NATIONAL RADIO NEWS

1914 1944

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LET THESE WORDS BE WRITTEN IN GRANITE WHERE ALL MAY SEE—"A GOOD NAME ENDURETH FOREVER."

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Romance of Radio 1914 to 1944

By W. FRANKLIN COOK

N. R. I. Technical Consultant

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1914 These were the "good old days"—when Radio was referred to as "wireless" most of the time—when only the stout-hearted dared walk into the room of a Radio fan and risk jarring the "cat's-whisker" off the long-sought-for sensitive spot on the galena crystal—when tubes were so microphonic that a heavy footstep anywhere in a house sounded like Major Bowes' gong in the phones—when practically all broadcasts were in code, and many a tense midnight listener mistook static for voices from the moon or Mars. "Bloopers," those unforgettable regenerative receivers developed by De Forest in 1912 and Armstrong in 1914, were just becoming known among experimenters; these sets acted like miniature transmitters during the tuning process, causing howls in neighboring receivers for blocks around. Loudspeakers existed only in the dreams of inventors; listening was done with headphones, and crushed and aching ears were the reward for perseverance.

The two-element rectifier tube had been invented by Fleming in 1906, and De Forest had added a grid to this tube in 1909. Pickard had perfected the crystal detector in 1907, and it was for many years the most popular of all detectors. Of course, Marconi had in 1901 amazed the world by broadcasting the letter "S" from Poldhu, England, to Saint Johns, Newfoundland. Our own NAA in Arlington, Virginia, went on the air in 1913 with a 100 kw. spark transmitter operating on 6,000 meters. About this same time Nauen, Germany, began broadcasting on 16,900 meters or about 18 000 cyc'es (just above the audio band), and station FL atop the Eiffel Tower in Paris began broadcasting on 10,000 meters. Many an old-timer still remembers tuning in these stations with a crystal set having huge tuning coils and an aerial hundreds of feet long. The Titanic had crashed into an iceberg in 1912, with Radio summoning assistance and bringing news of the disaster to a young wireless operator named David Sarnoff (now President of RCA) who was listening in a New York City skyscraper.

It was in 1914 that Hiram Percy Maxim founded the American Radio Relay League. War broke out in Europe this year, and amateur licenses were suspended in practically all foreign countries. American amateurs listened with suspicion to German Radio stations in this country and found at least one to be sending code reports on allied shipping to German submarines; recordings of the messages, turned over to the Secret Service, resulted in confiscation of this Telefunken station.

Broadcasting of entertainment—even of grand opera with Caruso singing—was now several years old, with the De Forest Radio Telephone Company starting things off with phonograph records in 1907. Only a handful of experimenters heard these first "canned" programs, and these were more interested in DX (distant) code reception than in the highly distorted and almost unrecognizable music. Few people even dreamed of the vast entertainment possibilities of Radio during these days, and James E. Smith founded the National Radio Institute in this year primari'y to train men for careers as wireless operators on land and sea.

1915 Human voices leaped across the Atlantic for the first time in history; this radio-telephone conversation between radio operators at Arlington, Virginia, and the Eiffel Tower in Paris was also heard by listeners in Honolulu.

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More and more ships were being equipped with wireless, creating a demand for trained wireless operators. The ability of Radio to save lives at sea in time of disaster was demonstrated forcibly again and again.

1916 America was doing its best to keep out of the great conflict in Europe despite the sinking of the Lusitania by a German submarine in 1915. Wireless was adopted by the New York Police Department as a means of combatting crime. Across the seas, wireless telegraphy was made compulsory this year on all British vessels over 3,000 tons. Naval vessels of all countries were rapidly being equipped with wireless transmitters and receivers.

1917 America entered the World War. All amateur Radio enthusiasts pulled down their antennas and packed away their Radio apparatus in observance of a Government order. Many answered the Navy's call for volunteer wireless operators, and by the end of the war, over 3,500 American Radio Relay League members were in service as operators and Radio technicians. All activity in Radio during the war was concentrated in the various divisions of the Government and among Radio manufacturers who were making equipment for the Government.

1918 Radio played an important part in the activities of the U. S. Signal Corps in France, as well as in maneuvers of the U. S. Navy. Radio principles were applied to submarine-detecting apparatus for the first time. Radio technicians became an established unit of U. S. armed forces, doing all repair work on Radio apparatus. Tube manufacturers were making special hard (high-vacuum) tubes for the Navy, and somehow these tubes got out to the public shortly after the end of the war. Their superior performance doomed the former gaseous or "soft" tubes as amplifiers, although the soft detector was to reign supreme for some years to come.

1919 The war was over! All bans on Radio were removed and amateur Radio was re-established as a hobby. Spark transmitters were being junked in favor of vacuum tube oscillators, and more and more hams gave up C. W. for phone operation. Scores of commercial wireless stations were built in this country; most of them used the famous Alexanderson alternator, which was simply a huge A.C. generator capable of producing A.C. powers up to 300 kw. at frequencies over 100 kc. These alternators fed power directly to the transmitting antenna.

It was during this year also that Dr. Frank Conrad of Westinghouse broadcast phonograph records over a home-made transmitter in his garage in Pittsburgh, getting an avalanche of fan mail and requests for favorite recordings. Westinghouse officials were amazed at this interest in Radio.

1920 Westinghouse built its first transmitter in a little shack atop its nine-story factory in Pittsburgh. This station, eventually assigned the famous call letters KDKA, amazed the world with a broadcast of presidential election returns on November 2, 1920, followed by a report of Harding's election. Some two thousand newspapers began printing KDKA programs regularly; Radio was being acclaimed everywhere as the newest form of entertainment for the home, and receiver sales skyrocketed upward. Navy multirange receivers left over from the World War were being sold to the public at this time, as also were receivers using honeycomb coils. "C" batteries made their appearance, pleasing the public because they cut down plate current and made "B" batteries last longer. Receiving tubes were hard to get, and cost anywhere from $6 up. Radio experimenters spent about $2,000,000 this year, not for complete sets but rather for parts with which to build their own crystal sets, small vacuum tube receivers, and transmitters. The first Armstrong superheterodyne circuit was announced, and amateurs immediately began experimenting with its circuit.

1921 Station WJZ at Newark went on the air and soon was broadcasting regular bedtime stories. The Dempsey-Carpentier prize fight broadcast made a hit; Radio had a sudden flurry of activity, with hardware, stationery, drug and even millinery stores selling commercial receivers or merchandising the handiwork of a mechanically-minded son or kid brother. Horns with places for attaching headphones were offered at $10 and up; glass and wooden bowls were also widely used to boost the sound output of headphones and permit groups of persons to listen to programs. Attachments for holding phone units against the tone arms of phonographs were being sold this year.

Broadcasting stations were springing up like toadstools; while there were only 5 in December of the previous year, 532 more had gone on the air by September, 1922. More than 20,000 dealers rushed madly into this entrancing new field, and thousands more started manufacturing Radio apparatus. The majority of these received badly burned fingers toward the close of this year, when intense competition knocked the bottom out of prices. In New York, Chicago and elsewhere, cut-price Radio centers started up, offering the stocks of financially embarrassed and bankrupt Radio manufacturers at mere fractions of the original prices.

1922 WGY and WEAF went on the air, with WEAF making history by offering its facilities to advertisers. Major Armstrong announced his super-regenerative loop receiver, a 3-tube circuit which amplified signals over 100,

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000 times with "nary a bloop or squeal." Magnavox came out with a deluxe electrodynamic horn type loudspeaker. The Hartley regenerative receiver circuit was popular with experimenters. Practically every high school student of the time had a crystal receiver and spent hours jiggling the little coil of wire called a "cat's-whisker," in order to get maximum power into the headphones. What a thrill it was in those days to clamp on the headphones, tune the receiver and scratch up the crystal for half an hour, then have the thrill of hearing a station 25 miles away!

1923 Neutrodynes took the country by storm, and soon you were a social outcast if you didn't have one. These sets didn't squeal, and you could actually get a station twice in succession at the same dial setting—sometimes! President Harding had one of these receivers installed in the White House. Other popular receiver circuits included regeneratives and ultradynes; popular tubes were the 201A's, the 171A's and the UV199 "peanut" tubes. Vacuum tube receivers had replaced crystal sets, except possibly among the high school expefimenters. Loudspeakers had come to stay. Set manufacturers prided themselves on the assortment of knobs and gadgets which decorated receiver panels, but already the public was calling for a single-knob control. Women resented the unsightly batteries, and inventors worked day and night to find some means of operating receivers from ordinary light socket power. Radio receivers became obsolete in from three to six months during these days, with even the larger companies selling surplus stocks at half-price and lower to clear the shelves for new models.

1924 President Coolidge's cat, presumably wandering in search of some errant love, was sought for and found by Radio, with newspapers making much of the story. Over 1,400 broadcasting stations were now pumping programs into the American ether; each station took any frequency it pleased in the band between 200 and 550 meters, since licenses did not specify any definite operating frequency. High-power transmitting tubes were not available, and the power radiated by each of these early stations was even less than that consumed by the average one-slice electric toaster. Daily broadcasts of Major League baseball games began this year, making a hit with fans.

The receivers being turned out by manufacturers were becoming more and more complex. By the thousands, an eager public snapped up superheterodynes, reflex sets, T.R.F. receivers and neutrodynes, and immediately there arose a need for skilled men to service these complex creations. Earlier receivers had been so simple that they seldom required servicing, and the real technical equipment in transmitters was being installed and maintained by trained factory experts, many of whom were N. R. I. men. To meet the public demand for repairs on ailing receivers, Radio dealers began hiring men especially for servicing work—and thus a new profession was born. Early servicemen sweated over burned-out A.F. transformers in the famous De Forest Model D-7 self-contained loop receiver, which with four tubes and a crystal detector in a reflex arrangement gave seven stages of amplification. In the equally famous RCA "portable" superheterodyne, the catacomb coils and the extremely fragile 199 tubes were going bad and creating profitable service calls. Western Electric came out this year with a magnetic horn loudspeaker, and this was soon supplanted in popularity by magnetic cone loudspeakers, some more than three feet in diameter.

1925 Radio coils reached a peak in unique design; set builders had to choose from standard solenoid coils, pancake coils, spider-web coils wound on forms like the spokes of a wheel, honeycomb coils, toroidal or doughnut-shaped coils, binocular coils, bank-wound coils, random-wound coils and even figure-of-eight coils. Coil forms were often removed after the windings were cemented together with a coating of coil "dope," on the theory that this would reduce losses. The Raytheon cold-cathode gaseous type BH rectifier tube was perfected this year. Overproduction of receivers was a chronic complaint in the Radio industry, with hundreds of manufacturers plunging foolhardily into production schedules which inevitably resulted in bargain sales, receiverships and bankruptcies. Radio was now well established as a form of entertainment, and so intriguing was this entertainment to the public that each new improvement was received with open arms by all who could dig up the necessary money.

1926 The first all-electric sets timidly made their appearance, mostly with T.R.F. circuits and separate power packs. The "tinkerer" type of serviceman, seeing the array of chokes, filter condensers and voltage dividers in the power pack, silently dropped out of the picture. "B" eliminators became popular, with the type 80 tube sharing honors with the Raytheon BH tube as the rectifier in these units. The famous Browning-Drake receiver circuit revived a dying interest in set-building. The purchaser of a complete new Radio installation still had to choose five separate items in most cases: *1.* A Radio receiver in a table model cabinet; *2.* A loudspeaker; *3.* A set of tubes; *4.* An "A," "B," and "C" battery eliminator pack; *5.* A suitable table or cabinet for the various units.

A U. S. Court decided that the Secretary of Commerce had no power to regulate broadcasting—only the power to issue licenses. This decision made Radio broadcasting even more chaotic

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than before; new stations merrily started up and increased power in tremendous jumps in order to drown out rival broadcasts. Whistles and heterodyne squeals were heard on almost every program. This year also marked the start of the National Broadcasting Company, the first network of stations.

In England the British Broadcasting Company was granted a Royal Charter. Its license to broadcast contained only one important restriction, namely, that no money could be accepted from outside interests; in other words, there was to be no commercial sponsorship of Radio programs. Broadcasting in England was to be paid for by the manufacturers of Radio equipment, by the Government, and by means of license fees collected from owners of receivers.

1927 Television was the big topic of discussion this year. Television receivers were being sold in kit form and as complete sets by Jenkins, Baird, Freed-Eisemann and several others. These sets used elaborate scanning discs and neon crater lamps, with the same scanning discs and photoelectric cells at the transmitters. Mechanical television systems reached the peak of their popularity this year, and even telephone television was tested out (with this set-up, two persons could see as well as talk to each other even though separated by many miles, but the quality of the image was very poor).

A super-abundance of stations forced manufacturers to sacrifice tone quality and fidelity to sharp tuning in order that interfering stations could be tuned out. Sales of Radio receivers reached a new low; the public sat back, waiting, aware that perfected A.C. sets were just around the corner. The Federal Radio Commission was established by the Government to clear up the chaos among transmitters. The first act of this Commission was to revoke all broadcasting licenses; it then assigned channels and powers so that interference between stations was a minimum, and reduced the number of stations as well. The Columbia Broadcasting System was started. Single dial receivers became a reality, with the Kolster Six as one of the early leaders. The McCullough A.C. tube was announced.

1928 The Atlantic Ocean was bridged by television, but image quality was still poor and unsatisfactory either for commercial use or for entertainment. RCA put out the famous Radiola 17, an A.C.-operated receiver. Diode detectors began to receive consideration among set designers. Types 226 and 227 cold-cathode tubes with indirect heaters were released by tube manufacturers and immediately snapped up by set manufacturers. The typical A.C. T.R.F. receiver of this day used type 226 tubes in the R.F. and A.F. voltage amplifier stages, a 227 tube as detector, a 71A tube in the output stage and an 80 in the power pack. A.C. screen grid tubes were announced the latter part of this year, with the 224 leading the list. Next came variable mu tubes and power pentodes.

1929 The Majestic receiver line, with several styles of console cabinets from which to choose, was the hit of the year. Majestic sets, with their characteristic deep bass response, met with instant popularity, and many are still in use today. An estimated 110,000 people were employed in the Radio industry this year.

The Radio manufacturing industry underwent an inevitable upheaval this year. Important Radio patents had been scattered among many holders; patent rights were being openly violated and infringement suits were common. The Radio Corporation of America, organized shortly after the war in order to keep control of the Alexanderson alternator in this country, secured control of the important Radio patents, and granted licenses for these to other manufacturers, who could then build receivers without fear of litigation.

