Radio News of Canada

20 CENTS | Vol. 4, No. 3 | TORONTO | SEPTEMBER, 1925 | 20 CENTS

Brown

In Universal Demand

BROWN LOUD SPEAKERS have established a world-wide reputation for superior performance. Throughout the globe, they are becoming more and more popular with radio fans who demand the best.

For volume of tone and clarity of reception, the Brown Loud Speaker cannot be excelled. Vocal and instrumental numbers are reproduced with that fine shading which makes listening-in a pleasure.

The range of your set is greatly widened with a Brown Loud Speaker. You get more distant stations clearly, because of the sensitive paper-thin aluminum diaphragm, which is an exclusive feature with the Brown.

When you buy a Brown Loud Speaker, you get an established product, the result of years of scientific research. It represents the perfection of the art of sound reproduction.

Famous Featherweight Phone, **$6.50**; Model H2 Speaker **$17.50**
Model H2 De Luxe, **$20.00**; Q Type..... **150.00**
Gramophone Attachments at.....**$14.00** and **32.50**

Made in England by
S. G. BROWN, LIMITED, LONDON, ENGLAND

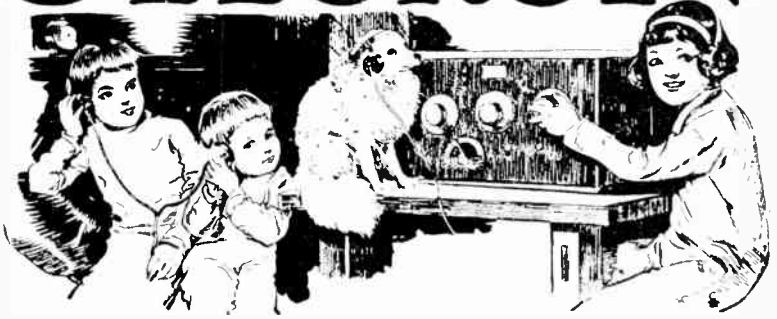
Canadian Distributors :

PURSER, BULL & CO. LIMITED, TORONTO

SOLD BY ALL GOOD DEALERS

Diamond·F

CELORON



The more you expect of your radio set The more you need Celoron

CELORON is the standard insulating material among radio manufacturers. It is the choice of nearly a million radio fans for radio panels and tubing.

In the face of such evidence, can you do better than to use Celoron for the building of your radio outfit?

Celoron Panels and Tubing

Celoron is uniform, practically indestructible, and readily workable.

Celoron does not soften under heat or deteriorate with age as do rubber and composition materials. It does not chip or crack, even if worked near the edge.

The dielectric strength of Celoron is many times higher than the most severe insulating requirements.

Ask your dealer to show you his assortment of Celoron panels and tubing.

CELORON TUBING

Celoron tubing has all the insulating qualities of Sheet Celoron. It comes in all sizes.

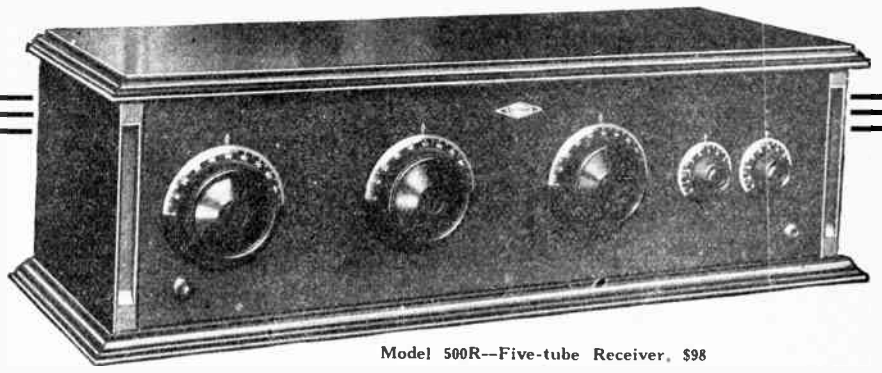
When you see this display rack, you can be sure of getting genuine Celoron Panels.

See our Radio Exhibit, Booth 21, Industrial Building, Canadian National Exhibition

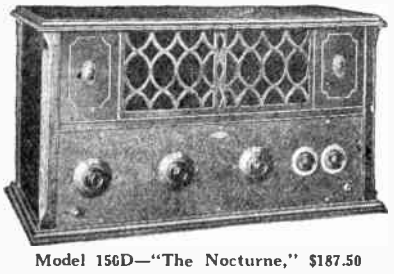
CELORON
RADIO PANELS

Diamond State Fibre Co. of Canada, Limited

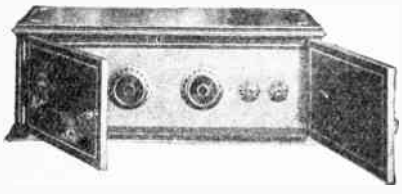
TORONTO :-: CANADA



Model 500R—Five-tube Receiver, $98

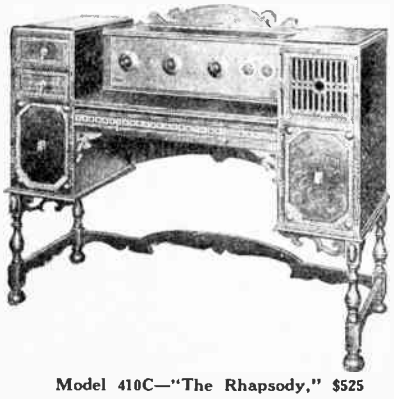


Model 150D—"The Nocturne," $187.50



Model 110D—"The Geisha," $137.50

Model 425C—"The Mikado," $535



Model 410C—"The Rhapsody," $525

Experience and Resources Made This Receiver Possible

WHEN Splitdorf decided to build a Radio Receiver it laid down this basic specification: A Product Worthy of the Splitdorf Reputation.

Then it concentrated on the task all of its enormous resources; all the wealth of experience accumulated during sixty-seven years of manufacturing fine electrical instruments.

The Result is Splitdorf Reception. And Splitdorf Reception is a Revelation of what Radio can be!

Ask the Splitdorf Merchant

Splitdorf Electrical Company Limited
TORONTO
CANADA

TRADE SPLITDORF MARK ESTABLISHED 1859

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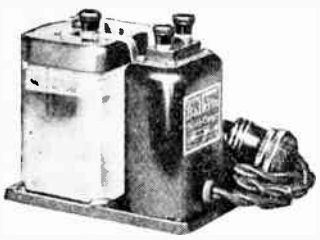
Announcing the Balkite Trickle Charger *at* $15 *and the new* Balkite "B" *at* $49.50

FOR THE "A" CIRCUIT



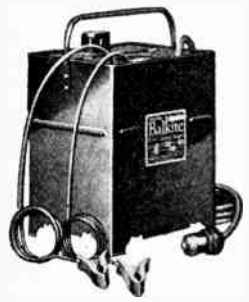
Balkite *Trickle Charger*

Charges both 4 and 6 volt radio "A" batteries at about .5 amperes. Usable in 3 ways: (1) As a regular charger with a low capacity storage battery for sets now using dry cells. (2) With storage battery sets of few tubes. Furnishes more current than used by 6 dry cell or 2 storage battery tubes, so that if used during operation it need be used at no other time. (3) As a "trickle" or continuous charger for storage battery sets of as many as 8 tubes. Sizes 5½ in. long, 2¾ in. wide, 5 in. high. Operates from 110-120 AC 60 cycle current.

Low capacity batteries especially adapted for use with this charger with sets now using dry cells are being offered by practically all leading battery manufacturers this fall.

Reputable manufacturers are also offering this fall for use with this charger special switches which turn on Balkite "B" and turn off the charger when you turn on your set. This makes the current supply for both "A" and "B" circuits automatic in operation.

Price $15



Balkite *Battery Charger*

The most popular battery charger on the market. It can be used while the radio set is in operation. If your battery should be low you merely turn on the charger and operate the set. Charging rate 2.5 amperes. Operates from 110-120 AC 60 cycle current.

Price $27.50

The Balkite Battery Charger is today the most popular charger on the market. It is the only charger commonly used while the set is in operation. Balkite "B" II is also well known. It replaces "B" batteries entirely and supplies plate current from the light socket. It was the outstanding development in radio last year.

We now announce the Balkite Trickle Charger at $15. This low-rate charger is especially adapted to use with sets of relatively low "A" current requirements — any dry cell set and storage battery sets having a small number of tubes. Owners of dry cell sets can now make a very compact and economical installation with a Balkite Trickle Charger and a low capacity storage battery of the type being offered by leading battery manufacturers this fall.

We also announce at this time the new Balkite "B" at $49.50. This new model is specially designed to serve sets of five tubes and less. It fits in your present "B" battery compartment.

Noiseless—No bulbs—Permanent

All Balkite Radio Power Units are based on the same principle. All are entirely noiseless in operation. They have no moving parts, no bulbs, and nothing to adjust, break or get out of order. They cannot deteriorate through use or disuse—each is a permanent piece of equipment with nothing to wear out or replace. They require no other attention than the infrequent addition of water. They do not interfere with your set or your neighbor's. Their current consumption is remarkably low. They require no changes or additions to your set. An "A" battery, a Balkite Charger and a Balkite "B" constitute the most advanced power equipment on the market, one that is economical, unfailing in operation, and eliminates the possibility of run-down batteries.

Distributed by BURNDEPT OF CANADA, Ltd.

130 Richmond St. W., Toronto 335 St. James St., Montreal

SPARLING SALES, Ltd., 276 Smith St., Winnipeg

RADIO SPECIALTIES, Ltd., 179 Pender St. W., Vancouver, B. C.

FAN STEEL

Balkite *Radio Power Units*

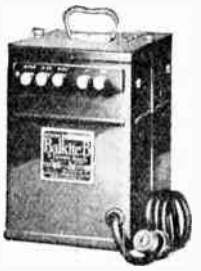
FOR THE "B" CIRCUIT

Balkite "B"

Eliminates "B" batteries. Supplies plate current from the light socket. Operates with either storage battery or dry cell tubes. Keeps "B" circuit always operating at maximum efficiency, for with its use the plate current supply is never low. Requires no changes or additions to your set. No bulbs—nothing to replace. Requires no attention other than adding water about once a year.

A new model, designed to serve any set of 5 tubes or less. Size 8¼ in. long, 8 in. high, 3¼ in. wide. Occupies about same space as 45 volt dry "B" battery. Operates from 110-120 AC 60 cycle current.

Price $49.50



Balkite "B" II

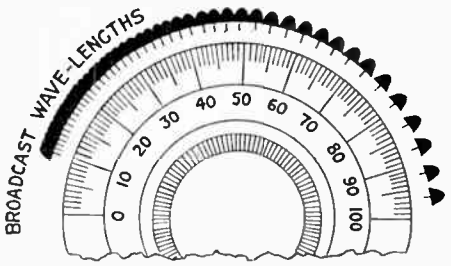
The most outstanding development in Radio last season. Same as the new Balkite "B" but will fit any set including those of 10 tubes or more. Current capacity 40 milliamperes at 90 volts. Size 9 in. high, 6¼ in. wide, 7½ in. deep. Operates from 110-120 AC 60 cycle current.

Price $75

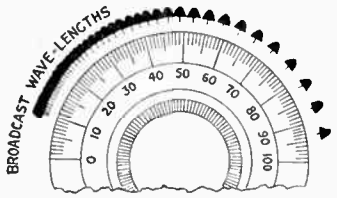
The Gould Unipower is equipped with a special Balkite Radio Power Unit

BALKITE BATTERY CHARGER · BALKITE TRICKLE CHARGER · BALKITE "B" · BALKITE "B" II

This Year—
Better, But Crowding Still Troublesome

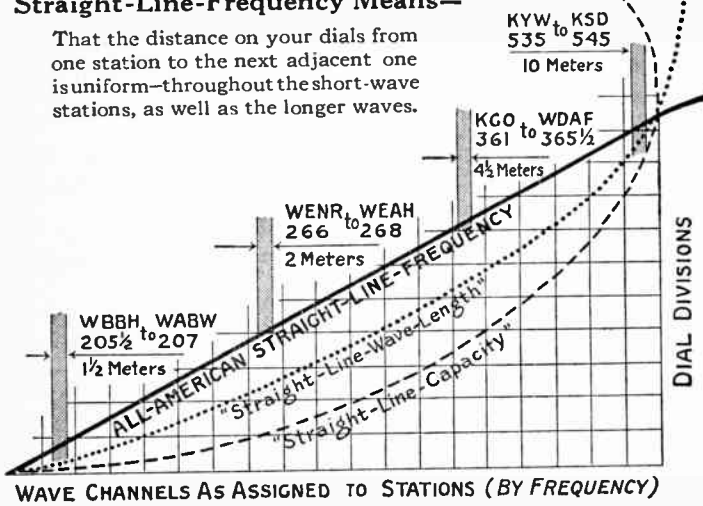


Last Year—
Bad Crowding of Shorter-Wave Stations



Straight-Line-Frequency Means—

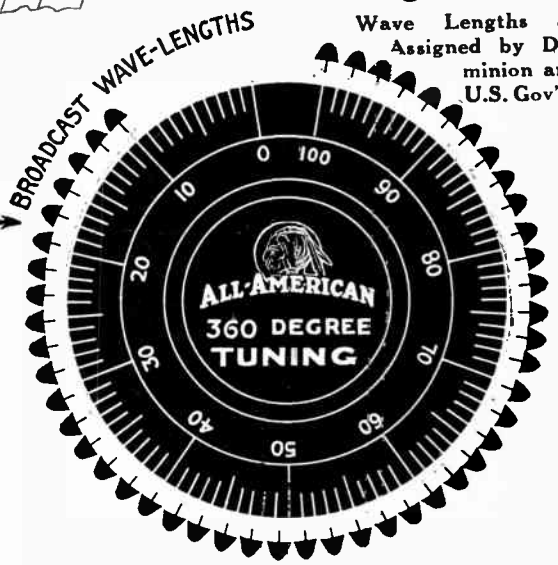
That the distance on your dials from one station to the next adjacent one is uniform—throughout the short-wave stations, as well as the longer waves.



WAVE CHANNELS AS ASSIGNED TO STATIONS (BY FREQUENCY)

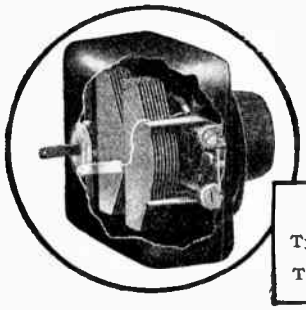
Next Year—
No Crowding!

Wave Lengths as Assigned by Dominion and U.S. Gov'ts.



20-KILOCYCLE INTERVALS ARE SHOWN ALTERNATE CHANNELS OMITTED FOR CLEARNESS

ALL-AMERICAN
STRAIGHT-LINE-FREQUENCY TUNING



All-American Straight-Line-Frequency Condensers
Type C-35 Max. 350 micromicro farads (Min. 10.5 mmf.)..... $6.50
Type C-50 Max. 500 micromicro farads (Min. 11.8 mmf.)..... $7.25

All-American Toroid Coils
Type T-1 Antenna Coupler $5.00
Type T-2 R.F. Transformer $5.00
Set of 3 Coils complete . . $15.00

Ease and certainty in tuning—no more crowding of short-wave stations—no need to buy vernier dials—no gears or other back-lash makers—body capacity absolutely *not distinguishable*—electrical efficiency unsurpassed—on one-half the panel space: that is the ALL-AMERICAN Straight-Line-Frequency Condensers.

New power for distance reception through close coupling—tuning of arrow-like sharpness—elimination of all oscillation worries through the self-enclosed endless magnetic field—non-radiating reception: that is ALL-AMERICAN Toroid Coils—Antenna Coupler and Radio Frequency Transformers. *See them at your dealer's.*

A new edition of the famous RADIO KEY BOOK, together with complete information about the new ALL-AMERICAN Straight-Line-Frequency TUNING, is yours for 15 cents, coin or stamps. Send for it today sure!

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73 Davis Chambers, Vancouver

Eastern Distributor
BURNDEPT OF CANADA LIMITED
130 Richmond St. West, Toronto
335 St. James St., Montreal

MEMBER RMA

OWNING AND OPERATING STATION WENR—266 METERS

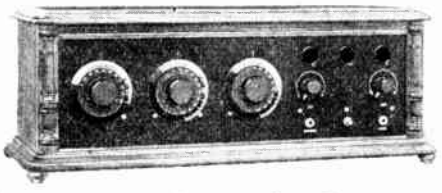
ALL-AMERICAN
Pioneers in the Radio Industry

FADA Radio

Presents a Complete Range of 9 beautiful Models

from the Neutro-Junior, selling at $60, to the Magnificent Art Models selling as high as $335.

The "Neutro-Junior" a 3-tube set adapted for dry cells or storage battery, selling at $60.



The Fada "Canadian," a 5-tube Neutrodyne in a beautiful walnut case, selling at $125.

The "Queen Anne Desk," one of Fada's strikingly beautiful art models selling at $335.

By concentrating on Fada, you are sure that the same unsurpassed quality which has made Fada the leader in the United States, will be maintained here in Canada. In addition, you'll get merchandising service unparalleled in the industry, and the support of liberal advertising space in leading Canadian newspapers and magazines.

FADA RADIO LIMITED
821-827 QUEEN STREET EAST, TORONTO

F. A. D. Andrea, Inc. New York, U.S.A.
Fada Radio Limited London, Eng.

Manufacturers of TUNED RADIO FREQUENCY Receivers using the highly efficient NEUTRODYNE principle. Licensed under Hazeltine Patents Nos. 238128 and 238894.

LICENSED BY INDEPENDENT RADIO MANUFACTURERS, INC. NEUTRODYNE

ATWATER KENT RADIO

"We don't open the box"

DEALERS have been telling us what they most like about Atwater Kent Radio.

"This sums it up," one of them said: "We send the sets to our customers' homes without opening the boxes. We know they're all right. 'Inspected' *means* inspected when Atwater Kent says it."

Other dealers gave similar testimony. Although we advise all to open the boxes and make sure there has been no accident in transportation, it is gratifying to know that they regard it as unnecessary.

The word "Inspected" on the pink tag attached to the bottom of every Atwater Kent set is a certificate of character. It means that every set has been subjected to no less than 140 gauge and physical inspections and nineteen electrical tests. All along the line of manufacture the smallest defect is a death warrant.

Even after the "final" inspection we are constantly picking Receivers from the finished array and testing them again.

Visitors at the factory sometimes think we are too fussy. That we regard as a compliment. Every dealer knows that "fussiness" at the plant relieves the customer from fussing in the home, and makes Atwater Kent Radio easy to sell.

"It is not our fault that we sell most of that make," a dealer told us. "The people take them away. Atwater Kent Radio has a good name, fastened to the people's mind with the glue of quality."

We believe in being fussy and shall continue to be.

Write for illustrated booklet telling the complete story of Atwater Kent Radio

ATWATER KENT MFG. COMPANY
A. Atwater Kent, President
4762 WISSAHICKON AVE. · PHILADELPHIA, PA.

Dealers, did you know—

THAT the farmers of the country have set down in writing their preference for Atwater Kent Radio?

The Meredith Publications and the Capper Publications recently asked the farmers: "What make of radio set do you expect to buy?" In the answers Atwater Kent was FIRST.

If you have prospects in rural districts, there's a tip for you.

