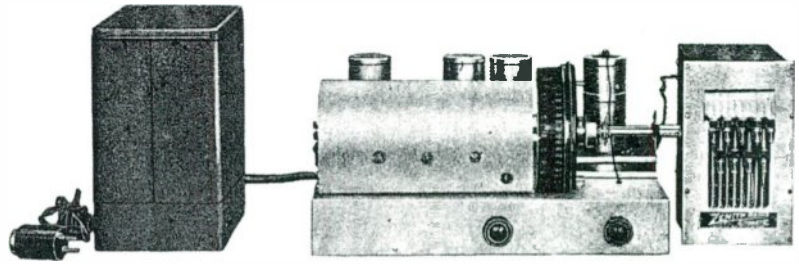
THE SCREEN GRID CIRCUIT

An ingeniously designed new circuit . . . perfected after months of painstaking research and experiment by the Zenith Laboratories . . . this newest circuit provides a simultaneous increase of selectivity and sensitivity heretofore unattainable with tubes in previous use. Combined with Zenith high quality, tone supremacy, distance ability and operating efficiency, the new Zenith Screen-Grid circuit affords the radio owner reception possibilities far beyond the scope of ordinary receivers.

Model 42
Also Model 422

THE 15TH ANNIVERSARY ZENITH RADIO

A Sensationally NEW Radio Receiver that sets an entirely new trend in Radio Design and an entirely New Standard in Radio Value



New Screen-Grid Chassis of the 15th Anniversary Zenith Receiver Model 42.

Until the close of WWII, Zenith dated its beginning to 1915 when R.H.G. Mathews first made and sold his saw toothed aluminum spark gap disks. This made 1930 the 15th Anniversary Year.

the
40 Series

For Model 40A, See 1928-29

1930

1930

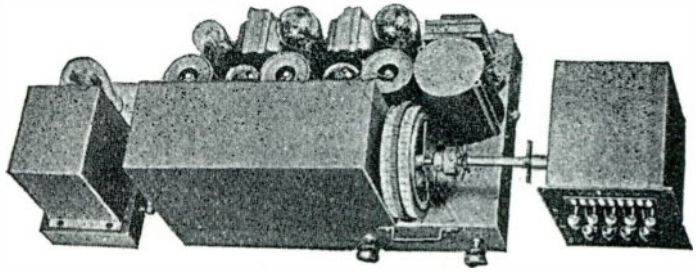
Model 52
Also Model 522

Model 53
Also Model 532

the
50 Series

Model 54
Also Model 542

Model 55
Also Model 552



1. **DOUBLE** Push-Pull Amplification (two stages of push-pull).
2. **GENUINE** Screen Grid Circuit.
3. **GENUINE** Automatic Tuning with
   4. Automatic volume control (all models except 52).
   5. Automatic Station Silencer (all models except 52).
   6. Automatic Station Indicator (all models except 52).
7. Linear Power Detection.
8. Audio Transformers—especially designed and Zenith built.
9. Sensitivity and Selectivity never before equalled.
10. Simple selectivity adjustment.
11. 5 gang condenser and 5 radio circuits.
12. Perfectly and completely shielded.
13. Self-healing Filter Condenser.
14. Power unit—heavy duty type built oversize for trouble-less long life.
15. 100% die made precision parts of highest quality.
16. Minimum noise level. Maximum signal strength. Line noise minimizer.
17. Simplified phonograph switch.
18. Translucent dial calibrated in kilocycles and meters.
19. Tone quality—Perfect! Never even approached before by any manufacturer. Complete range of depth and pitch. Flawless, pure, unbelievably natural.

Model 60
Also Model 602

Model 61
Also Model 612

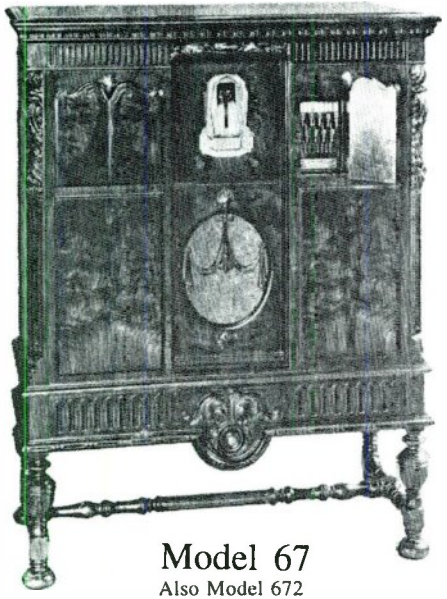
Model 62
Also Model 622

THE 15TH ANNIVERSARY ZENITH RADIO

A Sensationally NEW Radio Receiver that sets an entirely new trend in Radio Design and an entirely New Standard in Radio Value

the
60 Series

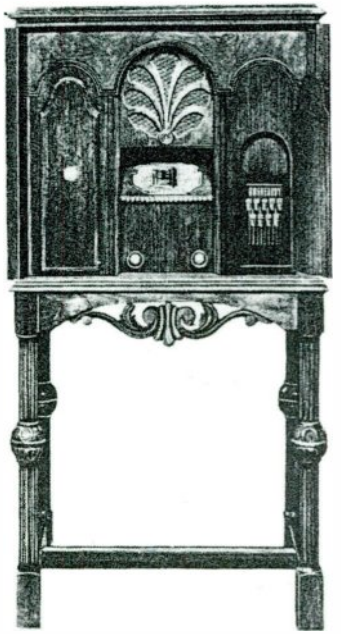
Model 64
Also Model 642



Model 67
Also Model 672

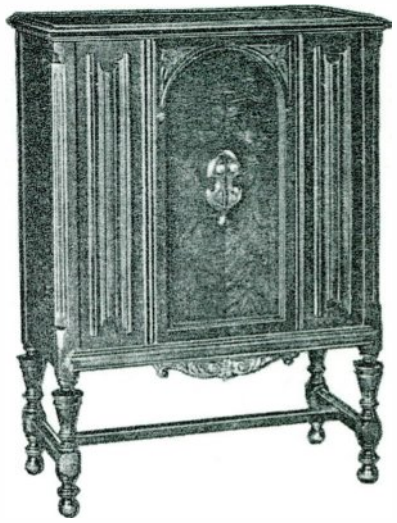
Zenith also offered a
"Zenith 15th Anniversary Model 152"
Nine tube Screen Grid Circuit with Automatic Tuning. The photograph used in the brochure is indistinguishable from Model 52 & 62.

ZENITH
the world's highest quality Radio



Model 563

1930



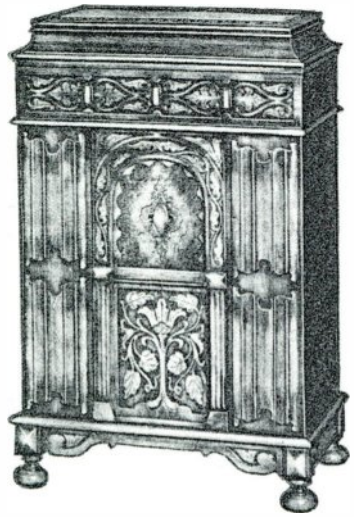
Model 71
Also Model 712

Model 72
Also Model 722

the
70 Series

For Models 78, 79
See 1931 Model Year

Model 73
Model 74
Also Model 732, 74, 742



Model 75
Also Model 752?

1930-31

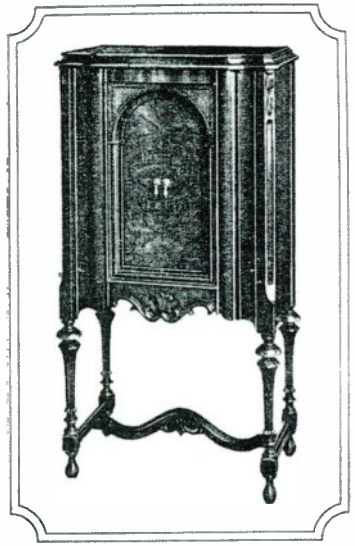
Model 10
Also Model 102

ZENITH
the world's highest quality Radio

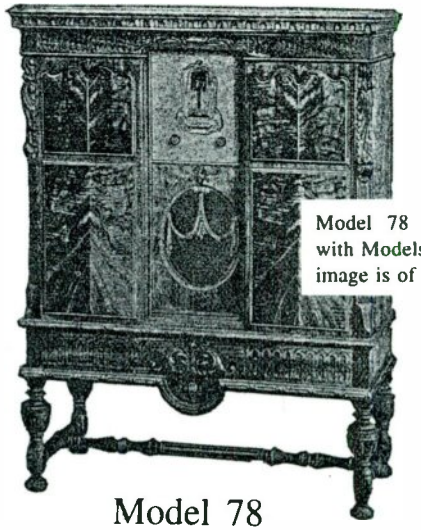
NOW...
the world's greatest radio value

the
Super Eights

Model 11
Also Model 112



Model 12
Also Model 122



Model 78 shared cabinets with Models 55 & 67. This image is of Model 55.

Model 78
Also Model 782?

Model 79 shared cabinets with Model 89 & 892. This image is of Model 89.

Model 79

Model A

the
First Zenettes

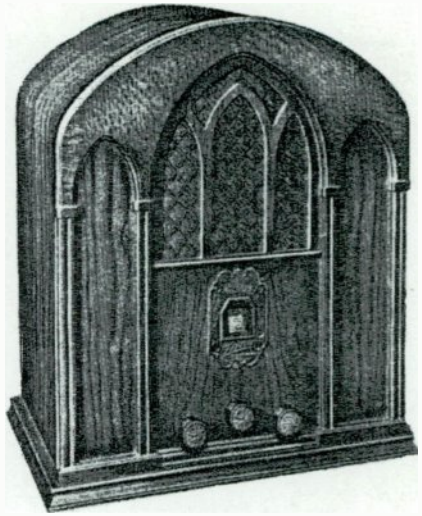
Model B

Model C

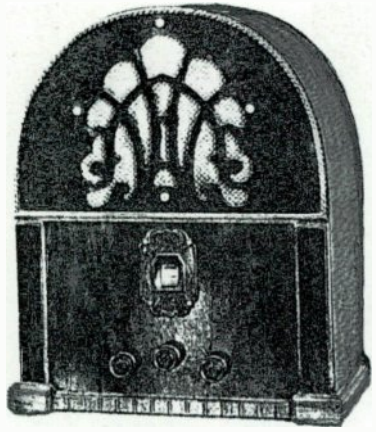
Model D

1931

1931-32



Model AH



Model BH

Model CH

Model LH

the
Zenettes

Model L
Model LP

Model MH

Model RH

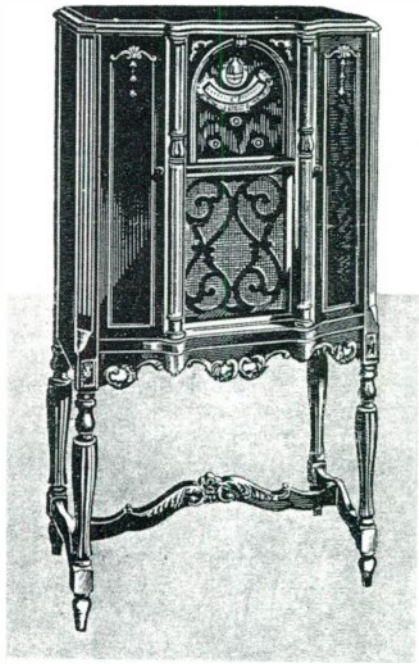
Model WH

the
Hypermetrons

Model 82
Also Model 822

Model 89
Also Model 892

Model 90
Also Models 090 & 902

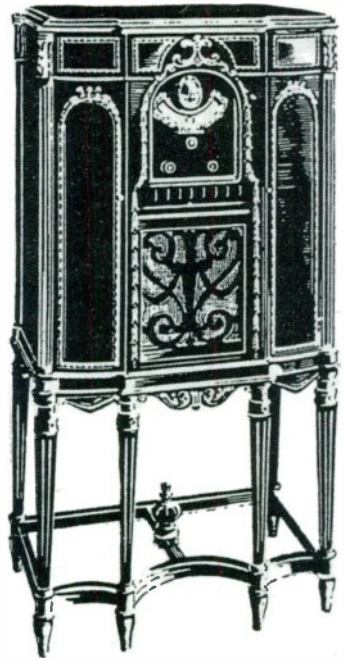


Model 92
Also Model 922

There is strong evidence that the **Model V-8** existed. However, no data concerning the appearance of this model has been found.

Model 91
Also Model 912

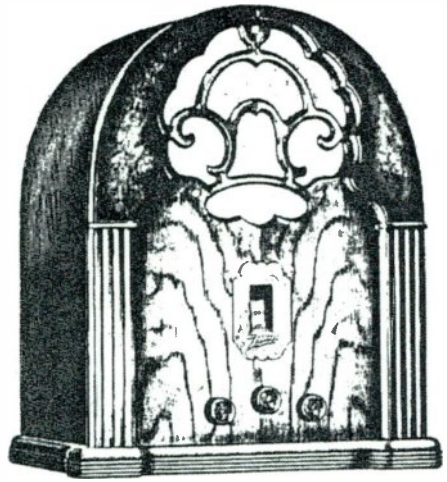
the Hyper-hetrodyne Ultra



Model 103

1932

The new ALL-STAR 1933 ZENITH RADIO
LONG DISTANCE



Model 210

Model 210-5

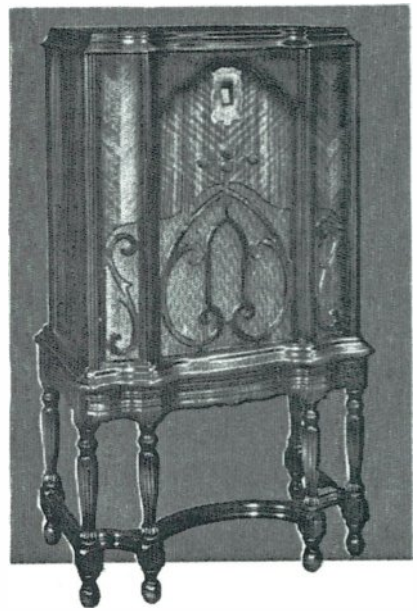
Model 216 shared cabinets with Model 230. This image is of a Model 230.

Model 216

200s Models

Model 220
Also Model 220-3

Model 230
Knob positions on production model are different from this catalog image.



Model 240
Knob positions on production model are different from this catalog image.

Model 244
Knob positions on production model are different from this catalog image.

A CHALLENGE

WE challenge anyone to name a single demonstrable improvement in radio which is not found in the new Zenith 1933 line. We further challenge anyone to name another radio line which contains all the improvements found in the new 1933 Zenith line.

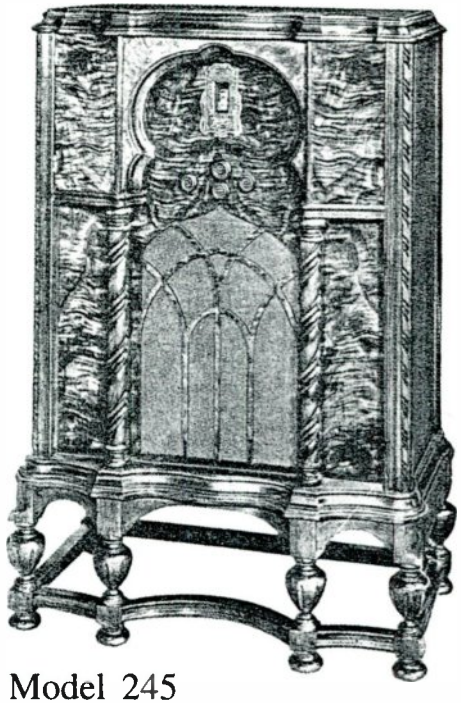
No cut-price, cut-quality sets are these, but the famed Zenith quality in modern long, short, and standard wave 1933 radio . . . backed by the oldest manufacturer in radio, by the only exclusive radio manufacturer, by a manufacturer who every year since 1915 has led with revolutionary radio improvements.

They give you superiority not in one angle of improved performance, but in all. ***Tone quality.** The new Zeniths bring it to you in life-like undistorted purity over the full range of the musical scale. ***Selectivity.** Advanced Zenith superheterodyne circuits cut in all stations sharply, with no cross talk or ghost sounds. ***Distance** . . . All the broadcasts in the ether of the world are brought to you by these short and European long wave sets. ***Volume.** Great reserves of power bring in stations from near and far in full rich, evenly regulated volume, and with fine tone whatever the volume. ***Attractive cabinets.** The new Zeniths are beautiful pieces of furniture at the same time that they are fine musical instruments and perfected electrical devices.

In brief, the new Zeniths and Zenettes are All-Star Radios built by an "all-star" manufacturer . . . modern as tomorrow . . . and with that most essential of all qualities: **best materials and finest engineering and construction at every point.**

Model 260

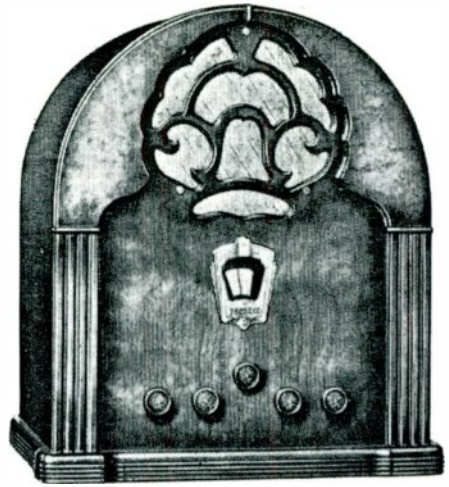
Model 270
Also Model 270-5



Model 245
Knob positions on production model are different from this catalog image.

200s Models

Approximately 40 models in the 200s model number range are listed in Zenith or other significant reference materials as having been produced in 1933. These 11 images, along with those of models 288 and 293 of 1933-34 are all those which were available from Zenith, the Fuog Collection or trade magazine advertising. It is not certain that all of the models listed in 200s range were actually produced.



Model 250
Also Model 250-3

the new ALL STAR 1933

ZENITH RADIO

1933

Model 410

Model 411

Model 420

Model 430

400s Models

Model 440

Model 441

Model 441 shared cabinets with Model 617. This image is of a Model 617.

Approximately 20 models in the 400s model number range are listed in Zenith or other significant reference materials as having been produced in 1933. These 7 images along with the Model 460 shown at the end of this year of the catalog are all those which were available from Zenith, the Fuog Collection or trade magazine advertising. It is not certain that all of the models listed in 400s range were actually produced.

Model 460 was Zenith's first automobile radio. It was marketed in both '33 and '34. Refer to last page of 1934 for an image.

Model 476-A
Also Models 476 & 476-B

500s Models

Approximately 35 models in the 500s model number range are listed in Zenith or other significant reference materials as having been produced in 1933. Many of these radios may have been produced under both the Zenith and Inter-Ocean marques, or only as Inter-Ocean models. No images of the 500s range models were available from Zenith, the Fuog Collection or from trade magazine advertising. It is not certain that all of the models listed in 500s range were actually produced.

The ONLY *Exclusive Feature in Radio* AUTOMATIC TUNING

Attracts Customers to Your Store AND SELLS THEM * * *

★

★ (1) This full-circle 8-inch logging dial gives precision tuning. There are dials on some radios 4, 3, and even 2 inches in length. How can such dials be divided with 95 wave channels and be easily read?

★ (2) The Shadowgraph, the modern invention by which anyone can tune to the resonant peak of the broadcast wave. Makes anyone an expert tuner of all stations.

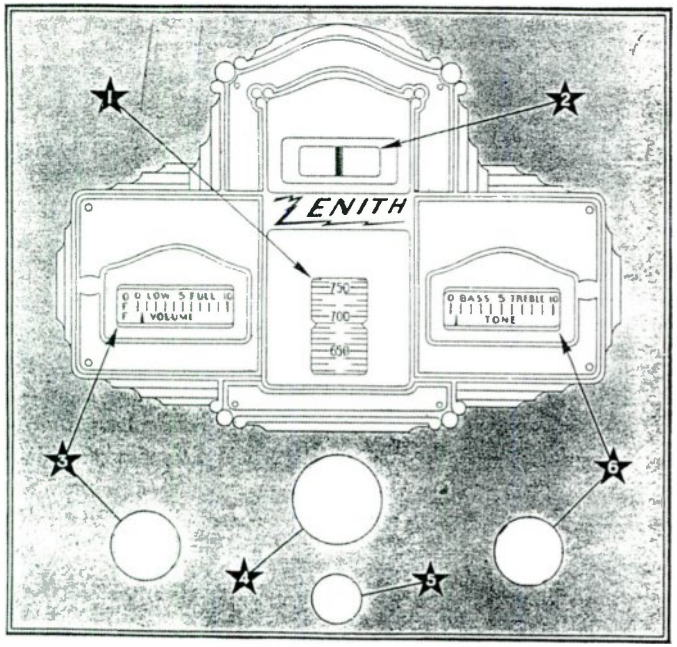
★ (3) With this indicator the volume may be pre-set, a necessity to avoid blasting when the tubes warm up. The knob which controls it has Zenith's famous tone-volume equalizer, which automatically emphasizes treble and bass as power is reduced.

★ (4) With this knob, police calls and the new Canadian station at Windsor, Ontario, which are beyond ordinary radios, can be reached. All Zenith radios tune from 540 to 1750 kilocycles, thus giving 121 channels, 26 more than the ordinary radio.

★ (5) Between-station noise suppressor and local noise suppressor. Operates automatically. When set can be operated manually as sensitivity control.

★ (6) With this indicator and the knob which controls it, Zenith's visual Treblo tone adjuster is operated. Makes sure of tone coloring most pleasing to the listener's ear.

A CHALLENGE... *We challenge anyone to name a single demonstrable improvement in radio not found in the new 1933 Zenith line; and we further challenge anyone to name another radio line which contains all the improvements found in the new Zenith 1933 line.*



All Star ZENITH RADIO

Shadowgraph Tuning

★ Here's the device that makes every child or adult an expert tuner. When a station is not tuned to exact resonance, a wide black shadow appears on the dial as illustrated at the left. As the station comes closer to the peak, the shadow becomes smaller; until finally, when tuned "on the nose," only a narrow shadow shows. Result: **Full rich resonance, not a rasping sound.**

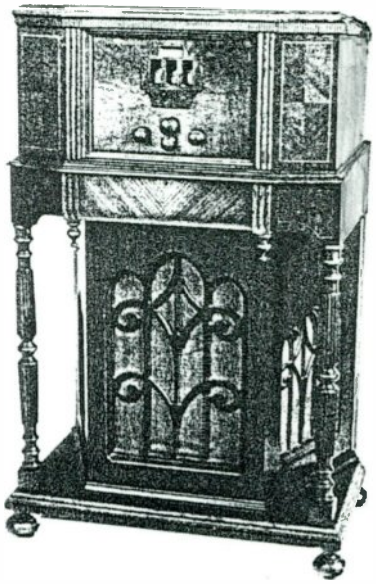
Visual Tone and Volume Indicators

★ No longer need you conduct experiments in tone quality each time you tune in a station. The new Zenith Visual Tone Indicator is a pointer traveling over an illuminated scale from full treble to bass. It enables you to log exactly the tone that best pleases your ear. Similarly, the Visual Volume Indicator permits you to log the volume that best suits you and thereafter the music comes on at that volume, instead of bursting forth like a hurricane. And capping these two, is the new Zenith Catenary Tone-Volume Compensation, keeping high, low, and middle tones in right relation as volume is increased or diminished.

These 1933 catalog images detail the dials of the '33 400s range sets and those of some of the 1934 700s model number range sets.

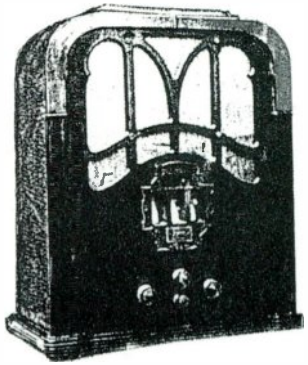
1933

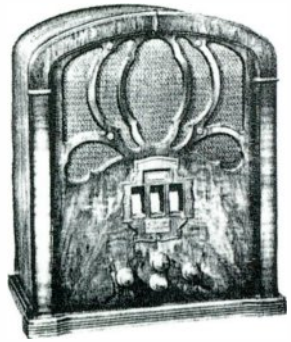
1933



Model 610

Model 612
Model 618



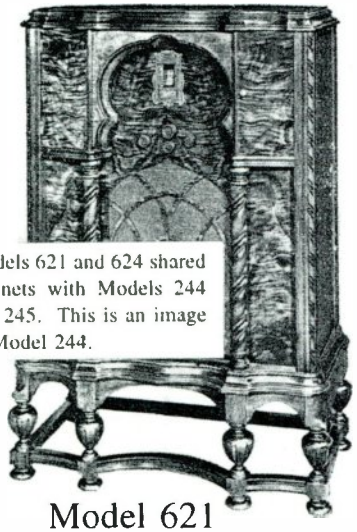


The image above is of the Zenith Model 616 in the Peters collection. The image to the right is the Zenith brochure image of a 616.

Model 616

600s Models

Model 617



Models 621 and 624 shared cabinets with Models 244 and 245. This is an image of Model 244.

Model 621
Model 624

Approximately 25 models in the 600s model number range are listed in Zenith or other significant reference materials as having been produced in 1933. Many of these radios may have been produced under both the Zenith and Inter-Ocean marques, or only as Inter-Ocean models. Only two of these 7 images of the 600s range models were available from the Fuog Collection and none were available from trade advertising sources. The remaining 5 images are retouched photos of radios in contemporary collections. It is not certain that all of the models listed in 600s range were actually produced.

Model C-10

Model C-10 is an anomoly in the normal Zenith model numbering, manufacturing and marketing systems. Refer to Annual Notes.

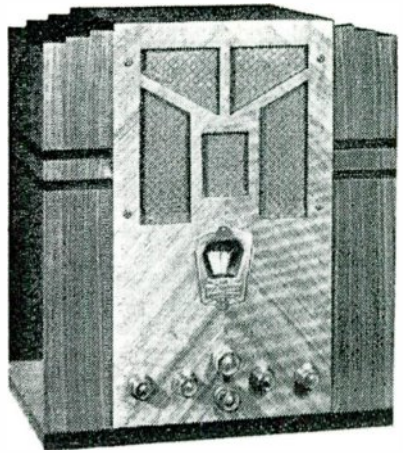
ZENITH ALL WAVE RADIO

Europe Is Broadcasting — *Tune In!*

Have you experienced the thrill of listening-in to foreign broadcasts? Have you heard radio programs direct from Europe?

On these Zenith All-Wave Models you will hear the latest musical successes direct from London. It is a real adventure—owning a radio that tunes in not only your favorite American stations, but also brings in grim police calls, aviation broadcasts, amateur stations all over the country—and foreign programs from all over the world.

These remarkable distance-getting sets are true Zeniths—built by the maker of the world's finest quality radio. Here's complete radio reception with new thrills for the whole family. See these Zenith sets at your dealer's today.



Model 288
Also Model 288-5

200s Models

There were 7 basic models in the 200s model number range listed in Zenith or other significant reference materials as having been produced for the 1933-34 model years. Only the 288 & 293 models were featured in print advertising. It is not certain that all of the listed models were produced.

Model 293
Also Models 293-X & 293-SX

From the North Pole to Tasmania

ZENITH

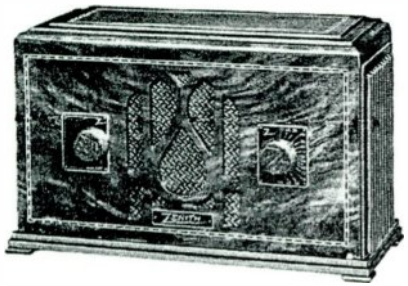
has pioneered short-wave radio!

1933-34

the
Challenger Series

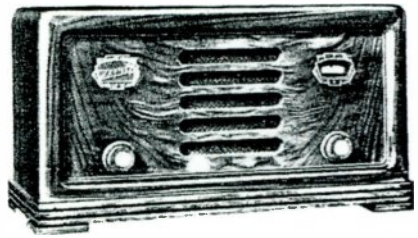
Refer to last page of 1934 catalog
for auto radios, Models 460 & 462

1934



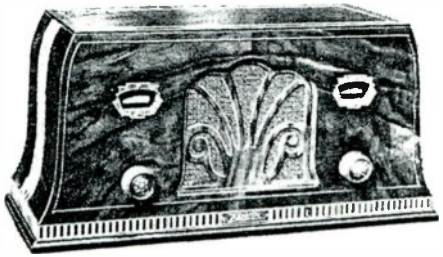
Model 701

Model 705



Model 706

Model 707



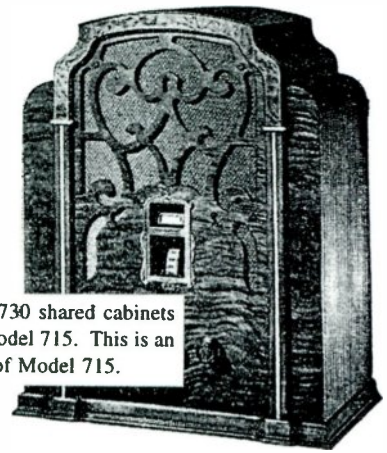
Model 711

Model 712

700s Models

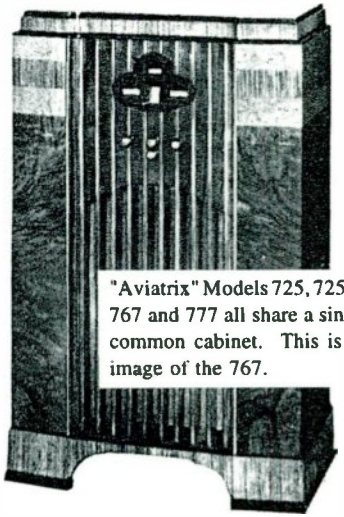
ZENITH

Model 715



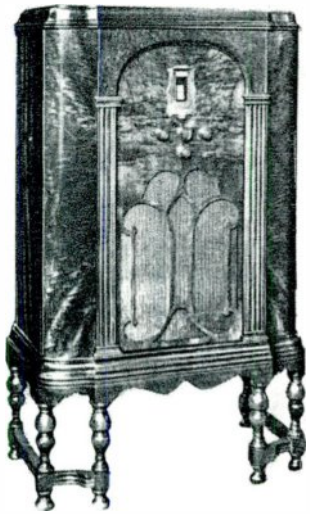
Model 730 shared cabinets with Model 715. This is an image of Model 715.

Model 730



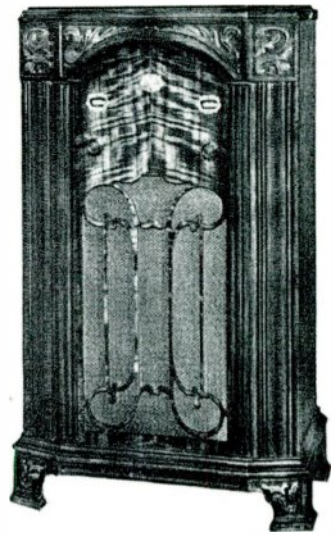
"Aviatrix" Models 725, 725-S, 767 and 777 all share a single common cabinet. This is an image of the 767.

Model 725
Also Model 725-S



Model 735
Dial bezel & knob positions on production model are different from this catalog image.

Model 740



Model 750

700s Models

Model 755

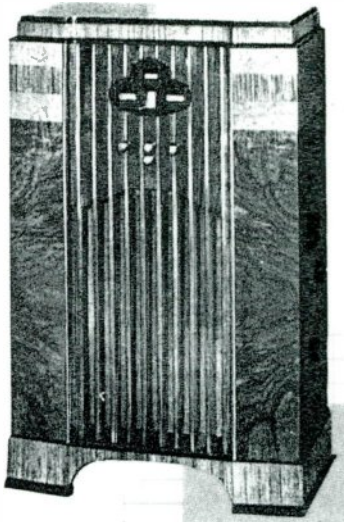
Model 760

Model 765

ZENITH

Approximately 28 models in the 700s model number range are listed in Zenith or other significant reference materials as having been produced in 1934. Images were available from Zenith, the Fuog Collection or trade magazine advertising for 18 of these models. It is not certain that all of the models listed in 700s range were actually produced.

1934

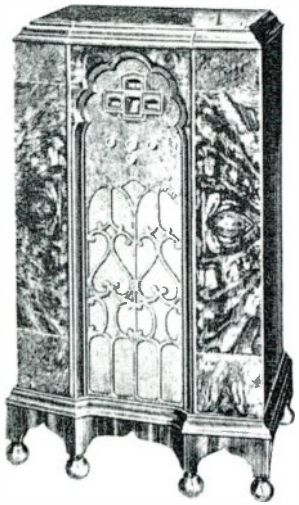


The Aviatrix Series

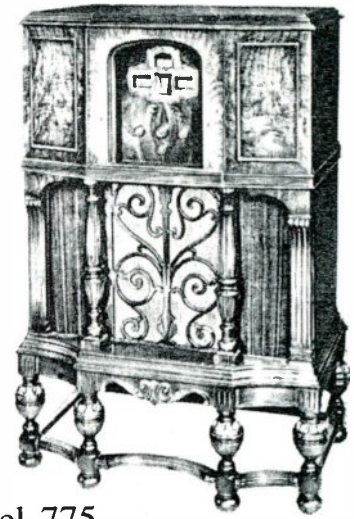
The three "Aviatrix" models of Retail Model Year 1934 mark the first major committment by Zenith to the principles of modern industrial design.

AVIATRIX

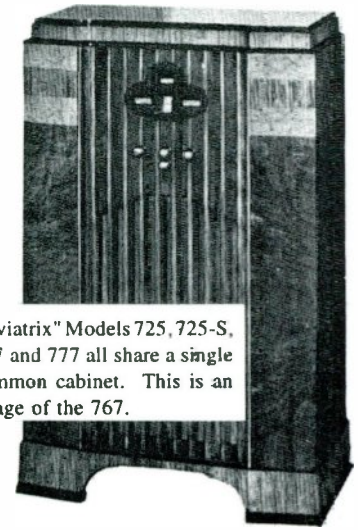
Model 767



Model 770
Also Model 770B



Model 775
Also Model 775B

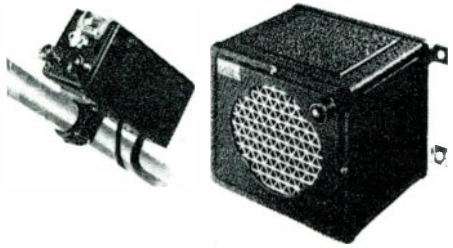


"Aviatrix" Models 725, 725-S, 767 and 777 all share a single common cabinet. This is an image of the 767.

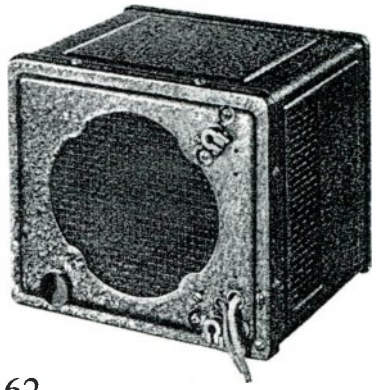
Model 777

700s Models

ZENITH Model 460
DIRECT TUNING AUTOMOBILE RADIO



Model 460

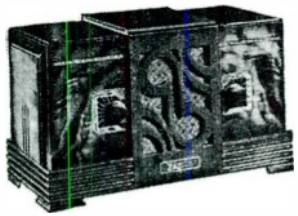


Model 462

ZENITH
AUTO RADIO

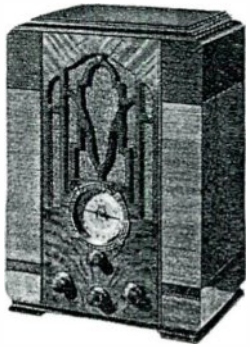
Automobile Radios

800s Models



Model 801

Model 805



Model 807

Model 808

Model 809

Model 834
Model 835

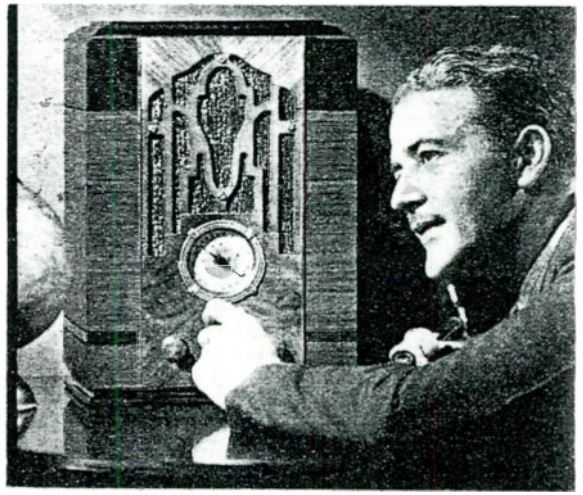
Model 827
Also Models 827R & S827

ZENITH

Model 811

Model 825
Also Model 825R

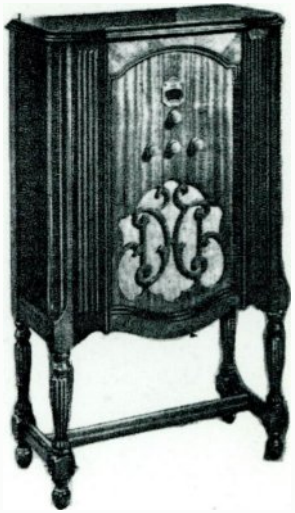
Model 829
Also Models 829R & S829



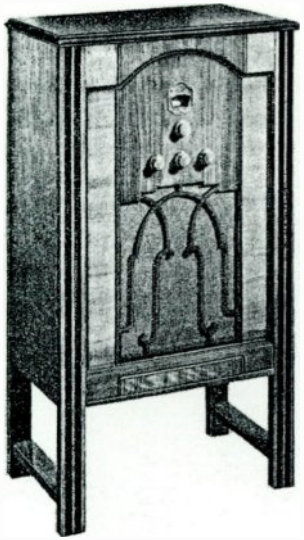
For 1935 automobile radios, refer to last page

1935

1935



Model 845



Model 847
Also Model S847

Model 850

Model 860

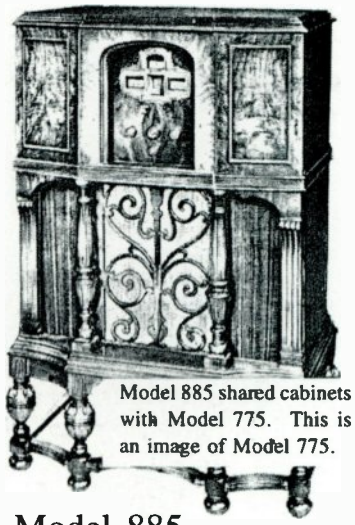
Model 861

800s Models

Model 870
Also Models 870R & S870

Model 871
Also Model S871

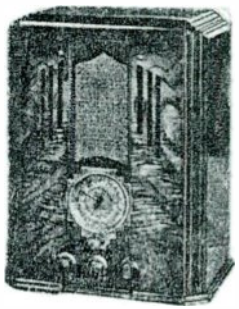
Model 880



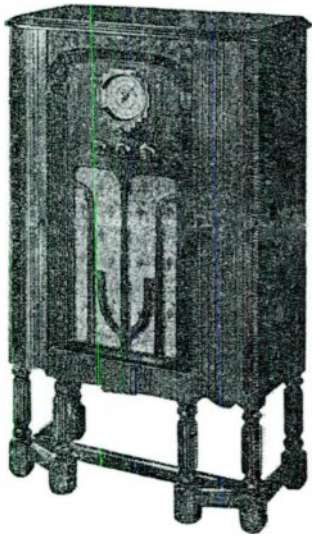
Model 885 shared cabinets with Model 775. This is an image of Model 775.