1930 The T.R.F. circuit still reigned supreme for this year and that to follow, even though many supers were being made. Interest rose in short-wave reception among the listening public; to meet this, manufacturers began putting out short-wave converters which changed an ordinary T.R.F. receiver to a short-wave superheterodyne. Plug-in coils for changing bands were replaced with band-changing switches about this time, but the average Radio set purchaser was content with broadcast band reception and scorned the complicated all-wave receivers. The National Carbon Company this year brought out a 2-volt air cell battery for farm Radios; this battery required no recharging and had a life of about one year as a filament supply for receivers using the new 2-volt tubes. Experimental television broadcasts with mechanical systems were begun by the British Broadcasting Company this year.

1931 RCA brought out the Radiola 80, one of the most famous of all Radio receivers; it was a 9-tube A.C. superheterodyne, and did more than anything else to start the super on its sudden climb to the throne as king of receiver circuits. The first midget receiver to attract widespread attention, the Jackson-Bell set, came out this year; it heralded a flood of midget receivers which still continues today. This year just about marked the end of the set-building boom which had started back in 1922; receivers built at home from kits gave way to manufactured sets.

1932 Automatic volume control was introduced, to make single dial receiver control more nearly possible and make reception more enjoyable by compensating for fading

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Manufacturers, seeking ways and means of overcoming the summer slump in the Radio business, began giving considerable attention to auto Radios. The auto sets sold this year required separate "B" batteries or a dynamotor, as well as a separate loudspeaker. Remote tuning controls were provided right from the start, however.

1933 Police Radio installations became an important factor in the war on crime, creating new jobs for Radio operators. Remote control tuning, with cables running from the control unit to the receiver, was featured by some manufacturers. Another feature of the year was the Philco inclined sounding board.

1934 All-wave receivers which actually brought in foreign short-wave stations were the hit of the year. Among broadcasters the big news was WLW's boost in power to half a million watts under an experimental license. It was this year, too, that Admiral Byrd isolated himself for several months in a cabin 123 miles south of Little America, with Radio as his only means of contact with his associates and the rest of the world.

1935 Interest in television was reborn with the announcement of the Zworykin iconoscope and the Farnsworth image dissector tube for cathode ray television. Sensation of the year was the introduction of metal tubes. Radio broadcasting stations alone had a payroll of $21,491,000 this year, and Radio technicians installed 1,100,000 auto Radios. All-wave antennas were developed for the new foreign-station receivers. All-wave signal generators and cathode ray oscilloscopes were also brought out by manufacturers, to assist servicemen in repairing the new sets.

1936 Automatic tuning was the big new feature in the receivers announced during the fall of this year; most of the early sets also had automatic frequency control. Approximately 8,000,000 receiving sets were sold this year. Philco made a few cathode ray television receivers for experimental purposes, and other laboratories worked feverishly on cathode ray television development. An estimated 3,000,000 automobiles were equipped with auto Radios at the beginning of this year, and three out of four families in this country had home Radios.

1937 Floods in the Ohio River Valley disrupted communications and made thousands homeless. Radio jumped into service; broadcast stations and amateurs joining together to re-establish communication with isolated communities. Portable and police radios were installed in boats, which were directed by radio in their rescue efforts. Hundreds of lives were saved by the unceasing day and night efforts of radio operators and announcers.

Events of the Presidential Inauguration were broadcast to the world over one of the largest radio hook-ups in history, with a number of N.R.I. men at the controls in Washington. Features of the new radios were cathode-ray tuning eyes, slide-rule tuning dials and sleekly veneered cabinets for consoles. A trend toward higher fidelity and more classical music resulted in the formation of the NBC Symphony Orchestra. RCA conducted extensive experiments with cathode ray television.

1938 Push-button tuning was now considered almost essential. High fidelity receivers made their appearance. Standards for television systems were approved by the Radio Manufacturers' Association, paving the way for the introduction of commercial television. Howard Hughes set a new record in flying around the world; contact with America by radio was maintained for the major portion of the flight, with Hughes broadcasting over a nation-wide hook-up while flying over Germany. Huge water-cooled 250,000-watt transmitter tubes, fatter than a man, made news this year, along with midget or finger-size tubes for hearing aids.

1939 Electronic Television emerged from the laboratories. Important demonstrations at the New York World's Fair and the start of regular high-fidelity television broadcasts served to arouse the public's interest. Several manufacturers made a limited number of high-definition 441-line commercial television receivers. Time tuning and remote wireless controls were the two outstanding features of the year's new radio models. Radio cabinet designers matched accepted classic furniture styles with many console units. Automatic frequency controls were no longer required to correct for errors in push-button tuning systems, for the development of adjustable iron core coils and zero-temperature coefficient condensers made electrical tuning systems satisfactory. Improved mechanical push-button tuning systems were used in many midget sets. High fidelity cabinet arrangements such as the acoustic labyrinth became more prevalent among higher priced receivers. Wind chargers were available for farming communities and built-in loop aerials were brought back as a noise-reducing feature. Considerable interest was shown in facsimile broadcasting, and the frequency modulation system of Major Armstrong was announced. The start of the European war revived the public's interest in short-wave receivers with which to hear foreign broadcasts. It soon became evident that radio was to play an important part in this war as a means of communication between airplanes, tanks and other military units.

1940 Interest in television remained at a high pitch. The first television network was established, when the Republican Convention was

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televised in Philadelphia; coaxial cables carried the images to New York and relay stations linked in Schenectady. To keep the public buying standard sets, many appeared with "television jacks" intended for the sound portion of television programs. Frequency modulation began to compete seriously for public interest as a high fidelity, noise-free means of transmission; commercial FM stations were permitted for the first time. Real portable receivers and extra small table models were widely sold. Tubes with 117-volt filaments made their appearance. A radio operated from a gas flame was demonstrated at the World's Fair. (The flame heated a thermocouple which produced sufficient power to operate the radio.) The war brought about a curtailment of amateur activities as communication with foreign countries was forbidden. Defense measures began to be taken, and many manufacturers began to convert to the manufacture of military equipment. The Selective Service Bill was signed and the draft started.

1941 The biggest year in radio history; 13,000,000 radio sets and 130,000,000 tubes were made this year. Radio models were frozen by agreement among the radio manufacturers, so as to release engineers for development of military equipment. Television in color was demonstrated and over $8,000,000 spent on television equipment and research. Commercial operation of television stations was permitted, with the acceptance of new standards. Frequency modulation began to spread rapidly with 30 commercial stations on the air. Hundreds of broadcast stations had their frequencies shifted and servicemen enjoyed a boom resetting push buttons. Interest in high-fidelity record-player combinations reached a high level.

Then, in December, came Pearl Harbor and the United States was again at war. All amateur operating activities stopped.

1942 The manufacture of all broadcast receivers was stopped and all receiver manufacturers changed over to defense activities. The manufacturers of war materials called for industrial control equipment and electronic engineers were in great demand. The better trained radio engineers and operators were snapped up in defense jobs or drafted, leaving a shortage of operators for broadcast and commercial stations. The Federal Communications Commission relaxed requirements for operating license classes for operating these stations. The manufacture of radio tubes was limited and many types were dropped altogether. The development of television was halted, but existing television facilities were used in training air raid and civilian defense personnel—the first example of mass education by television. Amateurs were permitted to join in civilian defense, forming communications networks for emergency purposes.

1943 Radio servicemen began to feel the pinch of the parts shortage. The draft was now taking large numbers of radio men, resulting in a business boom for those remaining. Remodeling receivers to get around shortages became fashionable. Electronic equipment of amazing types and quantities was made for the military forces. Equally amazing strides were made in electronic factory control equipment, designed to speed up production and deliver improved materials.

1944 Servicemen obtained some relief from the parts shortage as manufacturers were allowed to make some replacement parts. The emphasis is still on war needs, with no new radio receivers being manufactured. Even so, the United States has about 30,000,000 homes equipped with 57,000,000 radio sets. Trained radio men find more opportunities today than ever before in history. Servicemen are in great demand and so are operators for radio stations. War plants are still calling for radio men in great numbers.

The near future promises new opportunities. With the end of the war, much of the electronic equipment now devoted entirely to military uses will be allowed to spread to other factories and to civilian applications. Both television and FM are ready to go and we can expect a tremendous growth in both these fields just as soon as civilian manufacturing can again be permitted. Many millions of radios will be replaced and thousands of receivers that are now laid up will be repaired and put back into working condition. Opportunities everywhere! The man who has an understanding of the fundamentals of Radio —the necessary training—should make rapid strides in this vast and growing field.

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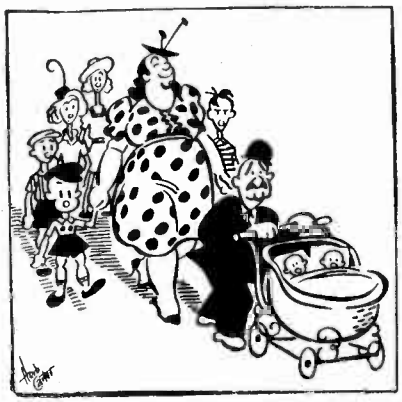

Who would have thought that time I whistled—it would turn out like this.

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THE STORY OF THE NATIONAL RADIO INSTITUTE

By GORDON BIRREL

Office Manager

Gordon Birrel

THIS story, like that of Radio itself, is no mere meaningless list of names and dates. Rather it is a record of pioneering and achievement that may well stir pride in the heart of every one associated in any way with the Institute, whether student, graduate, or member of the Institute staff.

Here is a tale of men with faith in Radio and in themselves; a drama of obstacles met and overcome, of promises made and (more important) kept, of hard work, of loyalty, and above all, the transformation of the ambition of thousands through Institute training from dreams into reality.

Today the Institute is so strong and thoroughly organized, the Radio industry is so large and has enriched our lives in so many ways, that few think of their humble beginnings and early struggles. Yet it is only fifty years or so since Heinrich Hertz set up his first crude transmitter, measured the velocity and length of the waves he generated, and paved the way for a host of early pioneers and inventors, and their discoveries.

A few years earlier, to be exact, February 3, 1881, in Rochester, New Hampshire, J. E. Smith was born. In bonnie Scotland the year before Hertzian experiments were begun, J. A. Dowie was born, and one year after him, in Washington, D. C., E. R. Haas came into the world. Thus the founder, the organizer, and the chief instructor of the Institute of today were born in the same decade with Radio itself. They grew up with it, so to speak, and what a growth it has been!

The first twenty-five years of Radio ending in 1914 saw Marconi's successful transmission and reception of wireless messages, the formation of his Wireless Telegraph and Signal Company, and the adoption first by naval forces and later by shipping companies, of wireless as an essential method of maritime communication.

By the turn of the century, transoceanic wireless transmission was in sight. Dr. J. Ambrose Fleming invented the diode vacuum tube in 1906, the year in which Mr. Smith graduated with the degree B.S.E.E. from Worcester Polytechnic Institute.

Shortly after this, Dr. Lee de Forest invented the "audion" and experimented with sound broadcasting in New York City. The Society of Wireless Telegraph Engineers was founded. By this time Mr. Smith, the ambitious young electrical engineer, was working for Westinghouse in East Pittsburgh, a position he gave up to become an instructor in electrical and other subjects in the Washington, D. C. school system.

In 1914 the first World War was let loose on an unsuspecting world. Thus the stage was set for the founding of the National Radio Institute.

Mr. Smith had, in the meantime, become deeply interested in various phases of wireless and had thrown himself with customary enthusiasm into the task of mastering the newest and most fascinating branch of electrical science. Such enthusiasm became contagious. Mr. Smith was besieged with requests for information on wireless problems, and in response to the demand, finally organized a class of four students in a small room in the old United States Savings Bank Building at 14th and U Streets, Northwest, Washington, D. C. The National Radio School, as it was known at first, had come into being. Additional students sought admission and

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the young school filled an increasing need by giving practical training in this new field.

From time to time students who were compelled to leave the city for one reason or another expressed desire to continue their studies. The first effort to teaoh Radio through the mail was undertaken. In the face of critics and skeptics, the National Radio School proceeded to develop a successful home study method of training parallel with its classroom training, thus establishing definitely our position as the pioneer home study Radio school. In our files we have a set of lessons graded by Mr. Smith for a student in Livermore Falls, Maine, and bearing dates as as early as February 14, 1916.

World War I was giving tremendous impetus to the development of Radio. Even before the United States entered the war these effects began to be felt. By 1916 the staff of the school had been increased to six, one of them Mr. Dowie, who had secured his education at Polytechnic Institute, London, the Chicago Electrical School, the Marconi School of New York, and Penn State College Engineering Division, besides doing electrical work and experimenting in Radio, coming to the young school in May, 1915. Four rooms were required for classes.

The heavy demands made upon Mr. Smith for instruction left him little time for the school's business affairs, and E. R. Haas became associated with the school in charge of advertising and organization.

J. A. Dowie, Chief Instructor
Senior Member, Institute of Radio Engineers
27 Years of Service with N. R. I.

Thus in the first two years the present management had taken charge, and the policies that have guided us through more than a quarter of a century were taking form.

A year later, in 1917, the United States entered the World War and the demand for wireless operators filled the classrooms to overflowing. Facilities were expanded, a staff of twenty instructors was engaged and over 150 local students were in training. Radio technicians were made part of the regular military forces. In the Spring of 1918 the U. S. Government gave Mr. Smith entire charge of training 800 students at Howard University for Radio work in the U. S. Army. During 1918 Mr. Haas was asked by the U. S. Government to do Radio work in connection with the Army Officers' School at Yale University.

Steadily increasing demands for instruction in wireless telegraphy and the growing interest in wireless telephony or "Radio" as it began to be known, expanded both the home study and residence classes. The former required all available facilities at the original 14th and U Street address, so classes were moved to 1345 Pennsylvania Avenue, Northwest, about half way between the Old Post Office Department Building and the U. S. Treasury, a convenient, central location on historic Pennsylvania Avenue. About this time also the Service Radio School located nearby was taken over and absorbed.

These were "the good old days." The National Radio School had become the National Radio Schools. We operated a Radio station with call letters 3YN between the downtown and uptown locations for the instruction of local students. Mr. Smith and Mr. Dowie personally graded lesson papers besides handling consultation and classes. On more than one occasion, Mr. Smith or Mr. Dowie carried the mail across the busy avenue to the Post Office themselves to set the standard of personal, prompt service that inspires their staff to this day.