Every Thursday Night—the potential audience of the Atwater Kent Radio Artists, who broadcast from ten stations every Thursday evening from 9 to 10 (Eastern Standard Time) is estimated at more than 10,000,000. These are the stations:

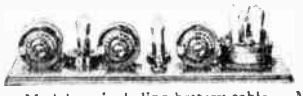
WEAF	*New York*	WCAE	*Pittsburgh*
WJAR	*Providence*	WGR	*Buffalo*
WEEI	*Boston*	WWJ	*Detroit*
WFI	*Philadelphia*	WSAI	*Cincinnati*
WCCO	*Minneapolis-St. Paul*	WOC	*Davenport*

Model 20, without tubes $112

Phonograph Attachment, with 9' flexible cord, $11.25

Model 24, without tubes, $140

Model L, with 9' flexible cord, $24



Model 10, including battery cable, but without tubes, $112

Model 20 Compact, including battery cable, but without tubes, $112

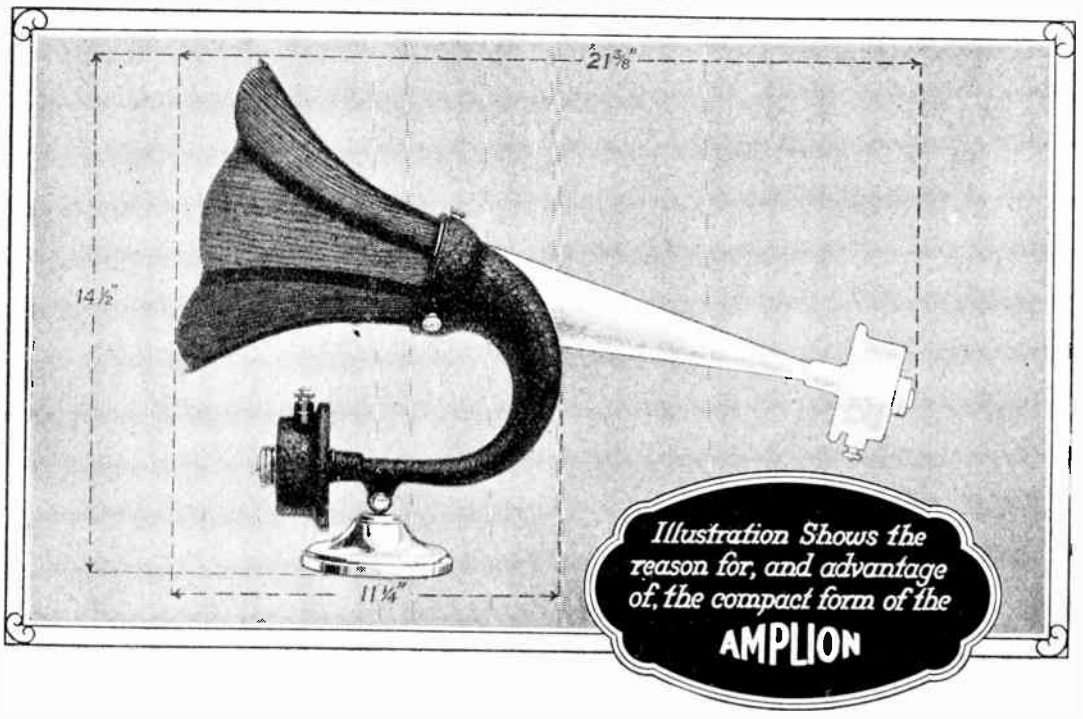
Model 12, built on special order, including battery cable but without tubes, $140

Model H, with 9' flexible cord, $31

AMPLION

The "DRAGON" SHAPE

An Explanation of interest



To illustrate the outstanding feature of **Amplion "Dragon"** design the New Senior de Luxe is shown as an example. With a back-to-front measurement of 11¼ inches only, there is afforded the equivalent of a "straight horn" Loudspeaker having an overall length of 21⅜ inches.

No other style of Loudspeaker possesses, or even approaches, the **Amplion** in the qualities which, in association with a suitable Wireless Receiving Set, ensure

"Better Radio Reproduction"

Dragon AR-19, **$45.00** ; Junior de Luxe AR-114 (illustrated), **$27.50** ; Junior AR-111, **$24.00** ; Dragonfly AR-102, **$13.50** ; Phonograph Attachments, AR-67, **$17.50** ; AR-35, **$25.00.**

All guaranteed to satisfy. All complete with cords.

Hear them at your dealer's—*in comparison.*

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WE LEAD, OTHERS FOLLOW

VOL. 4 TORONTO, SEPTEMBER, 1925 No. 3

RADIO AT THE CANADIAN NATIONAL EXHIBITION

The radio exhibits at the Canadian National Exhibition this year are worthy this great and growing industry.

It would be difficult to pick out any special display, as they are all equally good, and collectively, they make a fine showing.

Brandes are again showing the folks how they make their matched tone headsets, and have a very interesting demonstration.

De Forest-Crossley are exhibiting their new models in the Music Building, and are well worth seeing.

The Diamond State Fibre Co. Ltd. are showing Celoron in a novel way. They have rigged up a miniature race track, with several thoroughbreds in full racing form coming down the stretch, with the black filly Celoron well in the lead.

Marconi's are showing their new line in the Process Building, and their models are creating a good deal of interest, especially the newly developed superhet, they have just put on the market.

Among the loud speakers, Amplions, Baldwins, and Browns, are the most prominent, each of these companies having new models on view.

The Standard Radio Company are in the old Independent Telephone Co. booth, in the Process Building, and should be visited by all radio fans, as they have some new features that are decidedly interesting.

The Carter Radio Company are showing a good line of their well-known products and have a new Bremer-Tully condenser that should not be overlooked.

Among the battery men, we find Canadian National Carbon, and Dominion Battery Co. well to the fore with improved batteries in several new shapes, designed to conserve space in the various cabinets in which they are used.

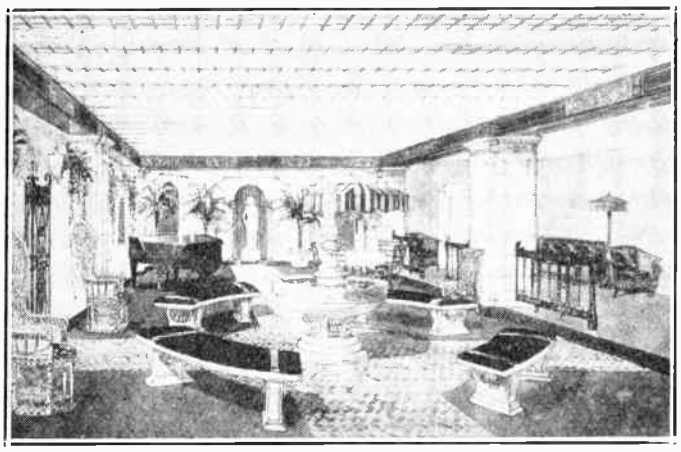
The British American Manufacturing Co. are showing the new Sleeper-Monotrol, amongst other lines.

The Westinghouse and Canadian General Electric have their usual displays, and in addition, are showing the new lines for the season's trade. These lines show many additional features over last year's models.

There are many other radio exhibitors we should mention, but space prevents in this issue. We are writing this on opening day, so that we have not had time to look them all over. Next month, we will have full descriptions of the radio section of Canada's National Exhibition, together with photographs, so that our readers who are not able to see the show for themselves will be given an opportunity to know what's new in radio.

We can say, however, that there is a very decided improvement in the quality and appearance of both sets and components over last year. Tuning has been greatly simplified—there are less controls—these improvements are to be seen in all the new models.

An Inspirational Broadcasting Studio



The above illustrates one section of the new Zenith Broadcasting Station, WJAZ, located on the twenty-third floor in the tower of the new Straus Building, Chicago, Ill.

"Better broadcasting begins with better studios, and that means environment and atmosphere," said E. F. McDonald, President of the National Association of Broadcasters, "and we propose to prove the point."

Thus far quality reception has been considered purely a matter of acoustics, and with no thought of the more important question of environment essential to the artists' inspiration and atmosphere to excite quality rendition.

WJAZ abandoned completely the standard heavy dull drapes prevalent in almost all studios, and through the country's highest-rated acoustic and electrical authorities, have overcome all obstacles of echo and sound rebound without without the use of the drapes and accomplished the one remaining necessity—local color and atmosphere.

Before entering the studio one comes into a reception-room of unusually large dimensions—set with costly tapestries and carpetings, and set in period furniture. To the right is an artistic archway within which a massive art metal gate fills in the enclosure. Franked on either side by smaller archways are wrought iron gratings, beneath which artistically built-in benches are positioned. This room being given over exclusively as a lounge for visitors and artists.

Passing through a great archway and into the studio proper one first comes upon a great wide verandah—giving the impression of having left the drawing-room of a chateau and out into the garden.

Here the visitors are seated in exquisite lawn furniture and apart from the artists in the garden beyond. The studio proper is, in a sense, a garden surrounded by a massive wall with grilled openings and great gateways overlooking a vast area of country beyond accomplished by certain scenic effects.

In the centre stands a massive art fountain of stone which adds a touch of realism, with its tiny spray of water noiselessly sparkling and enlivening the Japanese goldfish within its spacious reservoir.

The ancient tiled floorings are here and there offset by an occasional stone seat or other appropriate settings, all of which lends a touch of ancient days and a silent effect that plays upon the emotions.

The Zenith WJAZ station, however, has not left any details to the artists' imagination. Elaborate electrical apparatus ingeniously concealed throughout the entire setting of both the garden and the veranda is operated by the property man in charge of lighting from his station, which is also hidden from view, but from which he can see the entire performance. Automatically controlled lighting apparatus is positioned scientifically to produce certain perfect effects—the operator folllows the theme of the selection being broadcast, and with flood lights, fadeins and fadeouts, he produces the effect of sunrise, sunset, and moonlight as in day and night—and likewise the calms and storms—all with such faithful effect and reality as start the emotions and inspires the artist's greatest effort.

One can readily picture the effect upon the artist as he feels the richness of such environment and his carried along with the theme of his role by the effect of such surroundings and lighting which so faithfully follow his emotions, while he also feels the intimate closeness of an audience actually sitting before him midst all the richness of an ancient veranda and garden.

In promoting the interest of better broadcasting, Zenith was first to step out from the erroneous theory that solid drapes and walls were necessary at the Edgewater Beach Hotel in Chicago, they installed the famous Crystal Studio whereby through heavy plate glass partitioned (to prevent sound vibration penetrating through the microphone) they seated an audience which produced the desired effect upon the artist.

Zenith, when selling the former WJAZ station at the Edgewater Beach Hotel retained its call letters, which are now used in its Portable Broadcasting Station now touring Michigan, preparatory to its six-week broadcasting tour to the Pacific Coast, after which the Zenith new studio will be officially opened and WJAZ will be again back on the air.

The Zenith Straus Building Studio will be operated by remote control from its new power station now being erected 30 miles out of Chicago, where all of the interferences so common to city located stations will be entirely eliminated.

WJAZ will be open to the public during all of its performances.

PACENT SALES CONVENTION

Mr. R. H. White, of White Radio, Ltd., Hamilton, Ont., has just returned from New York, where he attended a sales convention of the Pacent Electric Co., Indications point towards a large volume of business in the U.S. and Canada during the coming year.

If you have any trouble obtaining your copy of RADIO NEWS OF CANADA from your news agent, send us his name and address and we will see that he gets a supply.

ALEXANDERSON REDISCOVERS HORIZONTALLY POLARIZED RADIO WAVES AT HIS "LAB."

This New Method of Wireless Transmission May Overcome Many Existing Problems

By Everett M. Walker
(Copyright)

Radio research is continually establishing facts and theories which hitherto were unknown or, at least, about which little was known. The recent rediscovery of the horizontally polarized wave by E. F. W. Alexanderson, of the General Electric Company, and its possibilities probably is the greatest contribution to the radio industry this year. However, little is known about the phenomenon.

At a recent gathering in Schenectady of radio men from various publications throughout the Eastern states Mr. Alexanderson said: "Our knowledge of the law of wave propagation is as yet very incomplete, and much research work must be done, both of a theoretical and practical nature, before we may expect to have a full understanding of radio transmission."

A visit to the research laboratory proves that Mr. Alexanderson is carrying out the above statement to every possible angle. As has been said many times, very little radio progress may be attributed to actual research along the lines of discovery, but the results are more or less accidental when working on some other phase of the science. The rediscovery of polarized waves was accidental. We say rediscovery because Hertz is said to have known of their existence in the early days of wireless development. Several other prominent radio engineers of the early days of wireless communication are said to have written about the phenomenon as far back as 1903.

Accidentally Rediscovered

Polarized waves were rediscovered accidentally because it was while Alexanderson was experimenting with the beam reflector at Scenectady that he ran across the horizontal wave. The directional transmitter was focused toward a receiving station located at Riverhead, L.I. Daily communications were taking place while various changes were being made on the transmitter which was being operated on a wave length of approximately 40 meters. At one point of the tests everything was apparently operating properly at the transmitting end except for the fact that it was impossible to detect the flow of any current in the antenna of the transmitter. However, in spite of this, the signals were being received at the Riverhead receiving station with remarkable intensity. This puzzled the engineers conducting the tests and various measuring instruments were rushed to the scene without result—and still the signals continued to be heard at Long Island.

After carefully examining the apparatus engineers found there had been a wire misplaced which made it impossible for the antenna to radiate a vertical wave. The waves being radiated were horizontal to the earth. This was determined by use of the unique device shown in picture No. 1. As may be seen, it consists of a small wave meter with a small antenna. When properly tuned and held in a vertical position the meter will detect vertical waves. When held horizontally to the earth it will pick up horizontally polarized waves. This explains why the signals were being heard in Riverhead and, incidentally, the accidental rediscovery of polarized waves.

Static May Be Eliminated

It also has been discovered that as a general rule static oscillations, or waves, travel in a vertical plane in a similar manner to the waves radiated by most of the present-day broadcasting stations. Therefore, if it is possible to obtain a radio receiver that will receive only horizontally polarized waves it is possible that static interference may be eliminated partly, if not entirely.

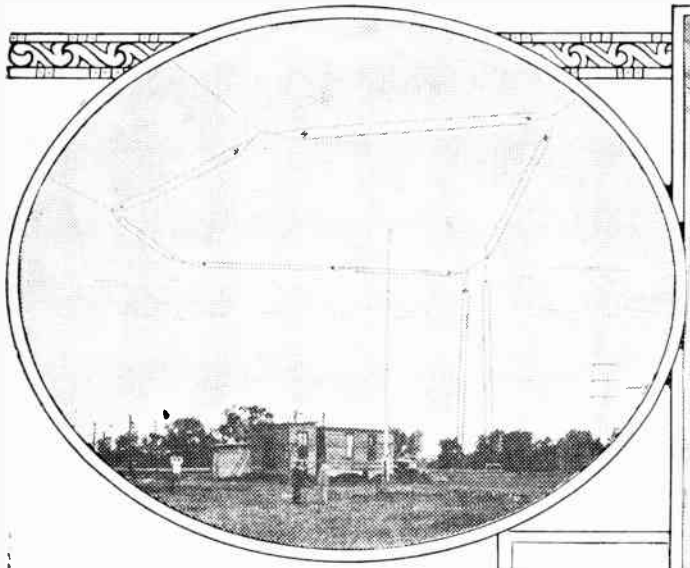
Furthermore, it may be possible to reduce interference between various transmitting stations by combining what is already known about directional waves and horizontally polarized waves. Alexanderson explains that a horizontally polarized radiator sends out waves which gradually shift their plane of polarization. A receiver adjusted for reception of vertical waves will not respond to these waves until this shift has taken place. As a result there is an area created about the station where it is impossible to receive the transmitting station. This area usually lies where the interference would be most objectionable. It is easy to see, therefore, that this method of radiating a wave from a transmitting set would tend to reduce local interference.

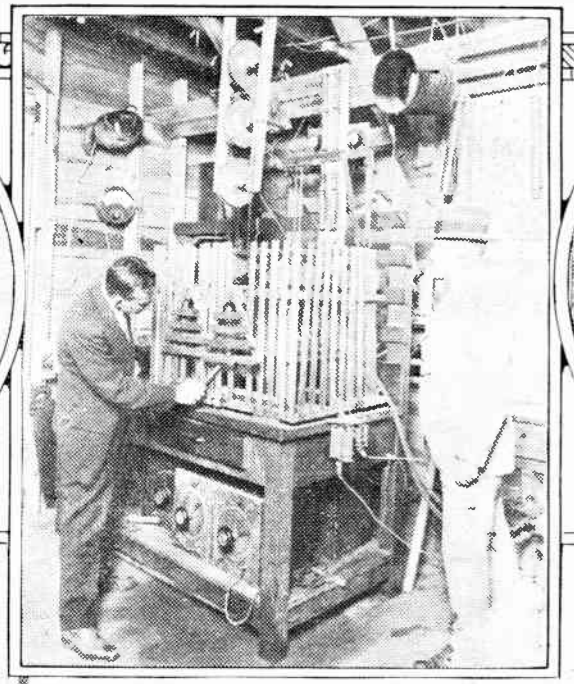
Their Effect on Fading

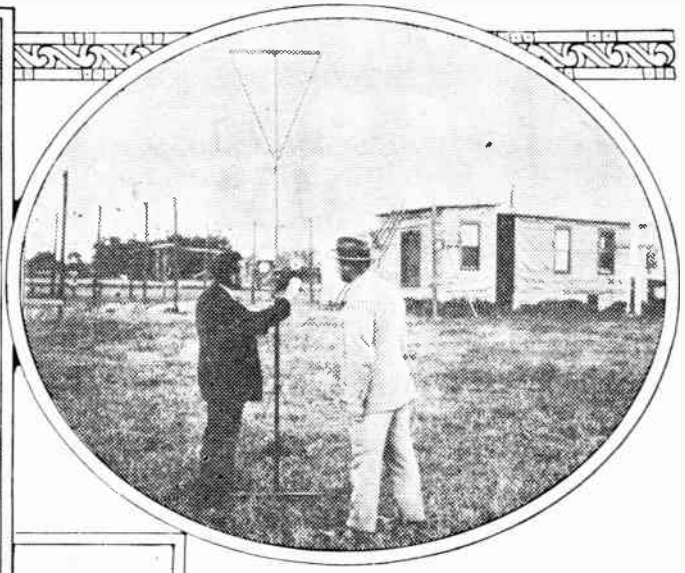
Two problems of present-day radio communication and broadcasting have been discussed; there is still a third, and, strange to say, horizontally polarized waves seem to have an effect upon it. The problem in question is fading. Fading may be divided into three classes in itself. The most common is the variation of a given station at a given distance between daylight and darkness. This phenomenon is known to every radio fan; he knows it is impossible to hear many stations over a distance of a thousand miles by night, and that it is almost impossible to receive consistently stations over a hundred miles while the sun is above the horizon. It is rather interesting to note at this point, however, that during recent months amateurs have noticed that the theory seems to reverse itself on wave lengths below fifty meters. As a result amateurs with low-powered transmitters have been able to span the continent during daylight hours when using these ultra short waves. There evidently seems to be little difference whether it is day or night on short waves.

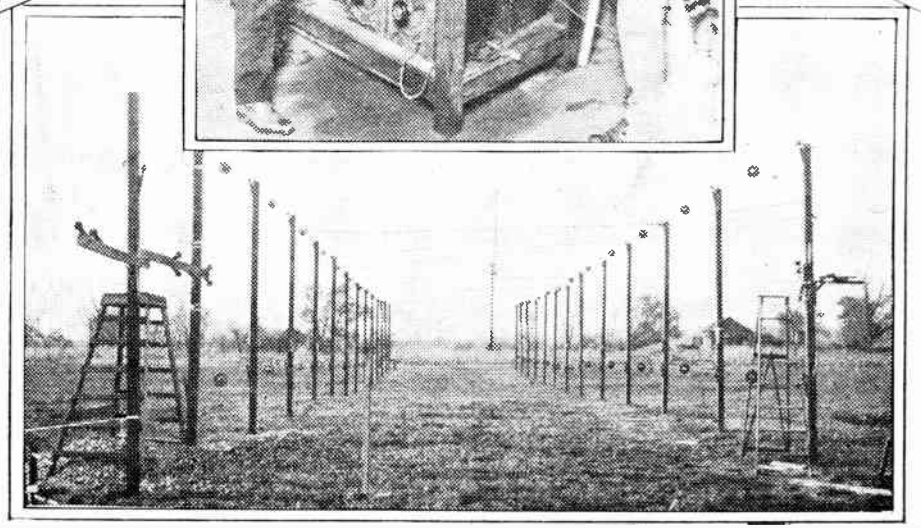
Another type of fading is the sharp decrease in signal strength of a received station, which is usually noticed when the sun is either rising or setting. Many radio fans located in the vicinity of New York City have probably observed that New England stations seem to have pronounced fading at these two times. Fading of this type has been observed on all waves.