Model 885

Approximately 37 models in the 800s model number range are listed in Zenith or other significant reference materials as having been produced in 1935. Images were available from Zenith, the Fuog Collection or trade magazine advertising for 19 of these models. It is not certain that all of the models listed in 800s range were actually produced.



Model 908
Also Model S908



Model 945

Model 960

Model 961
Also Model S961

Refer to 1934 Models 740/760 for a more legible view of this cabinet

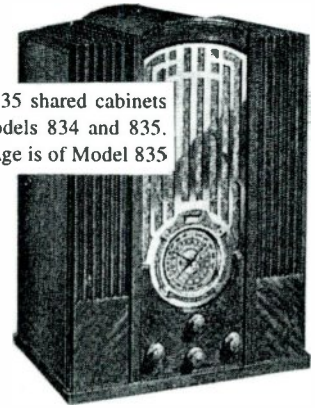
Model 970

See below for **Model 950**

900s Models

Model 950

Approximately 19 models in the 900s model number range are listed in Zenith or other significant reference materials as having been produced in 1935. Only 9 of these models were featured in print advertising which ran very late in the 1935 Retail Model Year. The image of Model 950 is a retouched photo of a radio in the Blankinship Collection. It is likely that all of the models listed in the 900s range were produced.



Model 935 shared cabinets with Models 834 and 835. This image is of Model 835

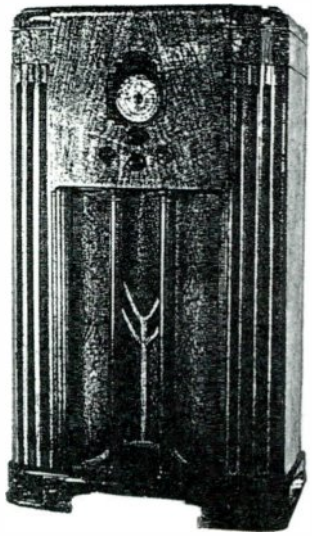
Model 935

1935

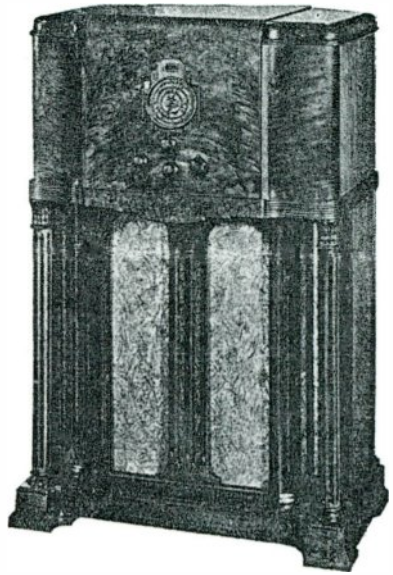
Model 975 shared cabinets with Model 765. This is an image of Model 765.

Model 975

Model 980



Model 985



Model 990

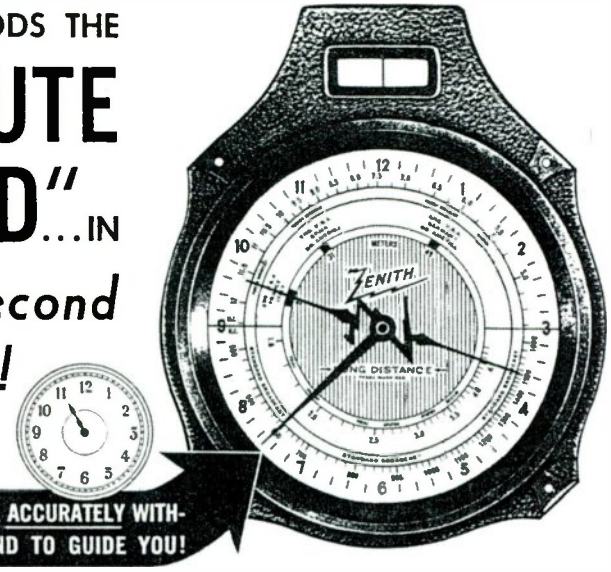
900s Models

NRA MEMBER U.S. WE DO OUR PART

ZENITH TRADE MARK REG.

LONG DISTANCE RADIO TRADE MARK REG.

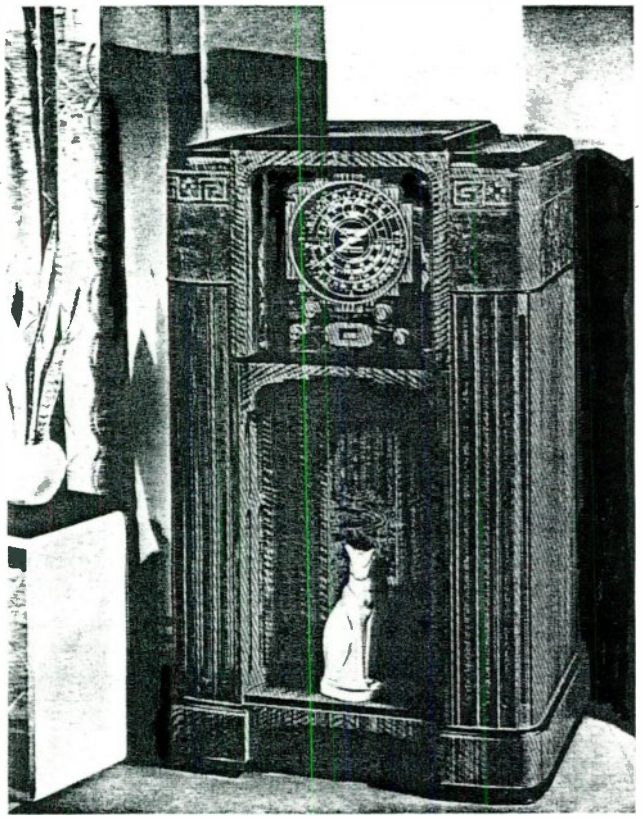
ZENITH ADDS THE "MINUTE HAND"... IN *Split-Second Tuning!*



This catalog image details the 800s dial. Escutcheon varies slightly for 900s models.

TRY TO SET A CLOCK ACCURATELY WITHOUT A MINUTE HAND TO GUIDE YOU!

HAIRLINE ACCURACY NOW POSSIBLE IN LOGGINGS AND RELOCATING ALL FOREIGN SHORT WAVE STATIONS



ZENITH STRATOSPHERE

Specifications

CIRCUIT:	Ultra modern 25-tube superheterodyne. Triple Filtering. Q.A.V.C. with magnetic relay. Disappearing delay A.V.C. with amplifier. Duplex high fidelity audio amplifier. Manual controlled variable selectivity.
TUBES:	1—6D6 1st R.F.; 1—6D6 2nd R.F.; 1—6A7 1st detector oscillator; 1—6D6 1st I.F.; 1—6D6 2nd I.F.; 1—76 2nd detector; 1—85 A.V.C.; 1—6D6 tuning meter amplifier; 1—6D6 A.V.C. amplifier; 1—79 electron relay; 2—76 parallel 1st audio; 2—42 push-pull 2nd audio; 8—45 parallel push-pull power output; 3—5Z3 rectifiers.
CABINET:	A symphony in rare wood. Rare woods blended into a symphonic harmony of exquisite color emphasize the true character of the Zenith STRATOSPHERE as a genuine musical instrument. Design has been dictated by the basic principles of acoustics, just as is that of the violin. Outstanding charm is the result. Solid walnut pilasters are combined with Australian laurelwood. The superstructure is Carpathian elm burl, inlaid with imported marquetry; a note repeated in the center of the grille. Doors are of matched American butt walnut, overlaid with marquetry. The entire ensemble is enhanced by a natural piano finish of satin sheen. Nothing finer has ever been produced by craftsmen in wood.
DIMENSIONS:	50½ inches high; 29⅞ inches wide; 19⅛ inches deep.
SPEAKERS:	1 Dynamic high frequency speaker; 2 Concert dynamic low frequency speakers.
CONTROLS:	Tuning; Tone; Volume and Switch; Band Switch; Q.A.V.C. Switch; Selectivity (high fidelity). (Q.A.V.C. level control on back.)
CONDENSER:	Special 4-gang.
WAVE BANDS:	All-wave from 63,600 to 535 K.C. (or from 4¾ to 560 meters).
OTHER FEATURES:	50 watts output; Individually lighted tuning ranges; Split-second tuning and dual tuning ratio—18:1 and 99:1; Elaborate shielding; High Fidelity; A.V.C. amplifier; Tuning meter amplifier; Immeasurable sensitivity; Sound diffusion; 9-inch airplane dial.

Model 1000-Z
Stratosphere

1100s Models

This image was first published in *A Flick of the Switch: 1930-1950* by Morgan E. McMahon and is used by permission of Mr. McMahon and the publisher, Antique Radio Classified.

Model 1117

Aproximately 16 models in the 1100s model number range are listed in Zenith or other significant reference materials as having been produced in 1935. None of these models was featured in either retail or wholesale advertising and no other images of these rare radios were found. It is uncertain whether all of the models listed in 1100s range were produced.

ZENITH
LONG DISTANCE RADIO

ZENITH RADIO CORPORATION, 3620 Iron St., Chicago, Ill.

1935

3 NEW AUTO RADIOS by ZENITH

to give the prospect the price and performance he wants

1— SUPPRESSORS UNNECESSARY

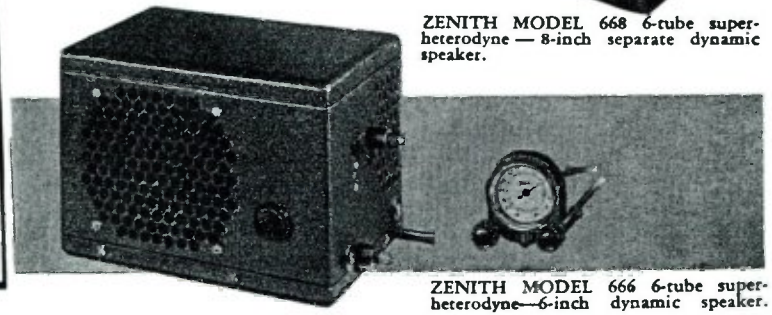
2— TRIPLE FILTERING

3— WIDE PRICE RANGE

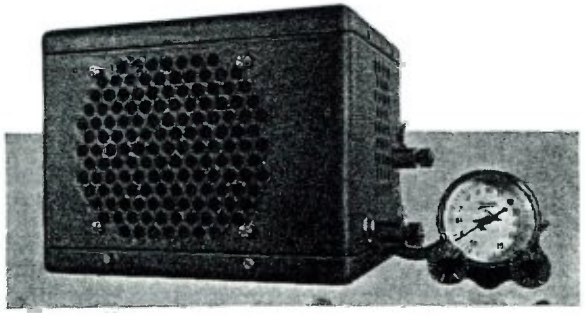
4— EASILY INSTALLED

5— FAMOUS NAME

ZENITH MODEL 668 6-tube superheterodyne — 8-inch separate dynamic speaker.



ZENITH MODEL 666 6-tube superheterodyne—6-inch dynamic speaker.

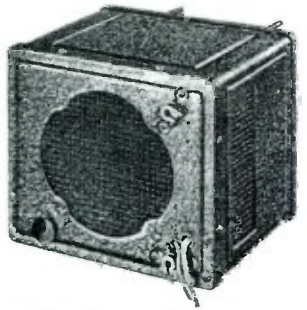


ZENITH MODEL 664 5-tube superheterodyne—6-inch dynamic speaker.

Investigate!

Get together with your distributor. Look into the new Zenith Automobile Radio Models. Performance that's startling—Triple Filtering—protection against outside noises—ignition—power lines—electric cars, etc. Least possible drain on batteries—no special parts required—no suppressors. Installs with ease and speed. An "Auto Radio" worthy of the Zenith name. Write your distributor for full detail.

And . . Brilliant ZENITH RECEPTION "AT THE WHEEL"



ZENITH MODEL 462 AUTO RADIO—

A superb, 6-tube all-electric superheterodyne receiver which gives tone quality superior to the average home radio. Improved automatic volume control practically eliminates blasting and blaring noises. Airplane dial control, indirectly illuminated with volume control knob, which serves as lock switch. Full size super-dynamic speaker which delivers rich, full tone. A powerful sensitive set which fits any car. May be installed in a few minutes, $49.95 complete.

ZENITH MODEL 7 AUTO RADIO 5-tube superheterodyne, airplane type dial. An outstanding value at $29.99.

The Model 462 automobile radio illustrated above was taken from a 1935 Zenith retail brochure. Automobile radios marketed in the 1935 Retail Model Year included the 462 and the 664, 666 and 668 also illustrated here along with the Model 7 mentioned in the copy under the Model 462 illustration. Further, evidence suggests that the 650HD, the 651HE, the 663 and the 680 were also automobile radios No images were located for these latter radios.

Chicago Radio Laboratory Products: 1919-24

Chicago Radio Laboratory (CRL), the precursor organization to Zenith, was founded in the winter of 1918-19 when R.H.G. Mathews and Karl Hassel, both Navy radiomen in WWI and both amateur radio operators before the war, agreed to go into partnership. Mathews and Hassel conceived CRL as a mail-order retailer of products for radio amateurs which would offer items manufactured by themselves as well as parts and equipment manufactured by others. They announced their new enterprise by placing a visually striking advertisement in the inaugural post-war issue of *QST* (June 1919) the primary magazine for radio amateurs. The ad featured an "Amplifigon," a unit incorporating a detector and one stage of amplification.

THE J-19 CATALOG

Years later, Karl Hassel would relate that they were able to produce the June 1919 catalog only because Mathews' father worked in the printing industry. The two young partners had no money at all. The front cover of the catalog carried three slogans: "Long Distance Radio Apparatus," "Every piece of apparatus sold given an actual long distance operating test" and "We use what we make."

The first device in the catalog was the Adams-Morgan Paragon, which was given a full page of text. This was followed by a photo and page of discussion of the "Amplifigon Audion Control Cabinet, Type AGN-1." The discussion also described but did not name the AGN-2. These devices are followed by one page each devoted to the One Step Amplifier Cabinet, Type AMP-1, and the Motor Boat Receiver, Type MBR-1. The Motor Boat Receiver was a complete radio, tuner and detector in a single box and tuned "short waves" from 180 to 700 meters (approximately the AM broadcast band today). These units are described as having an engraved front panel of black bakelite and as being housed in cabinets of golden oak. The only other CRL equipment featured is the WV-700 Shortwave Wave Meter and the HR-1 Hy-Rad Rotary Gap, a transmitter component. The J-19 Catalog closed with headphones, batteries and miscellaneous parts for home constructors.

Both the early *QST* advertisements and the J-19 Catalog list the mailing address as 1316 Carmen Avenue, actually the residence of Mathews' parents, where both partners were rooming. The catalog also lists a "City Office" at 1008 Karpen Building and a "Test and Experiment Station" at 5525 North Sheridan Road.

Chicago Radio Laboratory advertised in *QST* magazine almost every month from June 1919 until the company was re-directed to the entertainment radio market in the spring of 1922. The September 1919 ad introduced a new device, the Audion Detector Cabinet, Type AD-1, a single tube device priced at $11.00, plus the tube. In December, the ad featured the AD-1 detector ($11.00) with a picture and announced an advanced unit, the AD-2, "with sensitive high voltage adjustment" for $23.50. In an apparent economy move, the photo purporting to be the AD-2 is actually the photo of the AMP-1 used in the J-19 catalog. The *QST* advertising in early 1920 featured the Amplifigon Types AGN-1 and AGN-2 under a banner heading "Hear 'Em All Over the Room!" and asked readers to watch for the upcoming new J-20 Catalog.

The May *QST* carried CRL's first full-page ad and featured the new "C.R.L. Paragon Regenerative Receiver". The ad was headlined "Caught Up At Last!" and promised "IMMEDIATE DELIVERIES." Karl Hassel remembered years later that Adams-Morgan did not keep up with the volume wholesale orders from CRL and they decided to bring out their own receiver, a modified version of the original Adams-Morgan set. The June 1920 ad announced what, under some definitions, was the first commercially available portable radio, the Type PR-1 under the headline "Carry 'Em With You." The May and June 1920 ad also announced the availability of the second catalog.

THE J-20 CATALOG

The June 1920 Catalog was organized much as the 1919 catalog had been, but this time leading with a photo of an Amplifigon Type AGN-2 atop a C.R.L. Paragon Tuner. The next double page extols the capabilities of the new "Paragon Short Wave Regenerative Receiver" followed by pages featuring the Amplifigons AGN-1, AGN-2 and AGN-3 along with various Audion Amplifiers and Detectors. These were followed by pages dedicated to each of five new receivers. In retrospect, the most historically important of these new receivers was the Portable Receiver, Type PR-1 which contained a complete receiver and batteries in a single cabinet. The owner had only to add antenna, ground and headphones to connect directly to the emerging new broadcasting services:

"In balmy summer weather, when on the long-planned camping trip, with tent pitched on the lake shore beneath the sweet smelling pines, the long evening pass quickly when one can, without effort, "pick up" the latest ball scores, the weather forecast which may influence tomorrow's fishing trip and the news of the outside world."

Clearly this is the first "Zenith" radio intended for the brand new consumer market. The other new receivers included a special Jeweler's Time Receiver, two long wave receivers and a second Motor Boat Receiver.

Like the J-19 Catalog, the 1920 catalog closed with a selection of parts for amateur radio apparatus (meter, coils, etc.), headphones batteries and the Hy-Rad rotary spark gap disks.

For the next ten months the CRL advertising campaign in QST was carried in half-page ads featuring the Paragon receiver. The name of the receiver slowly transitioned from "C.R.L. Paragon Regenerative Receiver" (July 1920) to "C.R.L. Paragon Short Wave Reg. Receiver" (September 1920) and eventually to C.R.L Short Wave Reg. Receiver" in the December 1920 *QST*.

In the February 1921 *QST*, the Chicago Radio Laboratory used a full page ad to announce the new "Z-Nith Regenerator," the first known public use of what would become the Zenith name. The Z-Nith Regenerator *in the ad* (see comments under the F-21 Catalog below) appears to be identical in outward appearance to the C.R.L. Short Wave Reg. Receiver. The ad also promised "There is a Z-Nith product for your every need." The April 1921 ad was also full page size and featured the Z-Nith Regenerator and the Z-Nith Amplifigon Type AGN-3. This ad carried the address of the new offices and plant at 6433 Ravenswood Avenue and continued to list 9ZN at 5525 North Sheridan. All three addresses (including Carmen Avenue) are in close proximity on Chicago's North Side. The July 1921 QST ad announced the new F-21 Catalog and featured the highly sophisticated short wave receiver TYPE MC-3.

THE F-21 Z-Nith CATALOG

The F-21 Catalog was considerably more sophisticated graphically than those of 1919 and 1920, and carried photos of several well-known Z-Nith equipped amateur stations as well as the usual close-up photos of individual pieces of equipment. The 1921 Z-Nith product line also increased substantially with the top-of-the-line occupied by a magnificent matched pair of long and shortwave receivers, the Altaceiver Type CW-3 ($254.00) and the Multiceiver Type MC-3 ($236.00) It is clear however, that the heart of the 1921 Z-Nith Line was the Z-Nith Regenerator and its accompanying Amplifigons AGN-1,-2, and -3. The Line also contained the usual amplifier and detector cabinets, a second Jeweler's Time Receiver and the Portaceiver, Type PR. This second portable set was also clearly intended for the burgeoning consumer radio market. As before, the catalog contained parts, batteries, headphones and the Hy-Rad rotary spark-gap disks. The catalog closed with the introduction of a series of eleven radio transmitters for the amateur and broadcasting market. This is believed to be the only time the CRL/Zenith offered transmitters for sale to the public.

What is most remarkable about the F-22 Catalog is that CRL appears to have used photos of 1920 products for many of the 1921 illustrations! For instance, the Z-Nith Regenerator shown in the catalog (and in all *QST* ads until August 1921) appears to be identical to the 1920 CRL Shortwave Regenerative Receiver. However, the surviving Z-Nith Regenerators have three main knobs of equal size, each with 180 degree dials. Compare the color photo of the Z-Nith Regenerator in the Portrait section with the catalog photo shown in the Illustrated Catalog. A similar situation exists with the Amplifigon line and most of the other accessory equipment.

Advertising for Z-Nith amateur radio products continued in *QST* throughout the remainder of 1921. Most of the ads featured the Z-Nith Regenerator. The last known CRL ad in *QST* featured a cartoon and long list of amateur stations heard on a Z-Nith Regenerator and AGN-2 using only a set of bedsprings as an antenna! The point of this unique ad was the sensitivity of the CRL Regenerator/Amplifigon combination. The ad also stated "Our new catalog F-22 will be out February 1st. If you are not already on our mailing list, write us." We have found no other evidence that even suggests that a CRL F-22 catalog was actually produced.

ZENITH RISING

Chicago Radio Laboratory re-invented itself during the spring of 1922. In three short months, CRL went from what gave every appearance of being a mature manufacturing and sales organization in the radio amateur field, a market that they knew well, to a somewhat late arrival in the very new industry that we now know as consumer electronics. The F-21 Chicago Radio Laboratory catalog offered 24 electronic devices to the amateur market: five receivers, eight accessory devices (amplifiers,.detectors, etc) and the complete new line of eleven transmitters, all under the Z-Nith brand name. The new Zenith catalog, published in the spring of 1922 featured only five electronic devices: two receivers, three amplifiers and a handful of accessories.

THE 1922 ZENITH CATALOG

The 1922 Zenith catalog represents the new direction of CRL so clearly that two pages of the catalog narrative have been included in the preceding Illustrated Catalog. The cover of the first and, we believe, only Zenith retail catalog carried the slogans "The Ear of the World" and "Long Distance Radio" and introduced the new Zenith Lightning Bolt logo. The inside cover also carried the slogan "---- *designed and built for the man who wants to listen to the 'voices of the air' without being forced to become an electrical expert to do so*----." The catalog content reflects this new direction. It gives one page each to the two new Zenith receivers, the 1-R and 2-R and then follows with five pages of explanation of entertainment broadcasting. This is followed by a page of "Catalog Explanation" which states "Zenith agents handle all apparatus, supplies and accessories listed in the following pages. We recommend the purchase of Zenith supplies from Zenith agents for Zenith machines to insure full efficiency." Chicago Radio Laboratory had abandoned the mail order retail sales approach as well as the amateur radio market.

After two successful years (1922-23) of producing the 1-R and, predominantly, the 2-M amplifier, Chicago Radio Laboratory introduced the 3-R and 4-R receivers in 1924. At about the same time, they founded the Zenith Radio Corporation as the sales arm of the business. In a few short years, Zenith Radio Corporation absorbed Chicago Radio Laboratory and was well on the way to attaining a leadership position in the emerging consumer electronics industry.

Chicago Radio Laboratory

Chicago Radio Laboratory Products

YEAR	NAME	TYPE	DESCRIPTION	PRICE	COMMENTS
1919	Amplifigon	AGN-1	Detector + 1 Step Amp	$60.00	First major piece of radio gear manufactured by CRL.
1919	Amplifigon	AGN-2	Detector + 2 Step Amp	$90.00	J-19 Catalog has "special" AGN w/ 2 step amp. QST ad, Jan.'20 has AGN-2 at $90.00
1919	Paragon	RA-6	Receiver (tuner)		J-19 Catalog actually mentions "as manufactured by ADAMS-MORGAN of Upper Montclair, N.J." Oct. 1919 QST ad says "Now ready for distribution by us."
1919	Amplifier	AMP-1	Amplifier		Single stage amplifier.
1919	Motor Boat Receiver	MBR-1	Receiver		Tuner, Detector, 1 Stage regen. amp.
1919	Hy-Rad Rotary Disk	HR-1	Spark gap disk	$27.00	Rotor plus direct drive motor and stationary electrodes mounted on a breadboard.
1919	Hy-Rad Rotary Disk	HR-1	Spark gap disk	$10.00	Nov. 1919 QST ad also lists disk alone with price.
1919	S.W. Wave Meter	WV-700	Wave Meter		Looks like a breadboard crystal set, except has a small light bulb in circuit. Used to tune a transmitter. Offered 1919 only.
1919	Variometer	VM-600	Variometer		CRL Variometer, sold separately for use by home builders.
1919	Coil	SC-1	Coil		Amplifier coil used in CRL amps, sold separately for home builders.
1919	Audion Detector	AD-1	Detector	$11.00	September 1919 QST ad introduces AD-1 detector at mid year.
1919	Audion Detector	AD-2	Detector	$23.00	December 1919 QST ad introduced AD-2 at mid-year.
1920	Paragon		Receiver (tuner)	$55.00	"Paragon Shortwave Regenerative Receiver" with no mention of Adams-Morgan. CRL now making this device. Tuner 180 to 600 meters.
1920	Amplifigon	AGN-1	Detector + 1 Step Amplifier	$65.00	Difference between early and late is the candelabra tube bases were ONLY supplied on the "early" ones in 1919.
1920	Amplifigon	AGN-2	Detector + 2 Step Amplifier	$95.00	AGN-2 was also offered in 1919, according to J-19 Catalog verbiage.
1920	Amplifigon	AGN-3	Detector + 3 Step Amplifier	$125.00	
1920	Audion Detector	AD-1	Detector	$16.00	Detector in a separate cabinet.
1920	Audion Detector	AD-2	Detector	$25.00	Adds potentiometer for H.V. control.
1920	Audion Amplifier	AM-1	Amplifier	$28.50	1 step amplifier.
1920	Audion Amplifier	AM-2	Amplifier	$55.00	2 step amplifier.
1920	Portable Receiver	PR-1	Receiver	$60.00	Tuner, audion, high and low voltage batteries all in one cabine.
1920	Jeweler's Time Receiver	TR-1	Receiver	$65.00	Fixed frequency receiver, tuned Navy standard time station.
1920	Undamped Wave Rcvr.	CW-1	Receiver	$67.50	Longwave receiver, tuning as low as 20,000 meters. Is tuner + detector only.
1920	Undamped Wave Rcvr.	CW-2	Receiver	$92.50	This is a CW-1 receiver with 1 step amplifier added.
1920	Motor Boat Receiver	MBR-2	Receiver	$65.00	
1920	Hy-Rad Rotary Disk		Disk + Stationary Electrodes	$12.00	Rotary disk + stationary electrodes.
1920	Hy-Rad Rotary Disk	HR-1	Spark gap disk	$10.50	This item is the disk alone, w/o stationary electrodes, as per J-20 price list.
1921	Z-Nith Regenerator	REG	Receiver (tuner)	$55.00	"Z-Nith Regenerator" appears, like the 1920 "Paragon," to be a "new look" RA-6. F-21 Catalog photo is identical to the one in J-20 catalog. See Illustrated catalog.

YEAR	NAME	TYPE	DESCRIPTION	PRICE	COMMENTS
1921	Amplifigon	AGN-1	Detector + 1 Step Amplifier	$64.00	
1921	Amplifigon	AGN-2	Detector + 2 Step Amplifier	$89.25	
1921	Amplifigon	AGN-3	Detector + 3 Step Amplifier	$115.00	
1921	Multiceiver	MC-3	Receiver	$236.00	Tunes 180-600 meters, with regen receiver + detector + 3 step amp + antenna tuner.
1921	Audion Detector	AD	Detector	$17.00	
1921	Audion Amplifier	AM-1	Amplifier	$28.50	
1921	Audion Detector	ADP	Detector	$25.00	A Type AD+second control for use w/UV-200 tubes.
1921	Audion Amplifier	AM-2	Amplifier	$55.00	This was the precursor to the Zenith 2-M amplifier of 1922-25.
1921	Portaceiver	PR	Receiver	$66.00	New portable receiver. Regen. receiver + audion detector. Tuned 180 to 600 meters.
1921	Jeweler's Time Receiver	TR	Receiver	$69.50	Tunes to two fixed frequencies which are preset at factory to receive Navy standard time stations.
1921	Altaceiver	CW-3	Receiver	$254.00	Longwave (2500-20000m) CW receiver (damped + undamped). Companion to Multiceiver.
1921	CRL Regenerette		Regen. Accessory	$12.75	Regeneration accessory for non-regen sets.
1921	Superphone		Microphone	$30.00	
1921	Hy-Rad Non-Sync Disk	HRN	Spark gap disk	$49.00	Non-synchronous rotary gap + motor.
1921	Hy-Rad Sync. Spark Gap	HRS	Spark gap disk	$105.00	Synchronous spark gap disk + motor.
1921	Hy-Rad Rotary Disk		Spark gap disk	$10.50	Disk only.
1921	Hy-Rad Rotary Disk		Spark gap disk	$12.00	Disk + stationary electrodes.
1921	Radiophone	CR	Transmitter	$260.00	50 W; 110v.AC, CR 10 is same for 110v. DC.
1921	High Power	CR 20	Transmitter	$480.00	100 W.; 110v. DC Price: $540; 32v. DC Price: $500.
1921	High Power	CR101	Transmitter	$1669.0	500 W.; 110v. DC Price also $1669.
1921	High Power	CR201	Transmitter	$2239.0	1 KW.; 110v. DC price also $2239.
1921	High Power	CR401	Transmitter	$3829.0	2 KW.; 110v. DC price also $3829.
1922-2	Long Distance Radio Rcv	1-R	Receiver	$75.00	Announced May 22. On paper receiver tag, called "Zenith Radiophone 1-R"
1922-2	Long Distance Radio Rcv	2-R?	Receiver	$100.00	Not produced in quantity, possibly only prototyped.
1922-2	Amplifier	1-M?	Amplifier	$30.00	Shown in first Zenith catalog, but may not have been produced.
1922-2	Amplifier	2-M	Amplifier	$55.00	Announced in Piano Trade magazine, May 22 (Douglas).
1922-2	Amplifier	3-M	Amplifier	$75.00	Rare version, but was produced.
1922-2	Zenith Headphones		Headphones	$15.00	Shown in first Zenith catalog.
1922-2	Zenith Phono Adapter		Phono Adapter	$3.00	"makes a 'loud speaker' out of any phonograph, so that all in room can hear without headsets. Fits any phonograph." This was a passive acoustic device. See Illustrated Catalog.
1922-2	Zenith Storage Battery		Battery	$22.00	6 volt, 100 amp-hour wet cell battery, for use with Zenith radios.
1924	Long Distance Radio Rcv	3-R	Receiver	$160.00	Ads in Jan 24 Radio Age.
1924	Long Distance Radio Rcv	4-R	Receiver	$85.00	Ads in Jan 24 Radio Age.

Zenith Radio Corporation Products: 1922-35

MODELS

This database attempts to record all models of radio equipment which were produced by the Zenith Radio Corporation between 1922 and 1935. For clarity and simplicity, receiver models 1-R, 2-R, 3-R, 4-R, amplifier models 1-M, 2-M, 3-M and a few accessories are listed in this database even though these items were actually marketed and/or manufactured by the Chicago Radio Laboratory, the precursor organization to Zenith. Though these items were actually "CRL gear", they were nevertheless the first radio apparatus which was *marketed* as "Zenith" equipment. There are also a number of models listed in this database which were almost certainly never produced. It has been our policy to list all models attributed to Zenith by commonly recognized listings and to then carefully note those models about which many questions remain.

RETAIL MODEL YEAR

We originally intended to follow exactly the model dating system of Zenith, since that "system" had served Zenith during the years these sets were built. *However, the Zenith system itself was found to be full of errors and many many internal contradictions,* perhaps reflecting the general state of affairs of those early days of manufacturing. After a great deal of thought, we decided to adopt the year in which a set was sold at the retail level as the significant date. While this change will be upsetting to some, this new system does bring remarkable clarity to the entire Zenith line during these years.

The concept of annual "Retail Model Years" in manufacturing is a product of maturing industrial organizations in the 1930s whose success was based on mass production. The general idea was to bring out a totally new line of products just before the Christmas Season each year. These new models would, for example, be the "NEW 1940 Ford Line" and would have been introduced in the late fall of 1939, and would immediately make all previously marketed Fords seem old or out of date. Last year's models would have been sold off at very low prices, usually just before the arrival of the "new" line. This concept did not reach maturity at Zenith until the mid-1930s, when most models were introduced to the wholesale market in August or September and to the retail market in October or early November. At Zenith, thanks to a remarkably sophisticated inventory control system, year-end excess sets were almost unheard of and prices were rarely reduced.

Prior to the 1935 Zenith Line, there were actually three different event dates which were chosen for model year listings: the date of the first production run, or the date of introduction to the wholesale market (and announcement/advertising in such trade publications as *Radio Retailer, Radio Dealer*, etc) or the date established by introduction of a model to the retail market. No recognized list consistently utilizes the date of production as the "model year date" though several internal Zenith corporate histories do sometimes use these dates. Many lists, including Zenith's own *Service Manual* series, *sometimes* use what appears to be the date of wholesale introduction. For instance, all 19 major 800s models shown in the Zenith retail sales brochure labeled in large letters "**1935** Zenith Long Distance Radio" are listed as *1934 models in the Service Manual!* These radios were probably designed and prototyped in late 1933 and at least half of them would have been actually manufactured during 1934. Most were introduced to the wholesale market in August through October 1934. They then reached dealers in early to mid-November of 1934 as the NEW 1935 ZENITH LINE! (1935 being the "Retail Model Year"). Although the *Zenith Service Manual* lists these radios in 1934, we feel that most reasonable people would consider them "1935 models." Also, from the late 1930s until the present time, the preponderance of Zenith data is organized by Retail Model Year, as are most hobby references. Therefore, we have attempted to date each model in this list by its proper RETAIL MODEL YEAR date. This is a rather difficult task and is fraught with ambiguities. To aid the reader in finding the reference to a particular model, we have developed a Index and Rarity/Value Guide which is sorted by model number and which precedes the main database.

REFERENCES USED

The database began with the information from *Zenith Service Manual Vol. 1* and a more comprehensive but very unreliable model listing in the Vol. 1 -Vol. 3 Index contained in of the *Zenith Service Manual, Vol. 3.* These service manual listings were found to be rather inconsistent in dating models in these early years. The service information was heavily supplemented with data from original retail sales brochures and by information contained in print advertising of the era, especially in *Radio Retailing* magazine. Several major Zenith collectors have also been most generous in assisting the authors in identifying and cataloging unlisted models. Several previously models were also discovered in the *RCA's Radio Set Socket Layout Guide, 1921-1935* and Sylvania's Tube Complement Book reprinted in the recently released *Radio Diagram Sourcebook* by Richard Gray. The existence of these "new" models was at least partly confirmed by finding them also listed in the *Mallory-Yaxley Radio Service Encyclopedia*, First Edition, (1937). Finally, *Radio Collectors Guide,* Revised Edition, by Morgan E. McMahon was found both the most accurate and useful, though somewhat incomplete, modern model reference.

INDEX AND RARITY/VALUE GUIDE

The Index is included as an aid to both scholars and vintage enthusiasts. To access a specific model in the Database, look it up in the Index, find the appropriate Retail Model Year and then refer to the proper Year in the main database. The Index is sorted by Model, with the alpha listings of those models with no numerical model number being listed first. The IM entries indicate those models which are found in the Illustrated Catalog.

The authors have drawn upon the expertise of a number of the senior members of the vintage radio community in developing the Rarity/Value guide listed with the Index. This information was developed primarily for use by neophyte and occasional collectors of vintage Zenith radios, but should be of interest to scholars as well. Specific listings take into account reported auction prices, listings in collector price guides and, most importantly, the lengthy experience of a number of respected Zenith collectors.

Rarity Scale

A = Very Common
B = Common
C = Somewhat Uncommon
D = Uncommon to Rare,
# = Indicates a sub-model that may/may not be more scarce than the base model.

Value Ranges:

1 = Less than $80
2 = $80 to $120
3 = $120 to $180
4 = $180 to $270
5 = $270 to $400
6 = $400 to $600
7 = $600 to $900
8 = $900 to $1350
9 = $1350 to $2000
10 = Above $2,000
$ = Above $10,000

= Sub-models may be more scarce in some cases, which may be important to those radio enthusiasts who are collecting each possible variation of a model. Due to lack of data and/or correctness in reporting data of this detail, it is not possible for the authors to gauge the rarity of this (#) sub-model at this time.

The Value Ranges in the Index **are not** the Value Range of a particular set, varying related to its condition, with a mint set at the upper end of the range. Rather, the value range is **a statistical grouping of different models of similar value** where the average 1997 price for a particular model would fall, *if the radio in question were in Very Good to Excellent condition*, with the original finish, only requiring cleaning and minor touch up, with a complete and unrestored chassis with no parts missing. The average value of a model in Very Good/Excellent condition may fall near the bottom of the range or near the top. *Prices for sets that have been refinished, have parts missing, or have been electrically restored inappropriately would usually be substantially less than those listed.* Prices paid by collectors vary substantially by regions in the United States and, while the value of more common sets seems to be relatively stable, prices of rare sets are *very* volatile. Finally, although rarity and condition are the two most important factors in determining value, cabinet design and the electronic quality also seems to play a role in the value of Zenith sets.

COMMENTS

Please refer to the Introduction to the book for important comments related to the Illustrated Catalog section.

In the COMMENTS field in the main body of the database, readers will find a number of entries of "See Notes." These entries refer to the Notes which follow the database itself.

A CAUTION AND INVITATION

Like most major manufacturers of this early era, Zenith made many uncataloged modifications to many models during and between production runs. Minor "factory variants" of many Zenith models are known to exist. While these are of particular interest to some collectors, they are of little historical significance and have been ignored in this listing. However, the authors have been very diligent at trying to identify and catalog the truly "unlisted" models which do exist. We would welcome additional input from readers in identifying the remaining uncataloged Zenith radio products from this era. Please contact us c/o Schiffer Publications, 77 Lower Valley Road, Atglen, PA, 19310-9717, U.S.A.