In 1920 Westinghouse KDKA began broadcasting. An irresistible wave of popular interest in broadcasting swept the country. This was the day of the crystal receiver and the head set. An interesting sidelight is the story of the Harding vs. Cox election returns Washington's two largest newspapers have offices on Pennsylvania Avenue and flashed election returns on screens for the information of election crowds. Their returns received by ordinary telegraph service were often behind the returns received by station 3YN as broadcast from KDKA and other early stations, and we were thrilled when "National Radio" scooped the Nation's Capital!

The same year and month, November, 1920, the National Radio School was incorporated under the laws of the District of Columbia as the National Radio Institute. For a while a branch residence school was operated at Howard and Franklin Streets in Baltimore.

The kaleidoscopic growth of Radio continued. In two years after the first broadcast there were nearly 600 stations transmitting in the United States and broadcast station licensing was begun. Successful ship-to-shore Radio-telephone experiments were conducted and practical

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transatlantic shortwave communication demonstrated.

The year 1923 was marked by the introduction of the neutrodyne receiver. Broadcast receivers generally began to acquire complex technical features requiring competent servicing. Prior to this time servicing equipment consisted of a screw driver, pocket voltmeter, ammeter, and a hydrometer for battery checking! Any tinkerer could service a set—and did.

The need for trained Radio service men brought to light the need for a name for men who were properly trained. "Electrician" fell short of the mark, "Radio man" referred to operators on shipboard. The term "Radiotrician" was coined and used by us as early as 1922. Registration for the term was secured in the U. S. Patent Office in November, 1928, and has since been secured in Canada, England and elsewhere for the exclusive benefit of National Radio Institute graduates. This name has been carefully protected ever since. Unless a man has taken the N.R.I. Course he cannot properly call himself a *Radiotrician*.

Radio grew complex and technical. The Institute adapted its training and methods to keep in step with the new situation. The residence schools were gradually closed out. In 1923 the Institute was established at 1223 Connecticut Avenue, Northwest, near the famous old British Embassy Building, since torn down, and the entire effort of the Institute was thrown into home study training.

E. L. Degener, General Manager
26 Years of Service with N. R. I.

First one floor was occupied, then two. The Institute continued steadily in growth, and in October, 1927, our present large building, then two stories high, located at the southeast corner of 16th and U Streets, Northwest, was purchased and the second floor occupied. The next year it was necessary to take over the first floor also, and in 1930 the third floor was added to provide urgently needed additional space.

This is our seventeenth year in our present home. Located on Washington's finest boulevard, sometimes called the Avenue of Presidents, a little over one mile north of the White House and within easy distance of the Department of Commerce, the Federal Communications Commission, the Bureau of Standards, and the Congressional Library, we feel we are at the heart of Radio in this country. Our building is simple and substantial. It is always clean, bright and a beehive of purposeful activity. Yet we are never too busy to stop and greet a new student or an old one, and our latchstring is hanging out for you.

Closely paralleling the physical growth of the Institute and responsible for it, has been the growth of the Course and of the instruction staff. It is a matter of pride to the Institute that some of the earliest members of our organization are still with us. They have grown up with the Radio industry and with the school. As we have grown, new blood and new ability have been added, also, to meet the continual demand for the latest practical and experimental knowledge in the field and to maintain our position of leadership in Radio home study.

The story of our training is a long one in itself and a fascinating one. The very first text book was one used by the Signal Corps of the U. S. Army. This was soon supplemented by Dr. A. N. Goldsmith's book on Wireless Telephony, Audel's Handbook of Easy Lessons in Wireless Telegraphy, and E. E. Bucher's "How to Pass the U. S. Government Wireless License Examinations," a forerunner of N.R.I.'s own Quiz Book.

The constant development of Radio with its new discoveries and new applications, the requirements of home study students for more convenient lessons and more readily understood instruction and the success of the Quiz Book between 1918 and 1924, pointed the way to the writing of all our own lesson books. First came a series of fourteen, later increased to eighteen, on wireless telegraphy, and then a course of eight books on Radio telephony, a total of twenty-six books by 1920.

Rapid strides in broadcast station and transmitter development as well as in broadcast receivers forced complete rewriting of the Course and extensive additions so that by 1926 there were forty books in the Course, and by 1928, fifty. In spite of every effort to maintain the Course at a high level of accuracy and completeness, the continuous strides of Radio during the twenties led to a complete revision of our Courses. Every text book was completely rewritten from cover to cover and many new books were added on various branches of servicing, merchandising, broadcast station operation, commercial and ship station operation, aircraft in-

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stallations, television, sound pictures, public address systems, and many others.

This policy has been faithfully pursued; every year some books are revised, others replaced with entirely new ones. Every book must pass critical inspection for its technical accuracy and equally critical examination for its simplicity and readability. Today, in our various Courses, we use approximately 115 books, including reference books, besides job sheets and other instruction material, supplemented by a library of diagrams, articles, and books on every practical phase of Radio. You may be sure that as television, frequency modulation, electronics and other new developments assume commercial importance, you'll find ample information on them in your Course.

The earliest experience with home study emphasized strongly to the practical mind of Mr. Smith the importance of combining practical work with the study of theory. The first equipment furnished was for teaching the sending and reception of wireless telegraph signals. Mr. Smith later developed, patented, and undertook the manufacture of a special machine known as the Natrometer for automatic sending of code signals. This was eventually replaced with the even more efficient Nacometer, the machine now furnished N.R.I. men interested in learning the Radio code.

With the rise of set servicing came the need for practical experience in handling Radio receiving and servicing equipment, a need which was met by development of practical home experimental equipment. In the past seventeen years, six distinct series of these outfits have, one after the other, been developed to meet increasingly complex and more modern training requirements.

Now that our story has brought us down to date with modern and highly specialized training, modern equipment, a modern training plan, and an efficient staff, let's sketch in some of the significant developments that took place in intermediate years.

Back in 1926 at the beginning of the batteryless receiver era, the Radio compass was coming into general use, the Piezo crystal had been developed, beam transmission had been developed to a practical commercial stage, and successful Radio telephone experiments were conducted between New York and London.

In the same year both the National Broadcasting Company and the National Home Study Council were organized. The Council is an association of private home study schools and was incorporated in the District of Columbia, October 29, 1926, with Mr. Smith as one of the original incorporators and the National Radio Institute as a charter member.

The purpose of the Council from the very beginning has been to elevate the standards of home study training. Mr. Smith has been a member of the board of trustees of the Council and long a member of its educational committee, besides serving as Treasurer and in other capacities, and other members of the Institute staff have participated actively in Council meetings to the end that all home study students may receive better training, better service, and a square deal all the time.

Our Home—Owned and Entirely Occupied by N. R. I.

In 1927, the year the Institute moved to our present building, the Federal Radio Commission was created by Act of Congress. Transatlantic Radiophone service was opened to the public. The International Radio Telegraph Conference held from October 4 to November 25 in Washington was attended by members of the Institute staff.

The following year Station WRNY broadcast television signals. That autumn the Institute put on a series of Radio broadcasts over a nationwide N.B.C. hookup, featuring "The Radiotricians," S. L. Rothafel ("Roxy"), Dr. J. E. Dellinger of the U. S. Bureau of Standards; Mr. Smith and Mr. C. Francis Jenkins, the inventor. In addition to these four major broadcasts, the Institute has been on the air on many other occasions.

The year 1929 was marked by the pooling of Radio patents, the beginning of popularity of console and TRF receivers. It was in addition to the fifteenth anniversary of the National Radio Institute, a momentous year in our history.

From the earliest days of the Institute, Mr. Smith, Mr. Dowie, and other members of the staff had taken up important problems pertaining to the Course and Radio with recognized leaders in their fields. Mr. Smith wished to be able to do this on a more formal basis and give students and graduates the benefit of the most authoritative opinions available on Radio

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questions. To this end our Advisory Board was created in 1929.

Invitations were extended to and accepted by men carefully selected for their variety and breadth of experience, as well as their outstanding records as Radio engineers. The six original members of the Board represent some of the great names in Radio: Dr. Lee de Forest, Mr. Edgar H. Felix, Mr. Paul A. Greene, Mr. George Lewis, Prof. C. M. Jansky, Jr., Major-General George O. Squier.

We have always felt it an honor to be recognized in this manner and to pass along to our students the advice and recommendations of such leaders in Radio.

Dr. A. N. Goldsmith was added to our Advisory Board in May, 1934, to take the place of Major-General Squier who had died shortly before. With the rapidly growing importance of television, Mr. Philo T. Farnsworth was invited to serve on our Board and accepted in August, 1935, followed in 1938 by Mr. Harry Diamond.

In connection with the 1929 celebration of our Fifteenth Anniversary, a group of seventy - five Graduates from widely separated parts of this country and Canada assembled here in Washington. The Honorable Charles Curtis, then Vice-President of the United States addressed them from the steps of the Senate Office Building where he graciously posed with them and members of the Institute Staff for photographs and sound moving pictures.

Isabelle F. Fant, Supervisor of the N. R. I. Stenographic and Typing Department. With N. R. I. since 1920—a most valued and capable member of our staff which serves students.

Advantage was taken of the convention to hold a big dinner at the Arlington Hotel. In addition to the graduates present, Mr. Smith, the staff of the Institute, and a number of leaders of the Radio industry—including several members of the Advisory Board—attended. Congratulatory letters were received from many others and read. At the close the graduates presented Mr. Smith with a beautiful silver loving cup in appreciation for the influence he had upon their lives.

At this convention the N. R. I. Alumni Association was formed, the first officers elected, and a unanimous pledge taken to work for the interests of the Institute. This was the first alumni association of graduates of any home study school, an association which has flourished continuously since, and which every graduate of recent or of long standing is eligible to join.

Since then local Chapters have been organized in a number of cities. Among these, Baltimore, Philadelphia, New York, Detroit and Chicago Chapters are the strongest and most active. Baltimore Chapter was the first organized under the leadership of Mr. Peter J. Dunn, who subsequently was elected President of the Alumni Association, was re-elected for four consecutive years, and is still very active in Alumni Association affairs, this year serving as a Vice-President.

The first President of our Alumni Association, elected in 1929, is today Assistant Director, Broadcasting, Office of Censorship for the United States Government. One of the first Vice-Presidents, Mr. Hoyt Moore, who was present in Washington in 1929 when the Alumni Association was organized, is today a State Senator in Indiana. Many of our Alumni members have risen to high places in the business world.

Our story is getting long yet we have had barely space to mention subjects about which we would like to write whole pages. We'd like to tell you how with every development of Radio and every change in the industry we have striven to include the change in the Course. We'd like to tell you how we have increased the amount of information in the Course and the effectiveness of the training year after year, multiplying several times over the value of the training given with little, if any, increase in cost to the student.

We'd like to take you behind the scenes here at N. R. I. and show you what a competent, aggressive, conscientious staff has been built up to serve students, show the equipment and methods developed to serve quickly, intelligently, and helpfully. We'd like to bring you into some of our staff meetings here where you could hear us thrash out our student problems and our own, so that the actions we take and the advice we give

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represent not the hasty thought of one individual but the considered judgment of all those competent to contribute. While Mr. Smith no longer grades the lessons, and Mr. Dowie cannot personally answer all student letters, nevertheless, their ideal of personal service is our daily inspiration.

We'd like to tell you about each member of our staff—who he is, where he came from, his qualifications, and what he does to make our training or service more worthwhile, just as we'd like to get acquainted with scores of students whom we never see.

We'd like to tell you about the black days of 1929, 1930, and 1931—how we pulled our belts tighter and tighter, took our cuts in salary, yet did not raise our price for the Course nor cheapen N. R. I. training in any way. On the contrary, it was in 1930 and 1931 when things were at their worst that we wrote our modern Course, investing over $30,000 that could not well be spared to make the term "Radiotrician" and the letters "N. R. I." stand for something more modern and more important than ever before.

We'd like to show you some of our student records. You'd see records of students and graduates in almost every branch of Radio and in every foreign country and colony, besides every state in the union and every province in Canada. You'd see the record of students assigned to us for vocational training by the rehabilitation boards of 40 of our 48 states, the District of Columbia, the Territory of Hawaii, and Canada. You'd see records of blind students, and countless others—women who have made names for themselves in Radio alongside of men, men who have taken our Course, gone to sea as operators, and in the course of duty saved many lives, of men who have risen high in government and industry, yet nevertheless acknowledge gratefully the debt they owe the National Radio Institute, and above all that steadily growing body of graduates who through this training have won independence and advancement for themselves in Radio.

We'd like to show you some of the records of—we are happy and proud of our many—students and graduates who have used their knowledge of Radio gained through N. R. I. on the ground, on the sea and in the air in the Armed Forces of this country and of some of our gallant allies. Our latest analysis showed 2,398 N. R. I. graduates serving as Radio technicians with the Armed Forces and in war industries and 1,769 students in the U. S. Army and Navy studying the N. R. I. Course.

Yes, we have been trying to do our bit. In January, 1942, we mailed bulletins at the expense of the Institute to all N. R. I. graduates and students telling them of the U. S. Signal Corps need of Radio men in civilian jobs. More than 3,000 N. R. I. men responded, and the Signal Corps Colonel in charge of this activity informed us that the Signal Corps "employed HUNDREDS of these men." In May, 1942, we furnished the names of 1,000 graduates for possible Civil Service employment by the Signal Corps. Signal Corps Officers of various Corps Areas wrote these men about jobs available and employed many of them.

In addition we have, from time to time, both on request and voluntarily, cooperated with the following War Agencies and Government Departments in supplying Radio Training, Radio Trained Men, and certain vital information:

Pre-Induction Training Organizations and Courses,
Emergency Science and Management War Training Courses,
Army Air Forces,
Civilian Technical Corps supplying volunteer Radio men to Great Britain,
Civil Service Commission,
U. S. Navy Fire Control Schools,
Coast Artillery Enlisted Specialist Schools,
War Department Military Intelligence,
U. S. Veterans Bureau.

You have heard a great deal, no doubt, about Post-War Planning—planning for a better future. Here at N. R. I. we are thinking and planning for the Post-War Radio world as we expect it to be. Great as has been Radio's growth in the past—we foresee even greater growth ahead. More Radio men and BETTER TRAINED Radio men will be needed than ever before. N. R. I. training must be up to the minute, and you may rest assured we are keeping it that way. It must be MORE PRACTICAL, and we are often making changes like this, slipping them quietly into the Course where every student will get the benefit of them without waiting until the war ends.