Periodic variation in signal intensity is the third class of fading common to radio reception, but in particular to broadcasting wave lengths. It probably has been noticed by the ardent distance "fishing" radio fan that some stations seem to have the characteristic of fading almost completely out for a few seconds, and then return with usual intensity, while others may be heard for several minutes with maximum volume, then seemingly fade away for a period of several minutes. Several years ago tests were conducted by the amateur with the aid of the Bureau of Standards in an attempt to discover what caused fading and what its characteristics were. Results seemed to show that stations of the Middle West faded slowly, while those of the northeast seemed to fade very rapidly; in some cases so fast that it was almost impossible to notice









Picture No. 2, above, shows the antenna used to radiate horizontal waves.

Picture No. 3, right center, shows the transmitting equipment.

Picture No. 1, above, shows the device used for detecting horizontal waves.

Picture No. 4, left, shows other antennas used by Alexanderson.

the disappearing of the signals. When considering polarized waves it is this type of fading that is particularly interesting.

Have Corkscrew Curve

Alexanderson says the horizontal waves emitted from his radiator travel in a corkscrew fashion, which, naturally, continually changes the plane of polarization. At a distance of approximately ten miles a horizontally polarized wave of about forty meters has been found to have between twenty and thirty degrees shift. Alexanderson also observed that the most severe fading of a broadcasting station takes place at a distance of about 100 miles from the transmitting set. This is due to the fact that waves sent out by a broadcast transmitter are of two kinds—those which are known as space waves and those which are known as earth-bound waves. The latter waves travel a distance of about 100 miles when radiated from the ordinary medium power transmitting set. The former types of wave are those which are heard by the distant radio fan. They seem to take an upward course and are reflected in some manner or other. At this writing it is rather difficult to discuss how they are reflected, as there are a number of conflicting theories, some of which seems to prove anything. The theory that radio waves are carried through the ether has been denied by modern science, likewise the heavy side-layer theory. At any rate, it is assumed that the space wave acquires a twist of 180 degrees when emitted from a fifty-meter transmitter at a distance of approximately 100 miles. It is obvious that this would cause a dead spot at this point, of course, providing that all conditions were constant.

The Dead Spot

It is, therefore, obvious that this resultant dead spot could be moved back and forth, providing that a polarized radiator were employed. The means of varying the spot could be accomplished by raising and lowering the radiator. This undoubtedly would make possible more reliable communication for point-to-point work, although at present of no value to broadcast transmission.

At this date it is almost impossible to forecast the possible applications of polarized waves from a commercial and practical point of view. The experiments are of an interesting nature and have some true value which remains to be rediscovered. Men like E. F. W. Alexanderson, of the General Electric Company, have only begun their experiments along the lines of wave propagation.

Much has been said on polarized waves, but the writer has neglected to describe the apparatus that was used and responsible for the rediscovery of the horizontal polarized wave.

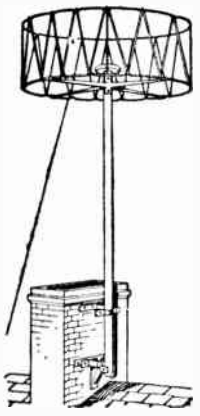
The unique antenna shown in picture No. 2 is the radiator for horizontally polarized waves. The antenna is of cage construction and is supported by three masts about fifty feet in height. It was with this antenna that the presence of the horizontally polarized wave was first noticed when communicating with the receiving station at Riverhead, L.I. It will be noticed that the current from the actual transmitter is fed to the radiator by means of feeder wires. These wires are not considered part of the aerial, but are used for carrying the radio frequency current from the oscillator to the radiator. Before the rediscovery of the presence of the horizontally polarized wave this antenna was of somewhat different construction, designed to emit a unidirectional wave.

The transmitter employed by Alexanderson is shown in picture No. 3. The set employs a 20-kilowatt water-cooled transmitting tube as an oscillator and operates usually on forty meters. The variable condensers shown at the right of the transmitter are balancing condensers for balancing the feeder wires which carry the current to the radiator. The man at the extreme right of the picture is E. F. W. Alexanderson, chief consulting engineer of the General Electric Company and rediscoverer of the horizontally polarized wave. The picture shows one corner of his laboratory, where research work with polarized waves is now being carried out.

A NEW TYPE AERIAL

We have just had the pleasure of testing a new type of aerial. This aerial is known as the "Perfex" aerial and is very popular in Great Britain and Continental Europe.

This aerial is fully covered by patents in all countries, including Canada and the U.S.A., and the Federal Radio Co., of 57 Colborne St., Toronto, will manufacture this aerial in Canada for use in the Dominion. The construction of the



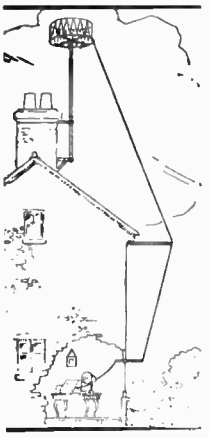
aerial is unique in many ways, and is the result of many years' experiment on the part of its inventor, who is a well-known British electrical engineer. It requires only one pole when used as an outdoor aerial, or it may be suspended in the attic, and used as an indoor aerial, or it can be folded flat and taken on camping trips, etc., and in this manner, it is the last word in portable aerials.

The inventor has designed a special type for Canada. This became necessary owing to the long distance freight haulage in this country, in order that aerials could be shipped all over Canada without the least fear of damage.

The aerial consists of a strong metal frame, in the form of a square, with 20-inch sides and has a depth of 12 inches. On this frame is wound the aerial wire. This wire consists of 8 strands of tinned copper wire, woven in the form of a loose tube (this special woven wire is also patented) and with the 50 feet of lead-in, which goes with every aerial, makes a total of 150 feet of special woven wire. There being 8 strands in the weave, this makes a total of 1,200 feet of wire.

The illustrations show the type of Perfex aerial used in the Old Country and Europe. The Canadian type will be square and made so that it can be packed flat for easy shipment.

Mr. B. Hethey, who is the general manager of the Federal Company, permanently fixed up this aerial on the roof of our laboratory in 30 minutes, using ordinary clothes line wire to strap it to the chimney, and made a neat-



looking job of it. He also fixed an indoor one up under the roof, hanging it on to a nail driven into the rafters.

These aerials were tested on three sets—a neutrodyne, a tuned radio frequency, and a regenerative receiver.

The results obtained were, broadly speaking, as follows: Comparing the indoor "Perfex" with an ordinary "L" type outdoor aerial, 60 feet high, we

found the volume equal on stations up to 500 miles distant. We should, however, perhaps mention that our location is excellent for reception.

Comparing the outdoor "Perfex" with the outdoor "L," we obtained greater volume on all stations with the "Perfex" and brought in three additional stations we had never been able to get with the "L," this we attributed to the fact that the "Perfex" is non-directional.

Regarding selectivity, the "Perfex" improved the selectivity of all three sets very considerably. We were able to cut out the most powerful Toronto Sta- with the neutrodyne and tuned radio-tion CKCL in three degrees of the dial frequency set, and five degrees on the regenerative receiver. This regenerative of ours, by the way, is not one of the last in the world.

We also found that with the use of the "Perfex," both indoor and outdoor, we did not suffer nearly so much from interference, and the squeals from surrounding sets were cut down considerably.

In giving our opinion of this aerial at this length, we do so for several reasons, people have fought shy of radio because of the unsightly appearance of old type aerials, and their inability to erect them. First, we are of the opinion that many especially in apartment houses, etc. The "Perfex" is easy to erect and looks neat and tidy. Again, many people become impatient with the interference caused by reradiation, etc. Any aerial which improves this situation is worth broadcasting.

Further than this, being more selective and giving greater volume, the "Perfex" aerial makes any set easier to tune, and thereby reduces the possibility of oscillations, and the accompanying reradiation, which is so annoying to the neighborhood listeners. We understand that Mr. B. Hethey has organized the Federal Radio Co. for the purpose of manufacturing the "Perfex" in Canada, and those interested should write him at 57 Colborne St., Toronto, Ont.

CKY DOES NOT ADVERTISE OWNERS

The only station in Manitoba, CKY, is owned and operated by the Manitoba Telephone System, but the station is not used for advertising the telephone service. According to a recent announcement, the name of the Manitoba Telephone System will not in future be broadcast in connection with the call letters. The Telephone System is owned by the people of the Province of Manitoba. CKY, therefore, announces simply "CKY, Manitoba's Own Station, Winnipeg." Business houses and other organizations making use of the station on a toll basis thus obtain the full benefit of their own publicity instead of sharing it with the operators of the station.

NEW COMPANY WILL DISTRIBUTE THE BRITISH-MADE "ULTRA" LOUD SPEAKER

The Federal Radio Company, of 57 Colborne St., will distribute the "Ultra"

loud speaker in Canada. This loud speaker is very popular in Great Britain and will undoubtedly have a large sale in the Dominion, as it is popularly priced at $15, and is well made, giving faithful reproduction and good volume.

BRITISH AMATEUR IN TOUCH WITH "BOWDOIN"

A note appeared in the Manchester Evening Chronicle of July 23rd to the effect that a wireless amateur at Sale had got in touch with the "Bowdoin," a vessel in which the MacMillan Arctic Expedition is travelling. This may to some extent be due to the fact that Mr. MacMillan is using Exide Batteries.

In a cable to the manufacturers, he informs them that for the fourth consecutive time he is carrying Exide Batteries, not only for lighting and ignition, but for radio work, both on the ship and on the aeroplane.

NEW CELORON KIT AT EXHIBITION

At the Canadian National Exhibition, the Diamond State Fibre Company of Canada Ltd. will be showing their new kit of Celoron tubing. This is the first attempt on the part of any Canadian manufacturer to put out a standard kit of tubing, which will include standard diameters and lengths for use in the popular hook-ups. The kit will contain 60 different sizes, as well as 20 Celoron binding post strips. An attractive counter display will be supplied with each kit on which will appear the price of each size for the convenience of radio dealers.

Radio dealers and the radio fans are invited to visit the Diamond State Fibre Company's booth, No. 21, in the Industrial Building during the Exhibition. Several interesting novelties will be presented and it is expected the booth will attract considerable attention. The background will be that of the Woodbine race track, exemplifying the 1925 radio panel handicap and showing how Celoron again leads the field.

GOOD AND BAD RESISTANCE

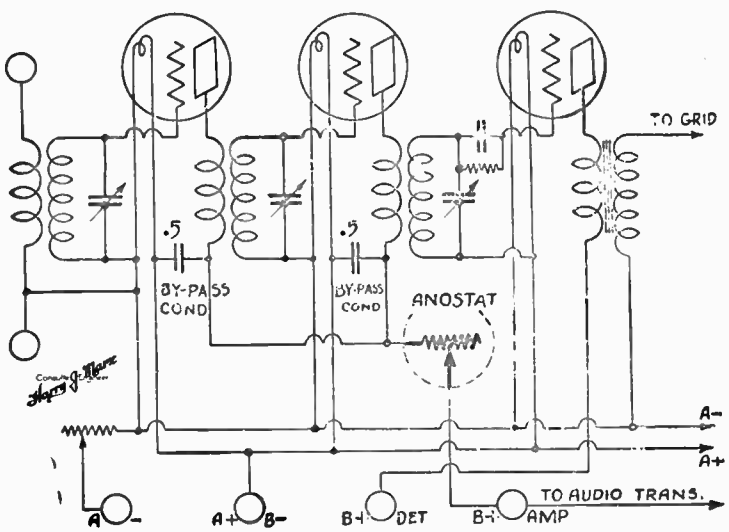
By Harry J. Marx

Resistances are an inseparable factor in all electrical circuits. It may not be there in the form of a rheostat, potentiometer or other piece of resistance apparatus, but every part of the circuit, whether it is just copper wire connections, condensers, coils or any other unit has some resistance value. It may be great or small as the case may be, but it exists and is a factor in the circuit. Copper wire is a good conductor, meaning its resistance is low, while a non-conductor simply means something that has a very high resistance.

Present-day radio apparatus is so designed as to reduce, as far as practical, all resistance in the tuned circuits.

Oscillation

This elimination of surplus resistance permits much sharper tuning and, therefore, improves selectivity. But in radio-frequency circuits, it multiplies the tendency of tubes to go into oscillation, producing the assortment of squeals, howls and whistles which not only come out of the loud speaker, but back up and go out in the air to play havoc with the neighbors' reception.



The old and incorrect practice was to add a potentiometer in the secondary circuit of the radio-frequency stages. This was equivalent to replacing the resistance back into the apparatus. It reduced the oscillation tendency, but it likewise killed the selectivity that was desired and, in addition, materially reduced the volume. Resistance should not be added where it becomes an integral part of the radio-frequency circuits.

The fundamental cause of oscillation is due to a great extent to the amount of voltage across the plate circuit. If this voltage is controlled so that it can be adjusted to a value just below the point where oscillation starts, then radio-frequency amplification can be used to full advantage. But this control must not be such as to add resistance in the tuned circuits.

Plate Voltage Control

Oscillation can be effectively prevented if a variable resistance is connected in series between the plate or primary coils of the radio-frequency transformers and B battery to prevent oscillation by reducing the plate voltage on the radio frequency tubes. Now by connecting a ½-mfd. condenser between the B terminal of the primary on the radio-frequency transformers and the filament terminal of the tubes, this artificial resistance can be shunted out of the tuned circuit. This condenser closes the plate circuit to the filament of the tube for the radio-frequency currents. In other words, on account of the condenser, these currents don't have to pass through the resistance—hence the resistance does not effect the tuning and selectivity.

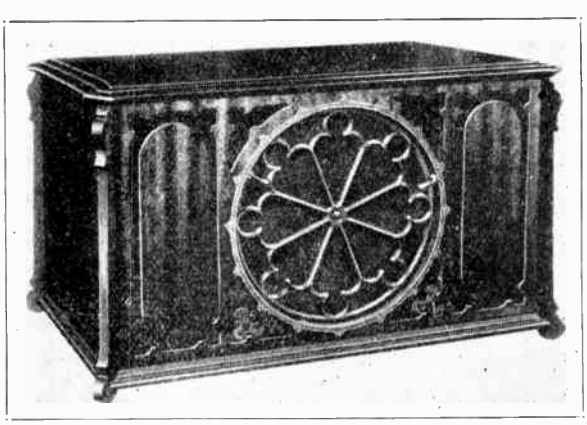
This variable resistance provides a means of reducing the plate voltage and, therefore, controls oscillation. This means of controlling oscillation was first utilized commercially by E. F. Andrews in the Deresnadyne receiver. The use of this control for radio receiving sets is covered by patent applications, but its use by the fan in building his sets or for remedying trouble in a set he has made is encouraged.

Mr. Andrews has now developed the use of this by-passed plate circuit resistance as a volume control, as well as an oscillation control. This is done by using an extremely high variable resistance having a maximum value of several megohms. The circuit is just the same as for the control of oscillation. The first part of the resistance can be used for oscillation control, and the high resistance part for controlling volume. Volume can thus be adjusted without the slightest distortion, and with great saving in B battery current.

This combination is known as the "Anostat," derived from "anode," meaning positive or plate, and the word "rheostat." Further details about the Anostat and new developments will be told about shortly.

R. H. WHITE PRESENTS PLAQUE TO LOUIS G. PACENT

Appreciation of the radio trade for his research and engineering achievements in the advancement of radio art, accompanies plaque presented to Louis G. Pacent, the well known radio engineer, by R. H. White, President of White Radio, Limited, Hamilton, Canada.



New Ultradyne as described on page 59

DOWN BELOW 100 METERS

By Allison D. Turnbull
(Asc., I.R.E.)

There are many radio fans who listen nightly to stations working on 200 to 500 meters. Excellent and varied entertainment goes on among these wavelengths, but there comes a time when the fan begins to tire of these stations and looks to new fields for amusement. He can go up or down the wavelength band. On the higher waves, we have The Hague, Paris, Rome, Chelmsford and numerous other continental broadcasting stations. On the lower band, way down below, WGY at Schenectady, KDKA at Pittsburg and many amateur phone stations, supply entertainment of quality in quantity.

Of the two bands, from 100 meters down and from 1,000 meters up, the former is the best for the broadcast listener to explore. The following reasons are self-evident for this fact. Due to the very high frequencies of the lower wavelengths, static is not as noticeable as it is on a wave of, say, 500 meters. Again the bothersome spark interference is conspicuous by its absence, and due to the fact that very little is known of this "radio paradise," the squeal of the heterodyning receiver has yet to make its debut.

A receiver that will conduct one into this mysterious area is fairly easy to construct. The directions for the building of such a receiver are given herewith, and if the directions are carefully followed, the results will be astonishing. As can be seen from the circuit diagram, the hook-up of this receiver is nothing new. The aperiodic primary is used, as in most cases if a single circuit was employed, the high antenna resistance would be detrimental to the working of the unit. The phrase "low loss" must be borne in mind while constructing the set. All instruments used in this receiver must be of the low-loss type. Fancy right-angled wiring must be done away with and all joints, etc., soldered. The writer recommends a good insulated flexible wire for all connections, as this type of connection will make all leads short and to the point.

All the parts for this receiver can be purchased, except the tuning coil. This must essentially be home-built, as there is at present no such coil on the market suitable for the requirements of the circuit. For greatest efficiency, tuning coil should have as little capacity as possible with a given inductance. The capacity of the coil depends upon the closeness of the turns together, the potential difference between adjacent turns and the insulation co-efficient of the supporting material. This material composing the insulation and support of the coil is very important, when we begin to work with ultra short waves. About the best condition would be to have an air space surrounding each turn of wire in the coil. The nearest achievement to this condition is to wind the turns of wire loosely on a skeleton-like support. This support must be of the finest dielectric material available. To eliminate resistance losses, a wire of medium gauge is advised, such as No. 18.

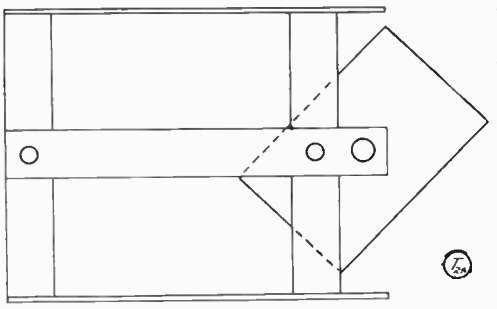


Fig1 Form for Coils

For the tuning unit, two pieces of tubing 3 inches in diameter by ½ inch long will be needed. Also four pieces of panneling 4 inches long, ½inch wide and 1/16 inch thick. In the tubing, drill four holes about ¼ inch from the edge and equidistant from each other, i.e., one hole a quadrant from the next. Drill a hole in each end of the strips about 3/16 inch from the ends. The strips are then fastened to the tubing, as shown in Fig. 1. Wind the primary and secondary coils on this form. The primary has five turns, wound ½ inch from one end and 1 inch from this wind 20 turns. The wire used must be No. 18 D.C.C. The wire is wound on just tight enough to remain in place. Adjacent turns must not necessarily be very close together. Do not use any binding liquid on the completed windings, as its presence will introduce high capacity. The feed-back coil is wound on a composition or hard rubber tubing about 2 inches in diameter and 1½ inches in length. The winding on this coil varies from 6 to 10 turns, the right number being found by experiment. Drill two ¼-inch holes on opposite sides of the tubing for a shaft. The turns of the coil are evenly divided on each side of these holes. For example, if the receiver functions best with 8 turns on the tickler, place 4 turns on each side of the shaft. These turns must be wound tightly and close together.