Zenith Radio Corporation Products
1922-35

Index and Rarity/Value Guide

by Model Number

MODEL	YEAR	IM	RA	VA
A	1931	X	C	5
AH	1931-32	X	C	5
B	1931	X	D	5
BH	1931-32	X	C	5
C	1931	X	D	4
C-10	1933	X	D	5
CH	1931-32	X	D	4
CH4?	1931-32	-	-	-
Chinese	1926	X	D	9
Chinese	1927-29	X	D	9
Colonial	1926	X	D	7
Colonial	1927-29	X	D	7
D	1931	X	D	5
English	1926	X	D	8
English	1927-29	X	D	9
Italian	1926	X	D	9
Italian	1927-29	X	D	9
L	1931	X	B	5
LH	1931-32	X	B	5
LP	1932	X	D	5
LS?	1931	-	-	-
MH	1931-32	X	D	4
Phono	1924	X	D	-
Portola	1931-32	-	D	-
RH	1932	X	D	5
RHD?	1932	-	-	-
Spanish	1926	X	D	10
Spanish	1927-29	X	D	10
Super	1924	X	D	9
TH?	1931	-	-	-
V-8	1932	-	D	-
WH	1931-32	X	D	3
WHA?	1931-32	-	-	-
1-R	1922-23	X	D	7
1-M?	1922-23	-	-	-
2-R?	1922-23	-	-	-
2-M	1922-23	X	D	5

MODEL	YEAR	IM	RA	VA
3-R	1924	X	C	6
3-M	1922-23	X	D	6
4-R	1924	X	C	6
7	1935	-	-	-
7 JR	1935	-	-	-
VII	1925-26	X	A	3
VIII	1925-26	X	B	4
IX	1925-26	X	C	5
X	1925-26	X	D	6
10	1930-31	X	D	5
11	1927-28	X	A	2
11	1930-31	X	C	3
11E	1927-28	X	A	3
12	1927-28	X	C	3
12	1930-31	X	D	4
14	1927-28	X	D	3
14E	1927-28	X	C	3
15	1927-28	X	D	5
15E	1927-28	X	D	5
15EP	1927-28	X	D	5
16	1927-28	X	D	5
16E	1927-28	X	C	5
16EP	1927-28	X	C	5
17(E)	1927-28	X	C	5
17(E)	1927-28	X	C	5
18E	1927-28	X	D	4
27	1927	S	A	4
28	1927	S	C	5
29	1927	S	C	5
31	1928-29	X	D	3
32	1928-29	X	D	3
33	1928-29	X	C	3
33X	1928-29	X	B	3
34	1928-29	X	C	3
34P	1928-29	X	#	3
35	1928-29	X	#	4
35A	1928-29	X	C	4

MODEL	YEAR	IM	RA	VA
35AP	1928-29	X	#	4
35APX	1928-29	X	#	4
35P	1928-29	X	#	4
35PX	1928-29	X	#	4
36X?	1928-29	-	-	-
37A	1928-29	X	D	7
39	1928-29	X	#	6
39A	1928-29	X	C	6
40A	1928-29	X	D	8
41	1930	X	D	3
42	1930	X	D	3
50?	1930	X	-	-
52	1930	X	A	4
53	1930	X	C	5
54	1930	X	C	6
55	1930	X	D	7
57?	1930	-	-	-
60	1930	X	D	5
61	1930	X	B	4
62	1930	X	B	4
64	1930	X	C	6
67	1930	X	D	7
70?	1930-31	-	-	-
71	1930-31	X	C	4
72	1930-31	X	C	4
73	1930-31	X	D	5
74	1930-31	X	D	5
75	1930-31	X	C	7
76?	1930-31	-	-	-
77?	1930-31	-	-	-
78	1931	S	D	7
79	1931	S	D	6
80?	1932	-	-	-
82	1932	X	D	4
89	1932	X	D	6
90	1932	X	D	5
090	1932	X	D	-

MODEL	YEAR	IM	RA	VA
91	1932	X	D	5
92	1932	X	C	5
102	1930-31	X	D	5
103	1932	X	D	7
104?	1932	-	-	-
112	1930-31	X	#	3
122	1930-31	X	D	4
152	1930	X	D	4
200?	1932	-	-	-
207	1933	-	D	-
208	1933	-	D	-
210	1933	X	C	5
210-5	1933	X	D	5
211	1933	-	D	-
211-5	1933	-	D	-
215	1933	-	D	5
215-3	1933	-	D	5
216	1933	S	D	5
217	1933	-	D	-
220	1933	X	C	3
220-3	1933	-	D	3
221	1933	-	D	-
225	1933	-	D	-
230	1933	S	D	5
238	1933	-	D	-
240	1933	X	D	5
241	1933	-	D	--
244	1933	X	D	5
245	1933	X	C	4
245A?	1933	X	-	-
250	1933	X	D	6
250-3	1933	X	D	6
251	1933	-	D	-
252	1933	-	D	-
258	1933	-	D	-
259	1933	-	D	-
260	1933	X	D	5

Zenith Radio Corporation Products: 1922-35
Index and Rarity/Value Guide (con't)

MODEL	YEAR	IM	RA	VA
261	1933	-	D	-
262	1933	-	D	-
263	1933	-	D	-
268	1933	-	D	-
268-A	1933	-	D	-
269	1933	-	D	-
270	1933	X	D	6
270-5	1933	X	D	6
271	1933	-	D	-
271-1	1933	-	D	-
271-21	1933	-	D	-
271-31	1933	-	D	-
272	1933	-	D	-
273	1933	-	D	-
277	1933	-	D	-
278	1933	-	D	-
280	1933-34	-	D	-
280	1933-34	-	D	-
281	1933-34	-	D	-
281	1933-34	-	D	-
288	1933-34	X	C	5
288	1933-34	X	C	5
288-5	1933-34	-	D	5
289	1933-34	-	D	-
291	1933-34	-	D	-
292	1933-34	-	D	-
293	1933-34	X	C	4
293-SX	1933-34	X	#	4
293-X	1933-34	X	#	4
299	1933-34	-	-	-
333	1928-29	X	D	3
333X	1928-29	X	D	3
342	1928-29	X	#	3
342P	1928-29	X	#	3
352	1928-29	X	#	4
352A	1928-29	X	#	4
352AP	1928-29	X	#	4
352APX	1928-29	X	#	4
352P	1928-29	X	#	4
352PX	1928-29	X	#	4
353A	1928-29	X	#	4
353AX	1928-29	X	#	4
362	1928-29	X	D	5
362X	1928-29	X	D	5
392	1928-29	X	#	6
392A	1928-29	X	#	6
410	1933	X	C	5
411	1933	X	C	5
412	1933	-	D	-
414	1933	-	D	-
420	1933	X	C	5
422	1930	X	D	3
430	1933	X	D	5
440	1933	X	D	6
441	1933	S	D	8
442	1933	-	D	-
443	1933	-	D	-
444	1933	-	D	-
460	1933-34	X	-	-
462?	1930	-	-	-
462	1934-35	X	-	-
470?	1933	-	-	-
470-5?	1933	-	-	-
470-5A?	1933	-	-	-
472	1933	-	D	-
472-A	1933	-	D	-
473	1933	-	D	-
473-A	1933	-	D	-
474	1933	-	D	-
475	1933	-	D	-
476	1933	X	D	5
476-A	1933	X	D	5
476-B	1933	X	D	5
478	1933	-	D	-
478	1933	-	D	-
479	1933	-	D	-
479-A	1933	-	D	-
500	1933	-	D	-
501	1933	-	D	-
502	1933	-	D	-
503	1933	-	D	-
510-5	1933	-	D	-
514	1933	-	D	-
515	1933	-	D	-
516	1933	-	D	-
516	1933	-	D	-
516-B	1933	-	D	-
517	1933	-	D	-
518	1933	-	D	-
520	1933	-	D	-
521	1933	-	D	-
522	1933	-	D	-
522	1930	X	#	4
530	1933	-	D	-
531	1933	-	D	-
532	1933	-	D	-
532	1930	X	#	5
533	1933	-	D	-
535?	1933	-	-	-
542	1930	X	D	6
550-1.0	1933	-	D	-
552	1930	X	D	7
558	1933	-	D	-
558-1.0	1933	-	D	-
560	1933	-	D	-
563	1930	X	C	4
568	1933	-	D	-
577	1933	-	D	-
578	1933	-	D	-
585	1933	-	D	-
585-1.0	1933	-	D	-
588	1933-34	-	D	-
589	1933	-	D	-
590	1933	-	D	-
590	1933-34	-	D	-
590-5	1933-34	-	D	-
593	1933	-	D	-
593-10	1933-34	-	D	-
600	1933	-	D	-
602	1933	-	D	-
602	1930	X	D	5
603	1933	-	D	-
604	1933	-	D	-
605	1933	-	D	-
606	1933	-	D	-
607A	1933	-	D	-
608	1933	-	D	-
610	1933	X	D	6
611	1933	-	D	-
612	1930	X	#	4
612	1933	X	D	6
613?	1930	X	-	-
615	1933	-	D	-
616	1933	X	D	5
617	1933	X	D	8
618	1933	X	D	-
619	1933	-	D	-
620	1933	-	D	-
621	1933	S	D	5
621D?	1933	-	D	5
622	1930	X	#	4
623	1933	-	D	-
624	1933	S	D	5
642	1930	X	#	6
650	1935	-	-	-
650HD	1935	-	-	-
651HE	1935	-	-	-
654	1935	-	-	-

Zenith Radio Corporation Products: 1922-35
Index and Rarity/Value Guide (con't)

MODEL	YEAR	IM	RA	VA
657	1935	-	-	-
660TD	1935	-	-	-
661TE	1935	-	-	-
663	1935	-	-	-
663-4	1935	-	-	-
664	1935	X	-	-
666	1935	X	-	-
667	1935	-	-	-
668	1935	X	-	-
672	1930	X	D	7
680	1935	-	-	--
688	1933-34	-	-	-
701	1934	X	C	2
702	1934	-	D	-
703	1934	-	D	-
705	1934	X	B	2
706	1934	X	C	2
707	1934	X	C	3
710?	1934	-	-	-
711	1934	X	C	3
712	1930-31	X	#	4
712	1934	X	D	3
715	1934	X	B	4
722	1930-31	X	#	4
725	1934	S	D	7
725-S	1934	S	D	7
730	1934	S	D	3
732	1930-31	X	D	5
735	1934	X	D	3
740	1934	X	D	4
742	1930-31	X	D	5
750	1934	X	C	3
752	1930-31	X	#	7
755	1934	X	B	4
756	1934	-	D	-
757	1934	-	D	-
760	1934	X	B	4

MODEL	YEAR	IM	RA	VA
762?	1930-31	-	-	-
765	1934	X	D	5
767	1934	X	C	7
770	1934	X	C	5
770B	1934	X	#	5
772?	1930-31	-	-	-
775	1934	X	B	5
775B	1934	X	#	5
777?	1930-31	-	-	-
777	1934	S	D	7
780	1934	-	D	-
782	1931	S	D	7
785	1934	-	D	-
788	1934	-	D	-
792?	1931	S	-	-
801	1935	X	C	2
804	1935	-	D	-
805	1935	X	A	4
806	1935	-	D	-
807	1935	X	B	4
808	1935	X	B	4
809	1935	X	C	7
810	1935	-	D	-
811	1935	X	D	6
812	1935	-	D	-
814	1935	-	D	-
815	1935	-	D	-
816	1935	-	D	-
817	1935	-	D	-
819	1935	-	D	-
822	1932	X	D	4
825	1935	X	C	3
825R	1935	X	#	3
827	1935	X	D	5
827R	1935	X	D	5
S827	1935	X	D	5
829	1935	X	C	7

MODEL	YEAR	IM	RA	VA
829R	1935	X	#	7
S829	1935	X	#	7
834	1935	X	D	8
835	1935	X	C	8
845	1935	X	C	3
847	1935	X	C	3
S847	1935	X	#	3
850	1935	X	D	5
860	1935	X	C	3
861	1935	X	C	5
862	1935	-	D	-
864	1935	-	D	-
865	1935	-	D	-
866	1935	-	D	-
870	1935	X	C	3
870R	1935	X	#	3
S870	1935	X	#	3
871	1935	X	D	5
S871	1935	X	D	5
880	1935	X	C	6
881	1935	-	D	-
885	1935	S	C	5
886	1935	-	C	5
887	1935	-	D	-
892	1932	X	D	6
902	1932	X	D	5
908	1935	X	D	4
S908	1935	X	D	4
909	1935	-	D	-
S909	1935	-	D	-
912	1932	X	D	5
922	1932	X	#	5
934	1935	-	D	-
935	1935	X	D	8
945	1935	X	D	3
950	1935	X	D	4
960	1935	X	D	4

MODEL	YEAR	IM	RA	VA
961	1935	X	D	4
S961	1935	X	D	4
962	1935	-	D	-
963	1935	-	D	-
966	1935	-	D	-
970	1935	X	D	4
975	1935	S	D	5
978	1935	-	D	5
980	1935	X	C	7
983	1935	-	D	-
985	1935	X	D	7
990	1935	X	D	7
1000Z	1935	X	D	$
1101	1935	-	D	-
1102	1935	-	D	-
1105	1935	-	D	-
1106	1935	-	D	-
1107	1935	-	D	-
1112	1935	-	D	-
1114	1935	-	D	-
1115	1935	-	D	-
1116	1935	-	D	-
1117	1935	X	D	5
1118	1935	-	D	-
1160	1935	-	D	-
1161	1935	-	D	-
1162	1935	-	D	-
1167	1935	-	D	-
1170	1935	-	D	-

ZENITH TRADE MARK

Zenith Radio Corporation Products
1922-35

General Legend

MODEL NUMBERS

From 1927 through 1930, basic models were identified with two-digit model numbers: 10, 11, 12 , etc. "Trailing" numbers or letters indicated, in general, sub-models with the same appearance and circuitry but with some special capabilities. For instance, an 14E is a Model 14 variant which has a power supply that runs off house wiring rather than the batteries of the original Model 14. The code for trailing numerals and letters of these early variant model numbers is as follows:

2	as in 352	110 Volt AC power, **25 cycle**
3	as in 353	110 Volt **DC** power
A	as in 35A	**Automatic** Tuning (pushbuttons)
E	as in 16E	110 Volt **AC** power, not batteries
P	as in 35P	**Electro-Dynamic** Speaker
X	as in 33X	**Special** or **Extra**

In practice, then, a Model 352APX was a basic Model 35, with a power transformer which operated on 110 VAC, 25 cycles (the trailing 2). The set had the patented Marvin automatic tuning push button tuning (the A) as well as conventional, it sported a powerful electrodynamic speaker rather than a weaker magnetic one (the P) and there was something special about the chassis (the trailing X). In the case of Model 35, the X signifies an extra audio amplification tube. However, some other "X" models had the same tube complement as the basic model and differed from the base model in other ways.

GENERAL CODING

The authors have had to condense the information related to each model so that the database will be concise enough to be printed in this volume. This has led to some coding of entries. Most of the coding is intuitive and can be read directly. A few codes will require reference to this list:

STYLE:

This entry refers to cabinet styles and conforms to the following:

Table	A generally small table radio (incl. cathedrals & tombstones)
Table/Con	A table model which had accessory legs or table available
Console	Generally a large "floor model" radio
Con+Ph	A combination radio-phonograph console

CIR

This entry records the basic circuit type of the receiver:

REG	Regenerative receiver circuit
TRF	Tuned Radio Frequency receiver circuit
SG	Screen Grid TRF type receiver circuit
SH	Superheterodyne receiver circuit

TU

This entry records the number of vacuum tubes used in the circuit, including all rectifier and ballast tubes.

P

This entry describes the type of electrical power necessary to operate the receiver:

Batt	Battery power only
AC60	Operates from 110-117 volts, AC, 60 cycles
AC25	Operates from 110-117 volts, AC, 25 cycles
AC1	Base model is AC60, but AC25 is available
AC2	Base model is AC60, but AC25 & 220v. AC, 60 cycles is available
AC3	Base model is AC60, but AC25 "all voltage" (usually 115, 125, 140 &200v. AC) or "all cycle, all voltage" was available
AC4	ONLY available as "all cycles, all voltage" radios
AC5	Available AC60 or AC25. Xfmr tapped at 115v. & 230v.
DC	Operates from 110 volts, Direct Current
AC/DC	Operates from 110-117 volts, either AC or DC

COVER

This entry records the frequency coverage of the receiver:

LW	The long wave spectrum, generally below 400 kHz.
BC	The "AM" broadcasting spectrum, generally 500-1500 kHz.
SW	The shortwave spectrum, generally 3 to 30 MHz.

PRICE

While Zenith was more consistent in retail pricing throughout the lifetime of a model than some other manufacturers, the retail price did vary on some models, particularly those offered for sale in multiple years.

COMMENT

Most abbreviations are intuitive. However, the following explanation may be useful:

ComCab = nn, mm means that the same cabinet was used for the models which are listed immediately following.

V1 refers to the *Zenith Service Manual, Volume No. 1*

V3 refers to a comprehensive index of models published in *Volume No. 3* of the *Zenith Service Manual*

McM refers to *Radio Collector's Guide* by Morgan E. McMahon.

M-Y refers to the *Mallory-Yaxley Radio Service Encyclopedia*, First Edition, 1937

RCA refers to RCA's *Radio Set SocketLayout Guide, 1921-1935*, published in 1935

Sylvania refers to Sylvania's Tube Complements manual as reproduced in the recently published *Radio Diagram Sourcebook* by Richard Gray.

Blue Book refers to the *Radio Record Blue Book* of 1929, an early guide published to assist dealers in determining the trade-in value of used radio sets.

Zenith Radio Corporation Products, 1922-35

MD.YR	MODEL	NAME	STYLE	CHASSIS	CIR	TU	PW	COVER	PRICE	COMMENT
1922-23	1-R	Long Distance	Table		REG	1	Batt	BC+LW	$75	Actual name was "Zenith Model 1-R Long Distance Radio Receiver." Announced, May '22 Piano Trade mag.
1922-23	1-M?	Amplifier	...		A	1	Batt		$30	In first Zenith catalog in 1922. Produced?
1922-23	2-R?	Long Distance	Table		REG	??	Batt	BC+LW	$100	May not have been manufactured in quantities
1922-23	2-M	Amplifier	Table		AA	2	Batt		$55	Most common amplifier.
1922-23	3-M	Amplifier	Table		AAA	3	Batt		$75	Produced in limited numbers. Missing from most lists.
1922-23		Storage Battery	...						$22	Carried the Zenith name, probably manufactered by others
1922-23		Phono Adapter	...						$3	Zenith Phonograph Adapter.
1922-23		Zenith Headphone	...						$15	Actual manufacture was likely sub-contracted.
1924	Phono	Phonograph Set	Console	Sim. 3-R	REG	4	Batt	BC		3-R circuitry. Panel differs. No cabinet. For insertion in Victor Model 215, 400, 405, & 410 cabinets.
1924	Super	Zenith Companion	Portable		TRF	6	Batt	BC	$224	By some definitions, the "first modern portable radio"
1924	3-R	Long Distance	Table		REG	4	Batt	BC	$160	Ads in Jan. 1924 Radio Age (Chicago).
1924	4-R	Long Distance	Table		REG	4	Batt	BC	$95	Ads in Jan. 1924 Radio Age (Chicago). Also listed @ $85.00
1925-26	VII	Super Zenith	Table		TRF	6	Batt	BC	$230	Popular receiver which served as basis for the Super Zenith series.
1925-26	VIII	Super Zenith	Console		TRF	6	Batt	BC	$250	Same as VII, except came with mahogany "spinet" legs.
1925-26	IX	Super Zenith	Console		TRF	6	Batt	BC	$355	Mod. VII + base of legs and compartments + internal loudspeaker
1925-26	X	Super Zenith	Console		TRF	6	Batt	BC	$550	Zenith's first dual speaker set; used the basic VII circuit and front panel.
1926	Chinese	Deluxe Zenith	Console		TRF	10	Batt	BC	$1500	Battery version. Cabinet hand painted on West Coast. See Notes.
1926	Colonial	Deluxe Zenith	Console		TRF	10	Batt	BC	$500	Battery version. Some lists quote $650. This is incorrect for battery version
1926	English	Deluxe Zenith	Console		TRF	10	Batt	BC	$750	Battery version
1926	Italian	Deluxe Zenith	Console		TRF	10	Batt	BC	$1100	Battery version
1926	Spanish	Deluxe Zenith	Console		TRF	10	Batt	BC	$2000	Battery version
1926		"B" Battery Elim.								"B" Battery Eliminator. Advertised briefly in 1926. Produced?
1927	27	Super 27	Table	27/28/29	TRF	8	AC60	BC	$280	Zenith's first fully AC radio, introduced in late 1926. See Notes.
1927	28	Super 28	Console	27/28/29	TRF	8	AC60	BC	$300	Super 27 + Spinet Base at $20.
1927	29	Super 29	Console	27/28/29	TRF	8	AC60	BC	$395	Super 27 + Console base with 2 speakers at $115.
1927-28	11		Table	11/12/14	TRF	6	Batt	BC	$110	Price also listed at $100 in McM
1927-28	11E		Table	11E/14E	TRF	7	AC60	BC	$175	AC version
1927-28	12		Table	11/12/14	TRF	6	Batt	BC	$100	Listed at $110 in McM. Blank dial; logging marks were applied to dial by owner.

MD.YR	MODEL	NAME	STYLE	CHASSIS	CIR	TU	PW	COVER	PRICE	COMMENT
1927-28	14		Console	11/12/14	TRF	6	Batt	BC	$180	Listed at $185 in McM. May have made 2 versions of speaker grille.
1927-28	14E		Console	11E/14E	TRF	7	AC60	BC	$255	AC version. May have made 2 versions of speaker grille.
1927-28	15		Table	15/16	TRF	8	Batt	BC	$185	The only Zenith model w/ a decorative external loop antenna.
1927-28	15E		Table??	15E/16E	TRF	9	AC60	BC	$285	AC version
1927-28	15EP		Console	15E/16E	TRF	9	AC60	BC	$375	AC power supply & Dyn.Speaker located in a "speaker table."
1927-28	16		Console	15/16	TRF	8	Batt	BC	$300	With loop. "Spanish Renaissance" design.
1927-28	16E		Console	15E/16E	TRF	9	AC60	BC	$400	With loop. AC version. McM lists @ $300
1927-28	16EP		Console	15E/16E	TRF	9	AC60	BC	$450	With loop. AC version + Dyn. Speaker
1927-28	17(E)		Tab/Con		TRF	10	AC60	BC		Ten tube Model 17 was an early version having 4 gaseous rectifier tubes.
1927-28	17(E)		Tab/Con		TRF	7	AC60	BC	$350	This version used a single rectifier tube. Both versions were available with spinet base for an additional $20 or, like the Super IX or Super 29, a "console base" with speaker for an additional $115.
1927-28	18E		Console	11E/14E	TRF	6	AC60	BC	$272	In Zenith Service Bulletin 21. Actually reached the retail market in Feb. 1928
1927-29	Chinese	Deluxe Zenith	Console	G	TRF	10	AC60	BC	$1700	AC version. May have been in production as late as 1931.
1927-29	Colonial	Deluxe Zenith	Console	G	TRF	10	AC60	BC	$650	AC version. May have been in production as late as 1931.
1927-29	English	Deluxe Zenith	Console	G	TRF	10	AC60	BC	$800	AC version. May have been in production as late as 1931.
1927-29	Italian	Deluxe Zenith	Console	G	TRF	10	AC60	BC	$1250	AC version. May have been in production as late as 1931.
1927-29	Spanish	Deluxe Zenith	Console	G	TRF	10	AC60	BC	$2500	AC version. May have been in production as late as 1931.
1928-29	31		Table	E	TRF	6	Batt	BC	$100	Battery version. ComCab: 31, 33, 333. See Notes.
1928-29	32		Console	E	TRF	6	Batt	BC	$180	Battery version. ComCab: 32, 34, 342. See Notes.
1928-29	33		Table	E	TRF	7	AC60	BC	$150	Model 31 + rectifier + AC tubes. ComCab: 31, 33, 333. See Notes. P.S.= ZE-10
1928-29	33X		Table	E	TRF	7	AC60	BC	$150	ComCab: 31, 33, 333. See Notes. P.S.= ZE-10.
1928-29	333		Table	E	TRF	7	DC	BC	$150	110 v. DC version. ComCab: 31, 33, 333. See Notes. P.S.= ZE-17.
1928-29	333X		Table	E	TRF	7	DC	BC	$150	ComCab: 31, 33, 333. See Notes.
1928-29	34		Console	E	TRF	7	AC60	BC	$230	ComCab: 32, 34, 342. See Notes. P.S.= ZE-10.
1928-29	34P		Console	E	TRF	8	AC60	BC	$250	Model 34 + Dyn. Speaker. ComCab: 32, 34, 342. See Notes. P.S.= ZE-11.
1928-29	342		Console	E	TRF	7	AC25	BC	$240	ComCab: 32, 34, 342. See Notes. P.S.= ZE-13.
1928-29	342P		Console	E	TRF	8	AC25	BC	$260	Model 342 + Dyn. Speaker. ComCab: 32, 34, 342. See Notes. P.S.= ZE-14.
1928-29	35		Console	E	TRF	7	AC60	BC	$270	The basic Model 35. ComCab: 35, 352, 353, 352APX, etc, etc. High boy cabinet is a mixture of Elizabethan, Renaissance and Gothic design in walnut and maple. See Notes. P.S.= ZE-10.
1928-29	35A		Console	E	TRF	7	AC60	BC	$325	Model 35 + Automatic Tuning. See Notes. P.S.= ZE-10.

MD.YR	MODEL	NAME	STYLE	CHASSIS	CIR	TU	PW	COVER	PRICE	COMMENT
1928-29	35AP		Console	E	TRF	8	AC60	BC	$385	Model 35 + Auto Tuning + Dyn. Speaker + additional rectifier. See Notes. P.S.= ZE-11.
1928-29	35APX		Console	E*	TRF	9	AC60	BC	$385	Model 35 + Auto Tune + Dyn. Speaker + Special E Chassis + additional rectifier. See Notes. P.S.= ZE-18.
1928-29	35P		Console	E	TRF	8	AC60	BC	$330	Model 35 + Dyn. Speaker + additional rectifier. See Notes. P.S.= ZE-11.
1928-29	35PX		Console	E*	TRF	9	AC60	BC	$330	Model 35 + Dyn. Speaker + Special E Chassis + additional rectifier. See Notes. P.S.= ZE-18.
1928-29	352		Console	E	TRF	7	AC25	BC	$280	110v. AC, 25 cycle version of 35. ComCab: 35, 352, 353. See Notes. P.S.= ZE-13.
1928-29	352A		Console	E	TRF	7	AC25	BC	$335	352 + Automatic Tuning. ComCab: 35, 352, 353. See Notes. P.S.= ZE-13.
1928-29	352AP		Console	E	TRF	8	AC25	BC	$405	352 + Automatic Tuning + Dyn. Speaker. ComCab: 35, 352, 353. See Notes. P.S.= ZE-14.
1928-29	352APX		Console	E*	TRF	9	AC25	BC	$405	352 + Automatic Tuning + Dyn. Speaker + Special E Chassis. ComCab: 35, 352, 353. See Notes.
1928-29	352P		Console	E	TRF	8	AC25	BC	$330	352 + Dyn. Speaker. ComCab: 35, 352, 353. See Notes. Also listed @ $350. P.S.= ZE-14.
1928-29	352PX		Console	E*	TRF	9	AC25	BC	$350	352 + Dyn. Speaker + Spec. E Chas. ComCab: 35, 352, 353. See Notes.
1928-29	353A		Console	E	TRF	7	DC	BC	$325	110 VDC version + Automatic Tuning. ComCab: 35, 352, 353. See Notes. P.S.= ZE-17.
1928-29	353AX		Console	E	TRF	8?	DC	BC	$325	A rarely listed set which was produced.
1928-29	36X?				TRF	7		BC		Listed only by McM. Probably erroneous. Not listed by Z. or Blue Book.
1928-29	37A		Con+Ph	E/E*	TRF	8/9	AC60	BC	$625	Produced in both 8 & 9 tube versions. Nine tube version used Special E chassis. Eight tube ver. P.S.= ZE-11. Nine tube ver. P.S.= ZE-18.
1928-29	39		Console	F	TRF	10	AC60	BC	$450	Italian Renaissance style in burl walnut and Carpathian Elm. With loop & "Loop Director" control knob.
1928-29	39A		Console	F	TRF	10	AC60	BC	$510	Model 39 + Automatic Tuning. ComCab: 39, 39A, 392. With loop & "Loop Director" control knob.
1928-29	392		Console	F	TRF	10	AC25	BC	$480	ComCab: 39, 392. 392 With loop & "Loop Director" control knob.
1928-29	392A		Console	F	TRF	10	AC25	BC	$540	Model 392 + Automatic Tuning. With loop & "Loop Director" control knob.
1928-29	40A		Con+Ph	F	TRF	10	AC60	BC	$850	Described & priced in 1928 Z brochure, though some lists show in 1929 only. Italian Renaissance styling. With loop & "Loop Director" control knob.
1928-29	362		Table	E	TRF	7	AC25	BC	$165	Factory brochure indicates 6 tubes. Rider's schematic indicates 6 + rect. P.S.= ZE-13.
1928-29	362X		Table	E	TRF	7	AC25	BC	$165	Rarely listed set which was produced. Refer Z. Serv. Bul. 20. P.S.= ZE-13.
1930	41		Table		TRF	7	AC60	BC	$100	Used one S.G. tube. Cabinet sim. to 31, 33. Date from brochure
1930	42		Console		TRF	7	AC60	BC	$175	Used one S.G. tube. Cabinet sim. 34, but w/raised side panels.

MD.YR	MODEL	NAME	STYLE	CHASSIS	CIR	TU	PW	COVER	PRICE	COMMENT
1930	422		Console		TRF	7	AC25	BC	$185	Used one S.G. tube. Cabinet sim. 34, but w/raised side panels.
1930	50?			50/60 Series	SG	9	AC60	BC		Zenith Service Manual No. 1 refers to a Model 50. Almost certainly, this is a generic reference to the Series. Unlikely that a Model 50 existed.
1930	52		Console	50/60 Series	SG	9	AC60	BC	$225	Later priced at $175. ComCab: 52, 522, 62. See Notes. Without loop. Automatic Tuning.
1930	522		Console	50/60 Series	SG	9	AC25	BC	$235	Later priced at $185. ComCab: 52, 522, 62. Without loop. Automatic Tuning.
1930	53		Console	50/60 Series	SG	9	AC60	BC	$325	Later priced at $275. Without loop. Automatic Tuning.
1930	532		Console	50/60 Series	SG	9	AC25	BC	$325	Later priced at $275. Without loop. Automatic Tuning.
1930	54		Console	50/60 Series	SG	9	AC60	BC	$450	Later priced at $395. Cabinet is Stuart/Charles II style ComCab: 54, 542, 64, 642. With loop & "Loop Director" control knob. Automatic Tuning.
1930	542		Console	50/60 Series	SG	9	AC25	BC	$450	Later priced at $395. ComCab: 54, 542, 64. With loop & "Loop Director" control knob. Automatic Tuning.
1930	55		Console	50/60 Series	SG	9	AC60	BC	$750	Later priced at $700. Elec. remote control. ComCab: 55, 552, 67, 78. With loop & "Loop Director" control knob.
1930	552		Console	50/60 Series	SG	9	AC25	BC	$750	Later priced at $700. Elec. remote control. ComCab: 55, 552, 67, 78. With loop and "Loop Director" control knob.
1930	57?		Console		SG	8		BC	$495	Only listed in McM. Probably erroneous.
1930	60	Super Midget	Console	50/60 Series	SG	9	AC60	BC	$188	Later priced at $145. Mini-console, the size of a bedside table. Without loop.
1930	602	Super Midget	Console	50/60 Series	SG	9	AC25	BC	$198	Later priced at $155. Also listed as Model 60-2. Without loop.
1930	61		Console	50/60 Series	SG	9	AC60	BC	$198	Later priced at $155. Cabinet is 18th Century American. Without loop.
1930	612		Console	50/60 Series	SG	9	AC25	BC	$208	Later priced at $165. Cabinet is 18th C. American. Without loop. Model number used also in 1933
1930	613?		Console		SG	9	DC	BC		Listed by McM & Mallory-Yaxley. Believe to be erroneous listing.
1930	62		Console	50/60 Series	SG	9	AC60	BC	$235	Later priced at $185. Automatic Tuning. ComCab: 52, 522, 62. Without loop.
1930	622		Console	50/60 Series	SG	9	AC25	BC	$245	Later priced at $195. Automatic Tuning. ComCab: 52, 522, 62. Without loop.
1930	64		Console	50/60 Series	SG	9	AC60	BC	$420	Later priced at $370. Automatic Tuning. ComCab: 54, 542, 64, 642. With loop & "Loop Director" control knob.
1930	642		Console	50/60 Series	SG	9	AC25	BC	$420	Later priced at $370. Automatic Tuning. ComCab: 54, 542, 64, 642. With loop & "Loop Director" control knob.
1930	67		Console	50/60 Series	SG	9	AC60	BC	$545	Later priced at $495. ComCab: 55, 67, 672, 78. Auto. Tuning. W/loop.
1930	672		Console	50/60 Series	SG	9	AC25	BC	$545	Later priced at $495. ComCab: 55, 67, 672, 78. Auto. Tuning. W/loop.
1930	152		Console	50/60 Series	SG	9		BC	$175	One factory brochure featured this previously unlisted "Fifteenth Anniversary Model" model. Automatic Tuning. ComCab: 52, 62, etc.
1930	462?				SG	6	AC25		$100	Listed in 1929 Radio Record Blue Book only. Source usually reliable.

MD.YR	MODEL	NAME	STYLE	CHASSIS	CIR	TU	PW	COVER	PRICE	COMMENT
1930	563		Console	E++	TRF	11	DC	BC	$250	This 110v. DC set, in a Mod. 35 cab., was marketed as late as 1932. Radio panel is identical to one of the versions of the Mod. 35. See Notes
1930-31	10	Super 8	Console	Super 8	SG	8	AC60	BC	$155	ComCab: 10, 102. Lowboy cabinet with ornate front. NOTE: This is different from Model X
1930-31	102	Super 8	Console	Super 8	SG	8	AC25	BC	$165	ComCab: 10, 102. Lowboy cabinet with ornate front.
1930-31	11	Super 8	Console	Super 8	SG	8	AC60	BC	$155	ComCab: 11, 112. NOTE: This is different from the 1927-28 Model 11
1930-31	112	Super 8	Console	Super 8	SG	8	AC25	BC	$165	ComCab: 11, 112.
1930-31	12	Super 8	Console	Super 8	SG	8	AC60	BC	$175	ComCab: 12, 122. NOTE: This is different from the 1927-28 Model 12
1930-31	122	Super 8	Console	Super 8	SG	8	AC25	BC	$185	ComCab: 12, 122
1930-31	70?			70 Series	SG	9	AC60	BC		McM lists Mod. 70. A generic 70 schematic is in V1. Almost certainly, no Model 70 was produced.
1930-31	71		Console	70 Series	SG	9	AC60	BC	$185	ComCab: 71, 712
1930-31	712		Console	70 Series	SG	9	AC25	BC		ComCab: 71, 712
1930-31	72		Console	70 Series	SG	9	AC60	BC	$210	Automatic Tuning. ComCab: 72, 722
1930-31	722		Console	70 Series	SG	9	AC25	BC		ComCab: 72, 722
1930-31	73		Console	70 Series	SG	9	AC60	BC	$315	Automatic Tuning. Also retailed for $265. ComCab: 73, 732, 74.
1930-31	732		Console	70 Series	SG	9	AC25	BC		Automatic Tuning. ComCab: 73, 732, 74.
1930-31	74		Console	70 Series	SG	9	AC60	BC	$315	Electrical remote control available, this model only. ComCab: 73, 732, 74.
1930-31	742		Console	70 Series	SG	9	AC25	BC		Listed as a model on patent sticker inside 70 Series models. Produced?
1930-31	75		Con+Ph	70 Series	SG	9	AC60	BC	$375	First Z automatic record changer. Cabinet is Tudor Period
1930-31	752		Con+Ph	70 Series	SG	9	AC25	BC		Listed as a model on patent sticker inside 70 Series models. Produced?
1930-31	76?			70 Series	SG	9	AC60	BC		Listed as a model on patent sticker inside 70 Series models. Produced?
1930-31	762?			70 Series	SG					
1930-31	77?			70 Series	SG	9?	AC60	BC		Listed in V1. Produced? Cabinet design unknown.
1930-31	772?			70 Series	SG	9?	AC25	BC		Listed in V1. Produced? Cabinet design unknown.
1930-31	777?			70 Series	SG					This listed by McM in 1930-31. Probably a typo for "772", which was produced in 1930. A Model 777 was produced in 1934.
1931	A	Zenette	Table	2004	SG	6	AC1	BC	$57.50	Also retailed at $69.50. Gothic Style. ComCab: A, AH. See Notes
1931	B	Zenette	Table	2004	SG	6	AC1	BC	$73.30	Also retailed at $57.50. Colonial cabinet. See Notes
1931	C	Zenette	Console	2004	SG	6	AC1	BC	$99.80	Also retailed at $84.00. "William & Mary" Style cabinet. ComCab: C, CH
1931	D	Zenette	Console	2004	SG	6	AC1	BC	$109.80	Very rare model. Was produced.
1931	L	Zenette	Table	2009-C	SG	5	AC1	BC	$49.95	Cathedral with scrolled lacewood. ComCab: L, LP
1931	LS?			2004	SG	6	AC1	BC		Listed in V3 Index. No other information. Produced?