With television immediately on our horizon we have been busy for years incorporating television in our training. Now graduates of the Institute are Teletricians as well as Radiotricians, and the newer term has also been registered for their identification and protection. It is our aim to build on the past, not to live in it, and to build for the future—the future of our students and graduates.

Yes, the most important part of the story of the Institute is not the record of past events, not the story of what we have done, but the story of what we are doing today; that, and the day by day achievement of N. R. I. students and graduates.

As we finish our thirtieth year and launch strongly into our thirty-first, with all it promises, we renew to every present and future student our pledge to train him thoroughly for today's needs and tomorrow's opportunities.

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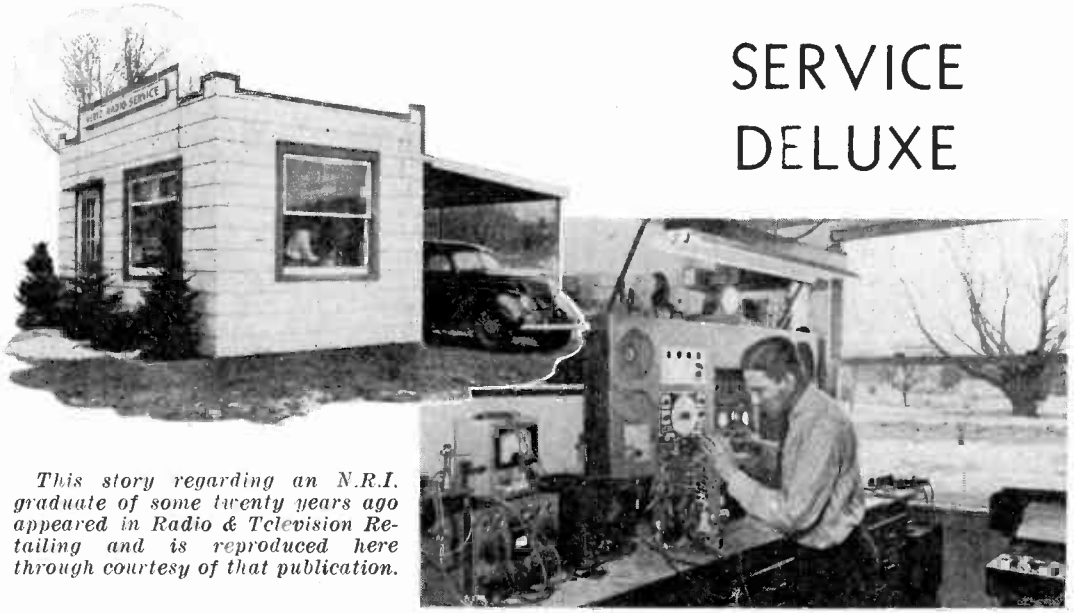
SERVICE DELUXE



This story regarding an N.R.I. graduate of some twenty years ago appeared in Radio & Television Retailing and is reproduced here through courtesy of that publication.

Wertz before his workbench in his immaculate, well-kept shop.

IN business for himself for the past 20 years, Lester F. Wertz, owner of the Wertz Radio Service, 4877 Kutztown Rd., Temple, Pa., continues to do a smart job of servicing in his community, war or no war!

Although Wertz formerly sold some sets, as well, he now does service work only. Specializing in radio reconditioning and repair, he also repairs minor appliances for the home, services record players and does a lot of auto radio work.

Wertz Radio Service is housed in a compact and meticulously clean, well arranged shop that contains the very best in modern lighting and servicing equipment.

Lester Wertz makes calls to do service on receivers in the home and covers a radius of about 15 miles around the town of Temple.

"The word about a good job seems to have a way of getting around!" says Mr. Wertz. He finds that customer confidence in his knowledge and ability to turn out only the best in radio repair has acquired for him a "preferred list" of clients in the high income brackets. The best equipment in radio in his territory is entrusted to him.

RADIO & TELEVISION RETAILING'S representative was interested to see the following set up in poster form, on Mr. Wertz's wall: "We reserve the right to make a nominal inspection charge. Locating radio trouble is our business, but no one can predict the time this requires. Parts and service guaranteed 90 days. All repairs cash."

Catching our eye, Wertz smiled. "You may be interested to know that I picked up that idea from another dealer whose story ran in your magazine recently," he said.

The test bench as shown in the accompanying photo contains plenty of working space. The panel houses a signal generator, multi-meter analyzer, test speakers, and other equipment. Wertz uses the oscillograph for aligning practically all sets. He finds that it gives more uniform results and saves time when dealing with high fidelity equipment.

In the particular job, on which Lester Wertz is shown working, the customer's complaint on the set was weak response, poor selectivity, and distortion. After giving the set the usual routine check, the cause of the distortion was located and corrected. The signal tracer was used to check the stage-by-stage gain which revealed the necessity for re-aligning. The final job, re-aligning, was then completed with the use of the oscillograph. The automatic record changer used with this particular set also needed adjusting and was corrected to the customer's satisfaction. The changer can be seen on the bench, extreme left, on supports which are used for servicing automatic changers.

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OUR PRESIDENT AND FOUNDER

J. E. SMITH

J. E. SMITH was born at Rochester, New Hampshire, on February 3, 1881. His family traces its origins in America to Colonial days. His father had been a farmer in his native state through practically his whole life.

Mr. Smith attended the public schools of Rochester, and early acquired an interest in mechanical things. For fifteen months he was a locomotive fireman and a member of the Brotherhood of Locomotive Firemen. He later became a student at the Worcester Polytechnic Institute, from which institution he received a Bachelor of Science degree in Electrical Engineering in 1906. He was then employed by the Westinghouse Electric and Manufacturing Company, in East Pittsburgh. In 1907, Mr. Smith came to Washington, D. C. to accept an appointment as an Instructor of Steam Engineering and Applied Electricity at the McKinley Manual Training High School, which he held until 1918.

Mr. Smith clearly saw the future and read its meaning. The world, revolutionized by Radio, needed trained men. In 1909-10 he introduced the study of Radio into the Washington, D. C. public school system and in 1914 Mr. Smith founded the National Radio Institute.

In addition to his other activities, Mr. Smith is a Senior member of the Institute of Radio Engineers, a life member of the American Institute of Electrical Engineers (Past Chairman of the Washington, D. C. Section) member of the American Radio Relay League, Radio Club of America, Washington Radio Club, Academy of World Economics, National Education Association of U. S., the National Aeronautic Association of the United States of America, the American Association for Adult Education, and the American Association for the Advancement of Science. Other affiliations of Mr. Smith are those with the Washington Chamber of Commerce, the Washington Board of Trade and the Central Business Men's Association. He is past president of the Round Table International, and a past president of the Washington section of the Worcester Polytechnic Institute Alumni Association. He is a director of the Washington Y.M.C.A.

It has been written of Mr. Smith: This man, the president of the organization which is training you for success in Radio, has in his student body men and women in every civilized country in the world. All his life he has known hard work—he's still at it and will be as long as he is physically able. He has known hardships but he claims that his successful graduates more than repay him in the knowledge of good work done, for all the obstacles he has had to overcome.

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OUR VICE-PRESIDENT AND DIRECTOR

E. R. HAAS

AMONG those men who early saw tremendous possibilities in Radio work, E. R. Haas holds an important place, the more so because he acted upon his vision and came to play an important role in the training of workers in this great new industry. As executive vice-president and director of the National Radio Institute of Washington, he has aided in the development of one of the greatest educational projects of his day and in the creation of successful careers for many men in all walks of life. The Institute which he serves educates people from all parts of the world in all aspects of Radio work, placing especial emphasis upon its efforts to increase individual earning power in a profession of almost limitless opportunity.

Mr. Haas was born on September 2, 1889, at Washington, D. C. He received his early education at the Drillery Business College, Central High School, and afterward attended the Law School of Georgetown University. Completing his formal studies, he secured employment in newspaper circles. Advertising and publicity work brought him in contact with the theatre, and he became assistant publicity director for Keith's Theatre, Washington.

It was while with Keith's that he had his first Radio associations. The theatre was running an act, "Via Wireless." Mr. Haas, seeking a spark transmitter for use in the show, obtained the desired outfit from J. E. Smith. Mr. Smith then an instructor at the McKinley Manual Training High School, was destined to become the organizer of the National Radio Institute; and he and Mr. Haas were to become president and vice-president, respectively, of the Institute.

Mr. Haas possessed the sort of vision that immediately grasped the importance of the new "wireless," as it was then called. Afterward, when he became connected with the World Film Corporation as assistant manager for the District of Columbia, this same quality of vision enabled him to look ahead, as today he still looks ahead, to the great future developments of television. He is one of those men who consistently look ahead.

In periods of rapid change, like our own era, men seek out, by some strange magnetism, those individuals who possess insight capable of piercing the future. This fact accounts, at least partially, for Mr. Haas' popularity. One who, in the past, has correctly seen ahead is likely to do so again. Many years ago Mr. Haas predicted the universal use of Radio broadcasting and Radio's use in aviation. His keen vision still sees television's certain development and numerous applications of Radio that have not yet been made effective.

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Stage by Stage Testing

By WILLARD MOODY
N. R. I. Consultant

Willard Moody

THE stage by stage method of locating trouble in a radio is just what its name implies—we test each stage in turn. In order to understand this technique we need to know, first of all, what the stages in a radio are, and how they are connected.

To make this point clearer, refer to Fig. 1 which is the block diagram of a typical superheterodyne radio. The signal enters through the antenna at point 1, passes through the pre-selector input and is combined in the mixer with the local oscillator signal to give an i.f. output at point 4. The oscillator output enters the mixer at point 3. The i.f. amplifier stage then builds up the signal and the output of this stage at point 5 goes into the second detector where it is demodulated. The detector output at point 6 goes into the first audio stage where it is amplified and the output of this stage at point 7 works into the power output stage. The power stage takes the relatively small power input signal and builds it up to a power level sufficient at point 8 to drive the loudspeaker. The speaker takes the electrical signal power and converts it into audible sound.

In studying the passage of the signal through the circuit, we have found that it progresses from the input to the output in a straightforward manner. Normally, the signal only goes from the input to the output stage, and does not travel in a reverse direction.

A perfectly clear understanding of the way in which the signal passes through the receiver is necessary in order to use the stage by stage method, a procedure which can be used to locate dead stages, distortion, hum and other troubles and which is of great assistance in everyday servicing.

The equipment necessary is simple and comparatively inexpensive, consisting of an ordinary servicing signal generator equipped with a test

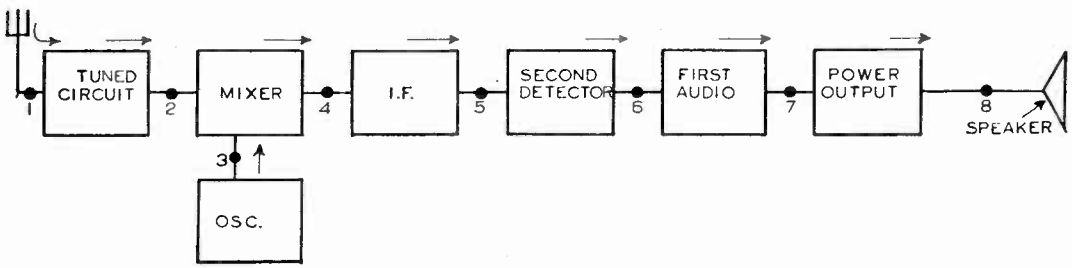

Fig. 1. Signal passage through a typical superheterodyne receiver.

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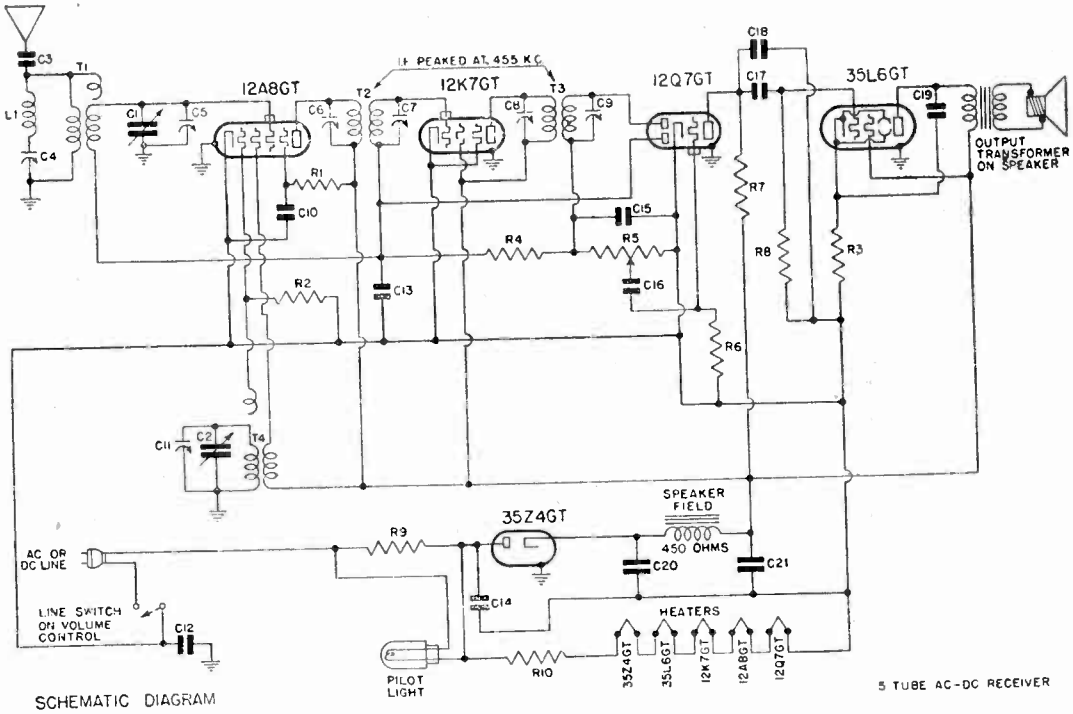

Fig. 2

cable and a series blocking condenser. A useful auxiliary piece of apparatus is a crystal type record player.

Two principal modes of attack are possible, forward and reverse application of the generator. In other words, we may inject a signal at the output of a stage, such as point 5 in Fig. 1 and next inject the signal at point 4 to test the i.f. stage (assuming a signal was heard in the loudspeaker with the generator connected to point 5) or we could work from the input to the output, first injecting a signal at point 4 and then, if it isn't heard, passing to point 5. If the signal is now heard we know that the defect is in the i.f. stage. We might find it necessary, in many cases, to work from the loudspeaker back to the antenna input or vice-versa.