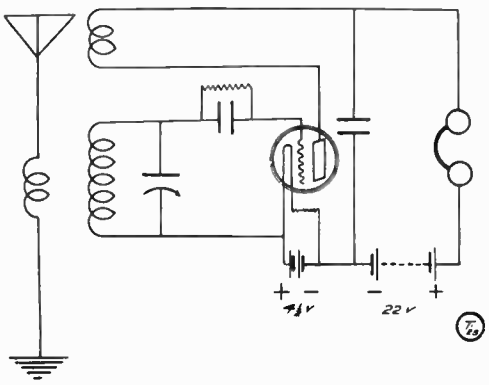
At one end of the first inductance, preferably the secondary end (see figure), two holes are drilled with a ¼-inch drill. The shaft of the tickler coil is intended to revolve in these. A piece of brass tubing 5½ inches in length and ¼ inch diameter constitutes the shaft. Place the tickler coil inside of the larger inductance with opposite holes facing each other, then force the shaft through the four holes. If the tickler coil does not fit tightly on the shaft, an application of sealing wax to the junction of shaft and tubing will make it do so. Use flexible wire for the tickler leads, soldering these well to the ends of the feed-back coil. Holes for terminals may completed unit can be fastened to the be drilled in the larger tubing and the tickler leads connected to them. The brackets. Arrange these so that the dial panel by means of brass angles or will cover the machine screws. This assures a better looking panel than if the heads of the screws were showing.

The variable condenser is of the low loss type. Such a condenser must have low dielectric losses, low losses due to skin effect and last, but not least its conductive resistance must be as low as possible. There are many such condensers advertised at present and the fan is advised to pick any reliable vernier condenser so advertised.

Practically any type of vacuum tube will be suitable as a detector in this receiver, but the writer obtained the best results, using the UV-199. Due to its low internal capacity and unique construction, it performed admirably, giving as loud a signal as its big brother 201A, besides being more economical. To achieve the ultimate, the base of the tube should be removed, but as this receiver does not tune much below 40 meters, the tube is best as it is. The socket contacts, however, must be always kept clean, as well as the tube prongs. A low-loss socket with a wiping contact was used in the original set.

It will be noticed that an automatic resistance is used to control the filament current. This was an Amperite, and it was found to work equally as well as a rheostat. This is due to the fact that the 199 used as a detector is not critical in regard to filament and plate voltage. An extra control is thus eliminated, and a protective device added to the receiver. A filament push-pull switch must be inserted in the "A" battery circuit to cut off the current when the receiver is not in operation. A single block "B" battery is all that is required to supply the plate current. Lower than 16 volts cannot be used with much success.

Mica-insulated fixed condensers are used respectively as a phone by-pass



and for the grid. The value of the phone condenser is not critical and may be anywhere from .001 mfd. to .005 mfd. The capacity of the grid condenser is .00025 mfd. and it is bridged with a 3-megohm grid leak.

Mount all the instruments on a Celoron or Bakelite panel, placing the parts as near as possible, to keep wiring leads short. As there are no parts likely to interfere with each other by feedback, etc., this can be done. Run the leads straight to the proper terminal. Do not let them hang loosely over various parts and other leads. The wires should cross each other at right angles. Do not let the wiring run parallel for any distance. To cut down the possibility of body capacity, connect the rotor plates of the variable condenser to the positive filament terminal. An aluminum shield can be placed in front of the coupler and also connected to this terminal to eliminate body capacity from that instrument. Caution must be taken while doing this to keep all metal parts, leads, etc., away from the shield.

A terminal strip drilled for the outside connections may be fastened to the rear of the receiver, and thus wired up. Many a panel is made unsightly by straggling wires running all over it. The receiver may be built in a small and self-containing cabinet, so that a radio-frequency amplifying unit of the neutroplex principle may be later added. This unit will perhaps be described in the near future.

The proper type antenna to use with this receiver is one about 20 feet in length with a very short lead-in. Of course, any type antenna shorter than 50 feet having a short lead-in would suffice. In some cases, it may be necessary to remove a couple of turns of wire from the secondary winding to enable the receiver to tune to the lower wavelength. Sometimes a small capacity fixed condenser in series with the aerial will cut down the wavelength to the desired value. Insulate the aerial well and be sure of a positive ground connection. When working at such high frequencies, as said before, everything must be taken into consideration.

After connecting up the respective wires to batteries, input and output, switch on the current. A hissing sound should be heard in the phones when the tickler is rotated. If this sound is not perceptible, reverse the connections to the tickler and repeat. If the set now oscillates, slowly turn the condenser dial, keeping the set just above the point where it breaks into oscillation. When a carrier wave is heard, reduce the tickler value until the whistle dies out, then tune in the station clearly by means of the dial vernier. The tuning process, as one can see, is very simple, but one needs to tune very slowly if he expects to get any results. Low loss apparatus has the advantage of sharp tuning, if it is in a proper environment. By this, it is meant that if a receiver constructed with low loss instruments is to work any way satisfactory, the surroundings of the receiver must be ideal, the wiring low loss and the layout of the instruments simple.

If it is desired to add an audio-frequency amplification, an open circuit or double circuit jack had best be wired up at the output. The signal audibility of this little set will be surprising and one only needs to put the best of care into the construction to be assured of total satisfaction.

RADIO COMMUNICATION

Long-distance Signals

A VOYAGE OF RESEARCH

Since radio communication was established on a commercial basis, several attempts have been made by theoretical investigations and practical tests to obtain satisfactory information concerning the variation of signal strength with the distance from the transmitting station. The results have indicated that the problem involved the calculation and measurement of a quantity influenced by so many carying conditions that experiments on a large scale were essential for obtaining complete data. An investigation of this kind would obviously be difficult and expensive, and it is a great tribute to the foresight and enterprise of the Marconi Wireless Telegraph Company Ltd. that a comprehensive research on this subject has been undertaken by engineers of the company, lasting for nearly three years, involving an enormous amount of preliminary work, and culminating in a journey round the world, in the course of which regular observations were made of the strength of signals from a number of stations. The material thus obtained has now been examined, and a report prepared, which was read before the Institution of Electrical Engineers, wireless section a few weeks ago. The theoretical discussion is the work of Mr. T. L. Eckersley, while the actual observations were taken by Mr. K. Tremellen, Mr. F. C. Lunnon and Mr. Alnutt. Captain H. J. Round, M.C., contributes a general introduction, and has directed much of the preliminary work.

Before the actual voyage commenced, it was necessary to develop and test a suitable method of measuring signal strength. In its final form, this consited of a local oscillator, by means of which an artificial signal of known strength could be introduced into a dummy aerial, coupled with the receiving set. This signal was adjusted to equality with the actual signal obtained from the receiving aerial, and the strength of the received signal thus became known. Considerable difficulty is frequently experienced in reading signals owing to atmospheric and other causes of strays, and it is much more satisfactory if the calibrated signal can be introduced into the actual receiving aerial and not merely into a dummy, which is not similarly affected by perturbations. This was eventually done, and the method of measurement checked by a large number of tests, for as the result of experiments in the early part of 1921, the observed and calculated values of the E.M.F. produced in an aerial were found to agree within reasonable limits.

Experiments with this apparatus were carried out in Great Britain during 1921 on signals from various high-power American stations. Valuable information concerning the effect of wave-absorption by land and ionisation was obtained. Signals at Broomfield, near Chelmsford, were weaker than at Girvan, near Glasgow, partly owing to a greater distance, but partly also to the

passage of the waves over Ireland and England. The peculiar variations occurring at sunrise and sunset were measured accurately, and a sudden and very marked reduction in signal strength took place in November and persisted through the winter.

A Remarkable Phenomenon

On January 28th, 1922, a voyage from Liverpool to Auckland via Panama was commenced, and the calibrated apparatus was used during the passage. The voyage was continued from Sydney to London via Colombo and the Suez Canal. Vertical and frame aerials of different types were employed, and observations taken by night as well as by day. From the results of this unique prolonged test, the validity of the attenuation formulae in general use can be investigated, and this is a matter of the highest importance in connection with the design of future stations.

Before discussing the conclusions which have been reached on this subject, reference may be made to a remarkable phenomenon which occurred during the voyage. At certain points, signals were apparently being received from both directions round the world simultaneously. The effect produced was similar to that given by two C.W. signals of slightly different frequency—low frequency beats. On one occasion, the signals were being received from a New York station while the ship was in the Pacific Ocean, 12,000 k.m. away, and at the same time signals were arriving along the long great circle route from the South-west—a distance of 28,000k.m. This produced a blurring effect on signals received by an ordinary frame or vertical aerial, but the effect was not obtained when a unidirectional receiver was used.

Another unexpected effect was the superiority of transmission from West to East over that in the opposite direction. Thus communication from America to Great Britain is easier than reversed traffic. The difference is not very great, but it is very difficult to frame any satisfactory theory of the phenomenon. In attempting to summarize the immense amount of material that has been obtained, the authors are faced by the fact that the great distances covered during the voyage and its long duration introduced many variable factors. It was very desirable to know something of the effect of seasonal change on signal strength, but when other conditions are also varying, it is difficult to disentangle the real facts.

Conclusions from the Tests

It has been possible, however, to arrive at the following conclusions. The semi-empirical formula of Cohen is insufficient as a basis for the comparison of observed and calculated signal strength, but the agreement between the observations and a formula given by G. N. Watson is good so far as transmission in the Atlantic is concerned. This result shows that the idea of a reflecting layer in the upper atmosphere is justified, as at distances greater than 2,000 k.m. diffraction is inadequate to account for the bending of the waves round the earth. The value of the attenuation constant is almost independent of the wave length, as practically identical results were obtained from a number of stations whose wavelengths varied from 5.8 k.m. to 23.45 k.m. The attenuation varies with the direction of transmission and other conditions, so that it is not yet possible to prepare a complete chart of signal strength for the world's surface; but a splendid beginning has been made, and exact information will be obtained in the near future which will enable operators in any country or on any ocean to know the exact range of their apparatus.

It is well known that there is a great difference between the efficiencies of day and night radio-communication. This is accounted for by the assumption of the existence of a reflecting layer to which reference has already been made. The lower surface of this layer during the day is ill-defined, and appears to be at a distance of between 30 and 40 k.m. from the surface of the earth. This lower surface is a bad reflector for waves at small angles of incidence, and hence absorption of the energy takes place, and long-distance transmission is difficult. At night, the disappearance of the sun's radiation permits recombination of ions to take place, and the level of the lower surface of the conducting layer is raised, while at the same time it becomes more definite and behaves as a more satisfactory reflector. This leads to improved range, as the energy of the wave is less absorbed during transmission, but slight variations in the height of the layer cause errors to occur when direction-finding apparatus is being used at night.

The signals received on the ship often came from stations that were so far away that the twilight area between sunlight and darkness was between the ship and the transmitting station. It was found that this region acted as a barrier, and a curve showing the variation in strength of signals from a single station throughout the 24 hours a day indicates that a reduction in strength takes place when the ray is half in light and half in darkness. The maximum signal strength was often eight times the value at the minimum. This effect complicates the study of the actual attenuation taking place, and renders a strict comparison of data a matter of doubtful value.

Special attention was paid to the occurrence and character of atmospherics. The usual salvos of "grinders" were received in the tropics, and crashes, clicks and fizzes are other appropriately-named disturbances, which add to the strain on an observer. Atmospherics are always produced over large areas of land in the tropics, and appear to reach a maximum at about 3 p.m. local time. By means of the directional type of aerial, it was possible to determine the general direction from which continuous atmospherics were arriving. This varied with the season. During the summer in the Southern Hemisphere, for instance, the grinders, which are the worst and most continuous type, came from Southern Africa, Australia and South America; never from above the oceans. During the homeward voyage, the source of the grinders was found to move westward with the sun, and regular observations were made on atmospheric strength and direction simultaneously with those of signal strength. This very comprehensive research, lasting nearly nineteen months, and involving so much expert work, which must occasionally have become very tedious, has been successful in removing some of the difficulties associated with successful commercial radio communication. Theoretical considerations have been confirmed and new theories advanced. As usual, new, unexplained phenomena have been met with, but all associated with the work may congratulate themselves on having made real advance in a subject of so much general importance to mankind.

TO LAUGH AT THE HEAT DURING DOG DAYS, DO A "DAILY DOZEN" WITH RADIO "GYM" DIRECTOR

Radio is helping the tired business man keep cool during the dog days. Health commissioners of various large cities have issued statements to the effect that proper daily exercise is one of the most efficint means of preparing oneself to withstand the intense summer heat, and the "daily dozen" of Westinghouse station KYW offers opportunity of thus keeping cool.

At 6.30 a.m. each day, Chicago Daylight Saving Time, Paul A. Leonhardt, physical director of the Central Y.M.C.A., goes on the air over KYW with a series of exercises, suitable to the average man or woman who is not vocationally located in tasks that produce the necessary bodily exertion. These exercises have been put on KYW regularly and constitute a pioneer feature with that station. Regular followers of KYW's daily exercises are found all over the United States as well as in Canadian cities.

THE DIARY OF A HAM

Being the unofficial story of the world's first amateur radio conference.

By Major Wm, C. Borrett, c1DD.

(Last Instalment)

Having described our trip over on the good "Antonia," the writer does not intend to go into all the details of the trip on short, but to take parts of his diary which deal with the most important parts of the trip and the congress.

On arrival in England on April 7th, I made straight for London, and met our good friend, Gerald Marcuse of G2NM. It was only a matter of a few hours when I had met some of the men whose calls were famous on this side through trans-Atlantic tests. The first night was spent with G5LF, Major Secretan, commonly known as "Sec." Signals were rather scarce from America that night, however, we were able to hook up with that well-known member of the Royal Order of Trans-Atlantic Basspounders, Elliot Campbell, of C1DJ, Halifax, N.S.

April 8th.—The next day, I made a trip up to the northern part of England to visit some other well-known English hams, and as usual listened in. Signals were coming in fine and the following were logged on my one-tube set: c1ED, c1AR, c1DJ, c1EB, u1CMX, u1AUP, u1PL, u1ABF, u1AAP, u1RD, u2BW, u2AG, u3HH, u3BTA, u3CJB, u3QV, KDKA, u8ADG, NKF, u1AF, 7EC (Denmark), a3BQ (Australia), g2FM, g2VO, g2CC, g6TD, g6AL, g5UQ, g6RY, i1CO, f8SM, NORE, and many more European signals, too numerous to mention. You would never believe the strength with which c1AR come in in England. If I did not know Ole Joe's fist, I would never have believed that he was not in England. The loudest U.S.A. signals were from 1PL and 1CMX and NKF. c1AR is by far the loudest of any I heard.

From this date until April 14th was spent visiting the different hams around England and getting over to France for the conference.

As I have shown in my report, which I wrote especially for "Radio News of Canada," the conference was divided into five committees and the one on which the whole thing depended for success was the committee on the formation of the Union, being Committee No. 1. It would take miles of writing to describe everything that happened, so I give herewith extracts from my notes of the happenings of the conference, just as it happened. These notes will give the reader an idea of the part that the A.R.R.L. delegates and others took in the conference in forming the Union. You have all read the official reports of the results of the conference, so now you can obtain first-hand information on the debates that lead up to those results, and it is hoped that every Canadian ham will get busy and join the I.A.R.U. after reading them. I now take you right to the conference in Paris:

April 14th, 1925

The opening session of the Congress convened at 3 p.m. on 14th April at the Faculte des Sciences, at 12 rue Cuvier,

Paris. It was a joint meeting of the amateur section and the legal ("juridique") section. Mr. Edouard Belin presided, and made an opening address in French. At the speaker's table were M. Belin, Gen. Ferrie, Comdt. Mesny, Mr. Maxim, Marcuse, Salom, Deloy, Onyner of Poland, Besuvais, and five other persons. About 250 present.

Gen. Ferrie spoke in French. These notes, what was spoken of in French, in many cases, it is only second-hand. Mr. Maxim delivered a carefully prepared keynote speech on the amateur position, translated into French by Deloy. Marcuse greeted the English-speaking amateurs. Borrett read a letter from the Canadian Marine and Fisheries, sending greetings. Salom spoke in French. A Belgian lawyer, name something like Email, a juridique, spoke in French, as did Onyner and somebody from Czeckozlovakia. Two unknown persons spoke in French from the audience, talking about the B.C.L.—afraid telegraph would freeze out the musicians from the use of broadcasting. A few remarks by Miss Dix, of London, representing a "radio circle" of some London Lyceum. Remarks by Deloor of Belgium. A Japanese lawyer spoke in French from the audience, on behalf of the broadcaster, I don't know to what effect. The meeting adjourned at 4.40 p.m. and the Juridique withdrew to hold their Legal Congress separately, while the amateur group remained to convene the amateur end in this same hall.

April 14th—General Amateur Session

The Amateur Congress convened in the same hall at 5 p.m., April 14th. By pre-arrangement with the French committee, Mr. Maxim arose and proposed M. Belin as president of the Amateur Congress, and put the vote, whereupon Belin was acclaimed president and took the chair. In similar fashion, he managed the appointment of the remainder of the Bureau of the Congress: Messrs. Maxim and Marcuse as Vice-Presidents, M. Beauvais as Secretary, and K. B. Warner as Second Secretary. Deley acted as interpreter.

Mr. Belin made an opening address, interpreted very briefly by Deley. The work of the Congress was to be done by sub-committees. Lists were to be opened at the end of this meeting, asserting one's desire to be on a sub-committee. Another plenary session to-to-morrow to examine applications. Sub-committees to file progress reports daily. Debate on how many votes per country in determining affairs of Congress. French propose a graduated scale running up to 3 votes, but Mr. Maxim had proposed one vote per country. Carried on the basis of 1 vote per country.

The order of the day, five questions, was voted per the original proposal of the French committee on arrangements.

There then began a consideration of regulations for the government of the Congress, as proposed by the French committee on arrangements, Mesny chairman. This was adopted, item by item. This was a stormy discussion, broken several times by outbursts and demonstrations by the French transmitting amateurs. Considering paragraph 1 of Article IV. of the regulations, the French amateurs said that were B.C.L. delegates, and that Mr. Maxim could not act as vice-president of such a congress! Wild confusion. Mezger, of France, inquired Maxim's attitude. Maxim replied we were interested only in two-way communication. Cheers from the French amateurs. Somebody arose to say there were so few transmitters

that they need the strength of the broadcast receivers. Perroux says if the B.C.L.'s are first in, French amateurs lose privileges, not gain. Maxim says his instructions are to say that we are interested only in two-way. Demonstration. Belin ruled this discussion out of order; business now to make rules for determination, not determinations of I.A.R.U. policy themselves. Discussion resumed and all regulations adopted. Minor racket among French hams, who demand to know who it is that claims to speak for France in the Congress. The meeting adjourned at 7 p.m.

April 15th—General Amateur Congress

This meeting began about 2.30 p.m. in same hall. About 3 p.m., a debate was going on between Belin and Edouard Bernaert, editor of "Paris-Radio," about whether this Congress is amateur. Lloyd Jacquet, U2OZ, taken on as interpreter. Discussion Congress procedure, it was proposed that on the first question on the order of the day, the formation of a Union, there be one delegate from each nation to vote in session after debate of the question. On all the other questions, there were to be sub-committees who should report, and their report would be debated in general assembly before accepted. Much discussion. Above proposal accepted by very great acclaim. (But it was not fully carried out.)

Article 8 of the Regulations was rewritten to make it clearer. It was not clearer. The sense of the unanimous vote, however, was that business shall be carried by a majority vote of those states present at any meeting. Cartault proposed vote of thanks to Selin, including his great kindness this morning in showing his laboratories to the Congress visitors. Unanimous; he expressed thanks. Ham messages of greetings read from amateurs in Italy, Holland and Russia.

April 15th — Sub-Committee No. 1 — "Committee on the Formation of An International Union"

The Sub-Committee No. 1 on the organization of the Union, consisting of everybody who had his name down on the register for this subject, met in the main hall at the Faculte des Sciences at 5 p.m., April 15th. By acclamation, Mr. Maxim was elected chairman, Jean G. Mezger, f2GO, Secretary; K. B. Warner acted as assistant secretary at Mezger's request. Fifty-six persons present.

There were 22 countries represented—19 directly and 3 by proxy—France, Spain, Brazil, Canada, Czeckozlovakia, Italy, Poland, Hungary, England, Belgium, Newfoundland, Austria, Argentina, Uruquey, Switzerland, Luxembourg, Japan, Netherlands, Sweden, Denmark, Finland and the U.S.A.