MD.YR	MODEL	NAME	STYLE	CHASSIS	CIR	TU	PW	COVER	PRICE	COMMENT
1931	TH?			2012	SH?	8	AC2	BC		Listed in V3 Index. No other information. Produced?
1931	78		Console	70 Series	SG	9	AC60	BC		ComCab: 55, 67, 78. Electrical Remote Control.
1931	782		Console	70 Series	SG	9	AC25	BC		Listed as a model on patent sticker inside 70 Series models. Produced?
1931	79		Console	70 Series	SG	9	AC60	BC		ComCab: 79, 89, 892
1931	792?		Console	70 Series	SG	9	AC25	BC		Unlisted but plausible 25 cycle version of Model 79.
1931-32	Portola	Portola	Special		SH	8		BC		Little known "end table" style radio made for Zenith by United Air Cleaners (later Sentinel). Was UAC model R106B.
1931-32	AH	Zenette	Table	2012J	SH	8	AC2	BC	$79.50	Also retailed at $67.50. ComCab: A, AH.
1931-32	BH	Zenette	Tablel	2021	SH	7	AC2	BC	$67.50	BH chassis mislisted as a 2012J in V1. Cabinet is NOT common with B
1931-32	CH	Zenette	Console	2012J	SH	8	AC2	BC	$99.80	ComCab: C, CH.
1931-32	CH4?	Zenette	Console?							Listed as a model on patent sticker of model MH, LH. Produced?
1931-32	LH	Zenette	Table	2022	SH	7	AC2	BC	$49.95	ComCab: LH, 210, sim. 210-5, 250. Cabinet is NOT common with L.
1931-32	MH	Zenette	Console	2022	SH	7	AC2	BC	$79.95	High boy in walnut and gum.
1931-32	WH	Zenette	Console	2022	SH	7	AC2	BC	$69.95	CC:WH, 220, 220-3, 845. Low boy in walnut and gum.
1931-32	WHA?	Zenette		2022	SH	7	AC2	BC		Listed in V3 Index. A Model WH with Auto. Tuning??? Produced?
1932	LP	Zenette	Table	2009-C-P	SG	5	AC1	BC	$59.95	Beautiful cabinet in "Lacewood over walnut." ComCab: L, LP. See Notes.
1932	RH	Zenette	Console	2012J	SH	8	AC2	BC	$125.00	ComCab: RH, 90. Typo in V1 lists chassis as: 2021
1932	RHD?	Zenette								Listed as a model on patent sticker of model MH, LH. Produced?
1932	V-8			2012-4J	SH	8	AC2	BC		Listed in V3 Index and Rider p.7-22. Appearance unknown.
1932	80?									The generic Hypermetron chassis. Unlikely that a Model 80 was produced.
1932	82	Hypermetron	Console	Hyper.	SG	10	AC60	BC	$235.00	ComCab: 82, 822. Automatic Tuning. 1st Zeniths to be priced WITH tubes.
1932	822	Hypermetron	Console	Hyper.	SG	10	AC25	BC		ComCab: 82, 822. Automatic Tuning
1932	89	Hypermetron	Console	Hyper.	SG	10	AC60	BC	$265.00	ComCab: 89, 892. Automatic Tuning. 1st Zeniths to be priced WITH tubes. ComCab: 79, 89, 892
1932	892	Hypermetron	Console	Hyper.	SG	10	AC25	BC		ComCab: 89, 892. Automatic Tuning. ComCab: 79, 89, 892
1932	090		Console	2012-4J	SH	8	AC2	BC		Refer to Rider p.7-22. Also sometimes listed as Model 90-0
1932	90		Console	2012-4J	SH	8	AC2	BC	$135.00	ComCab: RH, 90, 902. Introduced "Magnavision Dial"
1932	902		Console	2012-4J	SH	8	AC2	BC		ComCab: RH, 90, 902. Listed in Mod. 90 Owners Man. Probably produced.
1932	91		Console	2014	SH	10	AC1	BC	$155.00	Has signal strength meter. Cabinet is Early American "semi-highboy"
1932	912		Console	2014	SH	10	AC25	BC		Listed in Model 90 Owners Manual. Probably produced.
1932	92		Console	2014	SH	10	AC1	BC	$195.00	Has signal strength meter & Automatic Tuning. 18th C. English cabinet
1932	922		Console	2014	SH	10	AC1	BC		Automatic Tuning. 18th C. English cabinet

MD.YR	MODEL	NAME	STYLE	CHASSIS	CIR	TU	PW	COVER	PRICE	COMMENT
1932	103	Zenith Ultra	Console	2017	SH	14	AC60	BC	$290.00	Includes ballast tube & signal strength meter. Louis XVI Styling. Automatic Tuning.
1932	104?									Listed as a model on patent sticker inside Mod.L Zenette. Produced?
1932	200?				SH	5	AC60?	BC?		Schematic shown in Rider's 10-33. Erroneous listing? Produced?
1933	C-10		Table	2009-C	SG	5	AC1	BC		Interocean set, with "Skyrover" escutcheon. See Notes.
1933	207		Table?	702/207	SH		AC/DC	BC+LW		V3 Index says 207 = 702. This may refer to the chassis only.
1933	208		Table?	207/702	SH		AC/DC	BC+LW?		V3 Index says Mod. 208 = Rev. Mod. 207. Mod. 208 same as Mod. 703?
1933	210	Zenette	Table	2022A&B	SH	7	AC1	BC	$49.95	ComCab: LH, 210, sim. 210-5, 250
1933	210-5	Zenette	Table	2046	SH	7	AC1	BC+LW	$55.00	"For the Air Adventurer" Appearance sim.to LH, 210 & 250
1933	211		Table?	2022A&B	SH	7	AC1	BC		
1933	211-5		Table?	2046	SH	7	AC1	BC+LW		
1933	215	Zenette	Table?	2044	SH	7	AC5	BC		
1933	215-3	Zenette	Table?	2044	SH	7	AC5	BC		
1933	216	Zenette	Table	2044	SH	7	AC5	BC		ComCab: 216, 230.
1933	217		Table?	2044	SH	7	AC5	BC		
1933	220		Console	2022A&B	SH	7	AC1	BC	$62.50	ComCab: WH, 220, 220-3, 845.
1933	220-3		Console	2022A&B	SH	7	AC1	BC		ComCab: WH, 220, 220-3, 845.
1933	221			2022A&B	SH	7	AC1	BC		
1933	225			2044	SH	7	AC5	BC		
1933	230	Zenette	Table	2036	SH	8	AC5	BC	$55.25	ComCab: 216, 230.
1933	238			2053B	SH	8	AC3	BC		
1933	240	All Star Line	Console	2036	SH	8	AC5	BC	$78.75	ComCab: 240, 260. Dual speaker
1933	241			2036	SH	8	AC5	BC		
1933	244	All Star Line	Console	2036	SH	8	AC5	BC	$69.95	Also listed at $89.95. CC: 244, 245, 621, 624. See Notes.
1933	245	All Star Line	Console	2036	SH	8	AC5	BC	$102.50	Lowest priced Zenith with Automatic Tuning. CC: 244, 245, 621, 624. See Notes.
1933	245A?		Console?	2036	SH	8	AC5	BC		This listed in V3 Index only. Erroneous?
1933	250	All Star Line	Table	2031	SH	9	AC5	BC+SW	$73.00	Cabinet similar: LH, 210, 210-5, 250, 250-3 250/250-3 slightly larger than other sim. models.
1933	250-3		Table	2031	SH	9	AC5	BC+SW		Cabinet similar: LH, 210, 210-5, 250, 250-3 250/250-3 slightly larger than other sim. models.
1933	251			2031	SH	9	AC5	BC+SW		
1933	252			2031	SH	9	AC5	BC+SW		

MD.YR	MODEL	NAME	STYLE	CHASSIS	CIR	TU	PW	COVER	PRICE	COMMENT
1933	258			2051	SH	8	AC4	BC+SW		
1933	259			2031	SH	9	AC5	BC+SW		
1933	260	All Star Line	Console	2031	SH	9	AC5	BC+SW	$92.00	ComCab: 240, 260.
1933	261			2031	SH	9	AC5	BC+SW		
1933	262			2031	SH	9	AC5	BC+SW		
1933	263			2044	SH	7	AC5	BC		
1933	268			2051	SH	8	AC4	BC+SW		
1933	268-A			2051	SH	8	AC4	BC+SW		
1933	269			2031	SH	9	AC5	BC+SW		
1933	270	All Star Line	Con+Ph	2022A&B	SH	7	AC1	BC	$123.50	
1933	270-5		Con+Ph	2046	SH	7	AC1	BC+LW		
1933	271			2036	SH	8	AC5	BC		
1933	271-1			2037	SH	8	AC5	BC		Originally an Interocean schematic? See Notes.
1933	271-21			2037	SH	8	AC5	BC		Originally an Interocean schematic? See Notes.
1933	271-31			2037	SH	8	AC5	BC		Originally an Interocean schematic? See Notes.
1933	272			2031	SH	9	AC5	BC+SW		
1933	273			2030	SH	10	AC5	BC		
1933	277			2056	SH	8	AC4	BC+SW		
1933	278			2051	SH	8	AC4	BC+SW		
1933	410	All Star Line	Console	2030	SH	10	AC5	BC	$105.00	Shadowgraph Tuning. ComCab: 410, 770, sim.476A
1933	411	All Star Line	Console	2030	SH	10	AC5	BC	$124.00	Shadowgraph Tuning. ComCab: 411, 420, 775, 885.
1933	412			2030	SH	10	AC5	BC		
1933	414			2030	SH	10	AC5	BC		
1933	420	All Star Line	Console	2030	SH	10	AC5	BC	$145.00	Shadowgraph Tuning. Automatic Tuning. ComCab: 411, 420, 775, 885.
1933	430	All Star "Master"	Console	2033	SH	12	AC5	BC	$166.00	Shadowgraph Tuning. Multiple Speakers. Appear.sim. 430, 765, 975.
1933	440	All Star "Master"	Console	2033	SH	12	AC5	BC	$184.00	Automatic Tuning. Shadowgraph Tuning. Multiple Speakers
1933	441		Console	2033	SH	12	AC5	BC		ComCab: 441, 617. Very ornate.
1933	442			2033	SH	12	AC5	BC		
1933	443			2030	SH	10	AC5	BC		
1933	444			2033	SH	12	AC5	BC		
1933	470?			2044	SH	7	AC5	BC		Mentioned in V3 Index
1933	470-5?			2056	SH	8	AC4	BC+SW		Mentioned in V3 Index

MD.YR	MODEL	NAME	STYLE	CHASSIS	CIR	TU	PW	COVER	PRICE	COMMENT
1933	470-5A?			2056	SH	8	AC4	BC+SW		Mentioned in V3 Index
1933	472			2031	SH	9	AC5	BC+SW		
1933	472-A			2031	SH	9	AC5	BC+SW		
1933	473			2030	SH	10	AC5	BC		
1933	473-A			2030	SH	10	AC5	BC		
1933	474			2053	SH	8	AC3	BC		
1933	475			2054	SH	9	AC3	BC		Dual Speaker,
1933	476			2032	SH	12	AC5	BC		ComCab: 476, 476 A & B, sim. 410, 770
1933	476-A	Challenger	Con+Ph	2032	SH	12	AC5	BC		Moderne cabinet. Advertised with Challenger Series. ComCab: 476, 476 A & B, sim. 410, 770
1933	476-B			2059	SH	12	AC3	BC		Moderne cabinet. Advertised with Challenger Series. ComCab: 476, 476 A & B, sim. 410, 770
1933	478			2051	SH	8	AC4	BC+SW		
1933	478			2056	SH	8	AC4	BC+SW		
1933	479			2059	SH	12	AC3	BC		
1933	479-A			2059	SH	12	AC3	BC		
1933	500			2037	SH	8	AC5	BC		Mentioned in V1 & Sylvania (as Interocean). Originally an Interocean schematic? See Notes.
1933	501			2037	SH	8	AC5	BC		Mentioned in V1 & Sylvania (as Interocean). Originally an Interocean schematic? See Notes..
1933	502			2037	SH	8	AC5	BC		Mentioned in V1 & Sylvania (as Interocean). Originally an Interocean schematic? See Notes.
1933	503			2037	SH	8	AC5	BC		Originally an Interocean schematic? See Notes.
1933	510-5			2046	SH	7	AC1	BC+LW		
1933	514			2037	SH	8	AC5	BC		Originally an Interocean schematic? See Notes.
1933	515			2037	SH	8	AC5	BC		Originally an Interocean schematic? See Notes.
1933	516			2031	SH	9	AC5	BC+SW		NOTE: Tuning indicator not used on Mod. 516
1933	516			2037	SH	8	AC5	BC		Originally an Interocean schematic? See Notes.
1933	516-B			2037	SH	8	AC5	BC		Mentioned in V1 & Sylvania (as Interocean). Originally an Interocean schematic? See Notes.
1933	517			2031	SH	9	AC5	BC+SW		
1933	518			2031	SH	9	AC5	BC+SW		
1933	520			2035	SH	10	AC5	BC		Interocean schematic. See Notes.
1933	521			2035	SH	10	AC5	BC		Interocean schematic. See Notes.

MD.YR	MODEL	NAME	STYLE	CHASSIS	CIR	TU	PW	COVER	PRICE	COMMENT
1933	522			2035	SH	10	AC5	BC		Interocean schematic. See Notes.
1933	530			2038	SH	12	AC5	BC		Interocean schematic. See Notes.
1933	531			2038	SH	12	AC5	BC		Interocean schematic. See Notes.
1933	532			2038	SH	12	AC5	BC		Interocean schematic. See Notes.
1933	533			2038	SH	12	AC5	BC		Interocean schematic. See Notes.
1933	535?			2038?	SH	5	AC5	BC		This model noted in Mallory-Yaxley only. Produced?
1933	550-1.0			2031	SH	9	AC5	BC+SW		
1933	558			2051	SH	8	AC4	BC+SW		
1933	558-1.0			2031	SH	9	AC5	BC+SW		
1933	560			2031	SH	9	AC5	BC+SW		
1933	568			2051	SH	8	AC4	BC+SW		
1933	577			2056	SH	8	AC4	BC+SW		
1933	578			2051	SH	8	AC4	BC+SW		
1933	585			2053	SH	8	AC3	BC		
1933	585-1.0			2053B	SH	8	AC3	BC		
1933	589			2051	SH	8	AC4	BC+SW		
1933	590			2051	SH	8	AC4	BC+SW		
1933	593			2056	SH	8	AC4	BC+SW		
1933	600			2037	SH	8	AC5	BC		Originally an Interocean schematic? See Notes.
1933	602			2035	SH	10	AC5	BC		Interocean schematic. See Notes.
1933	603			2038	SH	12	AC5	BC		Interocean schematic. See Notes.
1933	604			2037	SH	8	AC5	BC		Originally an Interocean schematic? See Notes.
1933	605			2035	SH	10	AC5	BC		Interocean schematic. See Notes.
1933	606			2037	SH	8	AC5	BC		Originally an Interocean schematic? See Notes.
1933	607A			2033	SH	12	AC5	BC		
1933	608			2035	SH	10	AC5	BC		Interocean schematic. See Notes.
1933	610		Console	2037	SH	8	AC5	BC		Rare. Unique cabinet. Ball feet, corner columns, Lower speaker section is 1/2 hexagonal in plan & contains dual speakers. Shadowmeter tuning. Originally an Interocean schematic? See Notes.
1933	611			2035	SH	10	AC5	BC		Interocean schematic. See Notes.
1933	612		Console	2038	SH	12	AC5	BC		Interocean schematic. See Notes. Sold in BOTH Zenith & Interocean versions. CC: 612, 618.
1933	615			2035	SH	10	AC5	BC		Interocean schematic. See Notes.

MD.YR	MODEL	NAME	STYLE	CHASSIS	CIR	TU	PW	COVER	PRICE	COMMENT
1933	616	All Star Line	Table	2037	SH	8	AC5	BC	$39.95	Shadowgraph Tuning. Produced as both tombstone & cathedral? Originally an Interocean schematic? See Notes.
1933	617		Console	2038	SH	12	AC5	BC		Interocean schematic. See Notes. ComCab: 441, 617. Very Ornate.
1933	618	All Star Line	Console	2037	SH	8	AC5	BC	$59.95	CC: 612, 618.
1933	619			2033	SH	12	AC5	BC		
1933	620			2038	SH	12	AC5	BC		Interocean schematic. See Notes.
1933	621		Console	2035	SH	10	AC5	BC		Interocean schematic. See Notes. CC:244, 245, 621, 624.
1933	621D?			2035	SH	10	AC5	BC		Listed in V3 Index. Erroneous? Interocean schematic. See Notes.
1933	623			2038	SH	12	AC5	BC		Interocean schematic. See Notes.
1933	624		Console	2038	SH	12	AC5	BC		Interocean schematic. See Notes. CC:244, 245, 621, 624.
1933-34	280			2056	SH	8	AC4	BC+SW		
1933-34	280			2051	SH	8	AC4	BC+SW		
1933-34	281			2051	SH	8	AC4	BC+SW		
1933-34	281			2056	SH	8	AC4	BC+SW		
1933-34	288	Challenger	Table	2056	SH	8	AC4	BC+SW		
1933-34	288	Challenger	Table	2051	SH	8	AC4	BC+SW		
1933-34	288-5		Table	2022	SH	7	AC2	BC		
1933-34	289			2051	SH	8	AC4	BC+SW		
1933-34	291			2022A&B	SH	7	AC1	BC		
1933-34	292			2022A&B	SH	7	AC1	BC		
1933-34	293		Console	2056	SH	8	AC4	BC+SW		ComCab: 293, 735, 755.
1933-34	293-SX		Console	2056	SH	8	AC4	BC+SW		ComCab: 293, 735, 755.
1933-34	293-X		Console	2056	SH	8	AC4	BC+SW		ComCab: 293, 735, 755.
1933-34	299			2031	SH	9	AC5	BC+SW		
1933-34	460		Auto	2047	SH	7	BATT	BC	$59.95	First Zenith automobile radio. Two piece: chassis + control head
1933-34	588			2056	SH	8	AC4	BC+SW		
1933-34	590			2056	SH	8	AC4	BC+SW		
1933-34	590-5			2022	SH	7	AC2	BC		Listed in V3 Index only. Believe this is erroneous.
1933-34	593-10			2056	SH	8	AC4	BC+SW		
1933-34	688			2056	SH	8	AC4	BC+SW		
1934	701	Challenger	Table	...	SH	5	AC/DC	BC	$24.95	Mfg. for Zenith by Belmont (sim. to Belmont 530) Intro June 33

MD.YR	MODEL	NAME	STYLE	CHASSIS	CIR	TU	PW	COVER	PRICE	COMMENT
1934	702			207/702	SH	5	AC/DC	BC		V3 Index says 207 = 702. This refers only to the chassis. Made for Zenith by Belmont (Model 530) refer to Rider's Belmont 4-2.
1934	703				SH	5	AC/DC	BC		Model 703 is a revised Mod. 702 & same(?) as Mod.208. See V3 Index.
1934	705	Challenger	Table	2052A	SH	6	AC3	BC	$24.95	Small wooden table model
1934	706	Challenger	Table	2052A	SH	6	AC3	BC	$27.95	Small wooden table model
1934	707	Challenger	Table	2052A	SH	6	AC3	BC	$29.95	Small wooden table model
1934	710?				SH					Listed only by Mallory-Yaxley. Produced?
1934	711	Challenger	Table	2052B	SH	6	AC3	BC	$34.95	Two versions built: 2052A chassis w/o Shadowmeter & 2052B w/Shadowmeter and new name plate on front panel.
1934	712	Challenger	Table	2052B	SH	6	AC3	BC		711 chassis + Shadowgraph Tuning.
1934	715	Challenger	Table	2053B	SH	8	AC3	BC		Ornate round top tombstone. ComCab: 715, 730.
1934	725	Aviatrix/Challeng	Console	2056	SH	8	AC4	BC+SW		ComCab: 725, 767, 777. Bezel/controls differ.
1934	725-S	Aviatrix/Challeng	Console	2056	SH	8	AC4	BC+SW		Same as 725 above? ComCab: 725, 767, 777.
1934	730		Table		SH	5	BATT	BC		Chassis made for Zenith by Wells-Gardner (Model 06A) Not in Z.SerMan, see Rider's p. 4-9. ComCab: 715 ,730. See Notes.
1934	735	Challenger	Console		SH	6	BATT	BC+SW		Chassis made for Zenith by Wells-Gardner (Model 06A). Not in Z.SerMan, see Rider's p. 4-9. ComCab: 293, 735, 755. See Notes.
1934	740	Challenger	Console		SH	10	BATT	BC		Chassis made for Zenith by Wells-Gardner (Model 00A) Refer to Rider's Wells-Gardner 4-1, ComCab: 740, 760, 970. (bezels differ). See Notes.
1934	750	Challenger	Console	2052C	SH	6	AC3	BC		Chassis 2052A + Shadowgraph Tuning + larger speaker
1934	755	Challenger	Console	2053	SH	8	AC3	BC		Shadowgraph Tuning. ComCab: 293, 735, 755.
1934	756		Console?	2053	SH	8	AC3	BC		
1934	757		Console?	2054	SH	9	AC3	BC		Dual Speaker
1934	760	Challenger	Console	2054	SH	9	AC3	BC		Dual Speaker+Shadowgraph Tuning. ComCab: 740, 760, 970.
1934	765	Challenger	Console	2054	SH	9	AC3	BC		Dual Speaker. Cabinet sim. 430, 765, 975. Corner trim differs.
1934	767	Aviatrix/Challeng	Console	2054	SH	9	AC3	BC		Dual 8" Speakers, rosewood, madronna, maple, walnut, ComCab: 725, 767, 777.
1934	770	Challenger	Console	2032	SH	12	AC5	BC		Dual Speaker + S'graph. "Moderne" cabinet. ComCab: 410, 770, sim.476A
1934	770B	Challenger	Console	2059	SH	12	AC3	BC		Dual Speaker + S'graph. "Moderne" cabinet. ComCab: 410, 770, sim.476A
1934	775	Challenger	Console	2032	SH	12	AC5	BC		Dual Speaker + Shadowgraph. ComCab: 885,775,420,411.
1934	775B	Challenger	Console	2059	SH	12	AC3	BC		Dual Speaker + Shadowgraph. ComCab: 885,775,420,411.
1934	777	Aviatrix	Console	2059	SH	12	AC3	BC		Dual 10" Speakers, rosewood, madronna, maple, walnut, ComCab: 725, 767, 777. The 12 tube version of the Aviatrix.
1934	780		Console?	2032	SH	12	AC5	BC		

MD.YR	MODEL	NAME	STYLE	CHASSIS	CIR	TU	PW	COVER	PRICE	COMMENT
1934	785		Console?	2053	SH	8	AC3	BC		Noted in V3 Index
1934	788		Console?	2059	SH	12	AC3	BC		
1934-35	462		Auto	2057	SH	6	BATT	BC	$51.95	Two piece automobile radio: chassis + control head
1935	7		Auto		SH	5	BATT	BC		Both the Service Manual itself and advertising iindicate that Model 7 is an auto radio. See Notes.
1935	7 JR		Auto		SH	5	BATT	BC		Both the SerMan & ads indicate that Model 7 Jr. is an erroneous listing in V3 Index. See Notes.
1935	650		Auto	2057	SH	6	BATT	BC		Automobile Radio
1935	650HD		Auto	2057	SH	6	BATT	BC		Automobile Radio (for Hudson automobile?)
1935	651HE		Auto	2057	SH	6	BATT	BC		Automobile radio
1935	654		Auto		SH		BATT	BC		Erroneously listed as 5901 chassis by Zenith. Believe this is 1935 auto radio. See Notes.
1935	657		Auto		SH		BATT	BC		Erroneously listed as 5901 chassis by Zenith. Believe this is 1935 auto radio. See Notes.
1935	660TD		Auto	2057	SH	6	BATT	BC		Automobile Radio
1935	661TE		Auto	2057	SH	6	BATT	BC		Automobile Radio (for Hudson Terraplane automobile?)
1935	663		Auto	5510	SH	5	BATT	BC		Automobile Radio
1935	663-4		Auto	5510	SH	5	BATT	BC		Erroneous listing in Mallory-Yaxley only. Z schematic is for both 663 & 664 and is noted "663-4"
1935	664		Auto	5510	SH	5	BATT	BC		Automobile radio
1935	666		Auto	5616	SH	6	BATT	BC		Automobile radio
1935	667		Auto		SH		BATT	BC		Erroneously listed as 5901 chassis by Zenith. Believe this is 1935 auto radio. See Notes.
1935	668		Auto	5626	SH	6	BATT	BC		Automobile radio
1935	680		Auto	5617	SH	6	BATT	BC		Almost certainly an automobile radio. Listed by Mallory-Yaxley. Successor to 666/668? See Rider's Zenith p.6-3.
1935	801		Table		SH	5	AC/DC	BC	$34.95	Chassis made for Zenith by Belmont (Model 540) Refer to Rider's Belmont 5-7. See Notes.
1935	804		Table		SH	5	AC60	BC+LW		LW added. Refer Rider's 10-34. Chassis made by another manufacturer?
1935	805		Table	5502	SH	5	AC3	BC+SW	$29.95	5502A = "all volt., 25 cycle." 5502B =117VAC, 50-60 cps.
1935	806		Table	5504	SH	5	AC3	BC+SW		Key hole dial, escutcheon = 805/845/847
1935	807		Table	5506	SH	5	AC3	BC+SW	$39.95	Airplane dial version of basic 5504 chassis
1935	808		Table	5605	SH	6	AC3	BC+SW	$49.95	
1935	809		Table	5605	SH	6	AC3	BC+SW	$54.95	Chrome grille.

MD.YR	MODEL	NAME	STYLE	CHASSIS	CIR	TU	PW	COVER	PRICE	COMMENT
1935	810		Table?	5609	SH	6	AC/DC	BC+SW		110-125 volts
1935	811		Table	5609	SH	6	AC/DC	BC+SW	$54.95	110-125 volts. Beautiful Deco cabinet. Rare.
1935	812		Table?	5608	SH	6	AC/DC	LW+BC+SW		110-125 volts
1935	814		Table	5611-12	SH	6	AC1	LW+BC+SW		Listed by RCA & Mallory-Yaxley. Refer Rider's Zenith p. 6-6.
1935	815		Table	5611-12	SH	6	AC1	LW+BC+SW		Listed by RCA & Mallory-Yaxley. Refer Rider's Zenith p. 6-6.
1935	816		Table?	5608	SH	6	AC/DC	LW+BC+SW		110-125 volts
1935	817		Table?	5608	SH	6	AC/DC	LW+BC+SW		110-125 volts
1935	819		Table?	5608	SH	6	AC/DC	LW+BC+SW		110-125 volts
1935	825	Twin Midget	Table	5701R	SH	7	AC3	BC+SW	$49.95	Low profile. Not an airplane dial. ComCab: 825, 825R.
1935	825R	Twin Midget	Table	5703R	SH	7	AC3	BC+SW		
1935	827	Twin Midget	Table	5702	SH	7	AC3	BC+SW	$54.95	Shadowgraph Tuning, Chrome detailing on front. Not airplane dial. ComCab: 827, 827R, S827.
1935	827R	Twin Midget	Table	5702R	SH	7	AC3	BC+SW		Trailing "R" = Revised. Not airplane dial. ComCab: 827, 827R, S827
1935	S827	Twin Midget	Table	5701R-03R	SH	7	AC3	BC+SW		ComCab: 827, 827R, S827
1935	829		Table	5704	SH	7	AC3	BC+SW	$69.95	Chrome grille. Airplane dial version of basic 5701 chassis. ComCab: 829, 829R, S829.
1935	829R		Table	5703R	SH	7	AC3	BC+SW		Trailing "R" = Revised. Airplane dial. ComCab: 829, 829R, S829.
1935	S829		Table	5701R-03R	SH	7	AC3	BC+SW		ComCab: 829, 829R, S829.
1935	834		Table	1002	SH	10	AC3	BC+SW+LW	$120.00	Chassis =1001, except LW (and 7 meters?) added. Rider's 10-33. ComCab: 834, 835, 935
1935	835		Table	1001	SH	10	AC3	BC+SW	$89.95	Large chrome grille tombstone. Coverage = .535 to 48 MHz. ComCab: 834, 835, 935
1935	845		Console	5502	SH	5	AC3	BC+SW	$39.95	5502A chas. = "all voltage, 25 cycle." 5502B chas. =117VAC, 50-60 cps. ComCab: WH, 220, 220-3, 845.
1935	847		Console	5503	SH	5	AC60	BC+SW	$49.95	Not listed often, but a few do exist. ComCab: 847, S847.
1935	S847		Console	5507	SH	5	AC3	BC+SW		5505 chassis + 8" speaker. ComCab: 847, S847.
1935	850		Console	5505	SH	5	AC3	BC+SW	$59.95	Basic 5504 chassis + 8" speaker & airplane dial. No Shadowgraph.
1935	860		Console	5607	SH	6	AC3	BC+SW	$69.95	10" speaker + Shadowgraph Tuning
1935	861		Console	5607	SH	6	AC3	BC+SW	$79.95	10" speaker
1935	862		Console?	5610	SH	6	AC/DC	BC+SW		110-125 volts. V1-3 Index mis-lists this as chassis = 5609. Refer V1, p.169 and Rider's
1935	864		Console	5611-12	SH	6	AC1	LW+BC+SW		Listed by RCA & Mallory-Yaxley. Refer Rider's Zenith p. 6-6.
1935	865		Console?	5609	SH	6	AC/DC	BC+SW		110-125 volts
1935	866		Console?	5609	SH	6	AC/DC	BC+SW		110-125 volts

MD.YR	MODEL	NAME	STYLE	CHASSIS	CIR	TU	PW	COVER	PRICE	COMMENT
1935	870		Console	5703	SH	7	AC3	BC+SW	$79.95	Airplane dial & 12" speaker added to 5701 chassis. Also retailed @ $89.50. ComCab: 870, 870R, S870.
1935	870R		Console	5703R	SH	7	AC3	BC+SW		Airplane dial. ComCab: 870, 870R, S870.
1935	S870		Console	5701R-03R	SH	7	AC3	BC+SW		ComCab: 870, 870R, S870.
1935	871		Console	5703	SH	7	AC3	BC+SW	$99.95	12" speaker. ComCab: 871, S871.
1935	S871		Console	5701R-03R	SH	7	AC3	BC+SW		ComCab: 871, S871.
1935	880		Console	1001	SH	10	AC3	BC+SW	$120.00	Coverage = .535 to 48MHz.
1935	881		Console	1001	SH	10	AC3	BC+SW		12" speaker
1935	885		Console	1001	SH	10	AC60	BC+SW		ComCab: 885, 775, 420, 411.
1935	886		Console?	1001	SH	10	AC3	BC+SW		Appearance may be sim. to 885, et.al.???
1935	887		Console?	2059	SH	12	AC3	BC		
1935	908		Table	5614	SH	6	AC3	BC+SW		Tombstone. ComCab: 908, S908.
1935	S908		Table	5618	SH	6	AC60	BC+SW		ComCab: 908, S908.
1935	909		Table?	5614	SH	6	AC3	BC+SW		ComCab: 909, S909.
1935	S909		Table?	5618	SH	6	AC60	BC+SW		ComCab: 909, S909.
1935	934		Table	1002	SH	10	AC3	BC+SW+LW		Chassis =1001, except LW (and 7 meters?) added.
1935	935		Table	1001	SH	10	AC3	BC+SW		ComCab: 834, 835, 935
1935	945		Console	5508-09	SH	5	AC3	BC+SW	$59.50	8" speaker
1935	950		Console	5508-09	SH	5	AC3	BC+SW		10" speaker
1935	960		Console	5614	SH	6	AC3	BC+SW		6-legged console
1935	961		Console	5614	SH	6	AC3	BC+SW		Floor console. ComCab: 961, S961.
1935	S961		Console	5618	SH	6	AC60	BC+SW		12" speaker. ComCab: 961, S961
1935	962		Console?	5608	SH	6	AC/DC	LW+BC+SW		110-125 volts
1935	963		Console?	5609	SH	6	AC/DC	BC+SW		110-125 volts
1935	966		Console?	5607	SH	6	AC3	BC+SW		Probably only used 5607 chassis with 10" speaker
1935	970		Console	5902	SH	9	AC3	BC+SW	$129.50	ComCab: 740, 760, 970. See V3 Index & V1, p.193
1935	975		Console	5902	SH	9	AC3	BC+SW		ComCab: 430, 765, 975. See V3 Index & V1, p.193
1935	978		Console	1001	SH	10	AC3	BC+SW		
1935	980		Console	1201	SH	12	AC3	BC+SW		Cabinet sim. to 985, walnut VENEER pilasters. Shadowgraph Tuning
1935	983		Console?	1001	SH	10	AC3	BC+SW		
1935	985		Console	1201-L	SH	12	AC3	BC+SW		Two speakers: woofer/tweeter. Appearance sim. 980. Reeded pilasters recall the Stratosphere cabinet.

MD.YR	MODEL	NAME	STYLE	CHASSIS	CIR	TU	PW	COVER	PRICE	COMMENT
1935	990		Console	1201-L	SH	12	AC3	BC+SW	$250.00	Two speakers: woofer/tweeter. Reeded pilasters. Corner cols., bracket feet.
1935	1000Z	Stratosphere	Console	2501-C&-P	SH	25	AC1	BC+SW	$750.00	Legendary Top of the Line in mid & late 30s. First 100 made tuned continuously to 63.6 MHz. Follow-on units tuned to 45 MHz. Introduced in Radio Retailing in December 1934.
1935	1101		Table?	1001	SH	10	AC3	BC+SW		
1935	1102		Table?	1002	SH	10	AC3	BC+SW+LW		Chassis =1001, except LW (and 7 meters?) added. Rider's 10-33
1935	1105		Table?	1001	SH	10	AC3	BC+SW		
1935	1106		Table?	1002	SH	10	AC3	BC+SW+LW		Chassis =1001, except LW (and 7 meters?) added. Rider's 10-33
1935	1107		Table?	1201-L	SH	12	AC3	BC+SW		
1935	1112		Table?	5608	SH	6	AC/DC	LW+BC+SW		110-125 volts
1935	1114		Table?	5605	SH	6	AC3	BC+SW		
1935	1115		Table?	5609	SH	6	AC/DC	BC+SW		110-125 volts
1935	1116		Table?	5608	SH	6	AC/DC	LW+BC+SW		110-125 volts
1935	1117		Table	5614	SH	6	AC3	BC+SW		Tombstone
1935	1118		Table?	5618	SH	6	AC60	BC		Radio-phonograph
1935	1160		Console?	5607	SH	6	AC3	BC+SW		
1935	1161		Console	5611-12	SH	6	AC1	LW+BC+SW		Listed by RCA & Mallory-Yaxley. Refer Rider's Zenith p. 6-6.
1935	1162		Console?	5610	SH	6	AC/DC	BC+SW		Chassis similar to 5609. Models using 5610 have a 12" speaker
1935	1167		Console?	5618	SH	6	AC60	BC		Radio-phonograph, 12" speaker
1935	1170		Console?	5701R-03R	SH	7	AC3	BC+SW		12" Speaker

NOTES

1922

Production of first "Zenith" receivers began in the spring of 1922 in the QRS factory building at 48th Place and Kedzie in Chicago's Central Manufacturing District (on the near South Side.) The majority of production was Model 1-R receivers and 2-M amplifiers. A number of Model 3-M amplifiers were manufactured and at least prototypes of the Model 2-Rs were produced. There is no evidence that production runs of the Model 2-R were made and none are known to exist today. Production volume of Model 1-R receivers had reached 15 sets per day by July 1922. Production ran until the spring of 1923. Probable total production was most likely about 5000 receivers. Photographs of the Zenith booth at 1922 Radio Shows and store front displays indicate that a number of 1-Rs were placed in larger "console" and table-top cabinets. These previously unknown radios were probably "Show" units produced in very small numbers.

1923

All but a few CRL employees were laid off in the early spring of 1923 and the development of the 3-R and 4-R was completed. Production, this time of 3-R and 4-R receivers, then resumed and continued throughout 1923. Production volume of the new receivers was said to be considerably higher than that of the 1-R. Again, photos of the era record the existence of some "console" and table-top units in larger cabinets with integral speakers, using what appear to be production 3-R units. These previously unknown units appear to pre-date the introduction of the 1924 "Phonograph" unit. Production statistics are unknown.

1924

Production of the 3-R and 4-R continued throughout 1924, but was somewhat curtailed in the spring to give preference to the new Super Zeniths. The Zenith "suitcase" portable was introduced for the summer season of 1924. A little known Zenith "Phonograph" console unit was also produced. This unit utilized 3-R circuitry behind a new nearly square faceplate which was sized to fit a number of Victor phonograph cabinets. The phonographic horn already in the Victor cabinet was retained but a new Baldwin driver was installed. This "Phonograph" Model may have been sold separately, as well, since the factory brochure lists mounting the Phonograph radio in four different Victor models. The Super Zenith Models VII, VIII, IX, and X were introduced to the retail market in the fall of 1924 (Radio Age, October 1924), making them 1925 retail model year units under the nomenclature adopted in this listing.

1925

Production was moved from the QRS building on Kedzie to Zenith's plant at 3620 Iron St, also in the Central Manufacturing District on Chicago's South Side. The Super series (VII thru X) were the primary production for 1925, with the very expensive new 10-tube Deluxe models being introduced at the end of the year. (Oct. 1925 NYC Radio Show)

All Deluxe receivers, *except* the Spanish model, used dual speakers, one for high frequency audio, one for low. The Spanish model came with four speakers. The Deluxe chassis tuned from 100 meters (later 80M) to 550 meters. The Deluxe sets were advertised as "only regularly manufactured sets which operate successfully without loop or antenna" and as the "only regularly manufactured 10-tube set" and included a special 6-gang condenser. A 1927 retail brochure states that Colonial, English and Spanish models were carried in stock but that the Italian and Chinese models were custom built, requiring 60 days delivery. The Deluxe chassis was also sold without a cabinet, at least at the wholesale level.

1926

The engineering department worked throughout most of 1926 and early 1927 on the new Zenith line (models 11, 12, 14, 15, 16, 17, 18) which, except for the very rare Model 18E, reached the retail markets during either spring or fall 1927. Strictly applying the nomenclature used in this list, some of these "Teen" models would be 1927-28s while others, introduced in the fall of '27 or spring of '28 (the 18E) would be 1928 sets. Since this group of "Teen" models were considered a single "Line" by Zenith, all models from 11 through 18E are listed as "1927-28" sets. The model nomenclature "Model 17" and "Model 17E" were used interchangeably in advertising this popular model, giving rise to the apparently erroneous belief that there was a battery powered Model 17. Late 1926 saw the retail introduction of the Super 27, Super 28 and the Super 29 for the 1927 Line. These were AC sets in Super VII series-cabinets and were in Zenith's first all-AC sets. Zenith advertising at the time and internal documents and advertising from 1928 and '29 clearly indicate that the Super 27 is the model which Zenith claimed as the first truly "batteryless" set.

Like the Super VII series, the Super 27, 28 and 29 were, respectively, table sets (the 27), on a spinet-legged base (the 28) or on a console base (the 29). Models 11, 12 and 14 share a common chassis. The 11E, 14E and the little known 18E share a different common chassis. Model 15 and 16 share an 8-tube chassis. Model 15E, 15EP, 16E and 16EP together share yet another 8-tube chassis with a separate rectifier and power supply.

1927

The new models, 11, 12, etc., which had mostly been designed in 1926, were introduced throughout 1927. The Models 11 and 12 were the first modestly priced receivers in the Zenith line since the 4-R in '23-24. The five top-of-the-line Deluxe consoles were reintroduced as AC sets. Design was underway throughout 1927 on models which would become the new "30 Series."

1927-28

The "1927-28" factory brochure lists models 11 thru 17E and the five Deluxe models as the '27-28 Line and carries the slogan "The Quality Goes in Before the Name Goes On."

1928

The "1928" factory brochure is similar to the "27-28" brochure discussed above and lists the 30 Series sets (Models 31 thru 35 and 39), along with 15EP, 17E and the five Deluxe receivers as the "1928 Line." In 1928 sales literature, chassis were, for the first time, identified separately from the model numbers. The 10 tube Deluxe chassis was called the "G" chassis, the basic 30 Series chassis was called the "E", and the chassis for Models 39 and 40 were noted the "F" chassis.

The 30 Series Sets

Zenith introduced the heavily patented Marvin "Automatic Tuning" system of lever push buttons in the new 30 Series for 1928 and noted its inclusion in a particular model with a trailing "A" in the model number itself (35A, etc.)

The 30 Series (includes the 31, 32, 33, 34, 35, 35A, 362 and the 37A 6-tube version) appear to be a continuation of the 11E and 14E circuitry. The front panel controls include VOLUME on the left-hand side, and the ON/OFF on the right. The chassis has no provisions for phonograph input. The volume of the received signal is controlled by varying the plate voltage on the first three radio frequency (RF) stages. This is similar to the 11E, except the 11E also varies the plate voltage of the second audio frequency (AF). All cathodes of the 30 Series RF amps are tied together. Model 31 is the battery version of the Model 33 and Model 32 the battery version of the Model 34.

Model 35 was available with so many different versions of the circuitry, power supply and speaker that it was practically a "Series" by itself. Along with the internal differences, there were some minor variances in appearance of the inner front (control) panel. Further, some models have a recessed speaker grille, while others are flush mounted. External embellishments (trim and carvings) also vary.

The 30X series (33X, 34P, 35PX, 35APX and the 362X) is apparently a deluxe version of the 30 chassis (the "E" chassis in sales literature), probably modified for better performance. The panel controls include a combined ON/OFF/VOLUME control on the left, and the VARIOMETER control on the right, acting much like the compensating condenser on the 50/60/70 series of Zenith. Unlike the normal 30 Series sets, the 30X sets have phonograph input terminals on the back-left on the chassis. The phonograph audio is defeated by a toggle switch on the dial panel. The volume is controlled by varying the plate voltage of the second and third RF stages. The first RF stage runs full gain at all times. The cathode circuit of the first RF stage is grounded through a 10-ohm flexible resistor and parallel cathode bypass capacitor. The cathodes of RF's #2 and #3 are still tied together. Different audio interstage transformers are used on the 33X.