Such circuit defect localizing is easy. However, a professional serviceman might not bother with the signal generator at all, until it was necessary to use it in finding the defect. He would check the set by turning it on, listening to it and interpreting his observations. He might make a quick check (receiver volume control at maximum) of the audio system, for example, by merely touching a finger to the grid of the first audio tube to determine whether the audio stages were operating. He might use a voltmeter for rapid point to point analysis, but in many cases he would fall back on the signal generator. The beginner, on the other hand, would find the use of the generator extremely helpful and very likely would use it a great deal. In order to show just how the forward and reverse methods are used, let us consider the typical circuit shown in Fig. 2 and examine it for possible defects, employing stage by stage testing to find the faulty stage. First, familiarize yourself with the circuit.

The 12A8GT functions as a mixer. The r.f. circuit in the input is T1-C1 and C5. The oscillator tank circuit is T4-C2 and C11. The output of the mixer is fed to the primary of T2. This i.f. transformer is tuned to 455 kc. whereas the preselector circuit tunes from 540 to 1730 kc., and the oscillator tunes from 995 kc. to 2185 kc. (always 455 kc. higher than the preselector).

The secondary of T2 works into the 12K7GT i.f. tube and the amplified signal delivered by this tube feeds into the primary of T3. I.F. transformer T3 is tuned to 455 kc. and the secondary feeds the second detector. The upper diode plate is used for rectification or demodulation and the

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lower diode plate is used in a "gas-gate" circuit. The audio voltage output of the diode appears across R5 and may have a frequency between 40 and 8000 cycles, depending on the signals entering the microphone at the broadcast station studio.

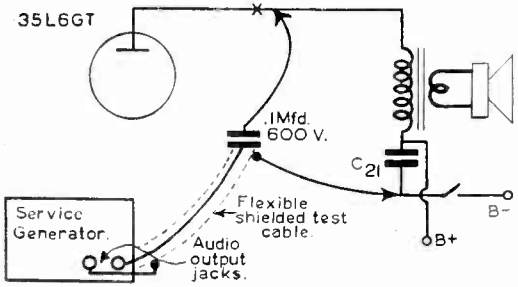

Fig. 3

The audio signal passes from the diode load to the grid of the triode section of the 12Q7GT through C16. This high gain triode builds up the signal level and it is next fed to the 35L6GT grid through C17. The output tube amplifies the signal and a comparatively large amount of audio power is developed in the 35L6GT plate circuit. This power is transferred to the loudspeaker voice coil through the output transformer.

All of the plate and screen circuits are provided with d.c. operating power by means of the 35Z4GT rectifier and the tube filaments are a.c. operated, being connected in series and through the on-off switch R10, K9 and the pilot light to the line.

The signal currents in the plate circuits are superimposed or put on top of the d.c. currents. If there is a hum current due to a defective supply and any one of the stages ahead of the first a.f. amplifier supplied with power are non-linear, hum modulation may develop. Locating hum and other troubles will be described later.

Locating the Dead Stage, Reverse Method

First, feed the audio output of the signal generator into the primary of the output transformer and B—, as shown in Fig. 3. If the signal is heard, we know the output transformer and loudspeaker are all right. If not, there may be a defect in the output transformer. C19, the speaker or the speaker field supply. Assuming the audio note is heard, shift the hot test probe to the 35L6 grid. The signal heard at the loudspeaker should be much stronger due to the gain contributed by the 35L6. If it isn't, look for a defect in the 35L6 stage—bad tube or incorrect voltages. Assuming a normal signal is heard shift the hot probe to the 12Q7GT plate. Failure to get a response now would point most probably to an open in C17. The generator test lead may next be shifted to the 12Q7GT grid. The gain of this tube is high and the output should sound much louder. If no response is obtained, look for a defective tube or possibly an open R7.

Next, if the signal has gone through all right, shift the hot test lead to the junction of R4 and R5. Failure to get a response now would probably mean an open in C16. The trouble could also be a short in C15.

The next test is made using an r.f. signal. The generator is connected as shown in Fig. 4, and its dial is set at 455 kc. (the i.f. of the receiver). The signal generator output control is set at maximum. The receiver volume control should also be at its maximum position. Some generators will not have sufficient output with the use of the shielded cable. Try disconnecting the lead marked G and use only one lead. If no output is heard, shift the hot "A" connection to the 12K7GT i.f. grid (Fig. 2) to boost the signal by taking advantage of the gain afforded by the i.f. stage, thus making sure the trouble isn't that the generator lacks sufficient strength to force a signal through the circuit. If no sound is heard it is very likely the trouble is in the second detector. The trouble might be an open in R5 or a very high resistance for R5. In some cases a short in trimmer C9 or open in the secondary of T3 would kill the signal as would a defective diode section in the 12Q7GT.

If the signal is heard when the generator hot lead is connected to the 12K7GT plate, shift the hot

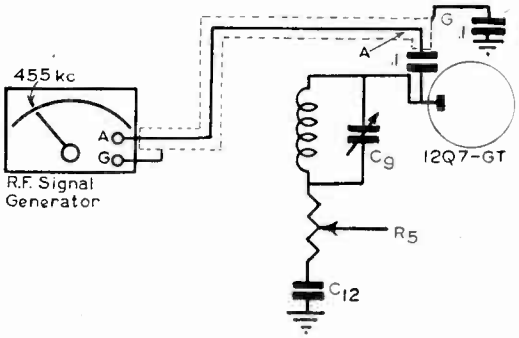

Fig. 4

generator connection to the 12K7GT grid. A loud sound shows the signal is passing through the stage. Failure to get a response indicates a defective i.f. stage. Trimmer C7 might be shorted, condenser C13 open, the secondary of T2 could

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be open or the tube might be defective. (If the i.f. stage was badly out of alignment the response would be very weak.)

If the signal passed through, the next step would be to check the mixer. Set the receiver dial at 550 kc. Leave the generator dial at 455 kc. Connect the hot generator lead to the 12A8GT grid. If a clear, strong signal is heard in the loudspeaker, the mixer is at least functioning as an amplifier. Assuming this, the next step is to check the receiver response at 550 and several points in the band. Set the receiver and generator dials at 550. If you don't get a response, look for trouble in the receiver oscillator. It may have stopped oscillating or it may be out of alignment. Also test the receiver response at 1000 and then at 1500.

You can check on the oscillator in several ways. A simple method is to couple the signal generator to the mixer grid through a .0001-mfd. condenser. With the receiver dial at 550 and generator adjusted for an unmodulated r.f. output at 550 + 455 = 1005 kc., tune the receiver dial higher in frequency, towards 1500 and at the same time tune the generator dial slowly and in step with the receiver dial, always keeping the generator at a higher frequency than the receiver dial (receiver dial setting plus i.f. equals generator frequency).

If a number of stations are picked up, you know the receiver circuits are all right with the exception of the oscillator. Look for an open oscillator coil, shorted oscillator tuning condenser or trimmer, an open in R_1, a short in C_{10} or a change in value in R_2, and if the oscillator circuit appears to be in good order but still refuses to work, try a new 12A8GT. Check the antenna coil for continuity.

Forward Method of Locating Dead Stage

In this method of testing, we work from the antenna to the loudspeaker voice coil. First, the generator may be connected to the antenna circuit as shown in Fig. 5. If the signal is heard weakly but on shifting the hot lead to point 2 it becomes normal, look for an open in C3.

If the signal still is weak but becomes stronger when the hot lead is connected to point 3, look for an open in the primary of T_1. If no signal is heard at 550 kc. when the generator is connected to the 12A8GT grid, turn the generator dial slowly to 455. A strong response at 455 shows the i.f. system is working, that the signal is being amplified by the 12A8GT and that the trouble is probably due to oscillator failure.

To check on this, adjust the generator for an unmodulated r.f. output. Connect the hot lead to the 12A8GT mixer grid through a .0001-mfd. condenser and the receiver to an antenna. This will permit picking up broadcasting stations, using the generator as the receiver oscillator. Then set the generator at 550 kc. plus 455 kc. which equals 1005 kc. Tune the generator dial *higher* in frequency and also tune the receiver dial higher. If stations can be tuned in, the set has a defective oscillator, but otherwise is all right. The oscillator circuit parts should then be checked as mentioned previously in the Reverse Method. The output of the generator should be set at about

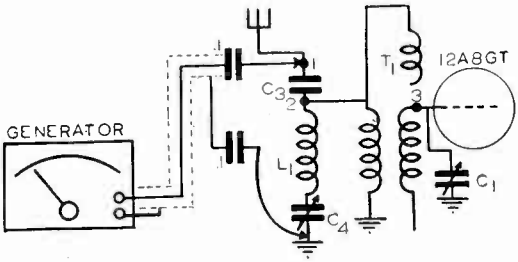

Fig. 5

30% of maximum. The setting is not critical in testing.

Assuming the 455 kc. signal does not go through the 12A8GT, but is heard with the generator connected to the 12A8GT plate, the trouble is localized in the mixer stage. If the signal is not heard the generator may next be connected to the 12K7GT grid, next to 12K7GT plate and then to the upper 12Q7GT diode plate, working through the receiver system in an orderly stage by stage method.

If the dead stage has not yet been reached, the generator's audio output is then used to feed a signal into the junction of R_5 and R_4, the 12Q7GT grid, the 12Q7GT plate, the 35L6GT grid, and finally the 35L6GT plate.

Locating Distortion

Distortion may be produced whenever we have a mismatch in impedance. Distortion may also be produced whenever we have incorrect operating voltages. While the voltages could be checked in the set without any definite method in mind, the analysis can be speeded up by first localizing the trouble in the defective stage and then checking the voltages in that stage.

Most technicians find it somewhat difficult to check distortion by ear when using a signal generator of the ordinary type. For checking the audio system, therefore, we may use a simple alternative method. A record player can be hooked up to the input of the audio section of

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the receiver to supply a test signal or you can merely tune the radio to a station and listen to the program. The record player may be connected across R5 in Fig. 2. The top lead to the receiver volume control can be disconnected by

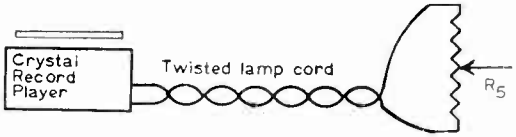

Fig. 6

unsoldering it temporarily to prevent picking up radio signals which permits definite localization of the distortion in the audio amplifier, if such distortion exists. The hookup is shown in Fig. 6. This circuit is useful only when the radio's audio system is a type that normally will work on about 1 volt input.

If the signal comes through the loudspeaker distorted, the defect is in the audio system. The output voltage of such a record player is quite low, so it is often necessary in order to make servicing tests efficiently, to use auxiliary equipment. A simple headphone circuit as shown in Fig. 7 can be used. The test leads may be used to listen in on the audio signal between the 12Q7GT plate and cathode. If the input signal

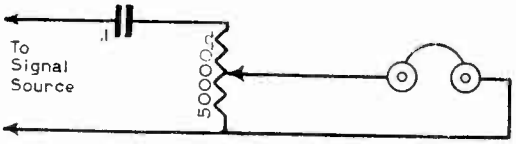

Fig. 7

on the 12Q7GT grid is clear but the output at the plate does not sound natural, the distortion is being produced by the 12Q7GT tube.

The distortion might be produced by a leaky or gassy 12Q7GT, or, very often, by a higher than normal resistance of R7.

Suppose, however, in continuing our tests we found that the signal on the 35L6GT grid was clear but the signal on the plate was distorted.

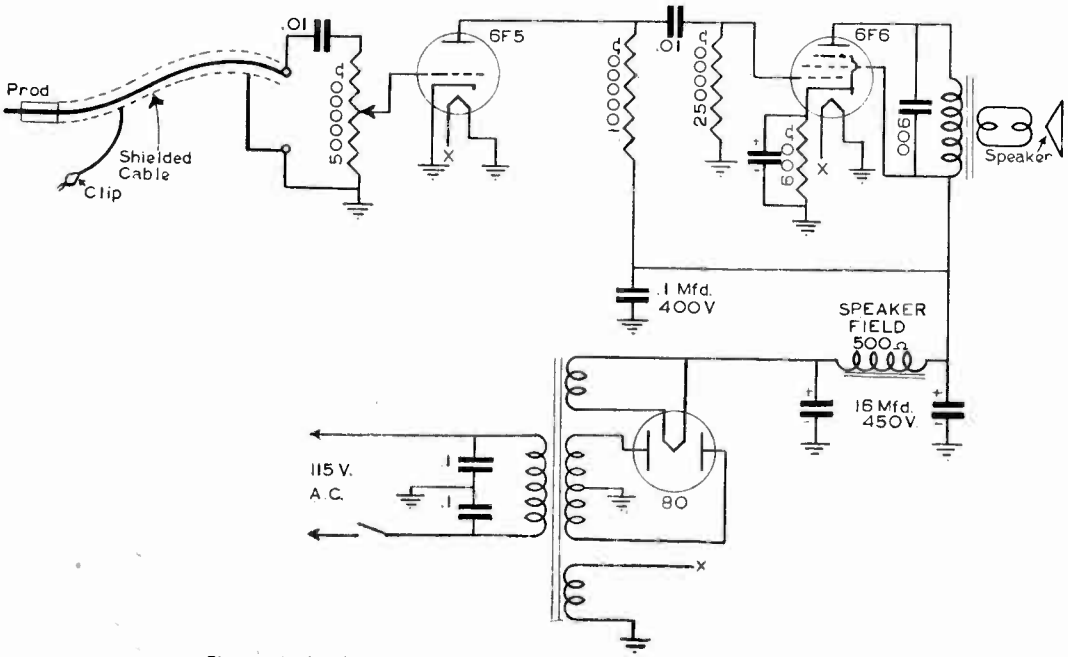

Fig. 8. Audio Signal Tracer.

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In checking this stage, first the phone would be connected across R8 and then between the 35L6GT plate and B— to check the input and output signals. The distortion would be localized in the output stage. The trouble might be too high or too low bias on the grid, leakage in C19, a defective tube, or possibly leakage in C17. We could readily check suspected parts with an ohmmeter or could try substitution of them. C17 and C19 could be tested by disconnecting them and measuring their leakage resistances. The leakages should be above 20 megohms. A simple and quick way of testing the stage would be to use a voltmeter. The voltage across R3 could be checked to determine the bias. You could check for voltage across R8 to determine whether or not grid current was flowing. Normally there should be no voltage across R8. If, with C17 disconnected, there was no voltage across R8, we would suspect C17 of being leaky. If the voltage did not change upon disconnecting C17, very likely the output tube would be gassy and in need of replacement.