Bernaert proposed the Congress specially invite a German representative to come in. He desired it in the interests of world peace. Comdt. Mosney replied that they were already invited by telegram. It was made clear that France wanted Germany to participate.

Lefebvre desired A.R.R.L. to suggest what should be done about the Union. Maxim wanted each nation to give its views. Czeckoslovakia wanted to know who represented who. It was agreed that question would be decided by a roll call by states.

On renewed request, Maxim outlined A.R.R.L. general proposal for a Union, based on views arrived at in several amateur conferences, proposing individual membership, and first headquarters in U.S.A.. Union devoted to two-way transmission and only experimentation attendant thereto—not B.C.L. Then asked for expression of opinion.

France, Lefebvre; Spain, Moya; Brazil, Lacombe; Austria, Fischel; Italy, Salom; England, Marcuse, Poland, Onynre; Canada, Borrett; Belgium, ?; Switzerland, Merz; and Japan all spoke on the proposal, with varying views. Some sentiment that it should not be an individual-membership society; some want federation of societies; much apprehension about restricting membership purely to possessors of transmitting stations; much desire that membership regs be easy enough to permit entry of folks merely interested in two-way work.

Maxim suggested petite commission to secure and examine comments and bring in a proposal. Bernaert said it resolved itself into four questions: Do you believe in the need for a Union? Do you agree to the proposition of the A. R. R. L. as to the form this should take? Membership by individuals or by societies? Are you only interested in transmission or transmission and experimentation and are you all excluding the B.C.L.? It was eventually agreed and ordered that everybody would consider this a questionnaire and be prepared to file an answer at 10 a.m. tomorrow. Meeting adjourned at 7 p.m.

April 16th—Sub-Committee No. 1

The sub-committee met at 10.30 a.m., April 16th, same place. Maxim, Mezger, Warner present as the Bureau. Thirty-six persons present. The roll was called and indicated 21 countries represented, as follows: Argentina, Mr. Reppete; Austria, Mr. Fischel; Belgium, Mr. Deloor; Brazil, Mr. Lacomb; Canada, Mr. Borrett; Czecho-Slovakia, Dr. Sule; Denmark, Mr. Perroux; England, Mr. Marcuse; France, Mr. Lefebvre; Finland, Mr. Perroux; Hungary, Mr. Grenkamp-Kernfeld; Italy, Mr. Salom; Japan, Mr. Usami; Netherlands, Mr. Tappenbeck; Newfoundland, Mr. Reid; Poland, Mr. Ondynca; Spain, Mr. Moya; Sweden, Mr. Swensson; Switzerland, Mr. Merz; Uruguay, Mr. Reppete; U.S.A., Mr. Maxim, Luxemburg, Mr. Degreet, absent.

Five questions were put on the blackboard for consideration, in French and English, and were discussed by Mr. Bernaert:

1. Do you believe in the need for an International Union?
2. Should the Union be established along the proposals made by Mr. H. Maxim yesterday?
3. Should membership be by societies or by individuals?
4. Do you agree to the definition of amateur proposed by A.R.R.L.?
5. Where should the headquarters of the Union be located temporarily?

On the original roll-call, questions 1 and 2 were carried unanimously; 21 voted. Question 3, Czecho-Slovakia, Hungary, Japan and Poland voted by societies; 17 votes for individual membership. Question 4, Japan voted no; 20 others voted yes. Question 5, twenty nations voted for U.S.A.; U.S.A. (last to be called) not voting. The various dissenting countries then asked to have their votes changed in the interests of unanimity, and the record was changed to read 21 votes, unanimous, on all the questions. Maxim congratulated the meeting. Berneart again expressed hope it would be clear that France, host at this Congress, did not leave out Germany. The German delegate, Mr. H. Kraus, here entered the meeting and was received with applause. The vote just taken was explained to him, and he voted with the majority on all five questions, making a unanimous vote of 22 countries.

The A.R.R.L. delegation was then asked to make specific proposals for the formation of a Union under the points agreed upon. Maxim asked five hours. It was agreed to meet again at 9 p.m., to-day. Krause addressed the meeting, said he was glad he arrived in time to help, and gave greetings from himself and those who sent him. The meeting adjourned at 11.30 a.m.

April 16th—Sub-Committee No. 1

(Around 5.30 p.m., Maxim, Mezger and Warner got busy on the new Constitution. Much preliminary debate. Only half of it ready by meeting time. Warner was to stay and carry on with the balance, while Maxim went to the meeting with the first half.)

Meeting convened about 10 p.m., April 16th, Faculte des Sciences, to consider A.R.R.L.'s Constitution. They speedily adjourned to provide typed copies of the document for study at next morning's session, as was demanded by Czecho-Slovakia.

(Big gang of English hams stayed up all night to type copies of English; ditto big French gang, translating and typing French edition.)

April 17th—Sub-Committee No. 1

10 a.m., April 17th, Sub-Committee No. 1 met, Perroux interpreter. Copies of the Constitution were ready and distributed. Roll called, showed 19 countries represented: Austria, Argentina, Belgium, Brazil, Canada, Denmark, England, France, Finland, Italy, Japan, Holland, Newfoundland, Poland, Switzerland, Spain, Uruguay and U.S.A. Representatives of Czecho-Slovakia, Hungary, Luxemburg and Sweden were absent.

The Constitution was considered, section by section, and each section adopted unanimously. The vote was then called on the adoption of the Constitution as a whole, resulting in affirmative votes from 19 nations represented, with none opposed, whereupon the chairman declared it adopted.

The German delegate proposed that amateurs of the Union use their good offices to secure the liberation of amateur radio in the Occupied Area. The Chairman declared this topic out of the field of the Sub-Committee, and no action was taken.

The meeting adjourned at 1 p.m.

April 17th—Full Amateur Congress

The full Amateur Congress met at 3.30 p.m., April 17th, M. Belin presiding. The president called for the report of Sub-Committee No. 1 on the organization of the Union. Maxim read a written report, presenting the Constitution adopted in sub-committee. After some discussion, Maxim outlined the Constitution, section by section, Deloy interpreting. Belin solicited discussion, particularly as to the manner in which the Constitution might be adopted, whether by sections or as a whole, etc. There was some discussion of points from the floor and Belin proposed various amendments, all of which Maxim showed were already covered by the documents as drafted. Finally, as customary, Belin called the names of countries and delegates making up the Sub-Committee, and 21 delegates stood up in favor of adoption as submitted, none opposed. There was a big demonstration. M. Belin declared the Constitution unanimously adopted by the First Congress. Marcuse thanked the gang who had worked all night to prepare the Constitution.

Mr. Krause, of Germany, requested the Congress suggest to the countries now holding territory in the Occupied Area that they permit radio privileges to the people in those areas. Belin says he will "take good note of it," but apparently otherwise ignored the request, which was obviously embarrassing. Krause pushed for an answer. Belin said no political questions can come up and that this was out of order. There was quite a stir over the question, President Belin ruling that the topic was out of order and others wanting it debated by the Congress. Belin called for a question of confidence. Epton requested Krause to withdraw the proposition to save trouble, which Krause did, with the statement that he would lay the matter before the Union.

April 18th—Meeting of I.A.R.U.

As per oral and blackboard announcements at Congress meetings, April 17th, the national delegates of Amateur radio present at the Congress met at 10.30 a.m., April 18th, in the Faculte des Sciences, 12 rue Cuvier, Paris, for the purpose of electing the Executive Committee of the I.A.R.U. under the Constitution adopted and ratified by the Congress the previous day. There were 19 countries represented: Argentina, Austria, Belgium, Brazil, Canada, Denmark, England, France, Finland, Germany, Italy, Netherlands, Newfoundland, Poland, Spain, Sweden, Switzerland, Uruguay and U.S.A. Delegates of Czecho-Slovakia, Hungary, Japan and Luxembourg were absent.

Mr. Maxim called the meeting to order and turned over the chair to G. Perreux, f8BV, as temporary chairman.

Perroux called for nominations for president of the I.A.R.U., and Mezger, f8GO, proposed Mr. Maxim; Borrett, of Canada, seconded. There were no further nominations, and Perroux called the roll, there being 18 votes in favor, none opposed, U.S.A. not voting. Perroux declared Maxim elected first President of the Union, and resigned the chair to him, amid applause. Maxim expressed thanks.

Maxim called for nominations for vice-president. Fischel, of Austria, nominated Marouse, of Great Britain. Italy proposed all Executive Committee members should be located where they can see each other frequently, and apparently opposed Marcuse appointment through misunderstanding of scheme. Merz, of Switzerland, seconded Marcuse. On roll call, 17 nations voted in favor, England and Italy not voting. The president declared Marcuse elected. Latter made a few remarks. Italian delegation congratulated Marcuse, and said they declined to vote for reasons of principle only.

President called for nominations for Secretary-Treasurer. Mezger, f8GO, nominated K. B. Warner. Bernsert, of France, in seconding the nomination, proposed vote without discussion. Roll-call showed 18 nations in favor, U.S.A. not voting. President declared Warner elected. A few remarks.

President called for nominations for the first of the Councillors. Hogg, g2SH, proposed Mezger, f8GO. f8AZ nominated Perroux, f8BV. Onynea proposed Lefebvre, f8GL. With three French candidates, the meeting QRXed ten minutes while the French amateurs withdrew to select a single candidate. Through Lefebvre as their spokesman, the French group then put forward the name of Perroux. Perroux spoke to say he was a commercial engineer and ineligible under the specifications of the Constitution; he thanked them, but said he could not accept and proposed it be some other Frenchman. Bernsert said Perroux should not be permitted to withdraw, but that the Bureau of the Union should interpret the Constitution and so rule, if necessary. The three members of the Executive Committee so far elected, constituting a majority, withdrew and considered this question. Returning, they cited A.R.R.L. precedents, which they said should be considered, and were sorry that they could not recommend the acceptance of M. Perroux. Lefebvre, as French spokesman, then proposed Mezger, f8GO; Reid, of Newfoundland, seconded. Roll call gave 18 nations in favor, France not voting, and Maxim declared him elected. (This business of proposing Perroux first was done by the French in full knowledge of his ineligibility, as a compliment to him, and the whole thing was arranged beforehand, with everyone agreed that Mezger was to be the choice.)

Proceeding to the second Councillor, Quinet, of France, proposed Repette, of Argentina. Fischel, of Austria, proposed Merz, of Switzerland. Lacomb, of Brazil, proposed Bell, z4AA, of New Zealand (applause). Onynea, of Poland, proposed second councillor should be in America, so as to have meetings. Borrett seconded Bell. Repetto said he was inelligible on account of commercial connections, and would vote for Bell. Krause, of Germany, seconded Merz. Merz said he thought representation on the committee should be world-wide and withdrew in favor of Bell. Fischel then withdrew his name, leaving Bell as the only candidate. He was unanimously elected by votes of 19 nations, and so declared by Maxim.

Maxim announced Executive Committee now complete and the Union in motion from this moment. He wanted to pay his dues and become the first member. The meeting adjourned at 12.30 p.m., and the Secretary-Treasurer opened the roll for membership.

April 18th—Closing Plenary Session

At 6.12 p.m., what was apparently a full plenary closing session of Joint Amateur and Legal Congresses convened. Belin called upon the meeting to ratify the complete work of the Congress in all its committees. This was done without dissent, by a standing vote.

Belin then made a closing speech, in which he congratulated the Congress on its co-operation and results; his thanks to Rene Mesney and son for their hard work in making the arrangements, etc. Roussel spoke on behalf of the B.C.L., asking hams to co-operate and be kind to them. Various miscellaneous speeches. It developed that a representative from Russia and one from Indo-China were present this afternoon, Dr. Merz, of Switzerland, had supplied bowl of flowers and Borrett, of Canada, at his request, asked Belin to present them to Maxim, which was done with great applause and demonstration, in the name of the transmitting amateurs present. More speeches, goodwill, inspiration received, thanks, etc. Belgian and French amateurs presented Warner with a 3-foot ham sandwich, weighing 10 pounds, tied in national ribbons, to catch up on meals missed preparing Constitution. Demonstration.

M. Belin declared the Congress finally adjourned at 7 p.m.

April 18th—Executive Committee, I.A.R.U.

Immediately upon the conclusion of the Congress, a mass meeting of the French amateurs present was held in the same hall for the purpose of forming a French section of the I.A.R.U. and electing officers therefor. Meanwhile, the Executive Committee of the Union met at the call of the President, there being present Messrs. Maxim, Marcuse, Warner and Mezger, a quorum, for the purpose of recognizing the section. Moved by Mr. Mezger that the I.A.R.U. recognize a French section of the Union, having for its officers the following:

President—Jack Lefebvre, f8GL.
Vice-Pres.—Edouard LeBlanc, f8DF.
Secretary—R. Andureau, f8CA.

Seconded by Mr. Marcuse and passed unanimously. Whereupon the meeting adjourned, about 7.10 p.m.

April 24th—Executive Committee, I.A.R.U.

At the Hotel Waldorf in London, at 10.20 p.m., April 24th, 1925, the Executive Committee of the I.A.R.U. met at the call of the President, there being present Messrs. Maxim, Marcuse, Warner and Mezger, a quorum. The Secretary certified that more than the required minimum of 25 paid memberships had been received by him from Great Britain. The Chairman stated that the members from Britain were then free to form a British section. Mr. Marcuse reported that a mass meeting of the British members had just been held at the radio dinner at the Hotel Waldorf, resulting in the selection of E. J. Simonds, g2OD, as National President. He moved that the British section be recognized; Mr. Mezger seconded; passed unanimously. Mr. Marcuse reported that 30 members had been present at this meeting and had elected E. J. Simonds as president and proposed that Mr. Simonds be recognized as the National President of the British section. Mr. Mezger seconded, and it was voted unanimously. Whereupon the meeting adjourned.

MAY YOHE, ONE TIME POSSESSOR OF HOPE DIAMOND, ON WBZ WAVE

May Yohe, laughing, singing May Yohe, who won the plaudits of the world with her bright eyes and gay tongue and nimble feet, will be introduced to the vast radio audience of Westinghouse station WBZ as the major attraction on the week's program which will be transmitted from New England's uper-power broadcasting station. This bright and breezy artist will go on the air in August and during the coming season, presenting a recital of songs, in which she will include selections of her own composition.

Many of the countless thousands of radio listeners who will tune in WBZ for this attractive and unusual concert will recall this blithe star of the calcium lights as the idol of theatre-goers and the favorite of the crowned heads and nobility of Europe. Her fame is also known throughout the universe as the former Lady Francis Hope, one time possessor of the mysterious Hope Blue Diamond, the family legacy of the Hope family that brought ill luck for generations to everybody who owned it, whose amazing adventures, passing from the kings and beauties of France, and sinister career with tragedy ever following in the wake of this ill-omened gem has been chronicled in the press of every country.

This famous actress who has toured the world has appeared before the footlights not only in the larger cities of America but also in Europe. She made her first bow to a theatre audience at the age of 17 when she appeared in the musical comedy, "Natural Gas."

From the first, May Yohe was acclaimed a success by critics as well as by the public and she appeared in many well known productions meeting with one success after another. Among some of the more prominent productions in which she took a leading role and scored a decided hit are "Christopher Columbus," "The Belle of Cairo," "The Giddy Throng" and "The Magic Opal," her first London engagement previous to her marriage to Lord Hope.

For her concert which will be broadcast from WBZ, she has arranged a program that will appeal to all listeners and recall to many the days of her great successes. Included in the selections she will render is "Oriental," one of her own compositions.

"RADIO MOVIES"

Broadcasting of motion pictures will be the next outstanding advance in the field of wireless communication, Atwater Kent, of Philadelphia, a member of Secretary Hoover's Committee on Broadcasting, believes.

Declaring he has been intensely interested in the recent transmission of motion pictures by radio across the city of Washington and their projection on a miniature screen, Mr. Kent said he anticipates the time when "radio movies" will be shown as clearly and large as canned pictures now thrown on theatre screens. He added:

"When it is remembered that radio broadcasting stations and broadcasting words and music of whole vaudeville shows and operas are achievements of the past ten years, perfection of radio motion pictures during the next few years seems a goal likely to be attained.

"Recent success in radio vision experiments indicate that by 1935, and perhaps even sooner, we can sit at home and watch the playing of a championship baseball series, projected on a radio picture screen, besides hearing the umpire's voice and the crowd's cheers, which the sound receiving set now picks up.

"Possibilities of such apparatus are unlimited. Inauguration of the President, manoeuvers of battleships, horse races and football games could be witnessed by persons all over the nation, at the time they happened, for waves carry the pictures across the continent in less than a second.

"Cost of a radio vision machine for homes is only a matter of speculation yet, but it seems that it could be made as accessible as high-powered sound receiving sets now on the market."

RADIO CONDITIONS IN NEW ZEALAND IDEAL FOR DX TRANSMISSION AND RECEPTION

Christchurch, N.Z.—Radio fans in Australia and New Zealand do not envy the American ham his location in the United States. The multitude of American hams yarning one another that are heard out here every night makes the fan out here scratch his poll with the phone jack and wonder how in the ether they ever hear anything from outside at all through the maze of local signals.

Fans out here not only have the advantage of a comparatively quiet spot in the ether, but also, apparently, the help of some as yet unknown quantity of the ether which enables them to perform super-achievements making them wonder if they woke up when the alarm clock went off.

Working distance on minimum power is a favorite stunt when conditions are good, and marvelous results have been obtained in these tests. The night New Zealand 4AA worked two-way with Australian 2CM, Sydney, a distance of 1,300 miles, on a power input that was eventually cut down to .0037 watts, is a case in point. Probably the flame of a match would use up more energy than that.

The work of New Zealand 3AL with a temporary station aboard the Port Curtiss bound out to Cape Horn up to a distance of 4,600 miles on an input of 12 watts also is worthy of mention. The same station in the hands of W. M. Dawson, of Ashburton, has just communicated two-way with u6AWT, San Francisco, using a single five-watt valve with less than the normal input: 13.45 watts, when the normal input is about 15 watts.

Mr. Dawson has just been granted a special short wave-band of 38-42 meters by the government, the only one in the Dominion at present, and he is anxious to carry out work on this wave with United States hams who should call on 88 meters. The 1, 2 and 3 district hams heard by z3AL are as follows: 1ABF, 1AF, 1ABX, 1ARY, 1BE, 1BY, 1CMP, 1CMX, 1PL, 1CM and 1CMP; 2AD, 2BY, 2BGI, 2BRB, 2BQR, 2CJB, 2CMS, 2CPA, 2GL, 2LS, 2RK, 2LE and 2RX; 3BEI, 3CJN, 3CHG, 3LW and 3SN. In passing it may be noted that British, Swedish, Japanese, Canadian, Italian and Mexican amateur stations have been heard by z3AL. All work is done on a detector with one stage of audio, using a low-loss tuner.

That these results are not unique is proved by reception equally as good by listeners. Using a low-loss tuner with detector and two stages of audio a listener in the South Island of New Zealand has logged over 100 American hams in a month, and his DX work includes nine British stations, four French, three Canadians and two Mexicans.

South Africa is apparently the only other continent to which Maoralanders have to push their signals in order to complete the list; fans having worked North and South America, Europe, Australia and Asia (French Indo-China).

Two-way telephony with a British amateur is claimed by Australian 3BQ, with British 2OD. The test was by no means fully successful, however, and practical two-way communication can be said to have been established between amateur stations in Great Britain and the antipodes. It is expected that during the coming months when conditions will be more favorable for reception in Australia and New Zealand two-way telephone communication will be established.

In the broadcasting world fans are pushing many of the American broadcasting stations out of loud-speakers with the use of four and five valves.

In the 500-watt stations that are to be erected in the four chief centres of New Zealand provision will be made for equipment for the re-broadcasting of broadcast concerts, and it is hoped that attempts will be made to re-broadcast concerts from Australia and later, perhaps, from the United States.

Taken altogether it may be said that the records that Australian and New Zealand amateurs have been enabled to put up in the past in the clearer, quieter ether of the south probably will be but the forerunners of many more achievements that will all find a place in the annals of wireless history.