Zenith apparently did not feel the need to use the X designation with the 34P set. There appears to be no version of a 34P using the 30 circuitry with the electrodynamic speaker (the P in the model number), UX-210 power amplifier, and ZE-11 power supply. The omission of the X is incongruent with the 33X and 35PX, etc. adding to the confusion surrounding model numbering nomenclature with this complex series of Zenith radios.

The 35PX, 35APX and one of the 37A versions use seven tubes. Other differences between X models and the remainder of the 30 Series include the X models incorporating three audio interstage transformers and a type 250 power amplifier. NOTE: The tube layout diagram in Rider's Perpetual Trouble-Shooter's Manual, Vol. 1 (early), is misleading--the two rectifier tubes are in the power supply chassis. The two chassis are not distinguished.

Power Supplies for the 30 Series ("E") Chassis

The power supplies used are quite confusing at first. However, Martin Blankinship was able to decode their differences and their applications:

ZE-10	60 Hertz, fullwave rectifier.	Models: 33, 33X, 34, 35, 35A
ZE-11	60 Hertz, 2-halfwave rect.	Models: 34P, 35P, 35AP, 37A, 6-tube.
ZE-13	25 Hertz, fullwave rectifier	Models: 362*, 362X*, 342, 352, 352A
ZE-14	25 Hertz, 2-half wave rect.	Models: 342P, 352P, 352AP
ZE-17	DC	Models: 333, 353A
ZE-18	60 Hertz, 2-half wave rect.	Models: 35PX, 35APX, 37A 7-tube version

Power Supply Notes:

ZE-10 - used with the 33 models. It has one full-wave rectifier and slightly higher plate voltages supplied to RF tubes through a #63-70 porcelain resistor valued at 22.5K ohms.

ZE-11 - used with the 34P, 37A 6-tube, 35AP, 35P. The ZE-11 uses two half-wave rectifiers due to a higher current capacity and voltage needed at plate of power amp. (Two #81 tubes have greater current capacity than one #80, and a higher peak-inverse voltage value). Slightly lower voltages are applied to the plates of the RF section through #63-85 porcelain resistor valued at 22.7K ohms.

ZE-18 - used on 35PX, 35APX, 37A 7-tube version. It was needed due to the current demand of 7 stages and the type 250 power amplifier.

* The 362/X cabinet may have been bigger (and different) than the 33 due to the possible larger physical size of the ZE-13 power supply. 25 cycle power supplies generally use larger transformers and capacitors than 60 cycle sets.

REFERENCES

Rider, John F., *Perpetual Trouble-Shooter's Manual, Vol. I* (early), pp. 25-26, pp. 657-663.

Zenith Service Bulletin #20, October, 1928.

1929

One original Zenith pocket sales brochure, identified on the front in large type as "1929" features the 30 Series models, the 40A and the five Deluxe radios and no other sets. It is probably safe to say, then, that the 30 Series was marketed in 1929 as well as 1928.

1930

McMahon and Douglas list the 50 Series radios as introduced in the fall of 1929. These models are, thus, *Retail Model Year* 1930. The *Zenith Service Manual* (very unreliable as to dates at this point) lists the 50 Series in 1928. The Zenith retail sales brochure for the 50 Series is clearly labeled "1930 Series Radio Receivers." Therefore, we list the 50 Series as Retail Model Year 1930.

The 60 Series brochure in the Zenith archives is noted (hand written) as "late 1929, early 1930." This would be the time of manufacture of the 60 Series which are also listed as 1930 Retail Model Year radios. The 563 was an unusual set marketed for at least two years in areas of the country with 110 volt direct current residential power. The exterior cabinet of the 563 is identical to the 35A, with the interior front panel being either very similar to or identical to some versions of the 35A interior front panel. The chassis was a 7 tube 30 series "E" chassis with four additional Type 71 audio amplifiers in parallel push-pull.

The Zenith 50 series uses a single volume control, which varies the screen grid voltage to the three RF stages. The 60 series was manufactured with either a single or double volume control. The double volume control varied the resistance across the input circuit and also the resistance into the first RF plate circuit. The double volume control was probably a modification since it was used on the 70 series also.

The power supplies on the 50 and 60 series are essentially the same. The ZE-50 and ZE-60 power supplies consist of just the power transformer and rectifier. The filter condensers, voltage divider resistor and center-tapped filament resistor are located on the main chassis.

"Automatic Tuning" accomplished by the patented Marvin pushbutton levers was provided on Models 52, 522, 53, 532, 54, 542, 55, 552 in the 50 Series. Note that the trailing "A" which connoted a model with Automatic Tuning was discarded after Model 40A.

Lastly, models 54, 55, 64 and 67 have a loop antenna with a switch for selecting either loop or antenna reception.

1930-31

The 70 Series was Zenith's effort to maintain presence near the top of the market. Prices varied from $185 to $375. Each was in Tudor styling in beautiful combinations of walnut, birch and red gum. The Zenith sales brochure for the 70 Series models is called "Series 1930-31." Retail model pricing was still "less tubes."

The power supplies of the 70 Series differ from those used in the 50/60 Series in very important ways. The filters, voltage divider and filament resistor are located in the ZE-70 power supply rather than the main chassis. It is not clear why Zenith moved these items over to the power supply. Possibly the failure rate of these components was high and locating them on the small power supply chassis made the sets easier to service. Due to this relocation, the power supply interconnecting cable to the main chassis does not match between the 50/60 Series and 70 Series even though the lugged connector will fit either type. In other words, a ZE-50 from a 50/60 Series radio can be hooked up to a Zenith 70 Series radio, but the set will not work and the electrical mismatch may cause damage to the chassis or power supply.

Unlike the 50/60 Series, the 70 Series ON/OFF switch circuit does not make use of the interconnecting cable between the power supply and main chassis. A separate set of wires connects the ON/OFF switch to the "bias" connector on the side of the power supply. A tone control was added sometime during the 70 Series production runs. The control was centered between the two existing control knobs.

REFERENCES FOR 70 SERIES NOTES

Rider, John F. *Perpetual Trouble-Shooter's Manual, Vol. I* (early). Peculiarities, pp. 25-26. Tone control, p. 674-L.

Zenith Service Manual, volume I, pp. 1-12.

The Super 8 Series, introduced during 1930, was a marketing move toward the middle of the console price range. A Zenith pocket sales brochure dedicated to the Super 8's identifies them as part of the "Series 1930-31."

1931

During 1931, Zenith responded to the deepening Depression by introducing a very low price range line, the Zenettes. These sets were carefully differentiated from the "Zenith" sets in brochures and advertising in an apparent effort to maintain the reputation of the "Zenith" sets as being near the top of the market. The Zenith factory brochure clearly identifies Zenette models A, B, C and D as "1931 Series". Finished backs were available for models A and B for an additional $2.50; "Sheraton" spinet bases were also available for Models A and B for $10.00. With the exception of the Model 77, 78 and 79 which were little known extensions of the 70 Series, the new Zenettes were the only new radios introduced for Retail Model Year 1931.

1931-32

In late 1931, Zenith introduced their first radios with the super-hetrodyne circuit. These were three moderately priced Zenette sets: Models LH, MH and WH. The Zenith sales brochure featuring these "3 NEW ZENETTES" calls them "1931-32 Series." The *Zenith Service Manual, Vol. 1*, also lists a "WHA" Zenette, which did not appear in any known sales literature or advertising and was probably not produced. It appears likely that the original four Zenettes, Models A, B, C and D remained in the 1931-32 line, as well.

1932

Zenith re-established its position in the upper portion of the radio price structure with the introduction of six new console models which fall in the 80/90/100 range model numbers: Models 82 & 89 "Hypermetron" sets, the Models 90, 91 and 92 and the then top-of-the-line Model 103 Zenith "Ultra." The patent sticker found inside some 1932 sets also list a Model 104. However, this model was not mentioned in any of the rather massive print advertising for this new line. A Zenith factory brochure on 90, 91, 92 calls them "Advanced 1932 Super-Heterodyne Zeniths." The Ultra Model 103 was advertized with 90, 91 and 92, so it must also be a 1932 model. The Zenette "1932 Series" sales brochure lists AH, CH, RH, and LP as "1932 Series." Accessories: spinet bases and finished backs were available for Models AH and LP.

1933

In 1932, there were 10 models in the combined Zenith and Zenette lines. In 1933, the number of models literally exploded to include more than 125 different sets! These sets fall into the 200, 400, 500 and 600 range model numbers. Many of these "models" are listed and schematics provided in *Zenith Service Manual, Vol. 1*, but are NOT mentioned in any sales brochures, print advertising or in any trade journal reviewed for this publication. It is likely that some of these listed sets were never actually produced.

The 1933 Line appears to be quite chaotic and probably represents several experimental strategies which were being employed to find niches in the radically shrunken radio market at the bottom of the Depression. In addition to the main "All-Star Line," Zenith introduced a completely separate product line which was built in the Zenith factory, but which was labeled "Interocean" and "Interocean Radio Corporation." The weight of the evidence is that these were Zenith sets in everything but name. They used some of the Zenith model numbers falling in the 500 and 600 series (and the curious C-10); at least some of these "Interocean" sets were identical in all but one part to Zenith sets carrying the same model number. The difference was in the dial escutcheon: Zenith sets of these series carried the name "Zenith" on a small insert in the escutcheon right below the dial window. The insert is attached with four brads. Interocean sets of that same model simply substituted a different insert carrying the name "Interocean" or possibly "Coronado" or others now unknown. The motive for this strategy was most likely to market excess plant production at a lower price (and less profit) while maintaining the image that the name Zenith meant "top-of-the-line." The strategy appears to have had limited success; both Zenith and other versions of these models are extremely rare today.

The *Zenith Service Manual, Vol. 1* contains two schematics (2035, p.93, a 10-tube chassis and 2038, p.79, a 12-tube chassis) which are labeled as being produced by the "INTEROCEAN RADIO CORP., CHICAGO, ILL." These sheets are formatted and drawn exactly like Zenith schematics of the same vintage and appear to be drawn by the same drafter. Both are dated "7-22-32", a plausible date for schematics of Retail Model Year 1933 sets. Each is also listed as an "Interocean" chassis by Sylvania, the only standard reference which mentions Interocean radios. Sylvania also lists chassis 2037 (8-tube) as an Interocean chassis. This is very plausible, for that would give Interocean an 8, 10, and 12-tube chassis, the same scheme as the Zenith line itself (see below). Interestingly, the 2037 schematic drawing included in the *Zenith Service Manual, V.1* is a "Z.R.C." schematic (rather than the normal practice of spelling out each word) and is dated "April 2, 1934" almost two years after these models were introduced. In this database, models using the 2035 or 2038 chassis are labeled "Interocean schematic", while those using the 2037 are noted "Originally an Interocean schematic?" Most likely, sets using all three chassis were marketed under both the Zenith and Interocean labels.

The primary group of 1933 Zenith radios was "The New All Star 1933 Line" which was composed of three main groups of receivers:

All Star Line 12-tube sets
- Model 430 "Master Zenith" console
- Model 440 "Master Zenith with Automatic Tuning" console

All Star Line 10-tube sets
- Model 410 console
- Model 411 console
- Model 420 console

All Star Line 8-tube sets
- Model 230 cathedral table model
- Model 240 console
- Model 245 console

All Star Line 8-tube sets
- Model 244 console
- Model 616 cathedral
- Model 618 console

All Star Special Models
- Model 210-5 BC+LW cathedral table model
- Model 250 BC+SW cathedral table model
- Model 260 BC + SW console
- Model 270 Radio-Phonograph Combination console.

Each of these five groups of All Star sets was featured in a separate factory sales brochure and form the heart of the Zenith 1933 Line. One noteworthy event was the rather quiet introduction of Zenith's first sets which tuned the burgeoning shortwave spectrum. These first sets were based on the 2031, 2051 and the 2056 chassis, 8 and 9 tube chassis which were used in about one-third of the 125 models offered in 1934. Curiously, no significant advertising of this new shortwave capability was done until the introduction of the 1933-34 element of the "Challenger Line." Another noteworthy development during 1933 was the introduction of Zenith's first automobile radio, the "Challenger" Model 460 in the late spring of 1933 (for the Summer Season).

It is also interesting to note that the Rider's Gamble section, p.7-43 and 7-45 show that the Gamble-Skogmo models Z521 and Z530 are the same as Zenith's models 521 and 530.

Since most radios sold in Gamble stores of that era carried the "Coronado" brand label, there is a very good chance that there are a number of Zenith-made Coronado radios.

The 1933 model "C-10" is an anomaly in many different ways. The example in the Blankinship Collection was manufactured under the "Interocean" label ("Interocean" and "C-10" are noted on the metal chassis tag) by Zenith. However, model number, though listed in the *Zenith Service Manual, Vol. 1*, is completely different from any other known Zenith or Interocean model numbering system. Further, the dial escutcheon on the front panel carries the label "Skyrover", a title apparently used by several radio manufacturers and/or retailers including Chicago's own Belmont. Finally, the V1 Index, though listing C-10 as a model, gives no year date and indicates that the C-10 was manufactured with an obsolete 2009-C chassis. We have classed the C-10 as a 1933 set because Retail Model Year 1933 is the only known year when Interocean sets were manufactured/sold.

The only Zenith retail brochure found which features sets in the 600s model range contained images of only two sets: the 616 and the 618. The Model 616 image in the brochure is quite similar to but different from the Zenith model 616 which is contained in the Peters Collection. This appears to be one of the several known instances where the appearance of the radio, as advertised, varied from that of the production model. All known instances of this understandable occurrence are identified in the Illustrated Catalog.

The distinction between the 1933 and the 1934 retail model years is blurred more thoroughly than any other two years. There is some evidence that several of the other "Challenger" receivers were introduced before the normal fall introduction of the succeeding (1934 in this case) retail model year's radios. However, since the vast majority of the sets in the Challenger Line were introduced as 1934 Line radios, all (except Model 460 automobile radio) are listed as 1934 rather than 1933 Line radios.

1934

After introducing over 125 sets in 1933, 1934 appears to have been a year of retrenchment, at least in the engineering department. Comparatively few new models were introduced, the most noteworthy being the striking "Aviatrix" consoles.

In planning the 1934 Line, the executive group appears to have decided that Zenith needed to expand the line downwards in price to compete at the broad bottom of the market and most of the 1934 Line was organized as the modestly priced "Challenger Line." Surviving records indicate that they were also convinced that Zenith could not build truly cheap sets in the same factory with the same workers which were normally working on higher quality and price radios. Thus, they contracted with Wells-Gardner, Belmont and, possibly, others to manufacture these bottom-of-the-line sets. The identities of the manufacturers and models listed in the database were inferred by comparing schematic diagrams and part number nomenclature. Refer to models 701, 702, 730, 735, 740 and the Model 7 auto radio.

The top of the 1934 Line radios were the "Aviatrix" consoles, Models 725, 725-S, 767 and 777. These radios along with the Model 288 tombstone mark the first incursion of modern industrial design into the Zenith line. Though the identity of the designer of these Art Deco sets is unknown, they were the harbingers of things to come.

For sets in the 600s model number range which are listed as 1934 radios in the Service Manual, refer to the Automobile Radio section of the 1935 notes below.

1935

At first glance, the 1935 Line is more comprehensible than those which preceded it. For the first time since 1930, Zenith produced a comprehensive annual retail sales brochure: "1935 Zenith Line" which purported to feature all of the 1935 sets. The 1935 Line, made up of approximately thirty-five sets in the 800s model number range, were introduced to the *wholesale* market at the normal time, August of 1934. Almost exclusively, sets in this line introduced a new-to-Zenith "airplane" type dial and almost all covered regular broadcast and shortwave spectrums. This is the well-known "small white dial" series which was the precursor to the Big Black Dial which characterized the 1936 through 1942 lines. The first instance of identifiable applications of modern industrial or "product" design principles was the 1933 Aviatrix cabinet (725, 725-S, 767, 777). In 1935, three chrome-front table models, 809, 829 and 835 were designed by the independent Chicago industrial design consulting firm, Rosenow and Company. Appearances suggest that table model 811 was also designed by Rosenow or possibly industrial designer Robert Davol Budlong who was also consulting with Zenith at that time.

It appears that Zenith reorganized the table/console model numbering system beginning with the 800s model number range of the 1935 Line. Table models were numbered 801-835 while the consoles were numbered 845-887. This same numerical organization was used with the 900s models and, most likely with the 1100s range, as well. The retail prices generally parallel the increasing model numbers within the table model group, and again within the console group. For instance, with the 800s table models, prices start at the lowest (Model 801 at $34.95 and Model 805 at $29.95) to the highest (Model 834 and 835 at $120.00 and $89.95 respectively.) The same general model/price pattern holds true in the console models.

In December 1934, Zenith introduced the legendary Stratosphere, Model 1000Z to the *wholesale* market. This wonderful 25-tube set and its 16-tube sisters (introduced with the 1936 Line) were to remain the top-of-the-line until the introduction of two 22-tube sets in the abbreviated 1942 Retail Model Year. In January and February of 1935, Zenith announced another completely new 1935 product line consisting of almost 20 radios with model numbers in the 900s range. These radios reached the retail market in the early spring of 1935.

Zenith added one complexity to the 1935 model number scheme which was particularly difficult to decode: significant revisions were made to a number of models during the year with *some* of the revisions being noted by appending a trailing "R" to the model number

(as 827R). Other modifications were made and noted with an "S" *preceding* the model number (as S827). The "S" variation appears to be quite rare and was at least partly decoded by Martin Blankinship:

"Since I only have one S-version set of the 800-900 series Zeniths, an S871, I researched this variation using the Zenith service manual and a March 1940 Zenith parts list. Both series of S chassis (5618-5701R etc.) have different dial scales with wider short and mid-wave hands than the 5614-5701 etc. It also appears that the "R" revised variation used the same chassis as the "S" variations. The 1940 Zenith parts list identifies part #26-70 as the dial scale for chassis 5703R (I found that dial scale in one of my spare parts boxes).

Model 908 IF=252.5 Kc: 15Mc trimmer adjust for SW
Model S908 IF= 252.5 Kc: 17.5Mc trimmer adjust for SW
The tuning condensers are different between the two sets, also.

Model 870 IF=485 Kc: 5-12 Mc SW:1.6-4.8 Mc Police; 550-1600Kc BC
Model S870 IF=252.5 Kc" 6.0-16 Mc SW; 1.5-4.3 Mc Police; 550-1500 Kc BC
The tuning condensers are the same part # for both sets.

From this evidence, it would appear that the "S variation" was an adjustment in shortwave spectrum coverage, adjusting it upwards. The lower IF frequency may have been a strategy to improve selectivity."

One curious piece of chassis design/manufacturing was noted on a number of the smaller 1935 console models (861, S871, 945, 950 and probably others): Zenith attached two large (approx. 3" x 5" x 5") empty closed metal boxes, one to each side of the chassis, flush with the rear plane of the chassis. These boxes had no known electrical or mechanical function and do not appear in any guise on the schematic diagrams. The only function of these enclosures that we can discern is to fill most of the cavities on either side of the rather small chassis to create a more impressive appearance for potential buyers. While this is not as egregious as the maneuvers of some of Zenith's competitors, it hardly lived up to the already solid Zenith tradition for quality and fair dealing.

The final complexity in the 1935 Line was the late introduction of 15 models in the 1100s range model numbers. Apparently, *none* of these radios was advertised, even at the wholesale level. Zenith advertising in the industry standard *Radio Retailer* shifted from featuring 900s range sets to a striking black panel ad reading "The Best Advice of 1935, SEE THE NEW 1936 ZENITH LINE BEFORE YOU DECIDE! Clearly, some of the 1100s range models were produced as a photograph of one, Zenith's model 1117, was found on page 190 of McMahon's *Flick of the Switch.* Little else is known about these assuredly rare radios. There is no assurance that all models were ever manufactured, even though they are listed and schematics were provided in *Zenith Service Manual, Vol. 1.*

1935 AUTOMOBILE RADIOS

By the 1935 Retail Model Year, automobile radios had become an important segment of the radio manufacturing industry. Zenith was particularly active in this field in the remaining years before WWII. In 1933 and 1934, the Zenith auto radios were "after market" equipment usually installed by dealers or specialty shops. By 1935 however, Zenith had become an original equipment supplier directly to automobile manufacturers. Very few records of this enterprise have survived. It is known that Hudson was one of Zenith's earliest customers.

Although listed as 1934 models in the *Service Manual*, Models 664, 666 and 668 were advertised in the wholesale press as "after market" sets in the 1935 Line. The 1935 Line retail sales brochure features the Model 462, held over from 1934 and the Model 7, a small auto radio which sold for about half the price of the others. This Model 7 is, we believe, the set which is sometimes listed as the "7 JR." The Service Manual also lists the 650, 654, 657, 660TD, 661TE, 663 and 667. We believe that all of these are auto radios which were sold to automobile manufacturers for installation at their factories. Three of these models, 654, 657 & 667 are listed with a 5901 (AC3) chassis. This chassis listing is erroneous; all three sets were based, most likely, on the 2057 chassis.

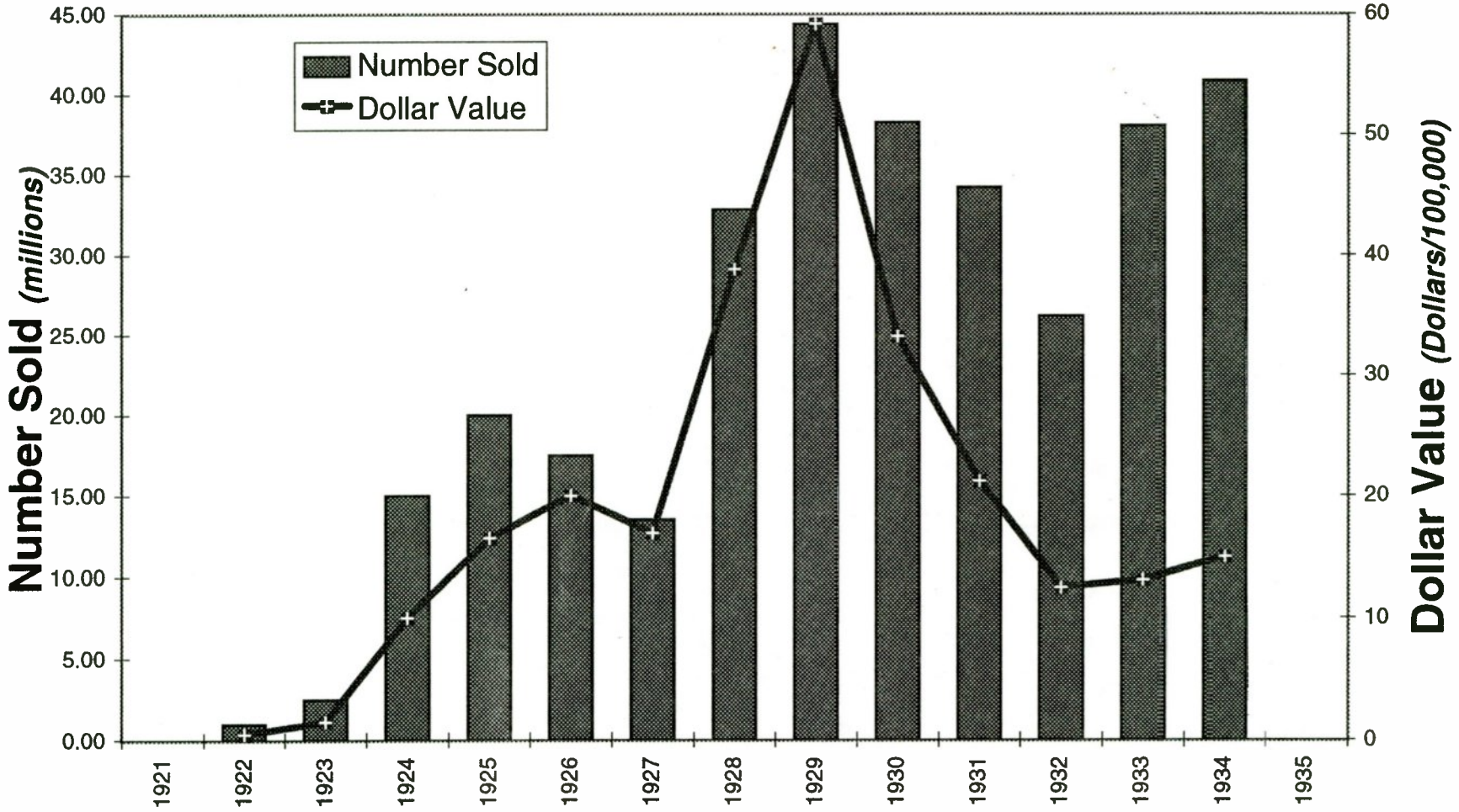
ZENITH CHASSIS NUMBERING, 1931-1935

From 1931 through 1934, Zenith used a four digit chassis numbering system based on numbers falling in the 2000s range. Unlike the chassis numbering system used after 1934, the 2000s system only denotes the chronological order in which the chassis were developed. The following charts the chassis employed during each Retail Model Year:

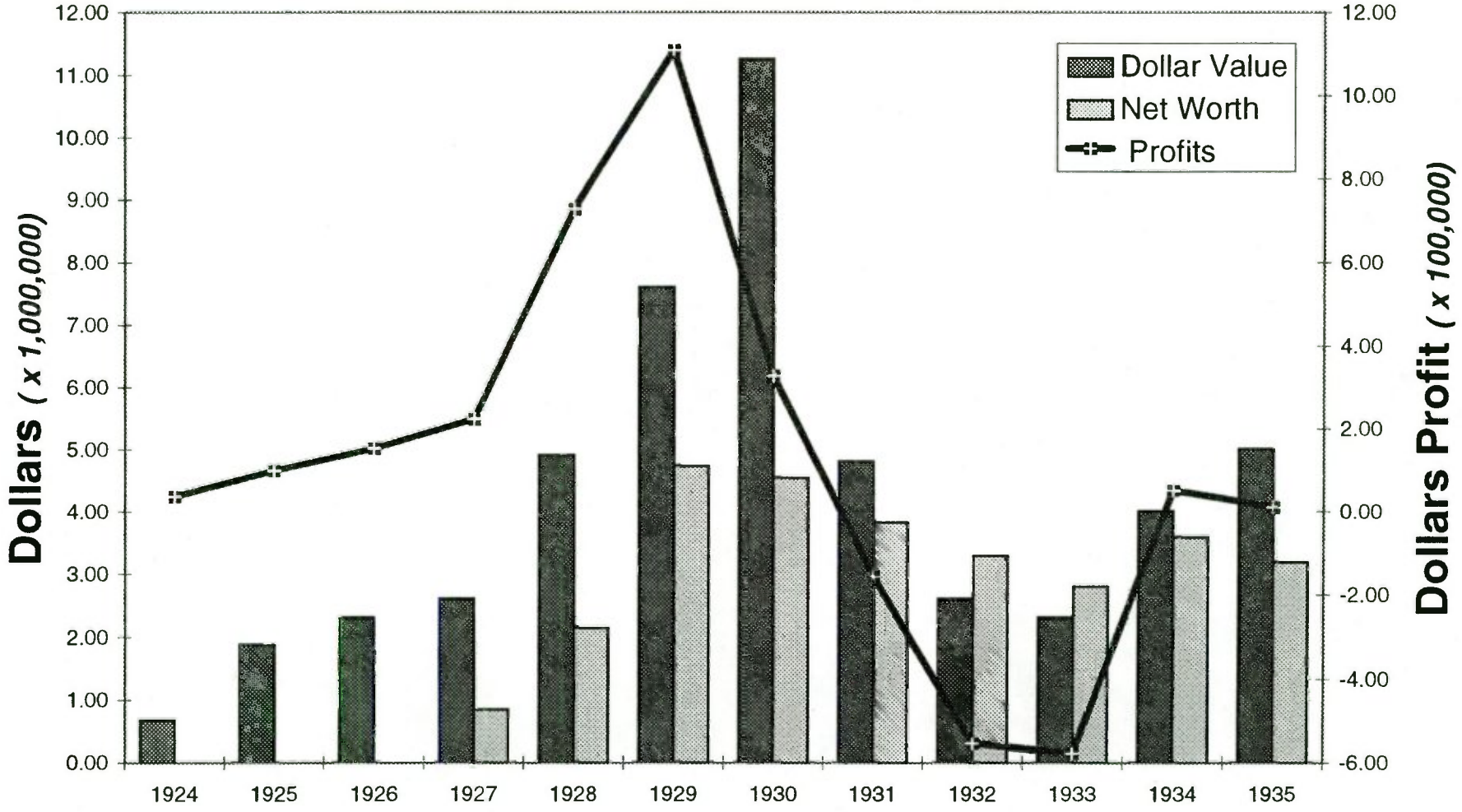
1931 sets included the following chassis: 2004, 2009(C), 2012
1931-32 sets include: 2012J, 2022
1932 sets include: 2009CP, 2012J, 2014, 2017
1933 sets include: 2009C, 2022, 2030, 2031, 2032, 2033, 2035, 2036, 2037, 2038, 2044, 2046, 2051, 2053(B), 2054, 2056, 2059.
1933-34 sets include: 2022, 2047, 2051, 2056.
1934 sets include: 2032, 2052A/B/C, 2053(B), 2054, 2056, 2057, 2059,.
1935 sets finish with 2057 (automobile radio).

The 5000s range chassis number adopted for 1935-40 encodes a bit more information about the chassis, conveying the tube count in the *second* digit. For example, when looking for Zenith 5-tube chassis, 5502-5509 are used for 1935 sets, 5510-5513 for 1936, 5516-5519 for 1937, 5521-5530 for 1938, etc. Zenith could not, of course follow this system with 10 or 12-tube chassis. Instead a 10xx and 12xx numbering system was employed. The last two numbers identify the chassis in sequence. For instance, the first 10-tube chassis, the 1001, was used in ten of the fourteen 1935 10-tube models, with the 1002 chassis being used in the other four sets. There was only one 12-tube chassis in 1935, the 1201, which was used in four models falling in the 900s and 1100s ranges.

APPENDICES
I: NATIONAL FIGURES ON RADIO SETS SOLD



II: SALES OF ZENITH RADIO SETS



III: A TECHNOLOGICAL HISTORY OF ZENITH PRODUCTS

ZENITH'S USE OF THEIR OWN OR EXISTING TECHNOLOGY

Keyed to Retail Model Year, 1924-1935

1924
- Zenith's first portable (Companion)
- First Zenith radio with self-contained loudspeaker (Companion)
- Nonregenerative Hassel-designed circuit (Super Zenith)
- Zenith's first radio-phonograph, in conjunction with Victor cabinets (Phono-panel)

1925
- First console with self-contained speakers/horns (Super IX, X)
- First Zenith to use dual-frequency horns (Super X)

1926
- "Only regularly manufactured set which operates successfully without loop or antenna" (DeLuxe)
- "Only regularly manufactured 10-tube set" (DeLuxe)
- Single dial tuning (DeLuxe)

1927
- Zenith's first AC sets (Super 27 Series, October 1926)
- Built-in loop antenna with director (Models 15, 16)
- Electro-dynamic speakers (Models 15EP, 16EP)
- First Zenith dial calibrated in kilocycles
- "The Quality Goes In Before The Name Goes On" motto first used

1928
- First all-Zenith radio-phono combination (Models 37, 40)
- Marvin automatic tuning (Models 35, 37, 39)
- Volume controlled by varying plate voltage on first three RF stages
- Specifically designed power supplies for specific models

1929
- Zenith's first use of screen-grid circuits/tubes (50 Series)

1930
- Zenith's first use of tone controls (Super 8, later the 70 series)
- First Zenith with electrical remote contol (Model 55)
- First Zenith automatic record changer (Model 75)

1931
- First Zenith upright table set (Zenette Models A, B)
- First Zenith table set with self-contained speaker (Zenette Models A, B)
- Zenith's first use of pentode tubes
- First Zenith with automatic volume control (Zenette Model AH)
- First Zenith super-heterodynes (Zenette Model AH)

1932
- First Zenith with sensitivity controls (Models 91, 92, 103)
- First Zenith with signal strength meter (Models 91, 92, 103)

1933
- First Zenith Shadowmeter
- First Zenith sets with shortwave/multiband
- First Zenith automobile radio (Model 460)

1934
- First Zenith sets with modern industrial design (Model 288 and others)

1935
- First Zenith Big Black Dial (Stratosphere)
- First Zeniths with dimensional tone (woofer and tweeter)
- First Zenith airplane dial

ENDNOTES

Chapter One: The Early Years

1. Thoughts for this section came from a variety of readings, among them: Beard, Mary. *America in Mid-Passage*. New York: 1939; Lowell, Dwight. *America in Our Time*. New York: 1947; Watkins, T.H. *The Great Depression*. Boston: Little Brown, 1993; Perrett, Geoffrey. *America in the twenties*. New York: Simon and Schuster, 1982; Phillips, Cabell. *From the Crash to the Blitz: 1929-1939*. Toronto: The Macmillan Company, 1969.
2. After *Heinl's Radio Business Letter* for the first week in October 1928 carried an article on the rapidly increasing radio activity in Chicago, the October 7, 1928, *New York Times* carried the headline, "Chicago Looms as Radio Center—Midwest Has Hopes of Wrestling Supremacy From New York—Geographical Situation Aids the Windy City." Other papers to carry the article, at the same time and in nearly the same form, were: *The Cincinnati Inquirer*, *The Terre Haute Sunday Star*, and the *St. Louis Globe Democrat*. McDonald to Wessel, October 9, 1928. McDonald Files; Clippings from the papers, *Heinl's Radio Business Letter* copy.

   The *Heinl's* article highlighted the more than thirty broadcast stations then operating in Chicago, the large number of radio manufacturing plants, the geographical superiority of Chicago, and the two annual radio shows.
3. Parker, Maude. "Chicago Society." *The Saturday Evening Post* (June 18, 1927): 5, 41.
4. Linton, Bruce A. "A History of Chicago Radio Programming, 1921-1931, with Emphasis on Stations WMAQ and WGN." Ann Arbor, Michigan: University Microfilms, 1953.
5. Barnouw, Erik. *A Tower in Babel*. New York: Oxford University Press, 1966, 125.
6. Sworn deposition of Ralph H.G. Mathews, October 5, 1945. This deposition was taken as part of a project to determine the actual beginning date of Chicago Radio Laboratory and Zenith Radio Corporation.

   In a July 9, 1980, letter to Alan Douglas, Mathews described his very first amateur station as:

   > It was in Springfield Ohio (we lived there then) in 1908. I had E.I. Co. (Electro Importing Co.—Hugo Gernsback) 1 1/2' speaker coil, an electrolytic interupter, a straight spark gap, condenser of tin foil on either side of a piece of window glass and a helix of some feet of edgewise coiled brass ribbon (wave length? who knows?) Receiver-auto coherer—a glass tube with 1 carbon and 1 nickel plated electrode in a glass tube, single slide tuner and a 75 ohm (?). I never did find out if it worked—there was no other "nut" in Springfield.
7. During the 1930s, Zenith used 1915, the date of Mathew's first commercial sales, as the beginning date for Zenith Radio Corporation. The 1930 Line, for example, was called the "15th Anniversary Line."
8. DeSoto, Clinton. *200 Meters & Down*. West Hartford, CT.: American Radio Relay League, 1936: 47-49.
9. Mathews was placed in charge of the radio section of the Naval Intelligence Bureau when he and Hassel moved to the facility. Earlier, at the Great Lakes Naval Training Station, Mathews had a variety of assignments, including electrician-in-charge of the U.S.S. *Yantic*.
10. Original documentation no longer exists that allows the determination of an exact date for the first production of Chicago Radio Laboratory products. The "early 1919" date for the formation of the partnership was established through the 1970 Schwartz interview with Karl Hassel, a 1945 sworn testimony of Ralph Mathews and the text of a speech delivered in 1944 by Hassel, which had been read and approved for accuracy by R.H.G. Mathews.

    The ban on amateur receiving equipment was lifted on April 12, 1919. The first postwar issue of *QST*, which contained an advertisement for Chicago Radio Laboratory, was published in May 1919 (dated June 1919), which strongly indicates that Mathews and Hassel were producing receivers virtually immediately after the receiving ban was lifted—whether they had begun production before, in anticipation of the lifting of the ban, is unknown. Mathews was elected vice-president of the ARRL in March 1919 and would have been privy to the negotiations leading up to the rebirth of *QST*.

    Chicago Radio Laboratory published its first catalog, J-19, in June 1919. The catalog, with one exception, included only receiving apparatus. The exception was the Hy-Rad rotary disk, which was not legal to use at that time, the ban on transmitting not being lifted until September 26, 1919. The Hy-Rad disk, priced at $10, was first manufactured by Mathews in 1915. The apparatus featured in the catalog had to be constructed and photographed, and the catalog printed and made available by June, again suggesting equipment construction prior to, or immediately at the lifting of the ban.

    The authors feel that the partnership founded in "early 1919" resulted in the construction of equipment by April 1919, and the actual founding date of Chicago Radio Laboratory as April 1919 is therefore a reasonable date.
11. There have been several published accounts of Hassel's involvement with the Pittsburgh University station which state that the station became KDKA, the first licensed broadcast station; indeed, this story is even related in several of Hassel's obituary accounts. The Pittsburgh University station was dismantled in 1918 and did *not* become KDKA. Some of the confusion may have stemmed from the similarity of calls: the Pittsburgh University station was 8XI and Frank Conrad's call (the station that developed into KDKA) was 8XK.
12. Karl Hassel's account of the earliest days of production were recalled in a 1970 interview conducted by Bernard Schwartz of Northwestern University.

    A 1985 Len Hilts interview with Bill Nail, then Director of Public Relations for Zenith, eluded to a then recently made Zenith history film in which Hassel "...told us the color of the oil cloth and everything, and the cups and so on. They actually did this on a kitchen table."
13. Hassel, Karl. Interview with Bernard Schwartz, Chicago, Illinois, September 23, 1970.
14. Hassel, Karl. "History of Zenith." Unpublished speech manuscript. Zenith Archives. This manuscript is the text of a speech delivered by Hassel in 1944. The cover letter indicates that Mathews had read it and had made corrections. It represents, therefore, the history as written by one and approved by the other of the two founders of the Chicago Radio Laboratory.
15. Mathews, R.H.G. Letter to Leo Gibbs, December 6, 1978.
16. An interesting anecdote relating to this installation was recounted by Mathews in an April 13,1978, letter to friend Leo Gibbs:

    > ...It was the end of WW I and the peace conference was going on. The big station at Lyon France (cw 20,000 meters) broadcast the conference news once each day (code, not voice, of course). The Chicago Tribune, naturally, wanted to scoop other papers, so we sold them on the idea of a special installation for this purpose. To put up that "70ft. 20 wire" loop was a big job, so we took 6 of our Navy Reserve radio men and put them up on the roof of the Tribune Building in uniform oriented to the right direction for Lyon. In the middle of this, one day, appeared on the roof a rough character "Umbrella Mike Boyle", the toughest union head in Chicago. (He was called "Umbrella Mike," because he appeared every morning in his favorite saloon, at the bar, holding an unfolded [not quite open] umbrella. He never accepted any money, people just came to the bar and while having a drink, dropped it in the partially opened umbrella!)
    >
    > Well, Mike wanted to know what we were doing, so I explained that the Navy was doing this to get the peace conference news. Mike listened to all this-then said "Young man, I don't believe a word of it!-but you look like good boys and you are serving your country-get on with it-you'll have no trouble from Umbrella Mike!"
    >
    > So we did! The installation was so successful that an operator could copy it from a loudspeaker on a typewriter.
17. "Zenith Radio Rushes Peace Conference News...Beats Cable by Twelve Hours-1919!" *Zenith Radiorgan* (November 1942): 7. (Reprinted in *Zenith Radio Log* (Christmas 1942): 22). Mes-

sages were filed at the Peace Conference in Paris, telephoned to Bordeaux and transmitted to Chicago by Morse code. A continuous watch of three eight-hour shifts was kept at the receiver in the newsroom of the *Tribune*. The receiver used for the operation was specially built for the project. The design was resurrected in the 1921 Z-nith catalog and called the Z-nith Altaceiver Type CW-3. It was a four tube longwave receiver which sold for $254 and was also known as the "Z-nith Peace Conference Receiver." It was powered by a six-volt storage battery and an assortment of B and C dry batteries.