In some cases it might be found that the signal in the plate circuit was clear and that the signal on the voice coil was undistorted, and yet the set did not sound "good." In such cases, the trouble would definitely be localized in the loudspeaker and you should concentrate on it. You might find that you had an off-center voice coil or possibly a warped cone in the loudspeaker, causing distortion.

While the headphone unit is usable and will work, it is somewhat of a bother to use it. An audio signal tracer equipped with a loudspeaker can be used instead. Fig. 8 shows a simple unit of this type. Using this signal tracer relatively little loading effect on the circuit under test is experienced. Also it is convenient, as earphones are not necessary and it may, in addition, be used for other purposes besides finding distortion in amplifiers. It can be used to check the output of the record player directly, and phono crystals that you believe may be defective can be checked by feeding the crystal output to the test amplifier (a.f. signal tracer). Numerous other uses will suggest themselves. The tester would be used just as the headphone was used in checking the signal. Also, if desired, you could use the reverse method, working from the voice coil back to the receiver audio amplifier input circuit.

Distortion in the detector or in the high frequency sections of the radio is not very common. Such distortion can arise, however, on occasion. To check the "front end" of the radio, we can use a modulated r.f. generator. The tone of the generator is not used. A record player can be used to modulate the generator, as most modern generators have provision for external modulation. The hookup is shown in Fig. 9.

The ground lead of the generator is connected to the radio chassis. The "hot lead" is touched to the various receiver test points. First, we may connect the hot lead to the diode detector plate which connects to C9 in Fig. 2. If the signal heard in the loudspeaker is distorted, the trouble is in the detector circuit, assuming the audio stages have been checked by using one of the methods previously discussed.

The generator hot lead may next be connected to the grid of the 12K7GT. If distortion is heard, shift the connection to the 12K7GT plate. Should the signal now be heard clearly without distortion, the defect is localized in the 12K7GT stage. A cathode to heater leak in the tube can cause the audio note of the generator to sound "sour,"

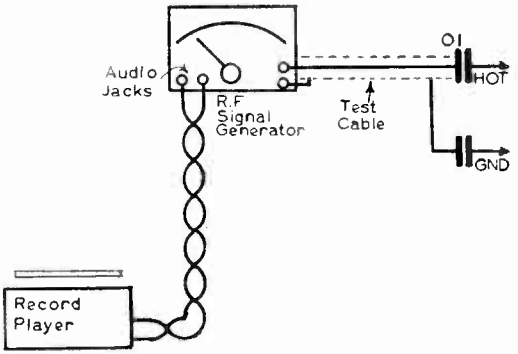

Fig. 9

or, in some cases, an open grid circuit will have the same effect.

Following the testing of the i.f. stage, the generator connection may be shifted to the grid of the 12A8GT. If distortion is heard and then, changing the connection of the generator, shifting it to the 12A8GT plate, results in a clear signal being heard, look for a defect in the mixer stage. (Sometimes regeneration or weak oscillation in a high frequency stage will cause distortion.) Using complete (r.f., i.f. and a.f.) signal tracing equipment, of course, you can check the signal at the various points in the receiver and easily find the stage in which the distortion is being produced.

Hum Troubles

Hum in the radio may arise due to a defective filter condenser, an open in a condenser such as C14, a cathode to heater leak in a tube or possibly an open grid circuit.

The fundamental hum output frequency of a half-wave receiver will be 60 cycles. Therefore,

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it is not quite so easy in a set using a half-wave rectifier to distinguish between cathode to heater leakage hum and power supply hum. However, by isolating the defect, using a stage-by-stage system, you can get at the root of the trouble.

Let's assume that there is a hum in the loudspeaker. If the hum current is flowing through the primary of the output transformer, the hum voltage will be developed across that primary. In order to determine whether or not the hum is in the speaker field for the most part or in the primary of the output transformer and being induced in the voice coil through transformer action, we can short circuit the primary. If the hum still remains substantially at the same level, we have localized the defect. It must be due to hum current in the field coil. In some cases, the trouble might be that, due to the customer's tampering with the radio, the voice coil hum bucking connections are reversed and changing the connections to the correct position would then get rid of the trouble.

In other cases we might find an open in C20 or possibly excessive leakage in C21. We could check both of these condensers simply by trying new ones, cutting the originals out of the circuit.

In many cases it will be found that the hum is not introduced in the voice coil because of coupling between the voice coil and the field coil, nor is the voice coil because of a hum voltage being developed in the plate circuit of the output tube. The trouble might be that R8 had an excessively high value of resistance, a changed value, or that possibly the grid wire of the 35L6 was placed too close to a heater wire in servicing the radio. Hum of this kind would usually be low in intensity but might be troublesome in a quiet room.

In some cases a severe hum is picked up if the lower terminal of R5 is not properly connected to the cathode of the 12Q7GT. Suppose that the hum disappears when R8 is shorted. We would know that we would be killing the input signal by shorting the grid resistor.

If we continued our test and found that the hum also disappeared when we shorted R5 or R6, we could be fairly sure that the hum was not originating in the plate circuit of the 12Q7GT but in the grid circuit.

In most cases of tunable hum, the trouble is that you have an open in a condenser such as C14 located in the power line circuit or C12. Both of these condensers may be checked simply by trying new ones.

A peculiar form of hum may sometimes be heard if C13 opens up. This condenser can easily be checked by trying a new one.

The important thing in all of the above work is to make an effort to localize the trouble before replacing parts wholesale. You want to be efficient in your servicing work.

A final point to remember is that the antenna of the radio should be kept as far as practicable away from power lines. This is to prevent hum modulation. Otherwise, coupling between the antenna and the power line might result in hum being picked up when tuned to a station. Hum is not the only servicing trouble which you will experience in your practical work. Noise very commonly causes trouble in radio receivers.

Forward Method of Locating Noise

In locating noise, the Forward Method is usually the most convenient. You may, however, also use the Reverse Method if you wish, and the choice is a matter that you yourself will make, according to your own liking for either one.

There are two main conditions under which noise is heard. The noise may be heard when the radio is connected to an antenna. Or, it may be heard when the antenna is not connected. If the noise is heard when the antenna is connected but is not heard (or heard only weakly) when the antenna is disconnected, the noise very likely is being picked up by the antenna. To overcome a noise condition of that kind, we often find it necessary to use a doublet transmission line and an antenna proper which is located in a relatively low intensity noise area.

Assuming the noise does not stop when the antenna is disconnected and that it is still very troublesome, we may try a line noise filter on the radio. If the noise stops, the trouble was that the noise was entering the radio through the power line or power supply wiring. In rare cases the set itself may pick up noise directly. For example, a tube which is not shielded or an unshielded coil may pick up interference directly, but in the majority of cases the noise is:

1. Entering through the antenna circuit.
2. Entering through the power supply circuit.
3. Originating in the set itself.

If the noise is being produced in the radio, it will be found in many cases that a poor contact of some kind is the cause of the trouble. This defective contact may be in a volume control and such a defect may not only cause noise but can also cause intermittent operation. If the contact is not steady, a clicking sound may be heard and in some cases a "rumble" like thunder in big sets having plenty of bass response. This action may be experienced when the control is merely touched or adjusted. Noise of a somewhat similar nature is often produced in sets which have electrical push button tuning systems. In one system, a mechanical arrangement makes the dial

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move and the main tuning condensers rotate. If the condenser bearings are tight or the rotor contacts are dirty and making poor electrical connections, excessive noise may be produced. Such defects can be remedied easily. The ball bearings may have a little oil applied to them and the dial can be moved back and forth several times while the oil is being applied. The rotor contacts can be cleaned with carbon tetrachloride and tightened.

It should be kept in mind, in working on radio receivers, that the vibration produced due to the mechanical shock in using the push button tuning may cause nearby parts to move and to make or break contact. When a button is pressed, the mechanical movement or vibration may be transmitted through the chassis. A coil or condenser with a loose lead on it may be moved and the loose lead will cause noise.

This also works backwards. That is, the sound vibrations of the loudspeaker may be transmitted through the cabinet to the chassis. Many sets have chassis which are mounted on rubber feet. If the screws holding the chassis to the cabinet are too tight, excessive noise may be produced. The remedy is clear in such cases—just loosen the chassis holding screws. Don't loosen them so much the screws rattle, but just enough so that they are held in place yet don't result in crushing down the rubber feet which act as cushions underneath the chassis.

In all the cases of noise previously mentioned, the emphasis has been on defects which were visible or which could be detected by ordinary inspection. Special tests would not be employed in running down such troubles because the professional serviceman would go right to them after listening to the noise in the radio.

The clue to this entire business of being a good detective in tracing down noise is to first listen to the noise and then form an opinion as to its cause. Then, you check, step by step, all of the most likely causes of noise that you have heard and you gradually narrow down the search for the cause of the trouble by ruling out each possibility after you have checked it carefully.

The first part of this technique is the inspection, trying the different controls of the radio and observing how they act and whether they produce noise when they are adjusted. The next step is isolation of the defect as outlined above.

Now we come to an important part of this noise story. Does the noise stop (assuming we have localized it in the receiver chassis) when that chassis is removed from the radio cabinet? (Be sure to leave all wires connected.) If it does, we may suspect speaker vibrations have been responsible. Let's check up on that theory by bumping the radio chassis up and down on the test bench. If the noise heard is a rattling sound or the set cuts on and off, we may find a loose coil, defective tube or some other loose part. In some cases even a drop of solder rattling around inside the chassis may cause intermittent noise.

Sometimes the trouble isn't so simple and we have to be really good to find its cause. You may not be able to see anything wrong with the parts of the radio and yet one of them is responsible for noise. How can we find that defective part? Well, one means of doing the job is to use a stage by stage method of analysis.

In a.c. sets a convenient way of blocking the passage of the signal through a stage is to take out a tube in the stage. But this is not possible in the a.c.-d.c. set, for removing one tube would open the filament circuit and prevent other tubes from working. Therefore, we must adopt some other means of finding the noise. We can reduce the stage gain of a stage or prevent coupling of a driver stage to a following stage.

Referring to Fig. 2, the 12A8GT is a driver for the 12K7GT. The 12K7GT drives the 12Q7GT, 12Q7GT drives the output tube and the output tube drives the loudspeaker.

Now, suppose that you wanted to find out whether or not the noise was in the audio system. First you would disconnect one lead to C16. Then, you could listen to the sound in the loudspeaker. If you heard a frying or sizzling sound, the trouble might be defective electrolytics in the power supply system and you could try new ones temporarily. If the installation proved successful, you would know the filters were causing noise. If the set seemed quiet but upon tapping the output tube crackling sounds were heard or even a ringing sound, you would look for a defective output tube and could try another as a test. You could also wiggle and tap the various parts in the audio system to find loose connections or noisy parts.

Grid condenser C17 is a common cause of noise and intermittent operation. In many cases it is squashed down in the chassis, wedged between other parts, and the sharp bend in its leads may cause the wax insulation on the ends to crack, so that there is no firm support for the electrical connections at the ends.

Referring to Fig. 2, we could check the circuit from the i.f. grid back to the speaker by connecting a wire between the plate of the 12A8GT and the B+ output tube screen. In other words, the primary circuit of T2 would be shorted out. Now, the i.f. tube and second detector tube could be tapped and the parts in these stages vibrated by tapping with a bakelite rod. The bakelite rod

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or other insulated tool is used to prevent getting an electrical shock.

The volume control of the radio is advanced to maximum volume and left at that position during the tests. The reason for using maximum volume is that we want to be able to detect even the weakest noises, so that, if possible, they may be corrected.

In some cases it may be desirable to put your ear near the loudspeaker to hear weak noises. These weak sounds may not seem important in a noisy service shop where a customer is talking, another man is working on a set, or even street noises coming into the shop mask the set noise. But in the set owner's home, during the quiet of evening, a slight rattle or buzz while higher pitched sounds are being reproduced in music or speech can be very annoying.

The i.f. can which contains trimmers C8 and C9 (or C6 and C7) may be tapped. If the noise is heard with the secondary of T3 shorted, the trouble lies in the second detector or following stages. If shorting C8 removes the noise, the trouble may be an intermittent open in the primary of T3.

If the noise is not heard with the grid connection to the 12K7GT removed, the defect is very likely in a circuit ahead of the i.f. tube, nearer the antenna. You can continue your tests, working back to the antenna circuit by this reverse method, or you can make a quick check of circuits from the 12A8GT plate back to the loudspeaker by shorting the primary of T2. If no noise is heard, look for a defect in the primary or in circuits ahead of that primary. Suppose, continuing your tests, that you found the noise had dropped in intensity by a great amount when you disconnected the grid lead to the 12A8GT. This would indicate most probably that the defect was in a circuit ahead of the 12A8GT.

The principles that have been explained and illustrated serve fully as well in locating troubles in other radios which may have different circuit arrangements. Stage by stage testing is a technique that can be used in checking any radio. Get a clear picture in your mind of the receiver as an electrical chain linking the antenna to the loudspeaker. See, in your mind's eye, the signal going through the r.f.—mixer—i.f.—second detector—first audio—power output stages, to the loudspeaker. If anyone of those stages noise modulates the signal or in any way affects the signal, you will know it by the symptoms of trouble, your observations and tests.

———*n r i*———

Judge—The evidence shows, Mrs. Grizzly, that you threw a rolling pin at your husband.

Mrs.—It shows more than that; it shows I hit him.

Television Over Phone Cables Foreseen

Investment of a sum approaching a hundred million dollars within the next few years in the construction of six or seven thousand route miles of coaxial telephone cables, which are capable of transmitting hundreds of telephone conversations simultaneously over a single pair of conductors and also of transmitting television images, is seen as a definite possibility by Keith S. McHugh, vice president of American Telephone and Telegraph Company, and George L. Best, assistant vice president of the company, whose article, "The Bell System's Interest in Program Television" appears in Bell Telephone Magazine.

When and where this cable construction will be undertaken depends, the authors point out, on many factors. These include such things as the requirements of our armed forces, general business conditions, the volume and distribution of long distance calls, and the availability of manufactured cable and equipment.