FULLER CO. WILL DISTRIBUTE MARCONI RECEIVERS IN ONTARIO AND QUEBEC

The Fuller Electric of Canada, Ltd., have been appointed distributors in Ontario and Quebec for the Marconi line of receivers.

Besides this they will, of course, distribute their own line of Sparta loud speakers and Fuller batteries.

ESKIMO SINGING

Efforts will be made by the Donald B. McMillan North Pole Expedition to broadcast back to civilization the voices of Eskimos singing in their native language, according to Mr. C. H. Thordarson, of Chicago, who built the broadcasting transformer equipment, the transmitting transformers and the receiving set transformers carried by the "Peary" and the "Bowdoin."

Mr. Thordarson sailed with Mr. McMillan from New York aboard the "Peary." He reports that the "Peary" is a converted French mine sweeper, which has had its hold reinforced and filled with cement to act as an ice-breaker for the "Bowdoin," as well as to carry the airplanes.

The two ships will push northward as far as possible, probably to Etah in North Greenland, which is about 11° from the pole. From these, the planes will first fly to the extreme north point of Axel Heibergland locating at Cape Thomas Hubbard. Here, communication by radio will be maintained with the Pole-seeking planes when they fare forth. The sending apparatus will also be used to communicate with American amateurs, and the broadcasting of Eskimo singing and talking will be attempted.

All the transformer equipment used on the McMillan Expedition, states Mr. Thordarson, was built under his supervision by the Thordarson Electric Mfg. Co. It consists of speech amplifiers and line amplifiers similar to the equipment furnished leading broadcasting stations in the United States, as well as the audio-frequency transformers placed in the Zenith receiving sets, which will be relied upon, as on the previous expedition, to keep the expedition posted on happenings back home.

The highly satisfactory performance of Thordarson transformers on McMillan's former Pole-finding attempt is said to have resulted in this honor of outfitting the second expedition.

NRRL STILL BUSY

NRRL, the experimental short-wave station with the U.S. Pacific Fleet, is maintaining its activity under the control of Lieut. F. H. Schnell, of the American Radio Relay League. Although the fleet is steadily steaming south-west and rapidly increasing the distance from the United States, consistent reports are still being received at League Headquarters of the reception of NRRL by American amateurs. One of the most interesting reports is that of W. K. Francis (U8PL), of Shawnee, Okla., who has reported good reception when the fleet was 2,000 miles south of Honolulu.

BOB "ASSISTS" DAD AT A RADIO WEDDING

The Boy Radio Fiend Executes an Idea Which Makes It Seem Advisable for Him to Leave Home Temporarily and go to Billy's Home

By H. L. Van Deusen

July 18.—Dad says I am a young limb of Satan and all on account of what happened at Melissa Yeoman's radio wedding.—Extract from Bob's diary.

Some of you folks may recollect me telling you how me and Billy Rich—he's my chum, and our friendship, just like a girl's complexion, is renewed daily—nishiated Dad a Radio Knight. Since then it's been a kinder delicate subject to mention around the house, as Dad still has a sore spot or two where the goat bammed him, and me and Billy has decided to wait for a more favorable time to organize our Knights of the Radio Circle.

Dad was just commencing to resume friendly relations with me and Billy when Melissa Yeomans, a young flapper that lives on Abruyn Street here in Ponckhockie, decided to get a man to keep her in the style to which she has been accustomed, and if she didn't up and pick as her victim J. Clifford Groves, the radio operator of our Boy Scout broadcasting station, and a brother Rotarian of Dad.

Sweet potatoes and weren't they the spoony couple, though! Honest, it was sickening, and, as I say to Billy, "I wish they would hurry up and get spliced and then they'll get good and sick of each other."

It got so that me and Billy couldn't step a foot anywhere without bumping into them. If we went to the Spring Quarry in Lindsley's Woods, they were there; if we went over the Cordt's Hose to sneak a ride on the fire engine, they were there. Why you couldn't mention a place in Ponckhockie where you wouldn't be apt to meet them.

Thats always the way, though, for before you are married, you take her everywhere, but after the honeytower, you take her nowhere. That's what Ma told Dad the other night, but he only snorted.

Me and Billy wouldn't have minded it so much if they hadn't kept telling our folks where they met us, and how they didn't believe in letting boys run all over town. That's the way with some folks, they never want a boy to have any fun.

The Radio Wedding Idea

Melissa is one of these romantic sort of flappers and J. Clifford is just the kind of a boob to fall for it, for when she suggested that they have a radio wedding, the chump was willing. They was over to our house at the time and me and Billy happened to overhear it. It seems she had read somewhere about some couple being married in a radio studio, and she thought it would be a fine thing for them to do it, too, specially as J. Clifford was the operator at Station XYZ, Ponckhockie.

I will give Dad credit for some sense, for he tried to talk them out of the idea, but it was no use, and before they left they had fixed the date and had got Dad and Ma to promise to stand up with them.

"It's a dodgasted idea," Dad says to Ma afterward, "but we Rotarians have to stick together, and I suppose a man might as well get married that way as any other."

"Of course," retorts Ma, sarcastic like.

As the days passed, I kinder forgot about the wedding, what with tinkering with a new radio set me and Billy was building, until I am coming home for supper the other night and found Dad scurrying around like mad and yelling at Ma as to where his shirt was, and Ma she was kinder upset trying to get supper out of the way so she could get dressed.

"Can me and Billy go to the wedding, Dad?" I asked.

"No!" he snapped, and when he spoke like that, I knew he meant it.

Well, after supper, I drifted over to Billy's house, for I knew if I stuck around, Dad would find some errand for me to do, and about an hour later, I drifts back and find Dad and J. Clifford sitting on the front porch in their shirt sleeves smoking some of Dad's best cigars, while the women folks are upstairs getting dressed.

The Crime Is Committed

As I go in the house by the kitchen door, I spotted Dad's Tuxedo coat hanging over the back of a chair. I don't know what possessed me, but as the coast was all clear, I slips a piece of Limburger cheese Billy had given me to take home and which I had been tempted to drop in the garbage pail, in one of the pockets and rubbed some of it on the coat tails, where it wasn't noticeable. Then I spots J. Clifford's coat and gives it a similar treatment.

By that time, I think it is best to go away from there and stroll over to Billy's house to slip him the glad news. He laffs and says: "Bob, you're a genius," which statement I take modest like.

After awhile, we go over to our barn to tune in on the wedding. I guess everyone in Ponckhockie that had a radio set was tuning in, for the newspapers had played up the affair that afternoon.

The ceremony was set for 8 o'clock sharp, and me and Billy got our set all tuned in and hooked up the loud speaker. Then we sat down on some empty barrels to enjoy ourselves.

We had no more than got settled comfortable when the voice of J. Clifford is emitted from the mouth of the loud speaker. He is saying: "This is Station XYZ, Ponckhockie. The station's popular operator, J. Clifford Groves, and Miss Melissa Yeomans are about to be united in the bonds of matrimony from the stations studio and it"——

"Smells like sewer gas in here," interrupts another voice that sounds like Dad's.

"Be quiet; you are right in front of the microphone," says another voice in a whisper.

It must have been rather stuffy in the studio, for it was hotter than blazes in the barn and we had the door wide open, too, and that good old Limburger must have been getting warmed up by that time.

I could just imagine seeing Dad perspiring and then me must have reached in his pocket for his handkerchief to mop his face and got hold of the soft lump of cheese instead.

Dad's Discovery

"Helen Maria!" snaps Dad's voice, and it fairly seemed to pop out of the loud speaker; "that's some of that cussed boy's work. If I had my hands on that young limb of Satan, I'd tan his hide," and then he adds some words not commonly heard at a wedding.

"For heaven's sake, shut off the juice!"

"Helen Maria!" snaps Dad's voice, "tha!'s some of that cussed boy's work! If I had my hands on that young limb of Satan, I'd tan his hide!"

PATIENT WIFE MAKES HUBBY'S HOBBY HELP

After Indulging in a Variety of Experiments, the Bank Teller Takes Up Radio, Which His Wife Turns to Good Account in an Emergency

By Marie Loscalzo

John Prentice was forever dabbling with what his wife called "foolery."

He had the basement filled with the scrapped remains of electric devices, water motors, fearful arrangements which generated evil-smelling gases sometimes and sometimes exploded with loud reports and plentiful odors.

Millie considered herself the most patient wife in Wellsville. The fact that John's salary as paying teller in the Wellsville Trust Company was just sufficient to enable them to live in comfort without allowances for extravagant experiments had something to do with the martyr-like expression which gradually became habitual with Millie.

New hats are vastly more intriguing to the feminiine mind than the latest in electrical treatises and silver forks on the table are more to be desired than patents for plating pencils, paper-knives and other casual articles of use.

John's recurring excuses that his only pastime was the hobby of the moment, whatever it chanced to be, brought invariably one response from Millie:

"Why can't you try having the hobby of making money?"

John at last gave up attempting to convince Millie that his play was more to be pitied than censured, and Millie resigned herself to explosions, burnt towels and absent-minded husband. Her mother took John's part.

"You should be glad, Millie, that his mind's not running on some of these bare-kneed flappers, instead of isms and so on. And as for a little upset around the house—isn't that better than a broken heart? You don't know when you're well off, my daughter."

The good lady stopped with a shriek, for John just then came in with a coil of wire over his arm and at least a dozen packages projecting from pockets or gripped in his hands. His face, too, was of the general cleanliness of a lineman after a hard day's work.

"'Lo, Mother! See my radio outfit? Sure I'm putting up one. Had a dickens of a time finding some of the stuff down cellar. Mil, have you been cleaning out that basement? Leave things alone, will you? I have so little time after the bank closes, I cant fish all over the place for what I want."

He vanished up the attic stairs. Millie groaned.

"Now, you'll see, mother—something terrible will happen. He always gets into a mess. He hasn't time to make his things right, and there's an accident or"——

"Don't worry, Millie. Seems to me this is about as harmless a fad as he's had. Let him alone! Can't you come to dinner Sunday? I'm going to Cora's for a month next week, so you'd better come. Bring John—I'm not afraid of his experiments."

Millie finally grew to be of the same mind. John's latest neither blew up the house nor filled it with nasty smells, and as he invested in the best apparatus, there was, they soon were able to really enjoy the outfit.

Millie ceased to scold him after she had listened to a few concerts by air and had heard her favorite lecturer deliver his last gem of oratory. The fashion talks, the marketing aids, were not so bad, either.

But success was too tame for John. Everybody was doing the same as he. What he wanted was to be a little better—go a little further.

He experimented and worried over various queer-looking contraptions until Millie feared he would be ill. He climbed around the roof where he had the aerial until she had heart palpitations, but so far as she could see nothing was improved, unless it was the interest of the neighbors in the Prentice house.

That was great enough, and with the enthusiasm of small-town dwellers they all sang the praises of the wonderful John who had brought the voice of the stars of song within listening distance. Millie was a hospitable soul and welcomed every inquiring door-friend as warmly as could be asked. John was not so anxious to have the radio made a public affair.

The Neighbors Like It

"You have all the town in here making an audience, Mil, and I've no chance to do a bit of work on those new attachments I want to try. Can't you make some excuse—tell 'em it's out of order or something?"

No; Millie wouldn't. It was the first time John had had a really usable hobby, and she intended to make up for all the other instruments of fright and torture.

"Shame on you, John. Remember how you made poor old Mrs. Henry faint with that horrid battery you rigged up in the living-room without telling me? And little Jimmy Thornton has a scar he will carry to his grave from that explosion with the gas and tubes in the back yard. Let them come and listen to our radio. I'm only glad they will come here, after all the queer things you've been doing."

John had no reply to make. Perhaps he realized Millie was right. Besides, he was not as quick at repartee as was his wont. His head ached all the time, and the work at the bank left him too limp to care much about radio at home. He decided not to bother with the new sending apparatus he had been figuring on. He was too tired and couldn't remember things any more.

Then one morning he forgot to get up and a frightened Millie was soon listening to the doctor's verdict of inflammatory rheumatism.

That meant weeks of illness and much expense, and when the bank account was audited by an anxious wife there was nothing to meet that expense.

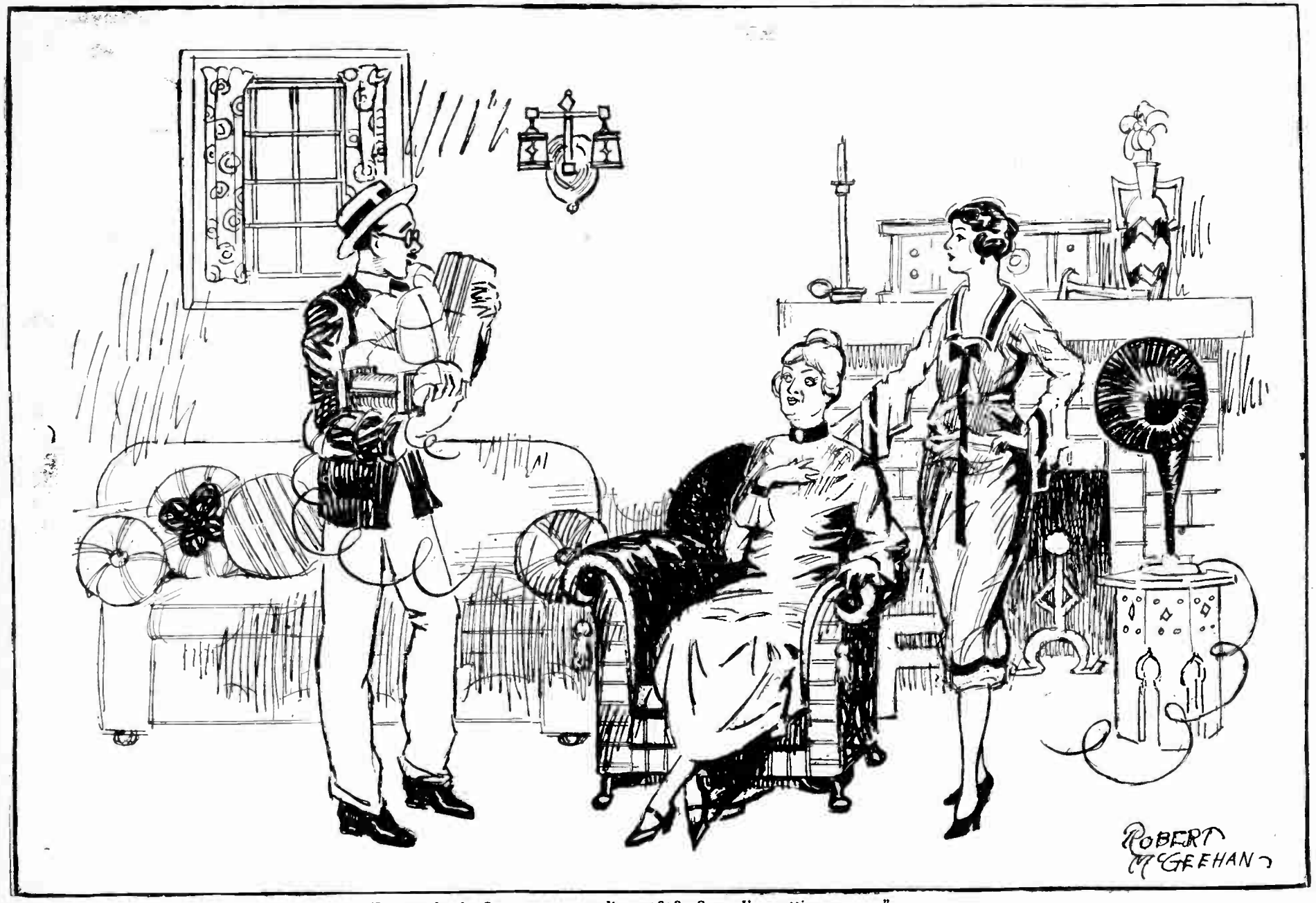
John had dipped deeply into the bank balance for his various experiments, but the last had been his "de luxe" hobby. Nothing but the best had satisfied him, and, of course, he had paid too much for many articles.

Hobbies Cost Money

Then the last payment on the house had come due and raked away the last of the savings; moreover, a paying-teller's salary is never too much.

Millie figured and figured, with the zeros all on the wrong side. What could she do? Nurses must be had, and that meant cash. If she went to the bank and borrowed or tried to it would hurt John's standing. Old Mr. Harvey, the president, was impatient about hobbies, anyway. He was the only one in Wellsville who had not come to listen to the radio receiver. And several of the directors were out-of-town men who took Mr. Harvey's word about the bank's affairs.

The money might be borrowed, but when John was well—Millie shivered a little at a certain thought—when John was well, there might be no position waiting for him. No, borrowing was out of the question. And there were no relatives who could help in this crisis.



"Lo, mother! See my new radio outfit? Sure, I'm putting up one."

She was sitting fingering her pencil and trying to keep from crying when Mrs. Henry's nervous knock sounded on the side-door.

What could she want? To help, perhaps, with the nursing—but Millie would trust John to none but professional care.

"Now, dearie," began the old lady, "I didn't come to hold John's hands. You get the best nurses Doc Andrews can find in the city. What I wanted to say was, I just been thinkin' maybe Millie and John haven't a lot of ready funds handy. You know my Sam is the agent for these houses and he said lately that John had just cleared off what was back on yours. So that took money. And John's experiments must have cost a sight. I know Sam used to have such idees, and, land! it took all I could scrape till he got so busy real-estatin' he had no time to fiddle around the house.

"And your ma can't spare you any, I know, with all her paving taxes. So listen here, dearie, and don't get angry. I know you won't accept money outright even if all of us neighbors chipped in. But we're all crazy about that radio of John's. I'm scared Sam is going to get one, too. But, look here—you let us all come and listen evenings. We can go up the backstairs and not bother John, and, besides, the room where he has it is at the side away from him.

"And we'll pay the same as if we went to the theatre. Be cheap at that if it money buying their own, and neglecting keeps some of the men from spending their business tending to it. What say, dearie? Suppose ten of us came a night and paid fifty cents each—that'd pay the nurse in a week. And no bother to you. And a pleasure to us, both to help out John now in his sickness, and to have the music and lectures we all like."

Millie was too astonished to speak at first. The idea of cashing John's whim was so new. But practical, too, she saw at once. It would relieve her of a worry she had thought could not be surmounted.

"Yes; that's a splendid plan, Mrs. Henry. And you're a dear to think of it. But just as soon as John is better you must all come the same way you have been—you're all always so welcome."

She saw her neighbor depart satisfied she had done a good deed and little thinking that she was in a way heaping star-beams on John Prentice's head.

The Neighbors Come In

For the eighbors came as per Mrs. Henry's offer. Came and filed nervously up the backstairs where John had thought to find a little peace and quiet for his super-het.

By closing all the doors to the front bedroom where the invalid lay he was kept in ignorance of what was going on.

"Just a few of the folks from the church in, John," satisfied him when he queried the wherefore of the late concert. Millie hunted up enough instruction books until she learned something about the proper manipulation of the dials and the care of the batteries. It was interesting, she found. Even a woman could understand it. Even a woman could become a fan, too, she soon discovered.

The only trouble with the radio concerts was one to be expected, too. All those attending became possessed of a desire to own their own. If Millie could climb on the roof to fix her aerial old Mrs. Henry decided she could manage an indoor antenna, though, after spraining her ankle from falling off a chiffonier where she was perched stringing a wire around the picture-molding, the elder lady began to praise loops.

None of the fans, however, gave up coming to the Prentice concerts until John was well enough to need no more the "pay-at-the-door" addition to his income. Shocked as he was at Millie's method of making a "tide-over," still he laughed at how she hauled down fifty cents each by turning his hobby into a help.

DESCRIPTION OF RADIO APPARATUS ON A MODERN TRANS-ATLANTIC LINER

Some Large Ships Have Radio Equipped Lifeboats and Automatic "Tape" Transmitters

By Capt. H. De A. Donisthorpe

The amount of radio traffic now handled on board Atlantic liners has grown to such proportions of late that it has necessitated the equipping of these liners with the most up-to-date radio equipment available.

As a general rule these ships' installations embody the following apparatus:

(1) A "spark" installation.
(2) A "continuous wave" system.
(3) An emergency equipment.
(4) A direction finder.
(5) A lifeboat installation.