18. The supports for the antenna were old windmill towers which were given to Mathews and Hassel for taking them down. Mathews to Douglas, June 4, 1979.
19. According to Hassel, "...you could hear that thing even in a padded box, it made so much noise..." Schwartz interview, 1970.
20. The Navy lifted the ban on amateur receiving on April 12, 1919. However, the ban on transmitting was not lifted until September 26, 1919. Before amateur activity could resume, licenses needed to be reissued and transmitters reassembled. According to DeSoto (58-59), amateur activity began again "before November 1919 was over."
21. DeSoto, 60-61. DeSoto, 60-61.
22. DeSoto, 65.
23. "Our First National Convention." *QST* (October 1921): 7-22. This article contains full details of the convention and presents an excellent "snapshot" of the status of amateur radio in 1921.
24. There was also a radio show (exhibition) in conjunction with the convention that attracted fifty exhibitors. Chicago Radio Laboratory exhibited their entire line of products, "from the Hy-rad sinc gap to the Multiceiver, including the new 'Transceiver' a two-way set using the same tubes for both transmitting and receiving." *QST* (October 1921): 18.
25. Karl Hassel, in the Schwartz interview, did not remember if the names were purchased or given to CRL.

    Mathews' recollection, contained in a letter to friend Leo Gibbs on December 6, 1978 was:

    > Adams-Morgan and I had the #1 and #2 licenses under Armstrong's patents. We did not copy their set-we brought them out at almost the same time, about six months after WW I. The "Paragon" name was more or less the name of the circuit, originally. I believe they were out with their model a few months before ours, and we originally used one of theirs at 9ZN, for a short time, much for comparison purposes.
    >
    > I can't give you a specific date as to the first CRL Paragons and Amplifigons, but six months to a year after I got out of Navy active duty at the end of WW I.

    There appears to have been no legal action on behalf of either party. The 1919 Chicago Radio Laboratory catalog specifically states that CRL is selling the Adams-Morgan Paragon. The Paragon name was dropped in the 1920 editions of the CRL catalogs as modifications to the original design produced a new, and exclusively CRL, rendition of the product.
26. According to Karl Hassel in "History of Zenith," an employee suggested adding the "ith" to the 9ZN call to form the Z-nith name.
27. *Who's Who in America*, 1959-1960, lists McDonald's birth year as 1890; however, a wide variety of references, including McDonald's obituary notice, place the date at 1886. The bronze plaque in the Zenith factory commemorating McDonald's death also lists his birth date as 1886.
28. Hampson, Phillip. "The Road to Success: A Sketch of Eugene F. McDonald, Jr., President of Zenith Radio Corp." *Chicago Tribune* (June 6, 1953).
29. "Commander McDonald of Zenith." *Fortune Magazine* (June 1945).
30. McDonald in later years turned this handicap into profit when the McDonald-inspired Zenith miniature hearing aid, because of its design and low price, decimated the competition in the marketplace and established Zenith as the worldwide hearing aid leader.
31. Hampson, *Chicago Tribune* (June 6, 1953).
32. Hampson, *Chicago Tribune* (June 6, 1953).
33. *Fortune Magazine* (June 1945).
34. Pennmann, Jack. "The 'Good-Bad Boy' of Radio." *Future Magazine* (June 1939): 26-32.
35. *Fortune Magazine* (June 1945).
36. Calibraro, Jim. "McDonald of Zenith." *Chicago Omnibus* (June 1967): 45-47.
37. Hampson, *Chicago Tribune* (June 6, 1953). Documents in McDonald's personal files show that although he officially resigned his Reserve commission in 1939, he remained active in Naval Intelligence through the Second World War, tracing the movements of various visitors to the United States.
38. The circumstances of "Commander" McDonald's rank have not been previously accessible. McDonald sold his very successful car business and volunteered for the Navy as soon as the U.S. entered WWI. He served as a Lieutenant in Naval Intelligence, primarily working out of the Ninth Naval District Office in Chicago. The process of his promotion to Lt. Commander in the USNR was begun by letters from the Director of Naval Intelligence in mid-1924 (23 July 1924, Op-16-A; 5 September 24, Op-16-A 21109-3) and was supported by letters from the Commandants of the Ninth and Fifth Naval Districts (February 11, 1925 and February 12, 1925). The letter from the Commandant of the Fifth Naval District is particularly complimentary, noting: "In one of his activities alone I consider he saved the Government hundreds of thousands of dollars by unearthing a project which was founded on fraud and calculated to enrich a few men at the expense of the Government. In discovering this, he prevented its accomplishment and saved the Government a great deal of money." McDonald was promoted to Lieutenant Commander, USNR, in February 1925.
39. There have been two dates widely reported for this incident, New Year's Eve 1919 and New Year's Eve 1920. The authors were unable to find any *direct* documentation for either date. The popular press, usually writing from materials provided by Zenith, uses both dates interchangeably. Based on newly available interview transcripts of long-term CRL/Zenith employees, references to locations and incidents in letters in the McDonald files, as well as McDonald's Zenith-produced obituary, the predominant evidence is that the incident took place on New Year's Eve 1920 and that McDonald's discovery of Mathews and Hassel was in early 1921, just after their move to the 6433 Ravenswood facility. The fact that there was a year change at the time of the incident has no doubt added to the confusion.
40. Brown, Elger. "Chicago Profiles." *Chicago Tribune Pictorial Review* (February 14, 1954): 15.
41. Pennmann, *Future Magazine* (June 1939): 26-32.
42. Hampson, *Chicago Tribune* (June 6, 1953). The authors verified much of the information dealing with McDonald's early life (as reported in the popular press) through a Christmas letter Commander McDonald wrote to long-time friend Herman Staebler on December 18, 1942. This letter, from the Commander's personal files, detailed much of McDonald's early life, including the Layton Garage incident.
43. *Fortune Magazine* (June 1945).
44. *Fortune Magazine* (June 1945).
45. McDonald bought Mathews' stock options in 1928 when he took controlling stock interest in Zenith; Hassel never exercised his stock option because of lack of personal funds. Hassel, Karl. Schwartz interview, September 23, 1970.
46. Details of the 1923 Mathews/Hassel contracts have been unknown for many years until the authors located this information in the McDonald files.

    Corporate memory indicates that there was a personality conflict between McDonald and Mathews that ultimately resulted in Mathews' departure. However, McDonald's files contain several cordial letter exchanges between the two in later years. The authors were unable to find any factual information to support any negative reason for Mathews' departure.

    As Mathews' connection with Zenith weakened, he was for a time the designer and consultant for radios made by Metro Electric Company, and in fact, the "Commander Series" was named in his honor (Douglas, Alan. *Radio Manufacturers of the 1920's. Vol. 2.*, 1989: 162). A full page advertisement for Mandel Electric Co. (Chicago) in the September 1929 *Radio* displays Mathews' picture in his Lt. Commander (U.S. Naval Reserves) uniform with the following caption: "...—formerly chief engineer of the Zenith Radio Corp. Designer of the Mandel Chassis and Mandel A.C. Dynamic Speaker, and under whose supervision these products are manufactured."

    Between 1929 and 1933, Mathews was a partner in R.H.G. Mathews & Associates Sales Engineering Consultants. In 1933, he formed Ford, Browne & Mathews Advertising Agency of Chicago and remained a partner in that firm until 1940. Mathews was on active duty with the Navy

during the Second World War and after the war held a variety of sales positions. He became affiliated with The Magnavox Company in 1954 and was Assistant to the Vice President and General Manager. After 1957, he held a number of sales and marketing positions with a number of companies, including Westinghouse and Blonder-Tongue, until his retirement in 1967. Mathews died on July 3, 1982, at age 82, in Ajijic, Jalisco, Mexico. As far as the authors can determine, Mathews never took further interest in any aspects of Zenith after his departure in the mid-twenties. (Materials for information on Mathews' post-Zenith life came from multiple sources, especially personal letters from Mathews to Douglas and Mathews to Gibbs).

Karl Hassel renegotiated his contract in 1933 and stayed with Zenith in various executive capacities for 55 years.

47. QRS was headed by McDonald's good friend, Thomas Pletcher, a colorful businessman much in the mold of McDonald himself. Pletcher eventually held a significant block of stock in Zenith until bought out by Commander McDonald in September 1928. Pletcher was a member of the Zenith Board from 1923 to 1928. See also Endnote 97 in this section.
48. The Q.R.S. Kedzie Street plant was constructed in 1919 and was heralded for its size: 150,000 square feet covering seven acres. The need for the large factory was attributed to the rapid growth of the company. "Start Construction on Q.R.S. Factory-Company to Treble Music Roll Output." *The Music Trades* (April 19, 1919).
49. "QRS Co. in the Radio Field." *The Talking Machine World* (April 15, 1922): 153; "Chicago Radio Ties Up With Talker Trade." *The Talking Machine World* (May 15, 1922): 123.
50. McDonald administered and advertised the fledgling corporation and Mathews handled correspondence while they were at the Zenith offices on Michigan Avenue.
51. Other early employees were Paul Anderson (hired March 24, 1922), Rudolph Grey (July 31, 1922), George Langford (October 23, 1922) and Stanley Janis (September 11, 1922).
52. Pletcher's advice was most important to McDonald. Pletcher had been involved with the music business for many years and knew it well. An article in *The Talking Machine World* for April 15, 1925, (p. 1) describes Pletcher as, "'Tom' Pletcher, vice president of the company and also president of the QRS Music Co., is known to practically every music dealer in the country, having been for thirty years prominent in the music field." "Demonstration of the New Zenith DeLuxe Receiving Set Before Select Audience" in *The Talking Machine World* (January 15, 1926): 48, stated: "It is said of Pletcher the he numbers among his friends dealers from coast to coast" and, "As a pioneer in the music industry, Mr. Pletcher was in a position to make logical comparisons between the merchandising of radio and music products...."
53. McDonald related the success of this alliance in: "Zenith President Declares the Music Merchant Best Retail Outlet for Radio." *The Talking Machine World* (March 15, 1926): 75. See also: Pletcher, T.M. "Music Dealers: Logical Salesmen of Radio Sets." *Radio Broadcast* (January, 1924): 226-229.

An early look at how Zenith viewed the effects of combining the music and radio business was contained in a paper by N.A. Fagen, Sales Manager at Zenith. This paper, detailed in *The Talking Machine World* (June 15, 1923): 70, suggested that the radio's appeal was its ability to provide music, its electrical nature being no more distracting than a motor in an electric player piano.

See also "The Radiophone and the Music Industries." *Piano Trade Magazine* (May 1922): 4, 6, 47. This article not only speaks of the radio as a musical instrument and its sales benefit to music dealers, but also presents a 1922 look at the "science" of radio. The article states that the Q.R.S. built CRL radios were being sold exclusively to music dealers.

As the product line expanded in later years, Zenith's distribution network likewise expanded to include appliance and furniture dealers and exclusive radio dealers, as well as music dealers.

54. "How WDAP Made History." *"Radio Age—"The Magazine of the Hour"* (February 1923): 25.
55. "Successful Test Zenith Set." *The Talking Machine World* (February 15, 1923): 110.
56. See the section of this book "Adventure, McDonald, and Zenith Radio" for a more detailed and documented description of the 1923 MacMillan Arctic Expedition.
57. McDonald, Eugene. "The Arctic Inspires a New Market: A Romantic Tale of How the Far North Formed the Experimental Laboratory for the Development of Zenith Farm Radio." Unpublished and undated eight-page manuscript in the Zenith Archives. An edited version of this manuscript was published in *Executive Bulletin*, Volume 14, No. 11, November, 1936. This publication was produced by the Policyholder Services Group Insurance Division of the Metropolitan Life Insurance Company.
58. Paul Anderson, Rudolph Grey, George Langford, Stanley Janis, and Joseph Wahlgren. All of these pioneers stayed with Zenith in various capacities for many years, each celebrating a 25th anniversary in 1947.
59. According to Carl Hassel, in the 1970 Schwartz interview, the sloping faux wood panels were McDonald's idea and were an attempt to spur sales by making CRL stand out from others.
60. Like the 1-R, early 3-Rs and 4-Rs had a screened porthole in the front panel to allow the operator to view the tube filaments. Later versions of both sets did not have the portholes. Some late 4-Rs are known to have been produced with brown front panels rather than the standard black.
61. In an August 8, 1977, letter to Leo Gibbs, Mathews discussed the portable:

> There is an amusing story about that portable. Both Hassel and I tried to talk Gene McDonald out of it. At that time, there were no solid state and only large tubes using large dry cells/ the set took 6 of them, and they only lasted a few minutes. Gene built 6000 of them—they all came back, at least twice, as unsatisfactory! However Gene was great at capitalizing on everything so they piled them up in Grant Park, with lots of publicity as the most expensive bonfire in history, poured kerosene (on) them and lighted it. The result was tremendous publicity on the fact the "when Zenith built an unsatisfactory product they destroyed it." It got spreads in papers across the country.

After extensive newspaper archive searches, the authors have been unable to locate news coverage of this event in the Chicago papers. The story is repeated and referred to frequently in Zenith house publications and has become part of corporate lore.

62. Zenith was among the first to produce a self-contained portable radio for the commercial market. Was it **the** first, as Zenith has claimed? This is a difficult question to answer, since it depends heavily on the definition of "portable" (which lacked any official definition) and the perceived difference between a radio being "portable" and "self-contained."

Chicago Radio Laboratory, for example, advertised a **portable receiver** (Type PR-1) in their June 1920 catalog. Referred to as a "pocket edition," the PR-1 was small and had on-board batteries and required only antenna, ground, and earphone connections for operation. Described as the ideal camping trip radio ("...with tent pitched on the lake shore beneath the sweet smelling pines, the long evenings pass quickly when one can, without effort, 'pick-up' the latest ball scores, the weather forecast which may influence tomorrow's fishing trip..."), the PR-1 had a finished wood case and an engraved polished Bakelite front panel. Other than its size, it looked like any other 1920 radio. It had no handle. Was it truly a portable? By what definition?

A "...completely enclosed unit set, made by Radio Units Inc., of Chicago...operates without outside aerial or ground, every part being enclosed in the case..." was featured at The Chicago Radio Show in June 1922 (*The Radio Dealer* (August 1922): 84). It was very large and judging by its appearance, most likely very heavy. The authors have not been able to find further data on this radio (or even if it was a "one-of-a-kind") but if it was as advertised, it could be the first **self-contained** portable radio (if <u>your</u> definition of portable does not include a speaker horn, since this receiver used headphones).

The August 1922 *The Radio Dealer* also features (p. 93) a fully self-contained portable by Radio Guild, of New York. The radio, Model R.G. 500, is reported to be the portable version of Radio Guild's self-contained *Vox Humana*. The article details how the Model R.G. 500 was carried into a restaurant and demonstrated by providing the Leonard-Britton fight for the patrons.

Radio Broadcast for August 1923, in "Sets for the Great Outdoors" (p. 337-339) lists a number of portables then available, including models by, among others, Colin B. Kennedy, De Forest, and Lyon & Healy—sets such as the "Aeriola Sr." and "Radiola II." A commonality of these featured sets was they were not "self-contained," needing external batteries and/or antennas for full operation; several were close to being self-contained, but all required an external antenna for maximum performance. None had built-in speakers and most needed an additional amplifier if speaker use was desired. Were they truly portables?

Operadio released the Model 2, with internal batteries and horn, in August 1923, but the large antenna contained in the removable cabinet cover calls into question its actual in-use portability—but it <u>was</u> self-contained.

The Radio Dealer for February 1924, in "Portable Set That's Portable Recently Placed on the Market" (p. 72), details the Westburr-6 and touts it as, "A self contained set, really deserving the name 'portable' has been put on the market by Westburr..." The Westburr, called the "Traveling Radio Receiver," had onboard batteries and antenna, played with the lid closed (external controls) and was encased in "a container of special design, resembling in size and appearance a high-quality weekend bag." The Westburr was also featured in *Radio Age* (April 1924): 34.

The Radio Dealer for May 1924, in an article by Pearce W. Mack, "Portable Set Will Make Radio Summer" (p. 32), states, "Year-round radio has arrived. Perhaps the most important factor contributing to this result is that for the first time portable sets which are really portable will be available...Last year, to be sure, many sets were called portable, simply because it was possible to cart them from place to place." *The Talking Machine World* (July 15, 1924): 54, writes of "the portable radio outfits which are now being turned out by some of the leading manufactures..."

The Zenith "Companion" appears to have been first advertised in *Radio Digest* in May 1924, and, as far as the authors can determine, was not "unique" enough to be featured in a special article as the Westburr had been in February. The two radios are very different in layout and were not the same radio as has been reported from time to time in the hobby press. Schiffer's *The Portable Radio in America* shows photographs of both radios (the Zenith Companion on page 74 and the Westburr 6 on page 75) and it is obvious that they are quite different in layout and appearance (it is also obvious that, on close examination, there are three different radios pictured: the interior view of the Zenith Companion is not the Companion but a Westburr appearing radio with a different horn).

Based on the materials now available to the authors—primarily advertisements and magazine articles—and the lack of surviving production records, it would seem that Chicago Radio Laboratory may have had the first portable, the PR-1 (depending on definition), Radio Guild the first self-contained portable, Operaradio the first production model self-contained portable and the Westburr 6 the first user-friendly self-contained portable.

Again, definition is the key to who was "first."

63. Many receivers of the period were difficult to tune because the three tuning dials were interactive. Receivers with three non-interactive dials were easier to tune and therefore more popular. To produce a non-interactive set, Zenith needed to purchase the Hazeltine Neutrodyne patent and they were not, at that time, able to afford both Hazeltine and Armstrong patents. Karl Hassel developed a coupling circuit that essentially eliminated most of the problems of the interactive dials and the set was marketed as the Zenith Super VII. Schwartz interview with Karl Hassel, August 23, 1970.
64. In the science of History of Technology, such "firsts" are very significant, since they often lead to other improvements. In this case, according to interviews with Hassel and Wahlgren, multiple speakers greatly improved tone and eventually led to Zenith's interest in sound quality and eventually "Hi-Fi".
65. "Know Before You Buy." *Radio Age—"The Magazine of the Hour"* (April 1925): 72.
66. This distributor letter explains why the Model X has been seen advertised as an "electric set," when in actuality it was most likely never produced as such. In fact, the Zenith service literature does not show the Model X as an "electric" (eliminator equipped) model.

    In spite of existing advertisements for the Zenith "B Battery Eliminator" (*Radio Age*, back cover color advertisement, June 1926), as well as trade journal announcements of its introduction [*The Talking Machine World* (December 15, 1926)], there is little supportive evidence that it was produced in any quantities.
67. "Zenith Radio Corp. Takes Over Large New Quarters." *The Talking Machine World* (April 15, 1925): 1. This article highlights the move to the "third factory and the removal of its executive offices to the famous Strauss Building at the corner of Michigan and Jackson Boulevards." It described the factory as, "...a four-story structure containing 185,000 square feet to be devoted exclusively to the manufacture of Zenith sets."
68. Wild and exaggerated claims in print advertising were common for most products in the 1920s and 1930s. Another common ploy was to announce a radically new product "to be introduced soon" and then never introduce it. It would also appear, with the benefit of hindsight, that many products pictured in catalogs appeared only there.
69. A look at the rise and fall of many of the early radio manufacturers is presented in "Radio Manufacturers of the 1920's," a three volume set of books by Alan Douglas (The Vestal Press Ltd.). Although the series provides detailed information about the early days of Zenith Radio, new materials researched by Cones and Bryant for this book show the Zenith section of "Radio Manufacturers of the 1920s" to be seriously flawed.
70. In a 1970 interview with Bernard Schwartz of Northwestern University, Robertson said he had previously been in the car business with McDonald. This must have been prior to World War I.
71. Al Pearson's father put the initial money into the automobile business. Robertson had originally started as an agent for Peerless Motor Car Company. When Peerless stopped building automobiles, Pearson and the ex-manager of Peerless formed Pearson and Buck Motors. When Buck left the partnership, Robertson teamed with Pearson and the two ran the business for Pearson's father. The dealership handled Dorf and National automobiles.
72. Nixon, L.A. "Many Exhibitors at National Exposition." *The Radio Dealer* (August 1922): 84.
73. "Zenith Chairman Hugh Robertson Marks 40th Anniversary." Press Release, December 11, 1964, Zenith Radio Corporation.
74. Robertson brought varied management and accounting skills to Zenith when he was hired in 1924. In addition to his automobile sales experience, he had worked in 1902 as a bank clerk with the Merchants Loan and Trust Company of Chicago and was paymaster with the Acme Harvesting Machine Company between 1907 and 1909. He was an auditor with the Peerless Motor Car Company, Chicago, from 1910 to 1913, and was secretary and manager of the National Motor Sales Company from 1913 until he joined Zenith in 1924.
75. According to Robertson's 1970 interview with Schwartz, "A lot of people left our company and...took the sheets to the company they went to; and finally, the whole industry was on...the weekly control."
76. "Zenith Export Department in Charge of A. G. Linsig." *The Talking Machine World* (May 15, 1925): 26.
77. Memo from Hazel Chesser to Ted Leitzel and Jack Ryan, May 14, 1954. Zenith Archives.
78. Refer to the section of this manuscript, "Order Out of Chaos" for the history of the development of the NAB and Klugh's role in the organization.
79. Klugh developed and patented an interior-player piano mechanism which he called the Inner-Player. He began manufacture of the Inner-Player in 1906. In 1913 he became president and director of the Cable Company and while with Cable, he organized the Imperial Player Roll Company, guiding it to a position as one of the leading producers of player piano rolls in the U.S. *The National Cyclopedia of American Biography*: 504-505.

    Klugh retired from the piano business in 1921. Pletcher, also a leading manufacturer of music rolls, likely knew Klugh well enough to know of his recent retirement and availability.
80. Klugh became a director of the RMA and Chairman of the Legislative Committee. He led the fight to persuade Congress to pass the law that created the Federal Radio Commission. He also served as Chairman of the Annual RMA Trade Shows, Chairman of the Convention Reception Committees and Chairman of the Banquet Committees for the RMA events. Information from: "A Tribute." Minutes of the July 16, 1941, meeting of the Board of Directors of the Radio Manufacturers Association.

    Klugh resigned from Zenith as Vice President and General Manager on July 10, 1934, but retained his Board of Directors position. At the time of his death on July 14, 1941, he was the second largest stockholder in Zenith. "A Tribute"; "Paul B. Klugh Retires From Zenith...". *The Radio Weekly* (July 11, 1934): 1.
81. See the section of this book "Adventure, McDonald, and Zenith Radio" for a more complete and documented discussion of the 1925 MacMillan Arctic Expedition.
82. In February 1926, the McMillan Radio Corporation was organized in Chicago. In February 1927, the Walbert Manufacturing Company entered into an agreement with McMillan Radio to manufacture a line of radios to be called "McMillan Radio." McDonald attempted to obtain an injunction against McMillan Radio in mid-1926 for improper use of the McMillan (MacMillan) name

(the suit pointed out that no one in association with McMillan Radio Corporation was named McMillan or MacMillan) and for the implication that it was the McMillan radio that was used in the Arctic, rather than Zenith, which would increase the demand for the McMillan radio. The McMillan Radio Corporation became so entangled in litigation that they were not financially able to pay Walbert, who had produced a number of McMillan radios. The end result was first the removal of any hint of connection to Donald B. MacMillan and his use of Zenith Radio in the Arctic, and in 1928, the bankruptcy of the McMillan Radio Company. Series of letters between Herriott and McDonald, 1926—1928, McDonald Files; also, "Permanent Injunction Is Granted Zenith Radio Corporation." *The Talking Machine World* (January 15, 1928).

83. Gustafson remained at Zenith until his retirement. He became chief engineer in 1934 and Vice President for Engineering in 1943. He was considered a gifted engineer and it is generally acknowledged that he made possible the development of the first all-band portable radio and the smooth transition of Zenith into television.

84. The first instance that the authors have discovered of Zenith's claims related to producing the "first electric receiver" were found in a fall 1927 Zenith newspaper advertising campaign for Models 11E and 14E. Each large advertisement was headlined "FIRST ELECTRIC WAS ZENITH...LATEST A.C., ZENITH'S FIRST." "The first *workable*, dry, all-electric radio sets were manufactured by Zenith. Now Zenith's latest entirely dry, all electric A.C. tube models are without question *first* in selectivity, tone quality, distance, ease of operation and *permanent efficiency*." The headline and copy undoubtably are referring to the Super 27 Series, which had been introduced in the fall of 1926. Note the careful qualifiers of "first workable, dry, all-electric radio sets..."

Who manufactured the first electric radio receiver? Determining this is just as difficult as deciding who made the first portable radio, and for the same reason: it is a matter of definition. What is an electric set? During the transition from battery to batteryless, some receivers used all batteries, some used some batteries and some electric, and, some were "all electric." Early advertising shows that at least one manufacturer produced a "batteryless" set in 1925, but what does that mean?

At a 1929 Zenith distributors meeting, Mr. Marshal of Zenith's engineering department reported on "...a brief history of the electric or light socket set." The text of his speech (found in the McDonald Files) is presented here in its entirety since it helps define what was then considered an "all electric" set and how Zenith viewed the situation.

> Only a few years ago, attempts were made to operate receiving sets direct from the lamp socket by applying alternating current directly to tube filaments and incorporating in the set potentiometers and bypass condensers on each tube in order to minimize the resultant hum. Realizing that the detector tube was probably the most critical as to type of filament current, crystal, or similar types of rectifiers were substituted for the detector tube.
>
> Efforts along these lines were, in a measure, successful, insofar as operation was concerned. But owing to the criticalness of the various adjustments, the set as a whole was not commercially practical and I am not aware of a manufactured set offered to the public that was built exactly along these lines with this method of electrification proven unsuccessful. Attention was then directed toward a means of utilizing the conventional storage battery and eliminating the necessity of removing this item for frequent charging. Devices for putting a low rate constant charge into the battery, while the set was idle, was put on the market and are with us today. This method was adopted by a great many manufacturers as a means toward an end. Our engineering department steadfastly discouraged this form of electrification with its attendant discomforts of liquids and acids.
>
> A receiving set using this type of filament current supply is in no sense of the word a light socket set, anymore than a gasoline automobile could be referred to as being electrically driven. Our aim has been a design a receiver that derived its power direct from the lamp socket during its operating period and without the use of liquids or chemicals of any kind. In the accomplishment of this in the Model 17 and 27, we feel that while the ultimate has not as yet been attained, a notable step forward has been taken. Future products of our engineering department will be along these lines with improvements added from time to time.
>
> Considerable investigation has been conducted with a view of using a well advertised type of AC tube, utilizing a heater element supplied with low voltage alternating current. This heating element raises the temperature of an adjacent element, that when sufficiently hot, supplies the electron stream and in this respect functions like the filament in an ordinary tube.
>
> Investigations we have made leave a certain amount of doubt in our minds as to whether a receiver using these tubes will measure up to our established standard of performance and ability to give day in and day out, satisfaction. While this type of tube holds promise of being satisfactory after more time and experimentation has been put in on its design, we were reluctant in adopting it on current production sets. We have at all times been keenly alert towards developments in the industry and our large clientele of distributors can rest assured that all practical and satisfactory improvements and developments will be given careful consideration by the engineering department.

If one considers that an "all electric radio" uses no batteries or battery eliminators, that it dry rectifies and filters the current and uses tubes designed for all electric operation (rather than battery tubes), then the Zenith Model 11E was most likely first (the Model 17, advertised in early 1927, still used "six regular storage battery tubes"). If "it plugs (screws) in" is the sole criteria, then Zenith was not first. Several articles in *The Phonograph and Talking Machine News* in 1927 credit Zenith with being "first to manufacture and market, practical, working electric radio sets." The Zenith X, claimed by some modern hobby writers— though never by Zenith—to be the first, certainly is not, since it was designed to use battery tubes and a battery eliminator.

85. The McDonald files contained information on the cost of the instruction books printed for the Deluxe and 11-16 Model series. Each instruction book was specified to be 16 pages with an extra page, the circuit diagram, glued in, and was printed by the Century Printing Company in Chicago in quantities of 3000.

Model	Cost
Electric Deluxe	$0.05
11E	$0.02
14E	$0.02
15E	$0.035
16E	$0.035
16EP	$0.035

86. "Zenith Dividend." *Radio Age—"The Magazine of the Hour"* (January 1926): 50.

87. According to a March 1927 *Phonograph & Talking Machine Weekly* article, "...the best interest of popular radio would be served if recognition were extended to a select group of responsible radio producers...that the stabilizing processes of the industry have reached a point where only responsible concerns can survive and that if these have a common aim in service to the public, the tendency to over exploit the new art will practically disappear."

88. In April 1939, Zenith Radio sought an explanation from Howard Radio Company about their use of the slogan "Built by Howard Radio Company, holder of RCA license No. 1, maker of quality radios since 1919." The inquiry was twofold: the claimed date for radio manufacturing and the RCA license.

Howard Radio Company withdrew their date claim after Zenith sent them factual information about the founding of their company. Among the materials provided to Howard by Zenith was an interview statement from A.A. Howard, founder of the Howard Radio Company. Howard stated that he had started a radio parts business in January 1922, but did not start manufacturing radios until acquiring a Hazeltine license in 1923. Howard removed the statement from their advertising, leaving Zenith as the oldest continuing manufacturer of radio equipment.

Of special interest here, however, is the RCA license claim. McDonald wrote RCA President David Sarnoff in 1939 to verify his own memory of the matter and received the following letter:

March 29, 1939

Dear Gene,

You are quite correct in your belief as stated in your letter of March 25, 1939, that the Zenith Radio Corporation was the first company to conclude negotiations for the issuance of an RCA Broadcast Receiver license.

The date of the Zenith license was March 10, 1927. The date of the Howard Radio Company's license was June 10, 1927.

With personal regards,

Sincerely yours,

David

It is charged by Douglas in "Gods and Mythology at Zenith" (DVHRC *Oscillator*, Vol. 4. No. 2), "Being granted the first RCA patent license was not exactly akin to being knighted by the Queen. RCA would gladly have signed up anybody at that point, and was cutting deals and forgiving past royalties to do it." Douglas does not document his allegation.

The obtaining of an RCA license did indeed become crucial to large radio manufacturers, regardless of its benefit to RCA, and, in effect *became* "akin to being knighted by the Queen," since without the license, sales suffered and banks would not make loans to unlicensed radio manufacturers. In testimony before the Senate Interstate Commerce Committee on the Couzens Bill, B. J. Grigsby of Grigsby-Grunow, manufacturers of Majestic radios, stated:

> We did not pay this royalty because we considered these patents worth such a royalty. We did not believe we needed these patents, and none of them had been adjudicated. But the radio combine had so terrorized the industry and had so intimidated the dealers and jobbers everywhere, that they were afraid to handle what they called "unlicensed" sets.
>
> Our bankers said they would not finance us unless we took out a license. They said they would not finance a patent fight against such a monopoly and there was nothing left for us to do but sign the license agreement. The merit of the patents had nothing to do with the case.

89. It was impossible to build a radio that did not infringe on at least one of the more than 100 basic radio patents held by RCA in the patent pool. "New Zenith Radio Licenses." *Presto—The American Music Trade Weekly* (March 19, 1927).

90. Initially, the 7.5% royalty was charged on the full price of the set as it left the factory, including the radio cabinet and the packing case, which, of course, were not covered by RCA patents. This led some manufacturers to ship radios without cabinets, having the dealers buy and install the cabinets separately. RCA modified their policy to not include cabinets or packing cases soon after they began issuing licenses. Testimony of B.J. Grigsby before the Senate Interstate Commerce Committee on the Couzens Bill, as reported in an undated *Heinl's Radio New* in the McDonald file.

    The agreement also required that the licensees grant back to RCA any patent the licensees' research departments might develop and allowed RCA access to any development in radio being explored by the licensee.

91. According to McDonald, "Manufacturers licensed under the RCA patents will now be able to expand their facilities with greater confidence in the security of their investments and the future of the industry, all of which will enable them to render greater service to the public. The radio has entered its first real state of stability." "Patent Licenses Offered by R.C.A. to Competitors." *Radio World* (March 26, 1927).

    An excellent analysis of the patent situation is found in: "Is There a Monopoly in Radio?" *Radio Broadcast* (October 1926):471-473. A chart showing the broad scope of the patent situation is found in: "The Patent Licensing Picture." *Radio Retailing* (May 1930): 34.

    The Federal government dissolved RCA's patent pool holding ability in November 1932 in an attempt to clarify the patent situation, however, RCA retained the right to license their pool under their own rules.

    The patent pool situation was not fully resolved for another 25 years.

92. By August 1927 seventeen manufacturers had been licensed by RCA. The superheterodyne patents were withheld from the licensing agreement since, according to David Sarnoff, "It is the one element in our line that most distinguishes it from competitive radio equipment. To divide the use of our superheterodyne patents would be almost to offer our trademark for competitive exploitation." "Patent Decision will be Appealed by Atwater-Kent: Sarnoff Outlines Position and Policies of RCA in Patent Situation; Philadelphia Manufacturer Will Appeal But Refuses Further Comment." *Radio Retailing* (August 1927): 56-58.

    RCA began licensing the superheterodyne in 1930 and by November, nine manufacturers—but not Zenith—held the licenses. "9 Superhet Licenses to Date." *Radio Retailing* (November 1930): 41.

93. For a fascinating "eyewitness" account of this $10,000,000 settlement legal battle, see: Curtis, Philip J. *The Fall of the U.S. Consumer Electronics Industry—An American Trade Tragedy*. Westport, Connecticut: Quorum Books, 1994, 1-102.

94. The McDonald files contain a great deal of information about Harry Marvin and his mechanical automatic tuning device. Harry N. Marvin worked in the Edison Laboratory prior to 1884. In 1884, he left Edison to develop his idea for an electric percussion rock drill. The highly-patented drill was exploited first by the Edison General Electric Company and then the Marvin Electric Drill Company. In 1894, Marvin organized the American Mutoscope Company that subsequently became the Biograph Company. This company acquired motion picture patents. In 1908, Marvin organized The Motion Picture Patents Company that acquired all of the controlling patents on motion picture films, cameras, and projectors. This company was dissolved by the Supreme Court as an unlawful trust. At that time, Marvin turned his interest to radio.

    Marvin filed patent for his mechanical radio tuning device in late 1925, but by late September 1927, when McDonald became interested, the patent had not yet been issued. McDonald personally took charge of the Marvin negotiations, visiting him first on November 2, 1927. Marvin signed a contract on January 3, 1928, that granted him $15,000 cash, $1.00 each for every automatic radio produced by Zenith that used the patent, and a number of other concessions. McDonald started production of the "automatic radio" at once, but did not release the story of acquiring the patent until March 14. The March 14, 1928, *The Chicago Daily News* and the same date *New York Journal* made the acquisition of the patents a headline story.

    Because of the Patent Pool agreement, Zenith had to turn the Marvin Patents over to RCA, which it did, for the sum of $1.00, on July 17, 1933.

95. "Zenith to Make Automatic Sets." *The Radio Record* (April 1928).

96. "Pletcher-Cardwell Zenith Stock Goes to McDonald-Klugh Above Market Price." *The Phonograph and Talking Machine Weekly* (September 15, 1928).

97. Several references suggest that after the initial corporate formation and capitalization of Zenith, Thomas Pletcher, and perhaps J.R. Cardwell, both of Q.R.S., quietly began buying up Zenith stock. In a letter to Douglas, dated January 8, 1980, Mathews stated "Gene sold himself out of control" by playing the stock market with Zenith stock. By early 1928, McDonald found himself in actual danger of losing control. Part of McDonald's 1923 partnership agreement with Hassel and Mathews included a stock option that had not been exercised by either. Mathews, by then essentially out of the Zenith picture, sold his option to McDonald, allowing him to again gain control. Pletcher and Cardwell agreed to sell their stock to McDonald, at above market price, and let go all ties with the company. Hassel retained his stock option but never exercised it because of lack of personal funds (Hassel interview with Schwartz, 1970).

    McDonald's private files reveal that Pletcher and McDonald, and their families, remained friends for many years. The two were fond of engaging in political bets and the files reveal that bets were made on nearly every local and national election. Pletcher was a frequent fishing guest on McDonald's various yachts.

98. Zenith distributors had reported a very high incidence of powerpack failures beginning in August 1928. Zenith brought suit in late August. Zenith felt that they were provided defective materials in order to damage their image of quality (the McDonald files have several "witness" reports that Cardwell—now with Grigsby-Grunow—was out "to get Zenith and were using every means in their power to do it"). A letter in the McDonald files from Grigsby-Grunow-Hinds Co., dated July 21, 1927, and signed by B.J. Grigsby, accepted the specifications for the powerpacks, listed the cost as $11.75 each, and stated, "We hereby confirm that we guarantee these units against electrical and mechanical defects for a period of one year, and in respect of the condensers for a period of two years." Zenith tried and was unable to enforce the guarantee.

Majestic responded that the powerpacks were made according to Zenith specifications, knowing that the specifications were not good, and that when tests showed they were not good, Zenith forced the delivery of the powerpacks anyway. Zenith dealers found that replacing the Majestic capacitors with Kellogg capacitors solved the problems. On September 21, 1928, D.W. May, Inc., informed Grigsby-Grunow that they would no longer carry Majestic radios because of powerpack failures. The D.W. May letter stated, "We have had a lot of trouble with your receiver chassis and particularly with your powerpacks and as it has been absolutely impossible to secure any service from you..."

As Majestic powerpack failures began to plague Majestic as well, a settlement was reached between the two companies.

99. The authors could not find primary documentation for this story, however, the story, or references to it, appears many times through the McDonald files.
100. "Annual Report for the Year Ending April 30, 1929." The Zenith Radio Corporation, Chicago.