A coaxial cable contains several copper tubes, slightly larger in diameter than a lead pencil, in each of which a single wire is centered by insulators. These tubes are customarily used in pairs, one to transmit in each direction.

The Bell System's first commercial trial of coaxial cable for telephone use was made between New York and Philadelphia in 1936. Its use for transmitting visual images for television broadcasts was demonstrated in 1937.

Since then, coaxial cable has been installed between Minneapolis and Steven's Point, Wis., and between Philadelphia and Washington; and a coaxial route between Atlanta and Jacksonville, in the South, is now under construction.

The routes selected for coaxial telephone cables will be those where the need for substantial numbers of additional long distance channels is likely to be greatest and where this type of cable seems best adapted to meet the need. When the cables are being installed, it is wholly possible to provide additional conductors to handle television.

Messrs. McHugh and Best also discuss the Bell System's plans for a trial installation between New York and Boston of a radio relay system which will be suitable for transmission of television as well as telephone messages. In this system, under development at the Bell Telephone Laboratories before the war, directs radio beams at very high frequencies will operate simultaneously in both directions, and will be relayed at stations spaced about 30 miles apart.

This project, representing another step in the use of shorter and shorter waves for radio telephony, will use micro-waves which are shorter than have been used thus far for commercial radio telephone service.

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N.R.I. ALUMNI NEWS

Louis J. Kunert ..... President
Peter J. Dunn ..... Vice-Pres.
Earl R. Bennett ..... Vice-Pres.
F. Earl Oliver ..... Vice-Pres.
Dr. Geo. B. Thompson ..... Vice-Pres.
Earl Merryman ..... Secretary
Louis L. Menne ..... Executive Secretary

NOMINATIONS FOR 1945

ONCE again it is time to give thought to the nominations of officers to serve our Alumni Association during the approaching year. Our Constitution provides that two months prior to January 1 of each ensuing year, nominations for the various offices shall be called for from the membership through the columns of NATIONAL RADIO NEWS.

Our Constitution further provides that one month prior to January 1 of each ensuing year, the two nominees for each office shall be submitted to the entire membership. The membership shall in return submit the ballots properly marked, voting for one nominee for each office.

In accordance with this procedure, it is our custom to call for nominees for the approaching year in the issue of the NEWS corresponding to this one, then in the next issue of the NEWS present the two nominees for each office for the election of one to take office on January 1.

All present officers may be candidates to succeed themselves, except the President. The President is limited to a term of one year, thus opening the way for other worthy candidates to be elevated to this position of honor.

Louis J. Kunert therefore will take his place with the distinguished gentlemen who are now known as past-Presidents. This group includes: John E. Fetzer, K. W. Griffiths, T. J. Telaak, Peter J. Dunn, Earl R. Bennett, Clarence Stokes, Dr. George B. Thompson, Edward Sorg, and F. Earl Oliver. Mr. Kunert, of course, will serve until December 31 before being retired to this honor roll.

Mr. Charles J. Fehn of Philadelphia Chapter, another idol in the East, was the runner-up in last year's friendly contest. We anticipate that when the final tally is taken at the end of this year Mr. Fehn will be on top or very close to it. This should be his year. He is entitled to the office by reason of his long service in the interest of our Alumni members. He would make a grand President.

In addition to President, we will elect four Vice-Presidents. This means that the eight men nominated for Vice-President will be named in the ballot to appear in the next issue of the NEWS and then the four receiving the greatest number of votes will be declared elected. You are requested to nominate four candidates for Vice-President.

We will also nominate and elect this year a Secretary and an Executive Secretary. Earl Merryman, our Secretary, has held this office since we were organized in 1929. He is at present serving in the South Pacific where he has taken part in four invasions. Mr. Merryman is very proud of his position as Secretary of our Alumni Association and he wishes to hold it indefinitely. Our membership will unquestionably return him to office, especially at this time when he is giving his all in the services of our country.

Mr. L. L. Menne, our Executive Secretary, is well-known to our members as Editor of NATIONAL RADIO NEWS and for his work as the Executive head of our Alumni Association. He is a candidate for re-election and stands on his record.

In order that our members may have a wide list of candidates to choose from, we are submitting the names of members located in various parts of the country. These are submitted merely to be of assistance to you. Do not hesitate to vote for someone whose name does not appear here, if you care to do so. Any member of the Alumni Association may be a candidate for office. Use the ballot on page twenty-nine and thirty.

Gorden E. DeRamus, Selma, Ala.
Don Smelley, Cottondale, Ala.
H. E. Nichols, Lowell, Ariz.
Edgar E. Joiner, El Dorado, Ark.
P. Rochelle, Little Rock, Ark.

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Oliver B. Hill, Burbank, Calif.
John Jerry, Exeter, Calif.
Dr. Geo. B. Thompson, Los Angeles, Calif.
P. A. Abelt, Denver, Colo.
A. H. Wilson, Canon City, Colo.
W. R. Haberlin, Bridgeport, Conn.
M. E. Perkins, Bristol, Conn.
Joseph Snyder, Danbury, Conn.
Wm. F. Speakman, Wilmington, Del.
Lambert P. Ayres, 3rd, Millsboro, Del.
J. J. Jenkins, Washington, D. C.
Robert E. Many, Washington, D. C.
Clyde D. Kiebach, Washington, D. C.
Wm. G. Spathelf, Washington, D. C.
Glen G. Garrett, Bonifay, Fla.
Austin L. Hatch, Ft. Lauderdale, Fla.
Stephen J. Petruff, Miami, Fla.
W. P. Collins, Pensacola, Fla.
Chas. W. Hardigree, Macon, Ga.
R. R. Wallace, Ben Hill, Ga.
L. E. McAllister, Mt. Berry, Ga.
John C. Bills, Boise, Idaho
Arvil H. King, Montpelier, Idaho
Arthur E. Miller, Cicero, Ill.
Earl R. Bennett, Evanston, Ill.
James Cada, Berwyn, Ill.
Harry Andresen, Chicago, Ill.
Harold Bailey, Peoria, Ill.
Lowell Long, Geneva, Ind.
G. H. Millspaugh, Anderson, Ind.
Chase E. Brown, Indianapolis, Ind.
Russell Tomlinson, Marion, Ind.
Raymond L. Drake, Cedar Falls, Iowa
E. C. Hirschler, Clarinda, Iowa
O. L. Kirkpatrick, Augusta, Kans.
Louis A. Harrison, Ellis, Kans.
Wm. B. Martin, Kansas City, Kans.
K. M. King, Wichita, Kans.
Wm. S. Nichols, Cynthiana, Ky.
Robert Steidle, Latonia, Ky.
S. E. Banta, Gonzales, La.
L. H. Ober, Alexandria, La.
Lawrence Merz, New Orleans, La.
Peter J. Dunn, Baltimore, Md.
E. W. Gosnell, Baltimore, Md.
J. B. Gough, Baltimore, Md.
Samuel Robinson, Hagerstown, Md.
C. O. Spicer, Hyattsville, Md.
Austin Vachone, Bath, Maine.
Joseph Dubois, Biddeford, Maine.
Ralph E. Locke, Calais, Maine.
Laurence E. Grant, Belmont, Mass.
Louis Crestin, Boston, Mass.
A. Singleton, Chicopee, Mass.
Omer Lapointe, Salem, Mass.
O. A. Grendahl, Duluth, Minn.
Arthur J. Haugen, Harmony, Minn.
J. I. Layman, Hector, Minn.
A. R. Stewart, Staples, Minn.
F. Earl Oliver, Detroit, Mich.
J. Stanish, Detroit, Mich.
Harry J. Stephens, Detroit, Mich.
Frederick Gaul, Freeland, Mich.
Orlando E. Irwin, Jr., Vicksburg, Miss.
Robert Harrison, West Point, Miss.

Ralph Black, Grayridge, Mo.
C. S. Burkhart, Kansas City, Mo.
A. Campbell, St. Louis, Mo.
C. W. Wichmann, Inverness, Mont.
Carl M. Darner, Sweet Grass, Mont.
V. S. Capes, Fairmont, Nebr.
Albert C. Christensen, Sidney, Nebr.
C. D. Parker, Lovelock, Nev.
Ellwood C. Lisenbee, Wells, Nev.
I. N. Hartman, Hawthorne, Nev.
Arthur Cornellier, Dover, N. H.
Clarence N. George, Dover, N. H.
E. Everett Darby, Woodsville, N. H.
J. A. Stegmaier, Arlington, N. J.
John Stein, Union City, N. J.
Delbert Delanoy, Weehawken, N. J.
Claude W. Longstreet, Westfield, N. J.
James E. Graham, Carlsbad, N. Mex.
Emil Hauzer, Carlsbad, N. Mex.
John E. Kreitner, Buffalo, N. Y.
Alfred R. Guiles, Corinth, N. Y.
Jesse O. Starr, Dobbs Ferry, N. Y.
L. J. Kunert, Middle Village, L. I., N. Y.
Charles W. Dussing, Syracuse, N. Y.
Irvin Gardner, Saratoga, N. C.
Max J. Silvers, Raleigh, N. C.
Arvid Bye, Spring Brook, N. Dak.
Jacob J. Knaak, Cleveland, Ohio
H. F. Leeper, Canton, Ohio
Chas. H. Shipman, E. Cleveland, Ohio
Byron Kiser, Fremont, Ohio
P. E. Traylor, Maysville, Okla.
R. E. Fullhart, Bartlesville, Okla.
Emil Domas, Dale, Oreg.
George H. Newton, Eugene, Oreg.
Elmer E. Hartzell, Allentown, Pa.
Chas. J. Fehn, Philadelphia, Pa.
William Dyson, Pawtucket, R. I.
James F. Barton, Greer, S. C.
Joel J. Lawson, Aberdeen, S. Dak.
Chester Warren, Lead, S. Dak.
W. P. Brownlow, Johnson City, Tenn.
J. E. Collins, Paris, Tenn.
H. A. Gilmore, Amarillo, Texas
B. A. McLendon, Dallas, Texas
L. H. Watkins, Ogden, Utah
Walter Leland, Orleans, Vt.
J. W. Gladden, Alexandria, Va.
A. P. Caldwell, Buchanan, Va.
T. E. Ellis, Richmond, Va.
R. E. Sawyer, Vancouver, Wash.
G. Blomberg, Hoquiam, Wash.
J. V. Williams, Bellingham, Wash.
R. A. Heise, Wheeling, W. Va.
Wm. Wiesmann, Fort Atkinson, Wisc.
J. C. Duncan, Duncan, Wyo.
Robert Kirkman, Calgary, Alta., Canada.
M. Martin, New Westminster, B. C., Canada
E. D. W. Smith, Winnipeg, Man., Canada
John T. Dixon, St. John N. B., Canada
Russell Burhoe, Woodstock, N. B., Canada
Donald Swan, Springhill, N. S., Canada
G. C. Gunning, Smith's Falls, Ont., Canada
E. Bergerson, Sherbrooke, P. Q., Canada
J. W. Meadwell, Saskatoon, Sask., Canada

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Phila-Camden Chapter

We continued to hold our meetings right through the summer. In spite of warm weather our attendance was very good. Our schedule calls for a business meeting followed by a blackboard discussion, on the first Thursday of the month, and for the third Thursday our time is devoted mainly to diagnosing and servicing radio sets.

Owing to transportation problems the attendance at our annual picnic was somewhat less than

Some of the good fellows at Phila-Camden Chapter.

in former years, but none of the usual enthusiasm was lacking. We took turns in a canoe ride down Neshaminy Creek, the canoe being owned by our former National President, Clarence Stokes. Norman Kraft was again on the job with hot dogs roasted on an open fire. It was a grand outing and some pictures will follow for the next issue of the NEWS.

You will meet a fine bunch of fellows in Phila-Camden Chapter and you are cordially welcome to attend out meetings. Drop in any time on the first or third Thursday of the month at 4706 Comly Street in Philadelphia.

JAMES SUNDAY, *Recording Secretary.*

Directory of Officers

(To Serve Until December 31, 1944)

President—L. J. Kunert, Middle Village, L. I., N. Y.

Vice Presidents—
Peter J. Dunn, Baltimore, Md.
Earl R. Bennett, Evanston, Ill.
F. Earl Oliver, Detroit, Mich.
Dr. Geo. B. Thompson, Los Angeles, Calif.

Secretary—Earl Merryman, Washington, D. C.

Executive Secretary—L. L. Menne, National Headquarters, Washington, D. C.

Tear carefully along this line

Nomination Ballot

All Alumni Association Members are requested to fill in this Ballot and return it promptly to National Headquarters. This is your opportunity to select the men who you want to head your Association. Turn this page over—the other side is arranged for your selections.

After the ballots are returned to National Headquarters they will be checked carefully and *the two men having the highest number of votes* for each office will be nominated as candidates for the 1945 election. The election will be conducted in the next issue of NATIONAL RADIO NEWS.

The President cannot be a candidate to succeed himself but you may nominate him for any other office, if you wish. You may, however, nominate all other officers who are now serving, for President or any office, or select entirely new ones. It's up to you—select any men you wish as long as they are MEMBERS IN GOOD STANDING OF THE N. R. I. ALUMNI ASSOCIATION. Be sure to give the city and state of your selections to prevent any misunderstanding. A list of the 1944 officers is given in the opposite column.

Detach this slip carefully from your NATIONAL RADIO NEWS so as not to damage the book. Tear off the slip at the dotted line, fill it out carefully and return it immediately to L. L. Menne, Executive Secretary, N. R. I. Alumni Association, 16th and U Sts., N. W., Washington, D. C.

Your signature .....

City ..... *State* .....

(*over*)

The 1945 nomination is a very important one. Choose carefully the men you desire to handle the reins of the Alumni Association for the coming year. Let's all do our part to help the staff handling the elections, by submitting ballots on or before October 15, 1944.

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Nomination Ballot

L. L. MENNE, *Executive Secretary,*
N. R. I. Alumni Association,
16th and You Sts., N. W.
Washington, D. C.

I am submitting this Nomination Ballot for my choice of candidates for the coming election. The men below are those whom I would like to see elected as officers for the year 1945.

MY CHOICE FOR PRESIDENT IS

.....

City ..... State .....

MY CHOICE FOR FOUR VICE-PRESIDENTS IS

1. .....

City ..... State .....

2. .....

City ..... State .....

3. .....

City ..... State .....

4. .....

City ..... State .....

MY CHOICE FOR SECRETARY IS

.....

City ..... State .....

MY CHOICE FOR EXECUTIVE SECRETARY IS

.....