The first named installation is now unfortunately somewhat of a nuisance to the broadcast listener if he be located in close proximity to the coast, but its retention is necessary at present for compliance with the existing regulations governing the safety of life at sea. The annoyance it causes to the general radio broadcast receiver is due to the fact that the electro-magnetic waves it produces are highly damped and will affect a receiver over a large range of wave lengths. This factor, however, it will be seen, is a useful one so far as marine communications are concerned, as it insures of an S O S or distress signal being picked up, even if the neighboring receivers are not accurately tuned to the universal and international 600-meter wave.

Fig. 1 shows a typical ship's radio cabin and the various apparatus is tabulated.

The "spark" transmitter in this instance is of the "quenched" spark gap type and consists of two coupled circuits with open and closed circuit inductances, composed of flat spirals of double copper strip mounted on ebonite panels. A three-way wave-changing switch enables a rapid wave change to be made and controls simultaneously the amount of inductance in both circuits. The normal equipment enables changes to be made to 300, 600 or 800 meters; the two former waves are compulsory by international wireless regulations, while the 800-meter wave is used for radio compass work.

The actual gap as shown is mounted in front of the panels, which are protected by an iron guard screen. The sparking takes place between the silvered copper disks and is practically noiseless, which is a great improvement over the old designs of spark gaps, which were exceedingly noisy.

The range obtained with such equipment is of course dependent to a large extent on the antenna's dimensions available with vessels equipped, but as a "normal range" 600 nautical miles can be expected between ships having tube receiving apparatus.

Continuous Wave Equipment

The arc as a generator of undamped waves is now practically obsolete and tubes are used instead.

In the installation depicted the oscillations are produced by means of one three-electrode power tube fed from the same alternator and transformer as that utilized for the spark apparatus, the alternating current being rectified by arrangement of two two-electrode tubes mounted on either side of the power tube.

The aerial tuning inductance is contained within the set at the top of the

apparatus and is wound on the "pile" principle and covers in five steps a wave length range of from 2,000 to 3,000 meters. A variometer, the control handle of which is shown in the top right hand side, gives a fine adjustment between the five aforementioned steps, the latter being made through the aid of plug-and-socket connections.

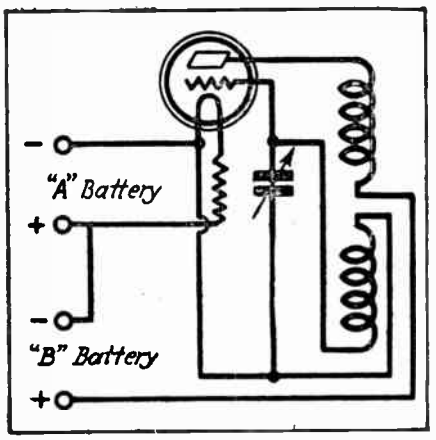


Fig. 3—Circuit of the Heterodyne Unit

This apparatus is rated at 1½ kilowatts. It gives a maximum antenna current of about 15 amperes and can easily establish communication up to 1,000 nautical miles. This distance is very frequently exceeded; in fact, some of the liners actually maintain touch with America right up to the time they dock in England.

A simple arrangement of change-over switches allows of an immediate change being made between the "continuous wave" set and the "spark" set and vice versa.

Receivers

The receivers employed in the equipment under description are common both to the continuous wave and spark sets with the exception that in the former case an addition of a "heterodyne" device is utilized.

The complete marine receiver shown consists of three essential pieces of apparatus:

1. The tuner.
2. The amplifier.
3. The local oscillator.

The function of the tuner is naturally to tune the antenna to the wave length required, and also to adjust the closed or secondary circuit to the same wave. These two circuits are coupled together in such a manner as to avoid as far as possible interference from unwanted signals.

The duty of the amplifier is to increase the strength of the signals and embodies in this instance a four electrode tube, which has been described fully previously in "The Radio News of Canada." This form of amplifier is useful in view of the fact that it gives a maximum amplification for a minimum number of tubes, an important economic factor.

The local oscillator or "heterodyne," as mentioned previously, is only utilized in the case of the reception of continuous waves and is an extremely simple piece of apparatus employing a single tube, and is used to produce feeble local oscillations in order to establish "beats" with the incoming antenna signals of the tuner. The actual circuit of this piece of apparatus is shown in Figure 2.

The circuit, it will be seen, consists of two circuits and on the low ranges of wave lengths a tuning condenser is connected across the grid inductance.

The inductances are of slab form and the one slab contains the two inductances.

In order to cover the complete range of wave lengths, two slabs are supplied, but in the high range a slight alteration in connections is effected which is not necessary to explain in this article.

A "B" battery of as low as three volts will be ample to produce the desired feeble oscillations.

The Emergency Set

The emergency set is one which must be fitted to all marine installations by international law, and must be capable of working without the aid of the ship's dynamo, so that in the case of an emergency assistance can be sought by means of the radio.

The source of power is generally a battery of accumulators, and must be able to establish communication up to 100 miles and maintain the same for six hours.

In this instance the apparatus consists of a simple form of vibrator which interrupts, in a regular manner, the direct current supply from the mergency battery which passes through the primary of the main transformer, producing high tension pulsating current in the secondary of that transformer and hus operating the spark transmitter.

The vibrator is set in motion by neans of the well known electro-magiet principle associated with induction coils, the winding of which is connected in parallel with the main transformer's primary.

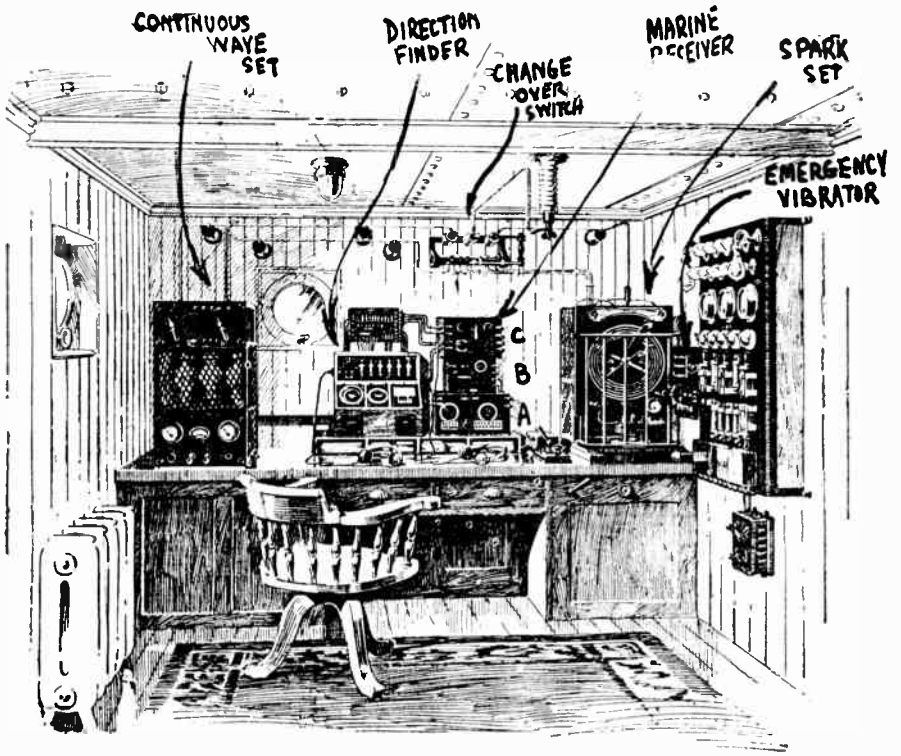


Fig. 1—A Typical Ship's Radio Room

Lifeboat Set

Besides the main installation some of the big liners now equip one of their motor lifeboats with a radio installation which is also placed under the care of the radio telegraphist.

This apparatus consists of a small spark transmitter and crystal receiver.

The energy for the transmitter is obtained from the current of a small generator run off the shaft of the propelling gasoline engine.

The latest lifeboat sets even embody a tube receiver, and in some instances a small rotating frame direction finder is fitted for advising the rescuing vessel of its position.

Direction Finder

This piece of apparatus has of late been frequently described in this journal

and other radio periodicals so that space will not be wasted on further description.

Nowadays some of the ocean greyhounds have such a large amount of traffic that they hold a coast station for long intervals at a time, and perhaps delay other vessels which have important messages for disposal. To overcome this difficulty such steamers are further equipped with high-speed apparatus

Very successful results have been made with this apparatus, and recently speeds of over 150 words a minute were obtained. This means a great saving in time and at the same time effectively helps in the clearing of the "ether."

The receiver consists of a special tuner and amplifier which provide for a large degree of magnification of the received.

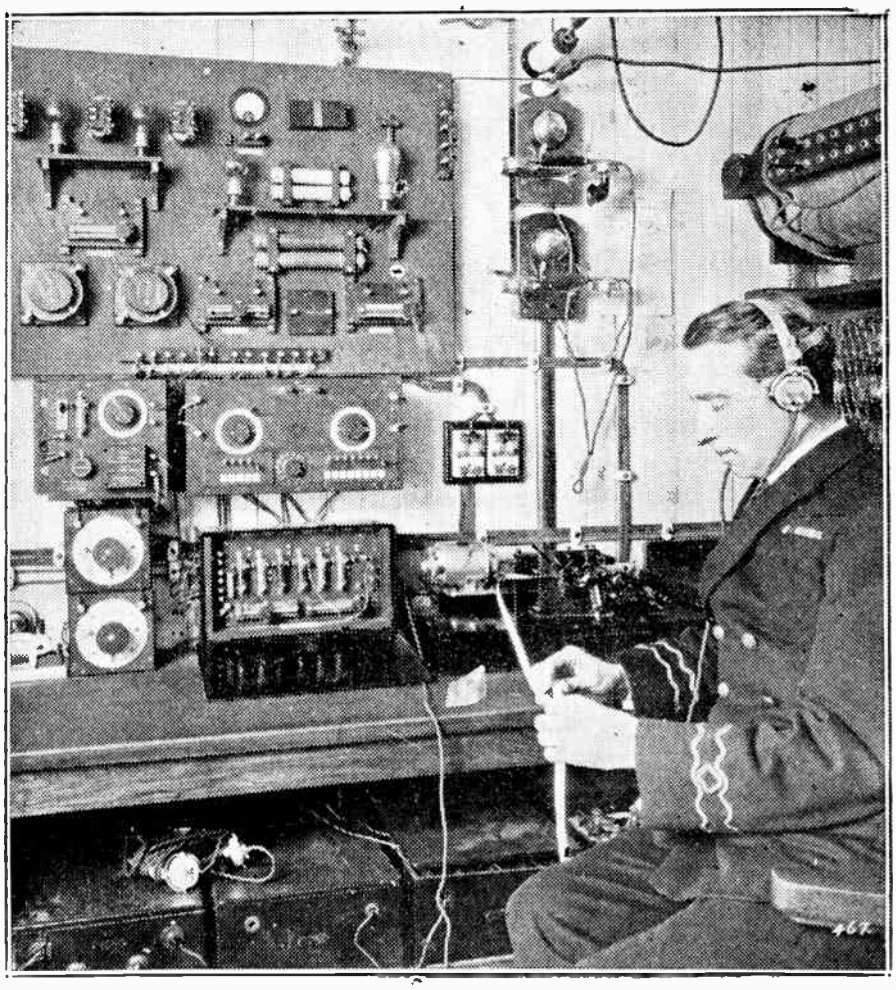


Fig. 2—In the above is pictured the radio equipment on the S.S. Majestic

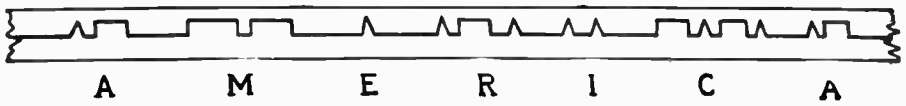


Fig. 4—Type of printing obtained on a high-speed receiver type

used in conjunction with the main continuous wave set. Fig. 3 shows the telegraphist of the White Star liner Majestic, which is fitted with high-speed apparatus, reading the "tape" from his receiver.

The transmitter consists of a special form of typewriter which punches holes in the usual telegraphic tape; this is fed through a Wheatstone transmitter which, in turn, through the agency of a special relay, operates the main "C. W." transmitter.

The energy, after having been suitably amplified, is then passed on to the undulator, the apparatus which prints the messages.

This apparatus relies on the electromagnetic principle which controls a movable arm and moves over the receiving tape, a writing siphon being connected to it. The printing is a transscription of the Morse code, the type of which is shown in Fig. 4.

The speed of the reception is dependent on the movement of the actual tape, and if signals are being sent at a high speed then the tape has to be removed from the siphon at a greater speed in order to allow of the printing being legible. The actual apparatus shown in Fig. 3 can be controlled within the range of speeds of 20 and 200 words a minute and is specially robust for shipboard use.

The time is soon coming when passengers of liners will be able to speak by means of the radio telephone from ships at sea to their homes just as though they were sitting in front of an ordinary wire-connected telephone. Successful experiments have been carried out in this connection by the American Telephone and Telegraph Company, and it now only remains for one of the big liners to establish the service for the other steamers to follow suit.

Recently the world has been startled by the astounding feats of sending pictures by radio and, as newspapers are already published on shipboard by means of received radio bulletins, it is not too wild a speculation to prophesy as a part of a ship's radio gear of the future a radio picture receiver.

MILL HILL WORKS WITH MACMILLAN EXPEDITION

Mr. C. W. Goyder (G2HM), of Mill Hill School, one of the first British amateurs to communicate with New Zealand, has gained further distinction by securing two-way communication between this country and the MacMillan Arctic Expedition ship "Bowdoin." Communication was first established on Saturday, July 18th, and subsequent signals have been exchanged with the "Bowdoin" since she crossed the Arctic Circle between the hours of midnight and 6 a.m.

Mr. Goyder's apparatus is of unusually simple construction. He works with a Mullard 250-watt valve on a wavelength of 40 metres, and employs a single-wire aerial. The receiver makes use of the Reinartz circuit, an interesting point, in view of the fact that Mr. J. L. Reinartz, its inventor, is the operator of the equipment on the "Bowdoin."

Immediately Mr. Goyder picked up his first signal from the Arctic regions, he set about to transmit, and received an acknowledgement at once, together with a request from the explorers to forward messages on their behalf to friends in the United States.

The Science Master at Mill Hill School will be glad to hear from any who receive signals from the "Bowdoin."

DIRECTIONS FOR BUILDING AN EFFICIENT FIVE-TUBE REFLEX RECEIVER

This Circuit Makes Use of All Modern Developments

By Fred E. Baer

There have been reflex receivers in the past, good ones and others not so good. But until recently little was done toward introducing some almost necessary refinements into the design. The new Priess set has so many of these refinements that a detailed discussion of its features is worth while for practically every one interested in radio reception.

The set uses five tubes, reflexing but one of them. The five vacuum tube sockets are mounted on a heavy insulating strip. This latter is in turn supported at each end by a rubber thong heavy enough to take up all shock and to support the tubes easily. The shelf normally hangs free of all other supports, as all connections are made to it by flexible leads. In this way microphonic noise is entirely eliminated.

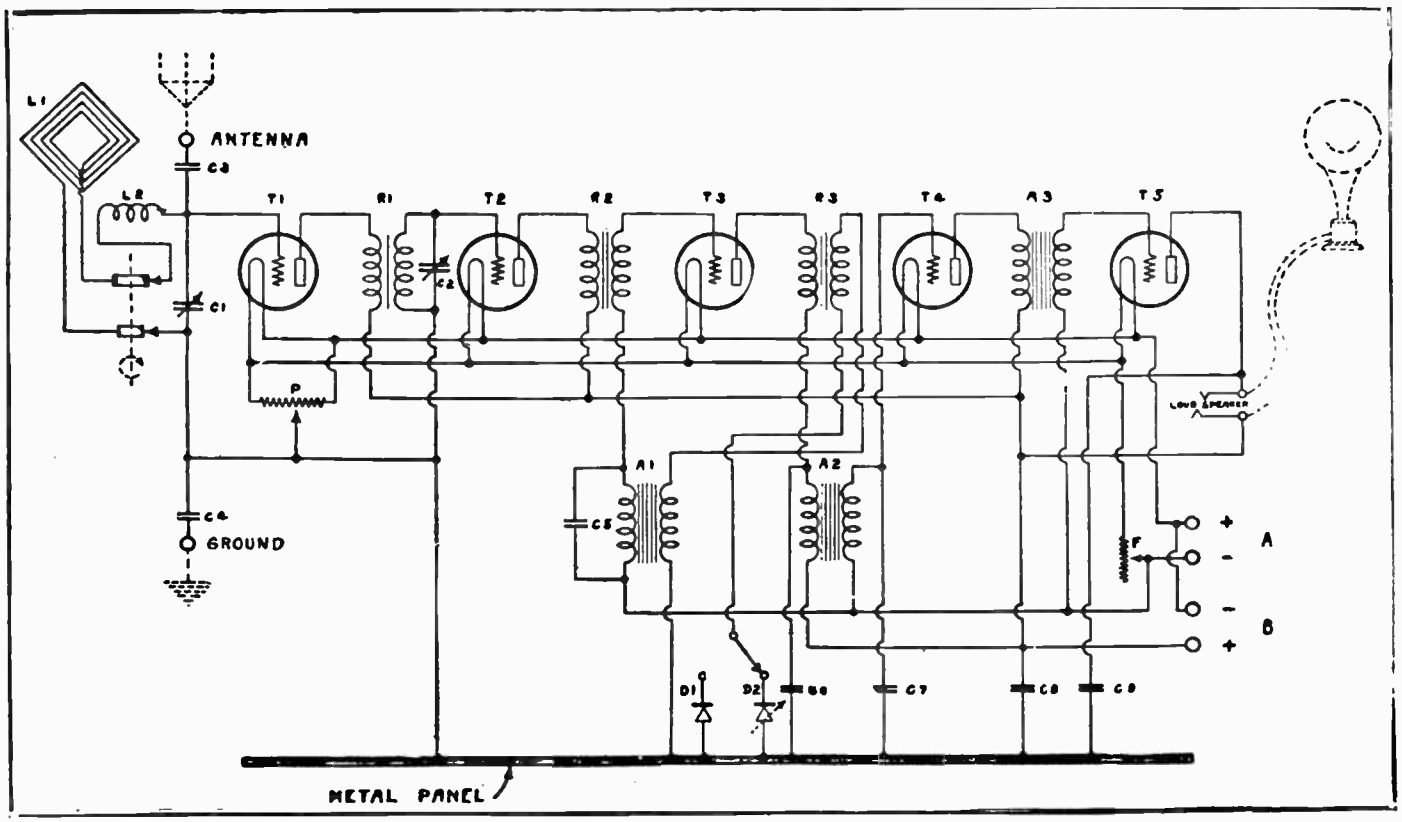
The apparatus is so placed throughout the set that all of the leads are short. The R. F. transformers are mounted in a row parallel to the tubes and close to them. In this way the radio-frequency circuits are all kept down in size.

The first tube is connected directly to the loop and antenna tuning condenser, and is coupled to the second by a tuned transformer, tuning being accomplished here also by a shunt variable condenser. In order to prevent oscillations in the first two tubes a potentiometer is provided for adjusting the grid potentials to the best value. This use of two sharply tuned circuits in cascade results in a very good selectivity for the set. And due to the fact that no selectivity is lost by balancing or neutralizing these two tubes the set is easily as sharp as the very common five-tube tuned R. F. sets using three controls.

The second tube is coupled to the third through an untuned R. F. transformer, thus providing the third stage of R. F. amplification. This tube in turn feeds the crystal detector through a similar transformer. This amount and type of radio-frequency amplification gives the set a tremendous distance range and an exceptional selectivity.

The detectors are provided with a clip to change from one to the other. One is a galena and has the usual spring contact, with adjustable pressure on the contact and means for shifting the contact point. The other is a fixed crystal combination. The use of the crystal eliminates self-generated detector tube noises and gives the set a clean cut reproduction free from any internal noise that distorts all forms of detector tube sets.