Chapter Two: Order Out Of Chaos

1. Sterling, Christopher H. and John M. Kittross. *Stay Tuned: A Concise History of American Broadcasting*. Belmont, CA: Wadsworth Publishing Co., 1978, 37-38, 83-88.
2. Bensman, Marvin. "The Regulation of Radio Broadcasting by the Department of Commerce, 1921-1927." Dissertation, University of Wisconsin. 1969.
3. Radio Act of 1912, Public Law 264, 62nd Congress, August 13, 1912.
4. A November 1921 Court of Appeals decision in the District of Columbia (in favor of the Intercity Radio Company) upheld the principle that the Secretary of Commerce had no authority to deny any broadcast license.
5. Schmekebier, Lawrence. *The Federal Radio Commission*. Washington: The Brookings Institute, Washington, 1932, 4.
6. "Stations Broadcasting Market or Weather Reports, and Music, Concerts, Lectures, etc." *Radio Service Bulletin* (May 1, 1922).
7. Technology of the day limited the practical range of frequencies for shipboard to between 450 meters (667 kHz) and 600 meters (500 kHz) because of limited space for antenna erection. The shipping interests, therefore, watched carefully the increasing number of broadcasters and their potential need for frequencies.
8. Hoover told the assembled group, "Until the last four or five months there has been little difficulty in handling these regulations." Garvey, Daniel E. "Secretary Hoover and the Quest for Broadcast Regulation." *Journalism History* 3:3 (Autumn 1976): 67.
9. *Talking Machine World* (May 1922): 52.
10. The regulation of radio met opposition from many in Congress who were concerned about giving control of the rapidly emerging radio industry to the government. This concern kept all radio regulation bills from passage until 1927.
11. Butman, Carl. " 'Hooverizing' Radio—Legislation Urgently Needed." *Radio Age—"The Magazine of the Hour"* (February 1923): 15.
12. Butman, 1923, 15, 28.
13. The announcement for the conference, reproduced in *Radio Age*, March 1923, page 16, stated:

    The Department of Commerce has sent out invitations for a reassembly of the radio conference held a year ago, together with some additional members.

    The conference held last year was for the purpose of considering legislation necessary in order to reduce the amount of interference in radio broadcasting. The legislation having failed to pass Congress it is felt desirable to investigate what administrative measures may properly be taken temporarily to lessen the amount of interference in broadcasting.

    Since the last conference the number of broadcasting stations has increased from 60 to 581, and it is estimated that somewhere between 1,500,000 to 2,500,000 receiving stations are now in use. The amount of interference has increased greatly and threatens to destroy the growth of the art.

    The conference will start on Tuesday morning, March 20 at 11 o'clock at the Department of Commerce.

14. The role of radio engineers in shaping the radio recommendations and laws of the 1920s is fully discussed in Slotten, Hugh. "Radio Engineers, the Federal Radio Commission, and the Social Shaping of Broadcast Technology: Creating 'Radio Paradise'." *Technology and Culture* (October 1995): 950-986.
15. Hoover is at times presented as a villain in the control of early radio, frequently compared to a Czar. In truth, Hoover was a benevolent friend of radio and worked within the meager guidelines provided him. He wrote often of the need for Congressional action, for example, *Radio Age* (May 1923): 9-10.
16. Schubert, Paul. *The Electric Word: The Rise of Radio*. New York: The Macmillan Company, 1928, 226; Smith, Frederick How the Government Will Control Radio. *Radio Age—"The Magazine of the Hour"* (July 1922): 3-4, 25-26.
17. The Navy had previously used these frequencies for fleet tactical communications and formally objected to their reassignment. Howeth, Lee. *History of Communications-Electronics in the United States Navy*. Washington, 1963: 383, 398 and 406.
18. Aitken, Hugh G. "Allocating the Spectrum: The Origins of Radio Regulation." *Technology and Culture*, Vol 35. No. 4 (October 1994): 695-696.
19. For a discussion of the cost of commercial radio and how it was paid, see: Smulyan, Susan. *Selling Radio*. Washington: Smithsonian Institution Press, 1994.
20. Hubbell *et al.* versus Royal Pastime, 242 Federal 1002, 1917.
21. *Variety*, May 5, 1922: 1.
22. Smith, Frederick. Fees for Composers-None for Broadcasters. *Radio Age* (February 1923): 5.
23. Although polite, the broadcasters told ASCAP they would go on the air with, "The Old Gray Mare, She Ain't What She Used to Be," rather then pay ASCAP for the privilege of broadcasting the latest ASCAP licensed hit, "My Bromo-Seltzer Bride." Smith, *Radio Age* (1923): 5.
24. Transcript of the meeting, September 20, 1922.
25. The ASCAP licensing fee presented at the meeting was a minimum of $5/day, and according to E.C. Mills, Chairman of the Executive Board of ASCAP, that figure was, "a point to talk up from or down to." Transcript of the meeting, September 20, 1922.
26. Eugene F. McDonald, Jr. (Chicago Radio Laboratories, which owned WJAZ), Thorne Donnelley and Elliott Jenkins (WDAP, later to become WGN), Dr. Frank Elliott (Palmer School of Chiropractics, which owned WOC), William Hedges (WMAQ), and Powel Crosley, Jr. (Crosley Manufacturing Company and station WLW).
27. A similar group had been formed on October 16, 1922, called the National Broadcasters League, to "promote the interchange of views and news between broadcasters." Many of the members of McDonald's first group were also involved with the National Broadcaster's League. It is unclear why the League, which was active in fighting ASCAP, was ineffective, and necessitated the formation of a new group. A discussion of the charter of the National Broadcaster's League is found in *Radio Age* (November 1922). The text of a letter sent by the League to ASCAP is found in *Radio Age* (February 1923): 15, 28.
28. Interview with William Hedges, October 6, 1952, as quoted in Mackey, David. "The National Association of Broadcasters—Its First Twenty Years." Dissertation, Northwestern University. 1956.
29. Several memos in the Zenith Archives, most notably memo from McDonald to Tid Leitzell, May 17, 1943.
30. Minutes, National Association of Broadcasters Organizational Meeting, April 25 and 26, 1923. NAB Archives.
31. Minutes of the National Association of Broadcasters, May 14 and 15, 1923. NAB Archives.
32. *Variety*, May 24, 1923.
33. Other officers were: Vice President, Frank W. Elliott (WOC); Vice President, John Shepard III (WNAC); Secretary, J. Elliott Jenkins (WDAP); and, Treasurer, Powel Crosley, Jr. (WLW). The Board of Directors consisted of Harold J. Power, William S. Hedges, Henry A. Rumsey, W.S. Harris, Robert Shepard, Bowden Washington, and G. Brown Hill.
34. Minutes of First Annual Convention of the National Association of Broadcasters, October 11, 1923. Zenith Archives.

35. Mathews, R.H.G. "The Chicago Radio Show." *Wireless Age* (January 1924): 24-26.

An article in the April 1924, *Radio Broadcast* ("The March of Radio: Real Information on the Size of Radio Audiences") quibbled with the mathematics arriving at such high figures, citing as an example the 8,534,950 figure for WJAZ. The author of this article felt that a figure of one-to-five was better than the one-to-fifty figure used by the stations. At that ratio, the WJAZ audience would be 800,000, which "is enough to stagger any one used to treating figures with more respect than do the radio publicity men."

36. McDonald, E.F., Jr. "Huge Census Shows Music Preference." *The Radio Dealer-Broadcasting Station Operation* (January 1924): 89-90; McDonald, E.F., Jr. "What We Think the Public Wants." *Radio Broadcast* (March 1924): 382-384; *Radio Age* (January 1924): 30-31.
37. McDonald to Leitzel, May 17, 1943, McDonald private files.
38. Mackey, 1956, 33.
39. "Senator Dill is Ardent Radio Fan." *The Radio Dealer* (June 1924): 74.
40. "Radio Fund Planned by National Association of Broadcasters." *The Radio Dealer* (September 1924): 106; McDonald files.
41. Mackey, 1956, 39.
42. A brief triumph for the broadcasters came when the Crosley broadcasting station in Cincinnati won a Federal District Court decision in May 1924 ruling that "radio is not a public performance for profit and the broadcasting of copyrighted music does not constitute a violation of the copyright." "Broadcaster Wins Copyright Suit." *Radio Age* (June 1924): 17.
43. Included on this committee were such well known broadcasters as Powel Crosley, Jr. and David Sarnoff.
44. See "The Patent Pool" in the section "The Early Years" of this book.
45. At the time, the telephone company license for use of their wires and patents cost from $500 to $2000 a year, depending on the size of the broadcast station—churches and schools were licensed for $1.
46. See Smulyan, *Selling Radio*, for a full discussion of this topic.
47. Chicago adopted Monday night from 7:00 PM for "Silent Night" in early 1923. Broadcasters were not bound to the arrangement and from time to time, a few did not adhere to it. On at least one occasion, listeners went on strike against the offending stations. Frank H. McDonald, president of the Broadcast Listeners Association of Chicago, urged a boycott of advertised products on the stations that violated "Silent Night"; the listeners won. By late 1926, better receiver technology and newly instituted radio laws made "Silent Night" unnecessary and Chicago abandoned it. Grist, John. *Valley Voices*. Carpentersville, IL: Crossroads Communication, 1995, 10; Barnouw, Erik. *A Tower in Babel*. New York: Oxford University Press, 1966, 93-94; "Chicago Stations Quit 'Silent Night'." *St. Petersburg Times* (January 1, 1928).
48. Interference was so severe that in December 1923 Hoover had to make a special appeal for all stations to stop interference long enough for the nation to hear a broadcast of the memorial service for President Harding. Garvey, Daniel. "Secretary Hoover and the Quest for Broadcast Regulation. *Journalism History*, 3.3 (Autumn 1976): 67.
49. A look at the problems as seen by Hoover is found in his opening remarks to the Conference reprinted in: "Third National Radio Conference," *The Wireless Age* (November 1924): 43-44, 54, 56.
50. McDonald, E.F., Jr. "Keep Interference Out of Politics." *The Radio Dealer* (February 1924): 93. According to this article, the moving of ship traffic out of the broadcast band was a direct result of negotiations between McDonald's National Association of Broadcasters and Secretary Hoover.
51. Butman, Carl. "Hearings on the Radio Bill." *Radio News* (June 1924): 1736, 1846-1849. Also, "White Bill Places Radio Control with Department of Commerce." *The Radio Dealer* (June 1924): 74.
52. McDonald, E.F., Jr. "Wants Hoover in Office One Hundred Years. Objects to Napoleonic Powers. Suggests Communication Commission for Radio." Zenith Press Release, December 15, 1924.
53. "Hoover Summarizes Radio Conditions." *The Radio Dealer* (December 1925): .
54. "E.F. McDonald, Jr. Issues Statement Regarding Important Radio Test Case." *The Talking Machine World* (February 15, 1926): 109; "U.S. Questions WJAZ's Wave Right." *Radio Age* (March 1926): 19.
55. *Radio Age* (April 1926): 27.
56. A very detailed look at the role of Commander McDonald in this case is presented in: Bensman, Marvin. "The Zenith-WJAZ Case and the Chaos of 1926-27." *Journal of Broadcasting* XIV, 4 (Fall 1970): 423-440.
57. Not everyone agreed with McDonald's tactics. Several 1926 editorials in *Radio Broadcasting* spoke harshly of his methods.
58. The actions of Eugene F. McDonald thus were at least partially responsible for the proliferation of radio stations, 24-hour programming, and the watchdog federal agency which was established to overs

ee the expansion.

59. *Radio Retailing* (February 1926): 143-145.
60. Godfrey, Donald G. "The 1927 Radio Act: People and Politics. *Journalism History* 4:3 (Autumn 1977): 75. See also: *Radio Retailing* (August 1926): 80-81; *Radio Broadcast* (September 1926): 372-373; Garvey, 70.
61. *Radio Retailing*. December 1926. p. 33, 40-43; *Radio Retailing*. January 1927. p. 48-49.
62. *Radio Retailing* (November 1926): 53-61, 81, 102; *The Radio Dealer* (December 1926) 43; *The Radio Dealer* (December 1926): 82-83; *Radio Retailing* (December 1926): 37-39, 58.
63. "McDonald for Confiscation of Air by U.S." *Syracuse Herald* (Tuesday evening, December 7, 1926).
64. Letter and Congressional responses in the McDonald private files.
65. *The Radio Dealer* (December 1926): 82.
66. A good analysis of the politics of the 1927 Radio Act is found in Godfrey, 74-78.
67. Friedrich, Carl and Evelyn Sternberg. "Congress and the Control of Radio Broadcasting, I." *The American Political Science Review* (Vol XXXVII, 5): 799.
68. Biographies and statements of praise for the Commission from national sources may be found in: *Radio Retailing* (April 1927): 44-45.
69. *Radio Broadcast* (July 1927): 138-140; *Radio Broadcast* (August 1927): 204-206; *Radio Dealer* (October 1927): 57; *Radio Broadcast* (December 1927): 105-107.
70. *Radio World* (October 27, 1928): 8; *Radio World* (November 10, 1928): 5-7; *Radio Retailing* (November 1928): 58-60; *Radio Retailing* (December 1928): 46-47; *Radio Broadcast* (January 1929).

Chapter Three: Creating A Market

1. McDonald sent a Radiogram from Battle Harbor, Labrador, on his return trip from the 1925 Arctic expedition, requesting S.I. Marks, a Zenith executive to "make sure Sport [Herrmann] has the $20,000 to $30,000 necessary to fund the Chicago Radio Show." If Herrmann was short on funds, Marks was instructed to contact McDonald's mother and have her secure a loan at the First National Bank in Chicago, signing for both of them. Radiogram, McDonald to Marks, September 19, 1925. McDonald Files.

McDonald's interest in the Chicago Radio Show was certainly enhanced by the fact that Zenith would be introducing the new 10-tube DeLuxe chassis that had been developed by Hassel's design team while McDonald was in the Arctic. "History of Zenith", written in 1944 by Karl Hassel, with editing notes by R.H.G. Mathews, the third co-founder of Zenith Radio Corporation. Zenith Archives.

2. "Great Radio Shows to Come." *Radio Age—"The Magazine of the Hour"* (May 1922): 1.
3. "Great Radio Shows to Come." *Radio Age—"The Magazine of the Hour"* (May 1922): 1.
4. "Chicago's Fifth Annual Radio Show." *The Radio Dealer* (October 1927): 35-44.

An October 1928 memo in the McDonald files lists reasons why Chicago is giving New York "a run for its money" as the dominant radio commercial center. Among the reasons suggested are the presence of more than 30 broadcast stations in the metropolitan area as well as eleven major radio manufacturing plants and a number of component manufacturers. Also highlighted is Chicago's geographical superiority and the two major radio trade shows held there each year.

5. "Shows Introducing Radio to Throngs." *Radio Age—"The Magazine of the Hour"* (July 1922): 5-

6; Many Exhibitors at National Exposition." *The Radio Dealer* (August 1922): 34, 84-85.
6. "The Chicago Radio Show." *The Radio Dealer* (August 1922): 84. This article also contains a photograph of this receiver. See Endnote 60 in "The Early Years" for a discussion of portable radios.
7. "National Radio Exposition Held in Chicago." *The Talking Machine World* (October 15, 1925) 151-152, 153-156.
8. "Before giving this endorsement, we [the Executive Radio Council] took into consideration the caliber, ability and financial responsibility of the Chicago Radio Show management, the location and adaptability of the Coliseum, which is Chicago's big exposition building and the only suitable place for holding a show of the importance such as the magnitude of radio merits. The October dates we consider particularly opportune for stimulating the best interests of radio." *The Talking Machine World* (August 15, 1922: 109.
9. "Radio Show in October." *The Talking Machine World* (August 15, 1922): 109.
10. "Chicago's International Radio Show." *Radio Age—"The Magazine of the Hour"* (October 1922): 20.
11. "A Real Radio Show." *The Radio Dealer* (September 1922): 118.
12. Chicago Radio Show an Outstanding Success." *The Talking Machine World* (December 15, 1923): 133.
13. "Three Big Shows." *Radio Age—"The Magazine of the Hour"* (May 1924): 14.
14. Mathews, R.H.G. "The Chicago Radio Show." *Wireless Age* (January 1924): 24-26.
15. Mathews, 1924, 26.
16. Zenith continued providing bags until the Sixth Chicago Radio Show (1927), when Grebe offered $500 for the concession. In an August 22, 1927, letter to McDonald from Klugh, Klugh stated, "I am glad of this because the bags would have cost us over $2,000 and I don't believe the advertising is worth that sum."
17. Letters from McDonald to Herrmann, September-December 1924. McDonald personal files.
18. See Endnote 1.
19. "Guide to the Fifth Annual Chicago Radio Show." *The Radio Dealer* (October 1926): 44.
20. "Dealer's Bureau Organized for Radio World's Fair." *The Radio Dealer* (September 1924): 62.
21. "First Radio World's Fair a Huge Success." *The Talking Machine World* (October 15, 1924): 83.
22. "Trade Trends at the New York Show." *The Radio Dealer* (October 1926): 89-91.
23. "First Trade Show Draws 18,000." *Radio Retailing* (July 1927): 79-80.
24. "Radio Trade Week in Chicago." *Radio Retailing* (May 1929): 70-71.
25. Survey of the Radio Trade Show, June 3 to 7." *Radio Retailing* (June 1929): 78-79, 82-85; "Screen-Grid Sets Dominate Trade Show." *Radio Retailing* (July 1929): 76-77.
26. "Play Show or Trade Show." *Radio Retailing* (July 1930): 41.
27. "Play Show or Trade Show". *Radio Retailing* (July 1930): 41; "Again We Say Needed—A Trade Show." *Radio Retailing* (October 1930): 33.
28. "The Show—All About It." *Radio Retailing* (July 1931): 10-11, 43.
29. "The Trade Show." *Radio Retailing*, May 1931: 21.
30. "The Radio Manufacturer's Association." *The Radio Dealer* (August 1924): 33, 52. Commander McDonald of Zenith was one of the six radio manufacturers involved in the initial formation of the RMA. The organization was formed for "the purpose of improving and stabilizing the industry." McDonald held a number of positions with the RMA throughout his career.
31. "The Outstanding Trade Function of the 1926-1927 Season." *The Radio Dealer* (September 1926): 103.

Chapter Four: Zenith And Early Broadcasting

1. WJAZ was licensed on August 17, 1922. FCC License Files.
2. *Radio Age—"The Magazine of the Hour"* (July 1923): 11.
3. Frequency was changed to 740 kHz on May 14, 1923. FCC Files.
4. FCC Files; Grist, John. *Valley Voices*. Carpentersville: Crossroads Communications, 1995: 304-310.
5. Although originally licensed to operate at 20 watts, resources suggest that it operated at closer to 600 watts until it became licensed to operate at 1000 watts on August 29, 1923. The efficient design of the transmitter and antenna system led to WJAZ being called the "world's most powerful broadcasting station" in the September 1923 *Popular Science*. "WJAZ, A Station with a Difference" (*Radio Age—"The Magazine of the Hour"* (July 1923): 11) states that the transmitter was operating on half-power and would not go full power until the MacMillan expedition, yet it was heard in Oregon, California, Florida, and Nova Scotia during its opening night 1,000 watt broadcast.
6. The new transmitter was designed for grid modulation but it was so powerful it could not be made to operate properly. AT&T held the patents for the more efficient plate modulation and after three weeks of poor performance, WJAZ switched to plate modulation and entered into negotiations with AT&T for a patent use license. Hassel, Karl. Interview with Bernard Schwartz, Chicago, Illinois, 1970.
7. "Welcome, WJAZ." *Radio Age—"The Magazine of the Hour"* (June 1923): 19; "WJAZ, a Station With a Difference." *Radio Age—"The Magazine of the Hour"* (July 1923): 11.
8. *Radio Age—"The Magazine of the Hour"* (July 1923): 11.
9. Powerfully built to get a signal to MacMillan in the North, the station set a number of distance records. On December 19, 1923, while engaged in a contact with MacMillan frozen in the Arctic ice, the WJAZ broadcast was heard by YMG in the Samoan Islands, more than 7,300 miles from Chicago. *Radio Age—"The Magazine of the Hour"* (February 1923): 30-31. WJAZ broadcasts were also heard by elements of the British fleet off Tasmania.
10. There is a great deal of confusion about the WJAZ/WGN/WDAP/WEBH station exchanges and reports of which station was the parent station of WGN are often incorrect. Through a rather round-about route, WGN was first licensed through ex-WJAZ on March 28, 1924 (date of call letter change, actual date March 24), and on June 1, 1924, a different station, WDAP, became WGN.

    The *Chicago Tribune* had initially experimented with radio in 1919 when Mathews and Hassel installed a receiving apparatus to receive news of the Paris Peace Conference. In December 1921, the *Tribune* entered into an agreement with station KYW in which the Tribune would provide news reports to KYW in exchange for mentioning their name. Deemed unsuccessful by the *Tribune*, the experiment was canceled in the spring of 1922.

    The *Chicago Tribune* published four articles between December 16, 1923, and December 19, 1923, attesting to the developing impact of radio on business. These articles stimulated the *Tribune* on March 24, 1924, to lease enough time over WJAZ to dominate the programming. Part of the agreement called for the call letters to be changed to WGN for "World's Greatest Newspaper." (The WGN call letters had belonged for some time to the steamer *Carl D. Bradley*. The owner of the ship, Carl Bradley, agreed to substitute call letters when told of the *Tribune* plans). After a much heralded program launch, including comments by Mayor William E. Dever and Eugene F. McDonald, Jr., the realities of broadcasting over ex-WJAZ proved distasteful to the *Tribune* and on April 4, 1924, the agreement with WJAZ was discontinued and the license returned to Zenith on May 9, 1924.

    At the same time the agreement was dropped with WJAZ, the *Tribune* announced the purchase of WDAP, the Chicago Board of Trade station, and assumed the same programming schedule of trade reports, weather, and music already established by the Drake Hotel station. Meanwhile, Zenith sold ex-WJAZ, then WGN, to the Edgewater Beach Hotel, on May 28, 1924, who then changed the call letters to WEBH. On June 1, 1924, the *Tribune* retrieved the WGN call letters and changed WDAP to WGN. Not long after acquiring WDAP, the *Tribune* also absorbed WTAS and WLIB, eliminating them, and WGN became the radio promotional outlet for the *Tribune*.

    Information for this endnote came from: Linton, Bruce A. "A History of Chicago Radio Programming, 1921-1931, with Emphasis on Stations WMAQ and WGN." Ann Arbor, Michigan, University Microfilms, 1953; Fink, John. *WGN, A Pictorial History*. Publisher unknown, 1961; Grist, John. *Valley Voices*. Carpentersville: Crossroads Communications. 1995; Workers of the Writers' of the Work Projects Administration in the State of Illinois. *Adventures of Broadcasting in Chicago*. Chicago: Board of Education, 1942; *Chicago Tribune*, March 29, 1924; "WGN Owners Buy WDAP Report Says." *Radio Digest* (May 31, 1924); *Radio Digest* (June 14, 1924); "New Radiophone Stations Operating in Chicago." *New York Times* (June 1, 1924); FCC License Files.

Conflicting information is found in: Brannigan, Alice. "WJAZ: It Was One of a Kind." *Popular Communications* (April 1996), as well as the February 1996 issue of *Popular Communications*.

11. Ex-WJAZ/ex-WGN was licensed as WEBH on May 29, 1924, and became known as the "Voice of the Great Lakes." In November 1928, WEBH was reduced to serving as a booster station for KYW and became KYWA, losing final identity on January 31, 1930. FCC license files; Grist, John R. *Valley Voices*. Crossroads Communications, Chicago: 306.
12. Ely, Martin Patrick. *The Adventures of Amos 'n' Andy: A Social History of an American Phenomenon*. New York: The Free Press, 1991: 41-53. Also, various correspondence between McDonald and Correll, McDonald personal files.
13. McDonald personal files.
14. "Fine New Radio Broadcasting Studio in Chicago Secured by the Zenith Corp." *The Talking Machine World* (September 15, 1924): 68.
15. Pierre Nuyttens was an early and close friend of McDonald's. He produced the line-drawing art for McDonald's personal Christmas cards and several company cards from 1922 until into the 1950s.
16. The mobile station initially used the experimental call 9XN, the same Zenith experimental call used for the station handling the Chicago end of the 1923 MacMillan Arctic Expedition traffic. It was initially licensed as 20 watts.
17. *Chicago Herald Examiner* (September 21, 1924): 25.
18. The authors have a variety of newspaper clippings from the mid-west detailing mobile radio broadcasts from numerous cities. Typical broadcasts included local talent, political speeches, programming by local civic groups, and classical music. In most cases, the Engineer-in-Charge of WJAZ was R. H. G. Mathews and the broadcast was made on 268 meters. In some cases, a Zenith radio receiver was given away to the person receiving the broadcast from the greatest distance.
19. McDonald private files.
20. The first antenna for the portable station was held aloft by a balloon, primarily as a public relations gesture. In actual operation, the antenna was designed on telescoping poles to fold down on top of the truck for travel. Hassel interview, 1970.
21. The unit was built on a one-ton Federal Truck chassis. Zenith Archives.
22. The use of gold plating was another public relations gesture.
23. It is important to note that the mobile WJAZ was completely self-contained and relied on no external power source. Although other mobile stations were quickly developed, they required an external power supply. *Radio News* for January 1925 (pp. 1149, 1226) features the self-contained WJAZ mobile truck as well as the mobile WGY station, which required an electrical feed. (Interestingly, mobile WJAZ is discussed in all the articles except one paragraph, however, mobile WGY appears first).
24. According to Karl Hassel in a 1970 Chicago interview with Bernard Schwartz of Northwestern University, the relocated WJAZ was not as successful as its original namesake. After several frequency shifts it was still located at the top end of the broadcast band, a less efficient location for their equipment. Zenith withdrew from the radio broadcast industry (until establishing an experimental F.M. station nearly 15 years later) and the interest of R.H.G. Mathews in Zenith began to diminish at the same time.

    By August 1930, Zenith was attempting to sell the Mt. Prospect facility which had become ineffective due to two frequency changes and sharing with two other stations (Zenith Radio Corporation Executive Memorandum, Petrtyl to Robertson and Burnet, August 28, 1930. McDonald private files). One of the early prospects for the property was Father Charles E. Coughlin. The WJAZ license was canceled by the FCC in November 1931 due to inactivity.

    The property at the corner of Mount Prospect Road and Central Road sat abandoned for many years and in October 1978, Zenith sold the land for $84,000 to the State of Illinois for road improvements. The transmitter towers and building were demolished in 1979-1980 and the old WJAZ land is now a roadside green area (Ghrist, *Valley Voices*).
25. "WJAZ's New Studio." *Radio Broadcast* (October, 1925): 767-769; "New Zenith Radio Station, WJAZ, Has Many Features". *The Talking Machine World* (May 15, 1925): 80; "Modern New Broadcasting Station Opened by Zenith". *The Talking Machine World* (July 15, 1925): 59 (also eluded to on page 115).

    In 1927, the Strauss Building studio was acquired by station WENR, who made it the first studio in Chicago to have a built-in organ. Workers of the Writers' Program of the Work Projects Administration in the State of Illinois. "The Adventures of Broadcasting in Chicago." Board of Education of Chicago, 1942.
26. WJAZ's transmitter was re-tuned to 20 meters in an attempt to determine if sunlight affected the efficiency of radio signals at higher frequencies.
27. The Escanaba Western Union Office stayed open at night to forward telegrams from radio listeners to WJAZ.
28. Commander McDonald held this belief throughout his life and voiced it frequently. His philosophy was most strongly presented in *Youth Must Fly* (New York: Harper & Brothers, 1942, 44-57), the book authored by McDonald to promote gliding and soaring in America.
29. Several articles in the *Escanaba Daily Press* for January 22 and 24, 1925.
30. *Escanaba Daily Press* (January 25, 1925). The same article details the attempt of Commander McDonald and his pilot, Ray Mack, to fly above the clouds to photograph the eclipse. The pair had to return, unsuccessful, after the plane began icing up at 4,000 feet.
31. WSAX was initially licensed by Zenith on July 23, 1923, as a 20 watt "station at the office." It operated on 1120 kHz with an irregular schedule from Zenith's McCormick Building offices until its license transfer to the mobile station on August 12, 1925. On April 23, 1926, WSAX was again broadcasting on an irregular schedule from Zenith offices, this time from 3620 Iron Street. The WSAX license was canceled by the government due to inactivity on June 1, 1928. The FRC withdrew the licenses of all mobile broadcasters on August 1, 1928. Grist, John. *Valley Voices*. Carpentersville: Crossroads Communication, 1995: 306-307.
32. The primary objective of the tour was promotion of Zenith and Zenith products. Frequent stops for WJAZ mobile (WSAX) were Zenith dealers, distributors and communities without broadcast facilities. Brief notes on stops and results of stops were published widely, for example: "Zenith Portable Broadcast Station an Aid to Dealers". *The Talking Machine World* (September 15, 1925): 115; "Zenith Plant Broadcasts From Houston." *The Houston Chronicle* (Friday, October 23, 1925).
33. According to a July 13, 1976, letter from R.H.G. Mathews to friend Leo Gibbs, during the Jack Dempsey visit, the champ grabbed the microphone and said, "Jesus Christ, that's a hell of a looking damn thing, isn't it?" before anybody could get to the cut off switch.
34. The mobile tour engineering group consisted of Mathews, "Doc" Price and "Wag" Wagner.
35. Projected costs for operation of WJAZ by the American Radio Broadcasting Corporation when it took over the operation were $70,716/year. In addition, ARBC had to pay an unknown amount for the actual rental of the station from Zenith. The largest budget line item was salary, $64,116. Mathews was paid $200/week; ARBC employed an additional thirteen people in the WJAZ operation, among them engineers "Doc" Price ($45/week) and "Gus" Gustafson ($35/week). Several documents and letters in the McDonald files, most specifically, Selleck to McDonald, October 21, 1927.
36. Refer to Endnote 46 in "The Early Years" section of this book.
37. Herriott to McDonald, April 13, 1927. McDonald files.

Chapter Five: Adventure, McDonald, and Zenith Radio

1. The best remembered of these tragic affairs was the U.S. Army expedition led to the northern end of Ellesmere Island in 1881 by Lieutenant (later Brig. Gen.) A.W. Greely. This party was the most northerly of numerous expeditions which participated in the International Circumpolar Year (1881-82). In the summer of 1882, a promised supply ship failed to reach the expedition, but they were able to carry on through the following winter, supported by summer hunting and reduced rations. The next summer, the Greely party remained waiting for rescue, as ordered, at their northern base until August (1883). They then retreated down the southeastern coast of Ellesmere to meet an expected rescue party at Cape Sabine. When they reached the area in late August, they found a high rock cairn which contained a note informing them that their rescue vessel, the *Proteus*, had arrived early and had been crushed in the wind-driven ice pack. The *Proteus* crew had raised the cairn just two months previously and then moved down the Greenland coast to safety in their life boats. The Greely party of 24 men had no boats and faced another year in the frozen Arctic with

only forty days of rations in hand. They also knew that most of the game had already migrated south ahead of the rapidly approaching nine-month long Arctic winter. That winter, 17 of the 24 men slowly starved to death, huddled with their mates for meager warmth in their one remaining tent. When a rescue party finally reached them in the summer of 1884, the seven survivors were themselves within days of death.

This tragic and much publicized story profoundly affected polar exploration for the next half century. The lesson of the Greely party was doubly reinforced in 1912 when Scott's party successfully reached the South Pole and then all starved and/or froze to death only 11 miles from their "One Ton" supply depot as they struggled to reach the Antarctic coast on their return trek. By the last few months before World War I, it was clear to explorers that the new radio science had to be applied to polar work if exploration were to continue without even more tragic loss of life.

2. Early Arctic and Antarctic explorers left messages in large conspicuous piles of rocks for other explorers (or rescuers) to find.
3. Roald Amundsen, the first person to reach the South Pole, used the traditional Arctic sledge and dog team. Amundsen later participated in two Arctic expeditions in the 1920s which utilized aircraft. However, he did not use radio on any of these efforts.
4. Allen, Everest S. *Arctic Odyssey: The Life of Donald B. MacMillan*. New York: Dodd, Meade and Co., 1962, 123.
5. "Crocker Land" was the name that Peary had given land that he thought he saw far out to the west across the ice of the polar sea during the 1909 Expedition. If Crocker Land did in fact, exist, it lay in that area of the polar sea north of northwestern Canada and northern Alaska. During the 1913-1917 Expedition, MacMillan was able to partly determine that the "mountain tops" seen by Peary were actually Arctic mirages. One of the goals of the airplane flights of the next MacMillan Expedition (1925) was to try to reduce the area of the "unknown/unexplored" portion of the polar sea and to finally determine whether Crocker Land existed. They were unsuccessful in that endeavor. In fact, some areas of the polar sea were not seen from the air until overflights by the U.S. Navy during the International Geophysical Year of 1957.
6. MacMillan, Donald B., *Four Years in the White North*. Boston: Hale, Cushman & Flint, 1933.
7. Allen, 221.
8. The *Bowdoin* was built by the Hogsdon Brothers Shipyard simultaneously with another similar vessel being constructed for U.J. "Sport" Herrmann, a well known Chicago yachtsman and close friend of Zenith's McDonald. Thus began the chain of events which would lead to the long association between MacMillan and McDonald.
9. After MacMillan's last trip north in 1957, "Mac" and his wife Miriam gave the *Bowdoin* to the Mystic Seaport Museum. The schooner was retrofitted with vintage Zenith radios (refurbished by Zenith) and served for many years as part of the museum. In about 1980, she was acquired by a citizen's group from near Bowdoin College interested in refitting and preserving her and then deeded to the Maine Maritime Academy (MMA) in Castine, Maine. MMA had the *Bowdoin* rebuilt and refitted as a training vessel. She is in use today. MMA crews have taken the *Bowdoin* as far north as Godhavn, Greenland, twice in recent years. The first of these voyages was filmed by Maine Public Television. The resulting program "The Two Lives of the *Bowdoin*" has been shown several times in recent years on PBS.
10. *Radio News* (September, 1923): 275, 316.
11. The private papers of both MacMillan and McDonald reveal a lifelong friendship that went far beyond their business relationship. Their correspondence in the late 1940s and early 1950s record McDonald giving the MacMillan's financial advice on the possible sale of the *Bowdoin* and on MacMillan's negotiation with Hollywood for rights to his life story. Throughout MacMillan's lecture career, McDonald paid for MacMillan's publicity agent. The correspondence also records McDonald's pivotal, but behind the scenes, role in seeing that MacMillan's life of Arctic accomplishments was finally recognized in 1949 with the Gold Medal of the National Geographic Society.
12. The technical aspects of the radio equipment aboard the *Bowdoin* and the amateur radio aspects of the 1923-24 expedition are covered in great detail in *QST* magazine (June, July, August, September, November 1923, and February, April, and especially November, 1924). Scholars are cautioned, however, that Mr. Mix's logs and articles DO NOT record either the full extent or the full impact of broadcast radio on the 1923-24 party. Mix's primary focus in both operation and in writing for *QST* was obviously on the amateur radio aspects of the expedition. The broadcast radio aspects of the expedition, especially the role of WJAZ, is recorded in great detail in MacMillan's personal diary which may be found at the Hawthorne-Longfellow Library, Bowdoin College, Brunswick, Maine.
13. Schnell, F.S. "Amateur Radio Shoves Off for the Pole," *QST* (July 1923): 7-13.
14. MacMillan, D.B. *Etah and Beyond*. Boston: Houghton Mifflin Co., 1927.
15. This and other quotations from MacMillan are taken directly from MacMillan's handwritten diary found in the MacMillan Papers at Bowdoin College.
16. McDonald made it a practice on both expeditions to take along a small supply of the latest Zenith receivers to give to people in the isolated communities of the Far North. The first of these gifts was to Stanley Brazil, the Canadian Marconi operator at Battle Harbor. McDonald left Brazil a 1-R receiver and 2-M audio amplifier, a much more modern receiver than then available at this isolated Marconi station. Today, that receiver is the centerpiece of the vintage radio collection of Brazil's son-in-law, Frank Turano, of suburban Washington D.C.
17. Erik Erngaard in *Greenland: Then and Now*. Copenhagen: Landemann Ltd. 1972, 43, wrote that Melville Bay had long been known to sailors as Greenland's Graveyard and noted that the 1819 whaling fleet lost 14 ships to the Melville Bay ice pack. In 1821 eleven ships and in 1822 seven ships were crushed in the Bay ice pack. The record year however, was 1830, when an enormous iceberg embedded in the pack suddenly overturned, as often happens, and in less than 15 minutes the entire Melville Bay whaling fleet of 19 ships was reduced to "matchwood". There were also several instances of individual ships (most notably the British rescue vessel, *Fox*) becoming imprisoned in the Melville Bay ice pack for more than a year before being reluctantly released. The technology of the *Bowdoin* was essentially that of the 19th century whaling fleet; the hull shape of the *Peary* of the 1925 Expedition was very similar to, but smaller than, the whaling ships of that era.
18. MacMillan, 1927, 80-100.
19. MacMillan was incorrect as to the distance involved; this was an understandable error since he had no 'Great Circle' maps drawn centered on Refuge Harbor. In 1923, it was not yet completely understood that long distance radio waves generally follow Great Circle paths from transmitter to receiver. The Great Circle distance to Prince Rupert is almost exactly 2100 miles. The Great Circle distances to Chicago and Boston are almost exactly equal at 2500 miles. The fact that points on the West Coast of North America are closer to northern Greenland than are points on the East Coast may account for the fact that several radio operators on early expeditions noted that propagation conditions slowly tended westerly as they traveled north from Labrador up to northern Greenland. None of this planetary geometry is evident from a standard Mercator projection map.

    Reference was also found in a 1924 Zenith press release that a major element of the British Fleet, sailing in waters off Tasmania also heard some of the 1923 broadcasts to MacMillan and cabled their congratulations to WJAZ and McDonald. This 1923 incident may have led to MacMillan and McDonald's confusion in the '40s and '50s as to the location of the *USS Seattle* when receiving the broadcasts from MacMillan and McDonald during the 1925 Expedition. At that time, the *USS Seattle* was in Wellington, New Zealand, in the Tasman Sea, rather than "in waters off Tasmania."
20. A copy of this telegram was frozen in a large block of ice and stood as the center-piece of the Zenith booth at the First Radio World's Fair held in Madison Square Gardens, September 22-28, 1924.
21. For example, this entry in MacMillan's log: "Mon., Dec. 24: At midnight CST our special program began from the Edgewater Beach Hotel, Chicago, Ill. Dr. McWaters [sic], Secretary of the Central Graduate Association of Theta Delta Chi seemed to be in charge. Mrs. Clerk, Mr. Clerk, Lillian and Lettie [MacMillan's sisters] all spoke to us and were heard fairly well. The music was poor. The Eskimos were with us until 3 AM."
22. For example, this from MacMillan's log: Fri. Oct. 5: [received via Barnsley (sent to him via

mail)] "To Donald MacMillan, WNP, Dear Mac, from October 3 on, will broadcast messages from your families from WJAZ, 448 meters and will endeavor each week to have one of your friends or relatives talk to you. Tune in a little ahead of time as we start promptly at midnight Central Standard Time each Wednesday. American newspapers have already carried one million lines of publicity on your expedition. We have in our scrapbook 255,000 lines. Will have your cousin talk to you next Wednesday. Advise me any special material you would like. Sorry I'm not still with you. Had bully but lonesome trip back from Labrador. Best regards to the boys. Cordially, E.F. MacDonald [sic.], Jr."