City ..... State .....

Detroit Chapter

After suspending meetings during July and August, we again got together on Friday, September 15th to open our Fall and Winter schedule.

Mr. Walter L. Wayman was our speaker on the fifteenth and got us off to an excellent start with a fine talk on the merchandising phase of Radio. Mr. Wayman has been in the merchandising end of Radio for many years in Detroit, and is very well known as one who has always shown more than a passing interest in the problems of our members when it comes to buying Radio parts. In his talk he gave us some valuable pointers which, in these days especially, should be helpful to our members.

We have a very instructive and interesting series of meetings lined up. Chairman Harold Chase and Secretary Harry R. Stephens have things well planned for the next several meetings. Mr. Henry Rissi, a favorite of our members is to be our speaker at one of our approaching meetings. Several other good speakers have already been tentatively arranged for. A complete announcement will be made as soon as all details have been consummated.

We are also lining up a number of motion pictures, some with sound, on Radio and closely related subjects regarding which we are very enthusiastic. These we feel will be a real drawing card in getting our members out for our meetings and also for attracting new members. Actual Radio Servicing at the meetings with someone describing the steps as they are being taken, is a feature which is proving to be of tremendous help to students as well as graduate members.

While the N.R.I. Alumni Association is primarily an organization of graduates, we are nevertheless glad to accept N.R.I students, whether beginners or advanced, as Associate Members. Students will find our meetings very beneficial and will appreciate the help and suggestions of our graduate members.

Remember, Detroit's Chapter meets on the third Friday of the month. If you are not now a member and wish to attend out meetings, get in touch with the undersigned whose address is 5910 Grayton, Detroit, Michigan. Your name will be placed on our mailing list to receive notices of all meetings.

Our Officers and members extend heartiest congratulations to the National Radio Institute on its thirtieth anniversary. May N.R.I. continue to grow and prosper under the wonderful leadership it now enjoys.

HARRY R. STEPHENS, *Secretary.*

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New York Chapter

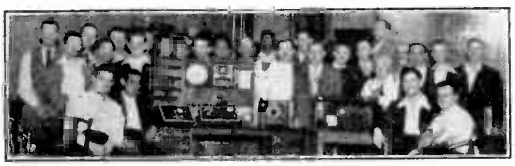
The next big event on our calendar is our social meeting scheduled for November 2nd. Mr. J. E. Smith, President of the National Radio Institute, has tentatively accepted an invitation to be with us. Mr. Smith promises to attend unless something unforeseen shou'd occur to prevent him from doing so. Mr. Smith has many personal friends in the New York Chapter who will want to be present on this date. Mr. L. L. Menne, our

J. E. Smith, L. J. Kunert (1944 Alumni Association President), Mrs. Kunert and L. L. Menne pose for the Alumni Scrap Book. Following the taking of this picture the group lunched at the Washington Golf and Country Club as the guests of Mr. Smith.

Executive Secretary, will also be present with us on November 2nd. We look forward to a big time.

A member of our Chapter who has talked to us on a number of occasions on radio subjects and who is making a big hit is Mr. William Peterson. Mr. Paul Ireland, our technical advisor, who conducts our Service Forum, is usually present with a lot of good information for our members.

Other members who took part in our recent programs are Mr. Frank Miale, and Mr. Bert Godas, who stepped in to take over the Service Forum on one occasion. Mr. Louis Paven is another new speaker, who was very favorably received.



Members pose with some of the equipment at New York Chapter.

Still another new speaker is Mr. G. L. Woodward, who gave a nice talk on the action of condensers. The talk was accompanied by some fine diagrams on the blackboard. Our members will want to hear more from these men.

Chairman Bert Wappler has worked extremely hard to give us fine programs. He seldom misses a meeting in spite of the fact his own business keeps him on the job for six days a week and sometimes seven. Bert has been trying to find a way to get a few Sundays off as a vacation.

Meetings as usual on the first and third Thursday of the month at St. Mark's Community Center, 12 St. Mark's Place, New York City. This is between 2nd and 3rd Avenues and easily reached but do not confuse this street with a similar one in Brooklyn. Our meetings are held on St. Mark's Place in New York City.

FRANK ZIMMER, *Assistant Secretary.*

Baltimore Chapter

First of all Baltimore Chapter sends congratulations to the National Radio Institute on its thirtieth birthday. Our congratulations also to the Alumni Association which this fall is celebrating its fifteenth anniversary.

Baltimore Chapter, under the sterling leadership of Mr. Peter Dunn, was the first local to organize. Although Mr. Dunn is now in the service he keeps in touch with our officers and members in his official capacity as National Vice President. When Mr. Dunn returns we are going to have a real blow-out.

Speaking of parties, we are planning a little social affair for our members in keeping with this anniversary year. All members will be notified and we expect a good attendance.

We have lost some of our members to the various services, but new members come into our chapter almost every meeting so that our total membership remains entirely satisfactory under these war conditions.

Mr. H. J. Rathbun, our Vice Chairman, who acts as our Radio Consultant, still holds the throttle during our practical Radio servicing discussions with any needed assistance from some of our old-timers. Here is where all questions are answered. None are too difficult—none too elementary—these discussions are for beginners and experienced alike.

Cooler weather means more pep for those who do not like the heat of the summer. Our attendance already is on the up-grade and will improve.

Meetings on the second and fourth Tuesday of each month, at Red Men's Hall, 745 West Baltimore Street, in Baltimore.

E. W. GOSNELL, *Chairman.*

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N. R. I. ALUMNI ASSOCIATION

In the reception room at National Radio Institute is a simply-bound book — black with red corners—which today is one of the most prized possessions of the Institute. You may have seen this book yourself —your own name may be inscribed in it— for this priceless book is the register in which all visitors to N. R. I. are invited to inscribe their names.

Opening to the first page of this interesting volume, we find that the first seventy-five names are all dated November 23, 1929; these are all graduates who came to the Institute on that day to participate in the celebration of the Fifteenth Anniversary of National Radio Institute. To commemorate the event and to join together fraternally and constructively the far-scattered Alumni of the National Radio Institute, this group of men on that day declared a convention and founded the now famous N. R. I. Alumni Association. Thirty-four states from Maine to California, from Florida to Minnesota, were represented in the first roster of members, along with four Canadian provinces and several countries outside of North America. Typical N. R. I. graduates were these seventy-five Alumni, each respected in his community, each well on his way toward a successful career in Radio.

That was fifteen years ago. So, as N. R. I. this year celebrates its Thirtieth Anniversary, we of the Alumni Association simultaneously celebrate our Fifteenth Anniversary.

Our record for the past fifteen years is one of which every member—every N. R. I. student and graduate—can well be proud. We were the first Alumni Association ever to be organized among graduates of a home study school; today, with more than thirty-five hundred members from every state of the Union, from every Canadian province, and from almost every foreign country, we have one of the strongest Associations of this kind in the world. Our members have profited greatly from their contacts with fellow Alumni through Chapter meetings

The Charter Members of N. R. I. Alumni Association, photographed in 1929, when our Alumni Association was formed. On this occasion our Charter Members were addressed by the late Charles Curtis, then Vice President of the United States, who is also shown in the photograph, first row, fifth from the right.

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CELEBRATES 15th BIRTHDAY

and through our official publication NATIONAL RADIO NEWS, and we in turn have guided the Institute in its dissemination of Radio knowledge.

The picture shown was taken at the time the N.R.I. Alumni Association was formed in 1929. In this group will be recognized the late Charles Curtis, then Vice President of the United States, who congratulated our members upon their fraternal spirit and their foresight in binding together for the common good of servicemen and technicians everywhere.

That convention in 1929 was brought to a close with a banquet at the Arlington Hotel in Washington. As part of the ceremony, a handsome loving-cup was presented to the National Radio Institute through its President, Mr. J. E. Smith. The actual presentation was made to Mr. Smith by the then newly elected Vice President of the Alumni Association, Mr. Hoyt Moore, of Indianapolis, now a State Senator in Indiana.

On the face of the cup is engraved the following legend: "Fifteenth Anniversary of the National Radio Institute. Presented to J. E. Smith, President, by the N. R. I. Alumni, November 23, 1929." On the opposite side is engraved the name and state of residence of each charter member of the Alumni Association.

Mr. Smith—Honorary President of the N. R. I. Alumni Association, Mr. Haas—Honorary Vice President of the N. R. I. Alumni Association, and all of the members of our Executive Staff extend greetings to the members of the Alumni Association on this occasion of their Fifteenth Anniversary and congratulate the seventy-five original members, for their devotion in carrying out an ideal which was founded upon the solid principle that in union there is strength.

This loving cup was presented to N. R. I. in 1929 by the Charter Members of the N. R. I. Alumni Association. It is handsomely engraved, including the name and state of residence of each Charter Member.

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Here And There Among Alumni Members

In the last issue of the NEWS we said that Vice President Earl Bennett of Bennett Brothers, Wilmette, Ill., besides all of his other responsibilities, manages to knock out five or six Radio sets a day. Boy! Did Earl take us apart. Says he, "Got quite a laugh! You certainly got your facts mixed up. For example, yesterday I repaired 23 radios, the day before I repaired 17. The weeks total is 92. My labor charges, exclusive of parts for last month amounted to $441.25. When my wife, Alice saw the article she looked twice then accused me of giving her a false impression of our prosperity, saying 'so we are headed for the poor house—only five or six radios per day—here it is black on white, so you can't fool me any longer.' " Maybe Earl has been holding out, Alice.

———n r i———

John E. Douglas recently passed the examination and received a Radiotelephone, First class license and is now employed as Chief Engineer at Station KBTM, Jonesboro, Ark. Before enrolling with N.R.I. Mr. Douglas was an automobile mechanic.

———n r i———

Secretary Stephens and Chairman Chase spent a weekend at Harold Chase's summer cottage at Briggs Lake, near Brighton, Mich., planning Detroit Chapter affairs for the next several months. A number of Detroit Chapter members have summer homes at nearby resorts. Good enough! Must be doing all right for themselves.

———n r i———

Sgt. Raphael Beaty of Keego Harbor, Mich., was in to see us. He graduated in 1933 *and had a nice shop in his home town. He was wounded in service and is now a patient at an Army hospital in West Virginia. Getting along nicely and in a short time he should be as good as new.*

———n r i———

Lloyd V. Stenberg, owner of Lloyd's Radio and Sound Service, Willmar, Minn. has one of the most modern stores in the country. Sent us some splendid photographs. Has a Radio, Record, Music and Sound Dept., also handles Western Electric Hearing Aids. In addition is Chief Engineer for Radio Station KWLM and is in charge of maintenance of Police Station KRIN of the County Highway Dept.—a busy man and does he love it!

———n r i———

Gordon E. DeRamus of Selma, Ala., got into Radio as a hobby. Along came an opportunity to accept a position as operator for the Selma Police Radio Station WASP and Alabama Highway Patrol WKSJ. DeRamus got a third class operators license and took the job. Recently he went to Atlanta, Ga., on vacation and while there took and passed the examination for a Radiotelephone operators license, first class. There's a fellow who is going right ahead.

———n r i———

George Stopera of Linden, N. J. maintains all the Radar and Electronic equipment at the plant where he is employed. Has a very interesting position.

———n r i———

Last issue we mentioned the names of as many of the ladies we could recall from memory who attended the dinner party sponsored by Detroit Chapter in honor of Mr. J. E. Smith. We now want to mention Mrs. Fouke, Mrs. Bisaga, Mrs. Ankeny, Mrs. Upham, Mrs. Clow, Mrs. Hasen and Miss Nicholls who also were present.

———n r i———

Bainard Stewart of York, S. C., who is a Corporal in the Army was in for a visit with Chief Instructor Dowie. Corporal Stewart is a Radio Operator for Uncle Sam.

———n r i———

Had a nice card from Vice President Earl Oliver and Mrs. Oliver. They enjoyed a well earned vacation at their summer place, Lexington on Lake Huron. Earl has been, in fact, still is working seven days a week.

———n r i———

Edward Mehl of New York Chapter opened his own Radio Servicing Shop about two months ago. Another N. Y. Chapter member to go in Radio business for himself is Paul Ireland. Good luck fellows!

———n r i———

R. Cooper Bailey of Richmond, Virginia is a Lieutenant Commander in the U. S. Naval Reserve. We know Commander Bailey very well. He has made several visits here at headquarters.

———n r i———

The honor for long distance attendance, at the picnic sponsored by the Phila-Camden Chapter goes to the mother of Charles Rowe. Mrs. Rowe traveled all the way from Brooklyn for the special purpose of attending the picnic.

———n r i———

William L. Malin, Jr. of Upper Darby, Pa., passed his examination for a second class Radio-telegraph license and immediately joined the Merchant Marine. He shipped out at once.

———n r i———

Charles J. Fehn, the old-standby in Phila-Camden Chapter, sends us a very glowing account of the picnic sponsored by the Chapter at Neshaminy Falls, Pennsylvania, the country home of past National President Clarence Stokes. That Quaker City bunch of good fellows know how to enjoy themselves.

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NATIONAL RADIO INSTITUTE STAFF
1914 — OUR 30th ANNIVERSARY — 1944

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Allen B. Dumont

Allen B. DuMont was born on January 29, 1901 in Brooklyn, New York. From 1915 to 1940 he held a first class commercial operator's license and worked during the summers on coastwise and transatlantic vessels. He also owned and operated an amateur transmitting station, W2AYR.

In 1924, Mr. DuMont received the degree of electrical engineer from Rensselaer Polytechnic Institute. From 1924 to 1928 he was employed by the Westinghouse Lamp Company and from 1928 to 1931 he was with the DeForest Radio Company. In 1931 he organized the Allen B. DuMont Laboratories, Inc. for the manufacture of cathode-ray tubes. Mr. DuMont has many patents to his credit, chiefly in the cathode-ray tube and television fields and he is the author of many technical papers on these subjects.

Mr. DuMont is a Fellow of the American Institute of Electrical Engineers, the Institute of Radio Engineers, the Television Society, and is President of Television Broadcasters, Inc.

Recently, during its 120th commencement exercises, Rensselaer Polytechnic Institute conferred upon him the degree of honorary Doctor of Engineering. As commencement speaker for the class of 1944, Mr. DuMont declared that, "Tomorrow's world means change and progress on a global scale. Technological advances already amount to twenty-five years of usual peacetime progress."

NATIONAL RADIO NEWS

FROM N.R.I. TRAINING HEADQUARTERS

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