23. *Radio Age—"The Magazine of the Hour"* (February 1924): 21. WJAZ was heard on a somewhat regular basis in the Pacific Basin during the fall and winter of 1923. The most specific documentation of this startling coverage was reception by the expatriate community in Samoa. The most thorough documentation may be found in *Radio Broadcast*, May 1924, which contains a lengthy letter from Quincy F. Roberts, American Vice Consul in Charge, Apia, Samoa.
24. For some reason, European-led Arctic expeditions lagged behind those of the major American explorers in the utilization of radio. In 1925, the Amundsen/Ellsworth/Nobile expedition did not utilize radio, as did MacMillan/McDonald/Byrd. In 1926, neither Bennett/Byrd in their Folker tri-motors, nor Amundsen/Ellsworth/Nobile in the airship "Norge," used airbourn radio. In 1928, however, a battery-powered emergency transceiver survived the crash of Nobile's airship "Italia" on the sea ice north of Spitsbergen. Flyers and ice breakers from five nations searched the sea ice for weeks and failed to spot the survivors huddled in a bright red tent. Finally, radio operators picked up the very weak transmissions of the survivor's emergency transceiver and planes were guided to the crash scene, preventing further loss of life. Unfortunately, polar pioneer Amundsen and five companions lost their lives during the search for Nobile when their French built and equipped seaplane apparently crashed into the sea. The French seaplane was not equipped with radio.
25. "What We Northern Men Owe Zenith" was a speech given at numerous locations throughout the U.S. in the winter of 1924-25 and in subsequent years. The speech title was modified at some time to "What We Northern Men Owe to Radio." However, the wording of the quoted concluding paragraphs remained unchanged. Three typescripts of the speech are located in the MacMillan papers at the Hawthorne-Longfellow Library at Bowdoin College.
26. MacMillan gave components of this speech at many functions and received a great deal of newspaper publicity for himself, his expedition fund raising and for Zenith. On January 24, 1925, he presented the portions of the speech over WEBH. During this presentation, "...he gave much credit to Mr. McDonald, and the Zenith Radio Corporation, whose efforts made it possible for the expedition to keep in constant touch with the outside world by means of broadcasting and receiving apparatus." "Donald MacMillan 'On the Air'." *The Talking Machine World* (February 15, 1925): 147.
27. The continual setting and breaking of long distance communications records during this era makes very interesting reading, particularly in *QST*. A comprehensive history of the development of the shortwave bands from the amateur point of view is found in DeSoto, Clinton. *Two Hundred Meters and Down, the Story of Amateur Radio*. West Hartford, CT: The American Radio Relay League.
28. Standard references of polar exploration list a flight over Spitzbergen in 1923, and several seaplane flights, again limited to the Spitzbergen area, during Binney's 1924 expedition.
29. *Toward the Poles: A Brief Account of Polar Exploration*." Washington, D.C.: Dept. of the Navy, 1950, 166-167.
30. Holland, Clive, ed. *Farthest North.* New York: Carrol and Graf, 1994, 223-285.
31. Repeated from newspaper accounts without attribution in: Fraser, Chelsea. *Heroes of the Air.* New York: Thomas Y. Crowell Company, 1926.
32. In fact, Amundsen along with American Lincoln Ellsworth, jumped off from Kings Bay, Spitzbergen, on May 21, 1925, at 5 PM. By 1 AM, they were within 136 miles of the Pole when shortage of fuel forced them to turn back. An almost fatal mistake was made when they landed in a small open lead to converse and get their bearings for the return flight. One of their two "Whales" (Vals) was badly damaged on landing and the Ellsworth crew almost lost their lives trekking over fresh thin ice to reach the other seaplane. The lead closed around the second ship and only superhuman effort by the crew got her up on the ice floes. For most of the next month, the crews faced slow starvation as they struggled to construct several ice runways. During much of the preparation for the MacMillan expedition, changing the flight plans to a search for Amundsen was a very real possibility. Only by the narrowest of margins did the Amundsen party finally take off, on June 18, and return to Spitzbergen to surprise a waiting world. Needless to say, the Amundsen party had no radio equipment with them. The MacMillan party learned by radio of Amundsen's reappearance and kept to their original plans.
33. For a discussion of the circumstances of "Commander" McDonald's rank, see endnote # 38 in the section, "The Early Years."
34. Some authors have related that these first three Navy Loening amphibian aircraft were model "O1-A1." Grover Loening's definitive book, *Amphibian, the Story of the Loening Biplane*, contains an appendix which lists the three amphibians used on this expedition as being model "OL-2." Model O1-A1 is an Army version which differs from the OL-2 in the size and shape of the rudder and has an added dorsal fin running along the top of the after fuselage. A beautifully restored example of this latter model is on display in the USAF museum in Dayton, Ohio. Other OL series models were produced for the Coast Guard and for the U.S. Marines for use along the Yangtze River in China.
35. Two letters in the Zenith archives from Secretary Wilbur to McDonald detail this March 1925 incident. It was recalled many years later in a November 2, 1957, letter from McDonald to MacMillan, found in the MacMillan papers at Bowdoin College.
36. Letters from Lt. Commander Byrd, Bureau of Aeronautics, USN, to Captain Bartlett, February 24 and March 30, 1925. The R.A. Bartlett papers, Hawthorne-Longfellow Library, Bowdoin College.
37. In that spring of 1925, the Navy had just contracted with Loening for amphibians. The first production models of the earlier Army order were just being finished at the Loening plant in New York City; the Army "loaned" the Navy the three amphibians sent North. These three planes were designated NA-1, NA-2, and NA-3. This series of events was indicated in the fragmentary McDonald files, confirmed in the Schur papers and discussed in some detail by Grover Loening himself in *Amphibian, the Story of the Loening Biplane*.
38. MacMillan's biographer, Everett S. Allen, notes that Commander MacMillan purchased the ship from a Hearst newspaper sports editor. However, MacMillan had no source of funds and had no time to raise the capital by public subscription that winter after his September return from the 1923-24 Expedition. (Four years earlier, he had taken over a year to raise the money, by public subscription, to build the *Bowdoin*.) Further, MacMillan's papers at Bowdoin College contain a three-page June 22, 1927, letter from McDonald to MacMillan which states, "It was a funny thing the other day, Mac, while roaming thru my safety deposit vault I ran on to the bill of sale of the "Rowena" now the "Peary" and telegraphed you immediately. I have now mailed it to Gould [presumably the new owner] so that it will be in his hands from this time on." One of the McDonald file photographs of the *Peary* at Etah, Greenland, shows the stern of the vessel. Her home port listing, easily visible, was shown as "Chicago." (Had MacMillan owned the ship, the home port would have been either Provincetown, Massachusetts, or Freeport, New Brunswick, or Wiscasset, Maine.) Elsewhere in the Commander McDonald's files are photographs of the burgee of the Chicago Yacht Club which flew aboard the *Peary* during the 1925 Expedition. Taken together, this partial evidence is rather convincing that McDonald did, in fact, buy the *Rowena/Peary* for the expedition. It is rather typical of McDonald that this largess was not made publicly known. Following the expedition, the *Peary* was sold at auction, a detail apparently handled by McDonald.
39. An after deckhouse was removed and cradles were built in its place for the three amphibians. The bow was also filled with cement to reinforce it for use as an icebreaker in the Arctic ice fields and the bow and stern received extra plating.
40. DeSoto, 86.
41. Taylor, Lt. Commander A.H. "Radio Communication of Shortwaves." *Radio Age—"The Magazine of the Hour"* (June, 1926): 19-20.
42. "Memo for Mr. E.F. McDonald of the Zenith Radio Corporation" Staff Headquarters, Ninth

Naval District, March 11, 1925, #C-25502, Zenith archives.

43. The authors discovered a file copy of a letter from McDonald to Admiral of the Fleet Coontz, which was a reply to a letter from the Admiral. In it, McDonald apologized for not requesting personal permission from Admiral Coontz to place Schnell aboard the *Seattle*, stating that he (McDonald) had incorrectly thought that Secretary of the Navy Wilbur's permission was all that was necessary. McDonald went on to state that Schnell's presence was for research and scientific purposes and that Zenith had no commercial interest in shortwave or in using Schnell's presence with the Fleet in advertising. While this letter apparently highlights a minor error in McDonald's handling of internal Navy protocol, it is irrefutable evidence of McDonald's key personal role in the Navy shortwave experiments of the summer of 1925.
44. In later years the Navy undertook a formal study of the early history of the development of shortwave in the Navy. In October 1945, Commander McDonald received a letter from the Bureau of Ships of the Navy Department discussing this study [Refer to File 900, BUSHIPS 1945] The letter discussed some of the difficulties encountered in the study, the passage of time, and so on, and concluded by saying: "Notwithstanding the difficulties above mentioned, a considerable amount of factual information has been assembled from which it can be concluded that Zenith played a very significant role in the introduction and early history of short-wave radio in the Navy."
45. Reinartz, 1XAM/1QP, and Fred H. Schnell, then aboard the *Seattle*, were the two American amateurs who had established two-way contact with French amateur Leon Deloy, 8AM, and thus had been the first to bridge the Atlantic on 100 meters just 18 months previously. Refer to DeSoto (*Two Hundred Meters and Down*) for further discussion of this historic era in radio history.
46. In fact, most long distance communication on the expedition took place on 40 meters.
47. A somewhat incomplete description of the radio equipment of the 1925 Expedition is given in *QST* (July 1925): 21-22. The description of the equipment aboard the *Bowdoin* seems accurate. The article, however, fails to mention shortwave equipment aboard the *Peary*. The two kilowatt shortwave transmitter aboard the *Peary* and its operator (Paul McGee, 9AE, of Mattoon, Illinois) are discussed in an August 1925 *QST* article. This article also mentions the intention of the expedition to use station WAP (the *Peary*) to broadcast local Eskimo talent on shortwave and, if possible, to then simultaneously rebroadcast it over Zenith's Chicago radio station, WJAZ.
48. The full complement of the Naval Arctic Unit was:

    Lieutenant Commander R.E. Byrd, USN(Ret.)
    Lieutenant M.A. Schur, USN
    Chief Boatswain E.E. Reber, USN
    Chief Machinist Mate, Aviation Floyd Bennett, USN
    Chief Machinist Mate, Aviation A.C. Nold, USN
    Chief Machinist Mate, Aviation N.P. Sorensen, USN
    Aviation Machinist Mate 1st Class C. F. Rocheville, USN
    Chief Aerographer Albert Francis, USN

    Moffett, who appointed the flyers, had served as Commandant of the Great Lakes Naval Training Station from September 1914 to December 1918. Mathews and Hassel were at Great Lakes during the end of this period, just before they started Chicago Radio Laboratory. The authors were unable to determine if this served any role in the developments of the 1925 expedition.
49. Lt. Schur's daughter, Virginia Glendening, notes that her father developed and patented the airman's automatic self-inflating rescue raft for this expedition. He assigned the patent rights to the Navy.
50. "Commanders MacMillan and McDonald, Jr., Off on Exploration Voyage to Far North". *The Talking Machine World* (July 15, 1925): 163.
51. Throughout early June, extensive communications plans were developed jointly by MacMillan, Zenith, and the Navy. Letters and memos in the files of MacMillan, McDonald, Byrd, and Schur all record Navy Secretary Wilbur's close personal involvement in these plans. Even with all the planning, there was still one major misunderstanding. Wilbur wanted the *Peary* to be equipped with a large longwave transmitter formerly installed on the battleship *USS Florida*. Wilbur, not a radio man and aware of the Navy's considerable reliance on longwave equipment, wished such equipment aboard to "insure the safety of the men and planes." Even though the longwave transmitter would have very limited range in the constant daylight of the North, MacMillan and McDonald agreed to the Wilbur request. The *Peary*, however, sailed from Boston without the *Florida*'s transmitter aboard. Surviving accounts indicate that this occurred because the Navy transmitter did not arrive dockside by the time of the *Peary*'s very public departure. For a short time, Secretary Wilbur thought that the transmitter had been left behind intentionally and sent a very concerned radiogram to MacMillan who, by that time, was at sea on the way to Sydney. MacMillan responded immediately that they, indeed, *wanted* the Navy radio aboard and suggested that the *Florida*'s radio be sent North to Sydney where the expedition would wait as long as necessary for its arrival. The fast Navy destroyer *Putnam* arrived in North Sydney on June 25 and the *Peary* took the longwave transmitter aboard. There are numerous pieces of correspondence related to this matter in the private files of all concerned. Probably the one of most historic importance is a private cable from Sydney in which Lt. Commander R.E. Byrd assured Secretary Wilbur that the whole matter was, indeed, an honest misunderstanding. A copy of this cable was forwarded to Commander McDonald, and found in his papers. The private files of Adm. Byrd also contain several pieces of correspondence and private notes related to this matter. All are consistent with the view that this incident had, at its root, an honest misunderstanding. Although the transmitter was apparently installed before the Navy planes flew in the High Arctic, as ordered by the Secretary of the Navy, there is no mention in any document or article of the *USS Florida*'s transmitter ever being used by any member of the expedition.
52. McDonald report to the National Geographic Society, June 10, 1925.
53. It was letters from these isolated Labrador missionaries, and possibly letters from a few of their brethren in Greenland—all rather desperate for more batteries—that eventually led McDonald and Zenith into the Wincharger business to electrify America's rural areas with wind power. Typical of McDonald, even in internal Zenith publications, he did not speak of letters from missionaries, only of "friends in the North."
54. Sometime during the trip north from Sydney to Battle Harbor and Jack Lane's Bay, the propeller of the *Bowdein* became badly bent. The specific circumstances surrounding the damage to *Bowdein*'s propeller is not clear from contemporary sources on the expedition. Some papers indicate that *Bowdein* had run aground, others that she fouled her prop with a trailing line, some had other theories.
55. Several references to this race were found in radiograms in the Zenith archives from McDonald to friends in the U.S. McDonald clearly loved both competition and winning.
56. On the return voyage, during a stop at Godthaab, McDonald purchased a second kayak as a gift for Sport Herrmann. The Commander planned that he and Sport would race them around the Chicago Yacht Basin in years to come. A photograph from the Zenith archives shows Commander McDonald and another figure, believed to be MacMillan, racing kayaks along the promenade of the Chicago Riverfront near where McDonald moored his yacht, *Mizpah*. The next time these kayaks appear in the written record was a very uncharitable complaint from the head of the Zenith packing shop in the late 1930s, Fred Cassens, which was published in *Radio Age*, March 1986. Cassens relates that he was asked to construct special slings in a box car to transport one of the kayaks to the Smithsonian Institution in Washington. Cassens was completely confused as to the facts, but he was very clear in his animus toward McDonald.
57. The only primary evidence of this historically important incident which remains is the daily report sent by McDonald to the National Geographic on July 24:

    24 July 1925
    National Geographic Society
    Washington DC

    Many thanks for your wonderful cooperation in expediting official message to and from Danish Minister. Governor Rosendahl sent message from Peary to Washington via 9XN at two AM Friday. Received response a few moments ago ten thirty same night. It made the governor feel most happy is on board the Peary in my stateroom as I dictate this and we are enroute Umanak for coal having left Disko Godhavn nine AM and should arrive Umanak mines at seven AM tomorrow Saturday. Mines are surface mines within twenty feet of shore we should be loaded in twenty four hours even with crude loading facilities. Governor Rosendahl deserves great credit for cooperation he has extended us

on very ambiguous advice. He however immediately upon receipt of the official communication from Secretary of Navy to Commander Byrd advising Danish cooperation thru American Minister agreed to give us the coal and to expedite delivery came with us we are towing his little auxiliary schooner so that he may return from Umanak. He brought with him aboard also famous Eskimo Pilot Peter Dalager and Aage Bretting, Danish Engineering Consular for the Government of Greenland. Norwegian steamship Danelac [sic.] arrived Godhavn just before our sailing but Governor Rosendahl realizing time emergency came with Peary regardless. Immediately after loading we will head north and join Bowdoin that left Godhavn at eleven AM someplace north they traveling under sail only and not going into Umanak with us.

58. Byrd, Lt. Cmdr. R.E. "Report of Activities of Naval Aviation Unit assigned to MacMillan Arctic Expedition."
59. Arctic aviators now know that the ONLY predictably safe landing areas in this region are ironically, on the vast smooth central ice cap of Greenland itself, a fact first noted by Schur and then confirmed by Bennett and Byrd on the last flight of the expedition. This discovery was exploited by the Allies during WWII and by the American military during the early days of the Cold War.
60. The air operations of the 1925 Expedition were thoroughly documented in Byrd's article "Flying Over the Arctic" in the November 1925 issue of National Geographic magazine.
61. Partial copy, official *Report of Activities*, Byrd Papers, The Byrd Polar Research Center, Ohio State University.
62. One of these two operators was a young amateur, Gilbert Gustafson. In later years, "Gus" became the legendary Chief Engineer and Vice President for Engineering at Zenith.
63. "Zenith Triumphs in Attempt to Communicate With MacMillan Expedition." *The Talking Machine World* (August 15, 1925): 138.
64. S.I. Marks was listed as either Treasurer or General Manger of Zenith during this time period. In one of the reorganizations of Zenith leadership a few years later, Marks became the New York distributor for Zenith, a key and potentially lucrative position in the organization.
65. MacMillan's only diary reference to radio during the stay at Etah was a notation, on August 17, that "the *Peary* contacted New Zealand last night." This is confirmed by Schnell's published narrative of his voyage on the *Seattle* (*QST*, Jan. 1924). Schnell went on to detail that he had other contacts in seceding days "with little difficulty."
66. Two people who write on radio in the 1920's, Alan Douglas and Ludwell Sibley, have questioned whether this broadcast ever occurred, and in fact, Douglas declared that it "did not happen" (*Oscillator*, Vol. 4, No. 2, February 1996). Douglas states that "the full story of this cruise is in *QST*, in DeSoto's book *200 Meters and Down* and in Howeth's *History of Communications-Electronics in the US Navy*. The private papers of the leaders of both the 1923 and 1925 MacMillan expeditions show that the radio operator's published logs of both expeditions are woefully incomplete in so far as non-amateur radio operations are concerned. *200 Meters and Down* is a history of amateur radio and covers the 1925 Expedition in a single paragraph; ***QST* magazine published the logs of WNP, John Reinartz, aboard the *Bowdoin*, but did not publish the logs of WAP, the *Peary*, AT ALL!** None of the six broadcasts from the *Peary* during the expedition were discussed in *QST*, which seems understandable, since it is a magazine about amateur radio. Four of the six were covered elsewhere in the press of the day. McDonald's files contain numerous radiograms sent from the *Peary*, many dealing with business at Zenith and many sent as personal greetings to friends.

Douglas also states that the *USS Seattle* was in Wellington Harbor on all dates when this broadcast would probably have happened, which is correct. As far as can be told from the records, the fleet was never in what could be called "Tasmanian waters" or "off the shores of Tasmania." This "Tasmanian" error was repeated by Admiral MacMillan in interviews leading to his biography (refer to Allen, *Arctic Odyssey*, 263-264), a portion of which reads as follows:

> As the U.S. fleet steamed west and the MacMillan expedition north, Schnell kept in constant touch with the *Bowdoin* by short wave. *When the Bowdoin reached Etah and the fleet was off the Tasmanian coast* [present author's italics], their short-wave communications were maintained with all parts of the United States, for the first time in radio history.

At the time MacMillan put a group of Eskimos in front of the microphone at Etah to sing for Admiral Coontz of the Pacific fleet, sending the human voice almost exactly halfway around the world, a record that never had been approached in those days when most ship-to-ship communication and most amateur transmissions of any distance were tapped in code. Admiral Coontz commented that the Eskimos sounded like a college cheering section. MacMillan agreed.

The authors have recently located the likely source of this confusion in the location of the *Seattle*: In late 1924, Zenith issued a press release to announce their new portable radio station, one paragraph of which states:

> For this series of experiments, which promises to be so intensely interesting, the call letters 9XN, intimately and long familiar to the general public, will be used. They will be remembered as the call letters that played so important a part in the radio communication with the MacMillan Arctic Expedition [in 1923-24]. The same call letters were prominently connected with the record breaking transmitting reception episodes when music and messages from Chicago were heard in Hobart, Tasmania; Melbourne and Sidney, Australia; and by the British Fleet off Tasmania, after Captain Waldo Evans, U.S.N., Commandant of the Ninth Naval District, extended the compliments of the United States Navy to the British Navy.

This press release, although referring to Chicago based 9XN, is the earliest mention we have found of locations "off Tasmania." There are also several published accounts of many ex-patriots and the U.S. Consul in Suva, Fiju, hearing WJAZ somewhat regularly at about this time (1923/24).

Douglas states that published portions of Schnell's logs (fall and winter 1925-26 issues of *QST* magazine) do not make reference to this occurrence. In fact, Schnell's seven-page narrative of his voyage on the *Seattle* was published in the January 1926 issue of *QST* and contains the following: "Holland OSV was heard August 16 at 4:45 P.M. and shortly after that *I heard some funny noise which turned out to be WAP [the Peary]—Lord what a note!* [present author's italics] August 19 I clicked with WAP after 6AWT fixed us up, and WAP was worked several times after that without much trouble."

It should be noted that Schnell and McDonald remained lifelong friends and regular correspondents. In fact, the *Zenith Radio Log* of January-February 1944 contains a long feature article on the visit of Captain (soon to be Commodore) F.H. Schnell to the Zenith plant and highlights the Eskimo broadcast to Admiral Coontz.

Another compelling piece of evidence is a quite angry radiogram from McDonald to the National Geographic Society, dated September 20, 1925, and followed the next day by an equally angry daily report (September 21), from McDonald to National Geographic, concerning the public claims which had been published, apparently from material in an NGS press release, telling of an New Zealand amateur's claims that he had set the current long distance record by receiving WAP (the *Peary*), but that signals were too weak for full two-way contact. McDonald made things very clear in that regard:

> 21st September 1925
> National Geographic Society
> Washington, D.C.
>
> Supplementing my radio of last night, New York Times September sixth credits National Geographic statement quote The record of greatest distance covered from MacMillan Expedition was Omeatra of Gisborne New Zealand who was unable to maintain two way communication due to extreme distance stop. This is directly contrary to fact and contradicts our statements previously radioed you as evidenced Williams messages August twenty fifth and twenty seventh to you quote McGee established new long distance record today daylight holding two way communication Boxhill Victoria Australia. Williams unquote. Other messages too numerous to quote have advised of consistent two way communication maintained with New Zealand and Australia including the message to the American Radio Relay League sent to Lieut. Schnell on board USS Seattle then laying at Wellington to New Zealand to the American Radio Relay League Convention Chicago relayed from New Zealand to the Peary Etah and by us back to Chicago on August twenty second stop

We have in daylight established voice and music communication with Australia and New Zealand stop September third, I radioed you of two hour voice program sent from Umanak and received New Zealand stop From KFUH five hundred miles north of Papeete Tahiti, we received greeting to expedition on August twenty second stop August twenty second greetings from the Army station Hawaii KXJ I received same date Peary received message of greeting from Governor General Foster of Australia and from Watt editor Sydney Wireless weekly thru two YI Sydney stop August twenty ninth received greeting from Governor General Ferguson of New Zealand thru two AC Gisborne New Zealand who is I.H,. Omerara who reported our signal strength in two way daylight communication maintained with him as five Contrary to your article, he had no difficulty maintaining two way communication stop Referring your article September first Hartford Times, Reinartz was removed for your good as much as ours and I have made no press statement for the reason of his removal simply to be charitable to the boy and I trust I will be forced to make a statement. Incidentally I note that he is referred to in this article as Lieut. Reinartz and he has represented himself as a naval reserve officer which is absolutely untrue.

McDonald.

Finally, the most compelling rationale for belief that the broadcast did occur as written is simply the fact that all of the major players were "Navy men" operating in public. To imply that McDonald and MacMillan, with Schnell's help, would perpetrate some sort of public relations fraud involving the Commander-in-Chief of the U.S. Fleet (whom they did not know) while they were surrounded by active duty Navy personnel commanded by Lt. Commander Byrd (who had very frosty relations with MacMillan and McDonald), simply staggers the imagination.

It is most unfortunate that such not-fully-researched claims have been given some credibility in the radio hobby press, resulting in a biased and inaccurate view of McDonald and Zenith and their contributions to Arctic radio. As Douglas stated in the February 1996 *Oscillator* "...it illustrates the risks of not examining one's sources."

67. "Commander E.F. McDonald, Jr., Tells of Importance of Radio in Northern Wastes." *The Talking Machine World* (November 15, 1925): 148.
68. *QST* magazine, the official organ of the ARRL, covered the activities of the 1925 expedition and is one of the primary sources commonly available to casual readers. Caution should be exercised in assuming that the *QST* reports and, indeed, the logs of the operators are a complete record of the radio activities of the expedition. They are not complete. Every single non-published source that we have accessed—the papers of McDonald, MacMillan. and Schur—each document numerous instances of non-radio amateur uses of the equipment which does not occur in the operator's log books.
69. *The Talking Machine World* (September 15, 1925): 150.
70. This obscure story was found in the Illinois Writers Project publication "The Adventures of Broadcasting in Chicago," published by the Project, a cooperative effort of the Works Progress Administration and the Chicago Board of Education in 1942. McDonald and Karl Hassel were interviewed extensively for this publication.
71. Letters to the captains of both Danish vessels in the harbor, requesting radio silence ("unless it interferes with your own schedules or needs") were found in the McDonald files.
72. There are several radiograms in the McDonald papers concerning this event. The storm was severe enough to drive a Norwegian trawler ashore in Godthaab harbor during that night.
73. Radiograms on September 15, 1925, from E.F. McDonald, Jr. to S.I. Marks at Zenith. McDonald files.
74. Radiogram. September 19, 1925, McDonald files.
75. Radiogram. September 21, 1925, McDonald files.
76. Unpublished "History of Zenith" written in 1944 by Karl Hassel, with editing and notes by R. H. G. Mathews, the third co-founder of Zenith Radio Corporation. Zenith archives.
77. The Zenith Deluxe Line: Colonial Model ($650), English Model ($800), Italian Model ($1250), Chinese Model ($1750), and the truly massive Spanish Model ($2500). Prices quoted are retail price in 1926.
78. There were also several exchanges with the National Geographic Society during the four days spent at anchor in Battle Harbor, including several clarifying the erroneous claims of a new Zealand ham operator (refer to End Note 66) of holding the world distance record by hearing the *Peary* transmissions from Etah.
79. During the wait, Battle Harbor authorities informed McDonald that the *SS Home*, a coastal freighter and passenger vessel was also missing and feared lost; a sister ship had been lost with all hands in a similar blow five years previously. McDonald was preparing to get underway to search for survivors of both ships when word came that both were safe, though far off course. Reinartz' failure to keep his radio schedule or to answer the frantic calls of the Peary, coupled with a number of previous serious transgressions, caused his removal as chief operator of the expedition.
80. According to *QST* (November 1925), Admiral Coontz felt that Fred Schnell's efforts were a key element in improving fleet communications. *QST* states that the letter reproduced below was the only such letter written by the Commander-in-Chief of the U.S. Fleet at the close of the Pacific cruise:

CinC File No. A6-2 (10-99)
UNITED STATES FLEET
USS SEATTLE, FLAGSHIP
19-Es-(0)
Passage Papeete, Tahiti, to San Diego, California
Sept. 21, 1925.
From: Commander-in-Chief, US FLEET
To: Lieutenant Fred H. Schnell, USNRF
SUBJECT: Letter of appreciation.
ENCLOSURE: (A) Copy of CinC USFlt file A-6 (10-92) of 16 September, 1925.

1. There is enclosed, for your information, a copy of the final report on super-high frequency radio, for the cruise to Australia-New Zealand, 1925.

2. Upon departure from San Francisco, the fleet had no experience in super-high frequency radio. Upon completion of the cruise six months later the successful application of these frequencies for the fleet long distances work had been thoroughly tested and proved.

3. You have labored tirelessly for the success of the venture. The Commander-in-Chief takes pleasure in acknowledging the effectiveness of your work, and in thanking you for your efforts.

4. The work you are going in to endeavor to make the amateur organization ready in event of National need, is an exceedingly important one. Through you, may I express my wishes for its happiness and success?

(Signed)
R.E. COONTZ
Admiral, US Navy
Commander-In-Chief
UNITED STATES FLEET
Copy to—
CNO
BuNav

The Navy moved swiftly to implement the new shortwave technology. The September 1925 issue of *QST* lists, for the first time, the shore and fleet stations with true shortwave capability (wavelength of 90 meters or shorter). The shore stations were: Bellevue, D.C.; Honolulu, T.H.; San Francisco, CA; Tutuila, Samoa; Balboa, C.Z.; Cavite, P.I.; Great Lakes, Illinois; Lakehurst, NJ; Quantico, VA; San Diego, CA; and Washington, D.C. With the fleet, besides the *USS Seattle*, shortwave equipment was in use on the *USS Relief*; *USS Canopus*; *USS Mexico*; and the *USS Pope*. The Navy airships, the *USS Los Angeles* and *USS Shenandoah* were also equipped to transmit and receive at shortwave frequencies.

81. "How Com. McDonald Kept in Touch With His Office". *The Talking Machine World* (November 15, 1925): 58a.
82. Dated July 30, 1928.
83. "Copper: Its Mining and Use by the Aborigines of the Lake Superior Region—Report of the

McDonald-Massee Isle Royal Expedition 1928." *Bulletin of the Public Museum of the City of Milwaukee* (May 29, 1929), Vol 10 (1): 1-182.

84. "An Archaeological Reconnaissance of Isle Royale, Michigan by Fred Dustin." October 1, 1931. Museum of Anthropology, University of Michigan, Ann Arbor, Michigan: 1-59.
85. An excellent account of the Cocos Island treasure and its many hunters is found in: Hancock, Ralph and Julian Weston. *The Lost Treasure of Cocos Island*. New York: Thomas Nelson & Sons, 1960, 325.
86. While in Panama, the group arranged with Col. J.A. Mars to take an hour-long flyover of Panama and the Canal. They also were provided a VIP tour of the tunnels under the locks.
87. Two accounts of the Cocos Island Expedition are found in the McDonald files, one by Sport Herrmann and one by Dr. Brownell. Both logs include details of the experimentation with the treasure hunting device. A third account, by McDonald, is: "On Board Yacht Mizpah." *The Cherry Circle*, Vol. XLIX (4), April 1930: 9-15.
88. Dr. Friedrich Ritter was a doctor of philosophy and doctor of medicine who had received his degree from the University of Freiborg, Germany. He had come to Charles Island with Frau Dore Strauch (Koerwin) attempting to establish a vegetarian Eden. Frau Strauch's husband was left in Berlin under the care of Dr. Ritter's wife.
89. Strauch, Dora (as told to Walter Brockmann). *Satan Came to Eden*. New York: Harpers, New York, 1936.
90. Commander McDonald corresponded regularly with the Ritters while they were in the Galapagos. Dr. Ritter sent his philosophical writings to McDonald, who paid to have them translated into English, edited by Baker Brownell, then translated back into German and returned to Ritter. The Commander also sent the Ritters any supplies they needed or requested.

    When Strauch returned to Germany, she turned to McDonald for help in compiling her story. McDonald had read of a young American reporter living in Berlin, Walter Brockmann, and arranged for him to actually write the book from Dora's stories. The Commander also negotiated the book contract with Harpers for her (with absolutely no return to himself) and arranged for Baker Brownell to perform the final editing. The Commander stayed in contact with Strauch until her death, helping her financially from time to time.

    For further information on this almost unbelievable story, the authors suggest you read, in addition to Strauch's book, "Satan Came to Eden," the following materials: "Berlin Couple Happy in Modern Eden. *New York Journal* (April 20, 1932); "Pomp and Ceremony Lacking in Court of the 'Empress' of Charles Island". *The Kansas City Times* (February 19, 1934); "A Strange Tropical Eden Shrouded By Death Mystery". *The Chicago Daily News* (November 22, 1934): 34; "An 'Empress' Rules Eden With a Rifle". *The Sunday Chronicle* (London) (June 9, 1935): 6; "Tragedy in Paradise: Behind the Scenes of the Galapagos Mystery". *Detective Tabloid*, (month unknown, 1936):12-17, 62-64; "The Ascetic Life in Sunburned Galapagos". *New York Herald Tribune*, Books (May 24, 1936): 5.
91. The group not only captured animals for the Chicago Zoo but also the Syracuse Zoo.
92. "Buy the Galapagos". *Chicago Tribune* (May 4, 1930); "How to Buy the Galapagos." *Chicago Tribune* (June 8, 1930).
93. "Buy the Galapagos". *Chicago Tribune* (October 3, 1930).
94. "Citizens of Ecuador Urge Galapagos Be Leased to France". *Chicago Tribune* (October 23, 1930).

Chapter Six: Surviving The Depression

1. Perrett, Geoffrey. *America in the twenties*. New York: Simon and Schuster, 1982, 339.
2. Watkins, T.H. *The Great Depression*. Boston: Little, Brown and Company, 1993, 38.
3. "Annual Report for the Year Ending April 30, 1929. Zenith Radio Corporation, Chicago." Zenith Archives.
4. Allen, Frederick. *Only Yesterday: An Informal History of the Nineteen-Twenties*. New York: Harper, 1951, 294-318.
5. Even banks were having problems keeping money flowing fast enough. On September 19, 1929, The First National Bank of Chicago, the chief bank used by Zenith Radio Corporation as well as McDonald for his personal accounts, sent Commander McDonald the following letter:

    > As indicated to you in our conversation on the occasion of your last visit, we are meeting with an almost unprecedented demand for loans from all quarters and as a result, we have been and are heavy borrowers from the Federal Reserve bank at a period of the year when ordinarily we would owe them nothing. Due to this condition, we have for some time been asking the assistance of all of our friends in an effort to reduce this indebtedness.
    >
    > I do not want you to interpret this letter in any sense as "calling your loan," but if you can conveniently effect a reduction from time to time, it will be helpful. You of course are familiar with conditions and I know you will appreciate our position and be glad to co-operate with us.

    McDonald paid the loan "in full" in three days. The Crash came within a month.
6. The reference to a "Zenith Junior Line" is most likely the genesis of the Zenette and/or the Interocean sets.
7. The Zenith leadership later changed their attitude about the benefits of "exclusive" dealership and actively encouraged exclusive Zenith dealers to carry "the best competing line you can get," believing that Zenith sets would prosper when customers could make direct comparisons with competing sets.
8. McDonald to Stockholders of Zenith Radio Corporation, July 10, 1930, with attachment: Extemporaneous Remarks of Paul B. Klugh, Vice-President and General Manager, Zenith Radio Corporation, to stockholders at the Annual Meeting held June 23, 1930, in Chicago.
9. "Zenith Radio Corporation Applies for Stock Exchange Listing." *The Music Trades* (February 24, 1928).
10. Hassel, Karl. Interview with Bernard Schwartz, Chicago, Illinois, September 23, 1970.
11. Zenith had been linked to a merger story earlier. *The Chicago Evening American* had run a Zenith/Wurlitzer merger story on October 23, 1928. In a personal letter to friend Thomas Pletcher, McDonald stated "...was actually a misprint in the office of the Chicago Evening American. The tape actually carried a story, saying that Wurlitzer has secured a substantial interest in All-American Mohawk, rather than Zenith. Thought it would give you a laugh anyway." McDonald files.
12. McDonald files.
13. Much later, in mid-1934, McDonald did propose that Zenith, Atwater-Kent and Crosley combine purchasing power to cut the cost of certain components used by all three in radio manufacturing. McDonald to Schwank, July 30, 1934. There is no indication that the proposal was ever instituted.
14. McDonald, Eugene. "Radio—An Economical Necessity". Manuscript copy of article submitted to several radio magazines in 1930. McDonald files.
15. Letter dated October 17, 1930. McDonald files. The letter was found attached to a mailing list that contained the names of prominent business men, chiefly in Chicago.

    McDonald often sent letters to a wide audience to explain his philosophies or merchandising concepts—his files contain numerous letters of this type. An interesting look at McDonald's merchandising mind is found in a letter sent in March 1934 to all oil and tire companies. McDonald had noticed that the streets were deserted during a half-hour address by President Roosevelt. He suggested that this lack of product usage was costing the oil and tire companies money and suggested that they join his campaign to endorse auto radio. McDonald files.
16. "Zenith to Issue Supplementary Device Patents." *Radio Retailing* (September 1930): 76.
17. McDonald to Zenith Distributors, June 2, 1930. McDonald files.
18. "Zenith Reverses Policy." Press Release, May 31, 1930. McDonald files. Also, text of telegram, Zenith Radio Corporation to Utah Radio Products, May 31, 1930. Also, text of telegram, Utah Radio Products to Zenith Radio Corporation, May 31, 1930. McDonald Files.
19. "Gossip Starts Merger Yarn About Zenith." *Chicago Daily News* (November 25, 1930).
20. McDonald Files.
21. McDonald to Baumer, February 9, 1931. McDonald Files.
22. The prices for models in this paragraph come from an early original factory brochure and are higher than often seen printed elsewhere. Zenith reduced their retail prices to stimulate sales and

a new factory brochure was printed reflecting the new prices. Refer to the data base for further explanation.

23. Annual Report for the Year Ended April 30, 1931, Zenith Radio Corporation, Chicago.
24. "The Season Opens." *Radio Retailing* (October 1931): 34-35, 68.
25. "Get Behind It!" *Radio Retailing* (September 1931): 41-42.
26. Internal memos from Paul Klugh on January 10, 1931, authorize manufacture of 2000 "Hypermetron" chassis and the plan to install them all in Model 79 cabinets for the "Hypermetron Model 89." A second memo the same day authorizes a Model 72X to use up the remainder of the Model 71 cabinets and 70 Series chassis.
27. "Zenith Quick Assets 6 To 1 Over Debts, Annual Report Says." *The Talking Machine and Radio Weekly* (June 15, 1932) 1, 23.
28. By the close of the 1933 model year, the Interocean experiment appears to have been abandoned. The authors have found neither images nor print advertising from 1933 which makes any reference to these radios. No information on Interocean was found in either the Zenith archives or the McDonald files. The only surviving information we have been able to locate is in the service manuals and within the vintage radio community. Zenith may have bought the name from the defunct Interocean Radio Company, an early manufacturer of radio horns.
29. "Annual Report for the Year Ended April 30, 1934." Zenith Radio Corporation, Chicago. Zenith Archives.
30. "Speech as Delivered: Commander McDonald to Employees, November 21, 1938." McDonald Files.
31. "Radio Prosperity Campaign." *Radio Retailing* (July 1933): 10-12. Also: "Entire Industry Backs Radio's Prosperity Campaign." *Radio Retailing* (August 1933): 10-15; "Campaign News." *Radio Retailing* (September 1933): 18-19.
32. "New and Novel Broadcasts." *Radio Retailing* (December 1933): 6-8; general sources.
33. McDonald files.
34. Research by the vintage radio community has identified the chassis of 1934 models 701, 702, and 801 as having been manufactured by Belmont Radio Corporation and the 1934 models 730, 735, and 740 chassis as being manufactured by Wells-Gardner. It is possible that the two least expensive 1935 Zeniths were also manufactured by another entity.
35. The first 100 Stratospheres produced tuned up to nearly 64 megacycles. Units produced after the first 100 only tuned up to 45 megacycles. Company legend indicates that the local oscillator was only effective at that very high frequency with carefully selected tubes. Units produced after the initial 100 run were redesigned to work with "normal" tubes and the dial face was redesigned to reflect the new lower frequency range.
36. Annual Report for the Year Ended April 30, 1936. Zenith Radio Corporation, Chicago. Zenith Archives.
37. "Commander McDonald of Zenith." *Fortune* (June 1945): 214.
38. "Annual Report for the Year Ended April 30, 1934" and "Annual Report for the Year Ended April 30, 1935", Zenith Radio Corporation, Chicago. Zenith Archives.