The signal goes back from the detector via a high-frequency tank circuit to the first audio-frequency transformer, and thence back to the grid of the third tube—the one that is reflexed. This tube has an audio-frequency transformer to couple it to the fourth, and that in turn is coupled to the fifth. The fourth and fifth tubes are really straight audio-frequency amplifiers. The three stages of audio amplification enable the set to produce loud speaker volume that could otherwise be obtained only by separate power amplifiers, since the loud speaker volume of a set is almost entirely dependent upon the amount of audio amplification present after the detector.



The audio-frequency transformers are of two types, with turn ratios of 3½ to 1 and 5 to 1, respectively. Two 3½ to 1 units are used and one 5 to 1. The reason for using two different types is that all amplifying transformers have a more or less peaked characteristic—that is, there is one frequency at which the amplification is a maximum, being less for both greater and lesser frequencies. This, of course, produces some distortion, as the amplifier will bring out the one frequency more strongly than others. Now, by winding transformers to two different ratios it is possible to displace the peaks of the curves and separate one from the other a substantial amount. Using transformers of this type, the over-all characteristic of the amplifier is very much improved, so much so as to result in practically a straight line over the major portion of the range. This feature is an important factor in reproducing with realistic quality.

The two variable condensers are mounted some distance behind the panel. Their shafts are fitted with insulated extensions, so that the hand, in resting on the knob, does not approach even the shaft of the condenser. This is the other step which in conjunction with the grounded metal panel eliminates hand capacity absolutely.

The effect of hand capacity has also been eliminated from the adjustment of the galena detector. This has been done by arranging the circuit in such a way that the adjustable contact is on the grounded side of the circuit.

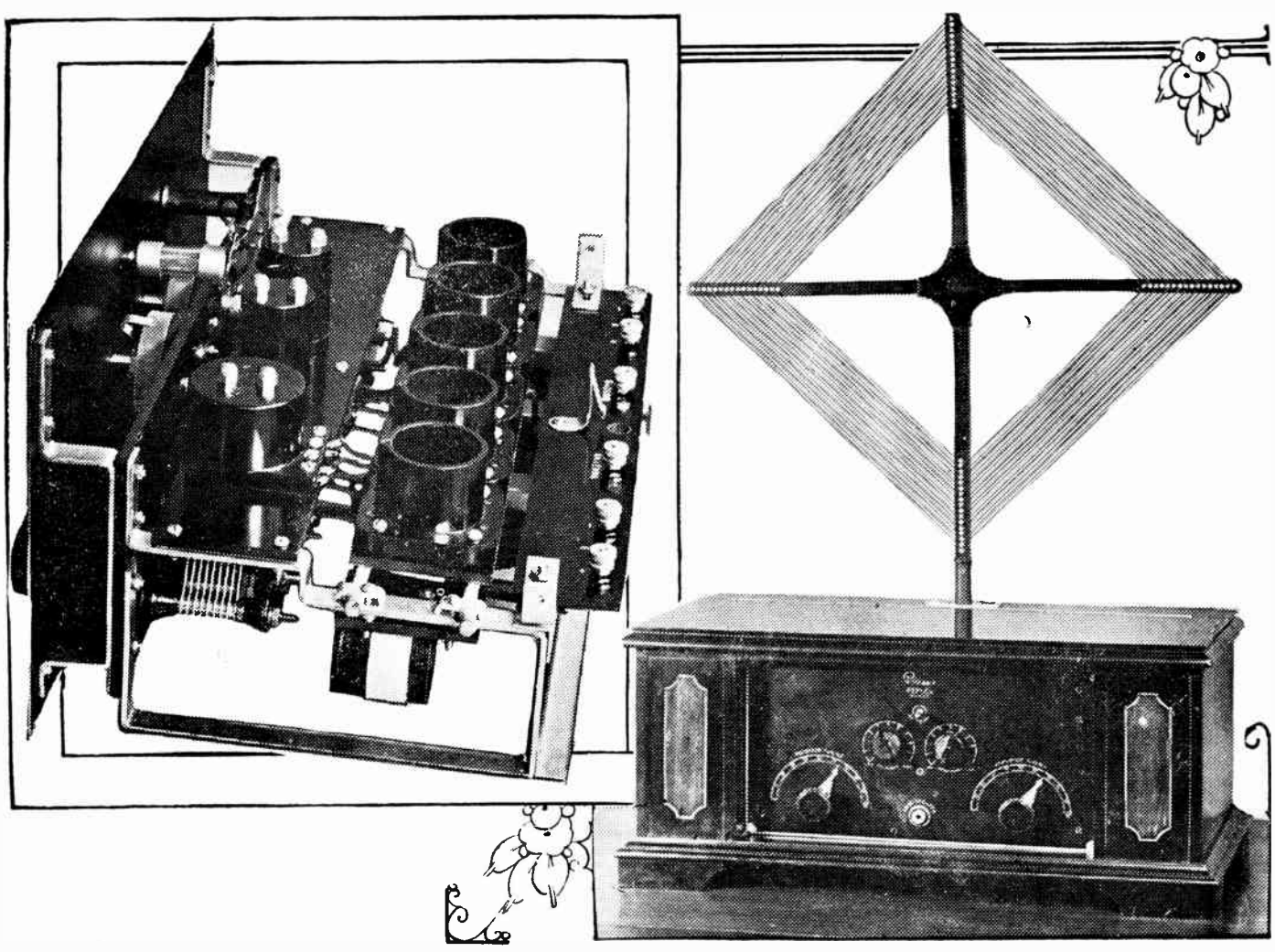
The loop antenna is wound on a molded bakelite frame. The contacting plug at the base of the loop and the socket into which it fits are both worthy of note. Every effort has been made to reduce the shunt capacity at each point. The two brush springs of the system are separated by the space of about an inch and the tip of the plug is similarly separated from the sleeve. The plug, too, is not of the usual telephone construction. The ordinary plug has an outside diameter of one-quarter inch. On this special plug the tip alone is somewhat over this value and the sleeve is about three-quarters of an inch in diameter. Further, the round portion of the shaft extends up through the cover of the set, and advantage is taken of the additional support afforded at this point by making the hole small enough to hold the loop firmly in position and yet large enough to let it rotate freely.

The loop circuit is loaded somewhat by a small inductance within the set. The splitting of the inductance serves to increase the circuit selectivity.

In order to permit the operation of the set with antenna where desired, antenna and ground terminals are provided. A small condenser is incorporated in the set, in series with the antenna terminal, to render the tuning of the set practically independent of the antenna constants. Also, a larger condenser is interposed in the lead to the ground terminal, so that the set is operated with some form of "A" or "B" battery from the power line; a ground in the supply base system will not cause a short circuit through the set and damage it or the tubes.

In addition, a metallic sheet is interposed between the shelf carrying the radio-frequency transformers and the condensers which are below it to eliminate any cross couplings.

The cabinet contains the set and has room in addition for four 22.5 volt "B" batteries. The set is mounted far enough back in the cabinet to leave a



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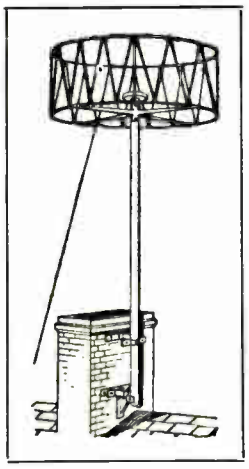

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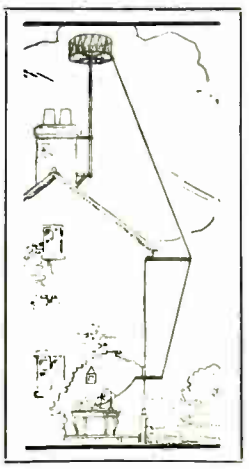

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The New Improvements

The New Slow-Motion Control

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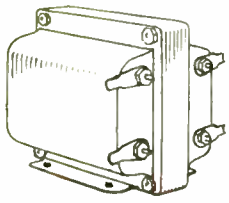
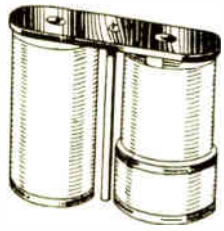


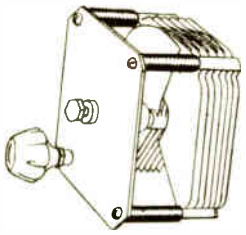
The New Transformer

Distortionless—gets rid of "muddy," "cloudy" tone.



The New Duoformers

Equalize amplification over all wave-lengths—giving tone free from "howls" and "squeals."



The New Low-Loss Condenser

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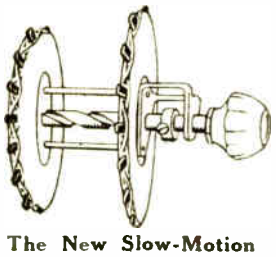

The New Slow-Motion Varind

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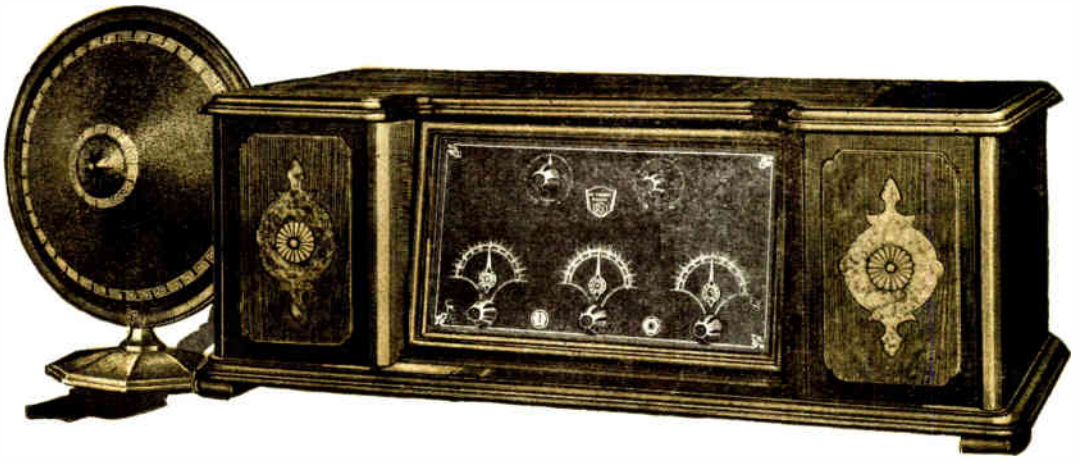
The NEW



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R-5A The same special type of five-tubed R.F. circuit as in the R-5 is here embodied in an elegant cabinet, fashioned in selected walnut with superb craftsmanship. A special type of loudspeaker unit is built in. Price, including five Westinghouse, Radiotrons (dry cell or storage battery type). "Musicone" Headset, Phone Plug and Grid Leak **$275.00**

R-5B Same circuit as the R-5. An elegant period design console with loud speaker. Fashioned in selected walnut. Price, complete with five Westinghouse Radiotrons, "Musicone" Headset, Phone Plug and Grid Leak **$395.00**

THE DE FOREST MODEL R5 depicted above is a five-tube receiver utilizing a special type of tuned radio-frequency amplification—a circuit with unique tone-recreating qualities.

Gone are all the "squeaks," "howls" and "hisses." It instantly gives the studio programme, clean and clear, with life-like realism. Gone is the uncertainty and guesswork—you can "log" this set with precision, getting a station at a fixed point on the scale every time.

Gone is the untidy mess of wires and exposed batteries, the ugly black panel, the mechanical look. Instead—a compact unit, batteries all enclosed in a beautiful cabinet fashioned in two-tone mahogany by Canada's finest furniture craftsmen. A dull satin-black panel from which the indicating marks gleam like burnished gold.

The price $175 (complete with five Westinghouse Radiotrons, "Musicone" Headset, Phone Plug and Grid Leak)—like every model in the New "R" series—establishes a standard of dollar-for-dollar value never before available in Canada.

De Forest & Crosley sets are sold only by selected dealers—merchants who have the experience, training, service facilities and responsibility which, in our judgment, are necessary in order to ensure you full satisfaction out of your investment in radio.

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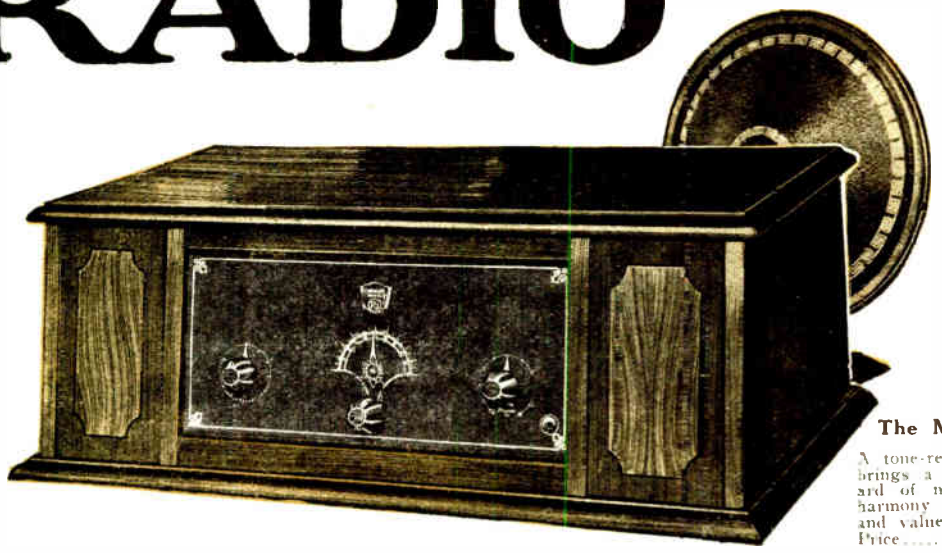

The Musicone
A tone-recreator that brings a new standard of mellow tone, harmony of design and value. Price..... **$22.00**

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MODEL R-3 is typical of the New Radio—the new vision in radio developed by three great research laboratories behind which are the outstanding names in radio. Comparison, test and examination only enhance the perfection, the superiority, the extraordinary value attained by De Forest & Crosley engineers.

This three-tube receiver employs a coupled circuit tuner, regenerative detection and two stages of audio-frequency amplification.

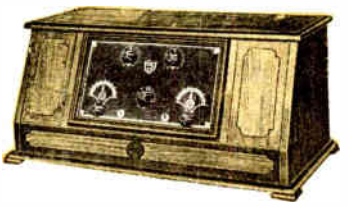
Note the many new features that give this set greater precision in tuning, greater command of programmes and better tone.

Then remember it is enclosed in a beautiful, two-tone, mahogany cabinet, built by Canada's finest furniture craftsmen. Etched metal panels. Gleaming gold indicating marks. Distinctive controls. No exposed tubes. No exposed batteries. Complete, neat, attractive.

In the R-3, at $84, you get the supreme value in Canadian Radio—a set expressly designed for Canadian conditions. ***Aerial Equipment and Batteries the only extras required.***

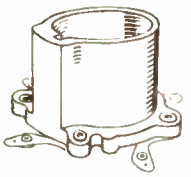
All De Forest & Crosley prices include Westinghouse Radiotrons, "Musicone" headset, Phone Plug and Grid Leak. Authorized Dealers will gladly demonstrate and arrange convenient time payments.

R-2 A two-tube receiver utilizing a coupled circuit tuner, regenerative detection and one stage of A.F. Amplification. Mahogany cabinet. Price, including two Radiotron tubes, "Musicone" Headset and Grid Leak **$55.00**



R-4 A four-tube receiver utilizing the new Super-Trirdyn circuit. Rich two-tone Adam Brown Mahogany Cabinet, with art satin finish. Price, complete with four Radiotron tubes, "Musicone" Headset, Phone Plug and Grid Leak **$135.00**

The New Refinements



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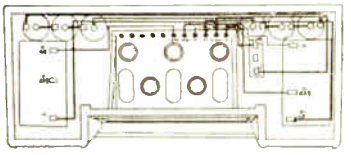
Vari-colored silk-covered wires. Each lead has special lug and aluminum indicating tag.



Accommodation for Heavy Duty Batteries
No exposed mess of wires and ugly batteries.

Etched Metal Panels
Dull satin-black background. Indicating marks in raised etching gleam like burnished gold.

Cabinets by McLagan
Mahogany and walnut in rich two-tone effects, designed and fashioned by Canada's finest furniture craftsmen.

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Musicone headsets and loud-speakers expressly designed to match.

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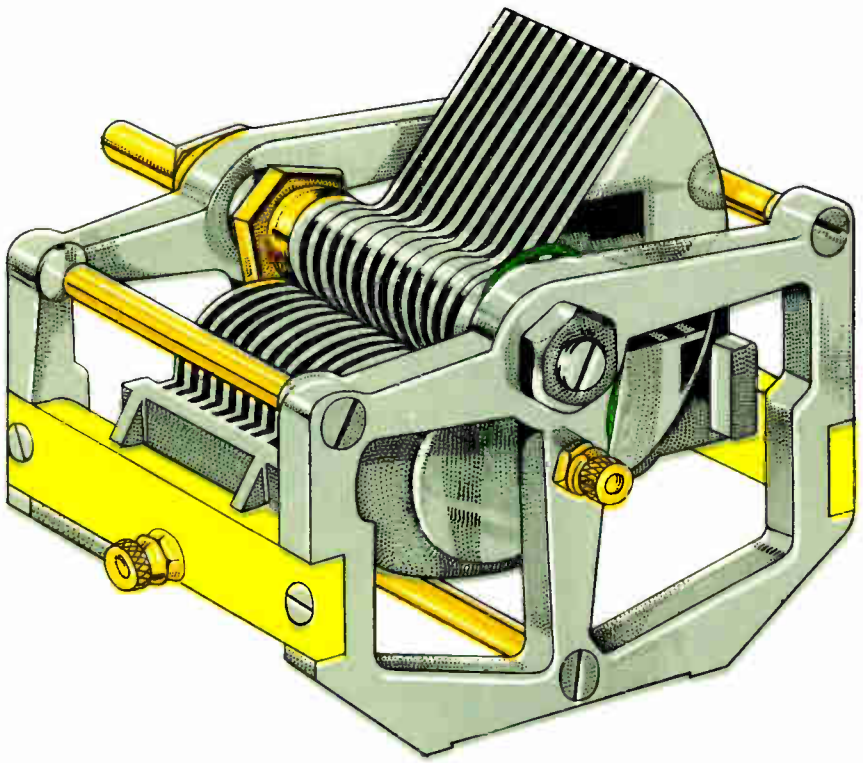

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FISHER KITS SUPPLIED AS FOLLOWS:—

No. 1. 3 Air core transformers only.
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recess in front of the panel. This recess is deep enough to prevent the knobs from projecting beyond the front of the panel, adding materially to the good appearance of the entire apparatus and affording a mechanical protection for the knobs. The cabinet is finished in appropriate tones to harmonize with both the gold and black of the panel and the black and gold of the loop.

Fans who consider building this receiver should follow general directions given in the description of the manufactured sets. Some of the specifications of this set are rather hard for the novice to follow, and for that reason a compromise has to be made in several cases.

For example, while the metal panel is very desirable a composition insulated panel will serve the purpose satisfactorily. This eliminates the necessity of having an insulated extension to the condenser shafts. Also the construction of the loop antenna may be simplified. This aerial need not be mounted on the top of the set as shown in the photogarph, but may be placed in any convenient place in close proximity to the receiver. Two wires may be used to make connections between the loop and the receiver instead of the plug already mentioned.

In the diagram T1, 2, 3, 4 and 5 are standard UV201A or C301A tubes, and R2, 3 and 4 are standard untuned frequency transformers. R1 is a tuned radio-frequency transformer such as a neutroformer. A1 and 2 are audio-frequency transformers having a ratio of between 3½ to 1 and 5 to 1. A3 is another audio transformer with a ratio between 2 to 1 and 3½ to 1. C1 and 2 are both 17-plate variable air condensers of standard design. C3 is a fixed series antenna condenser with a capacity of .00025 mfd. C4 is a fixed ground condenser having a capacity of .002 mfd. C5, 6, 8, 9 are audio-frequency by-pass condensers having a capacity of .002 mfd. C7 is a fixed condenser shunted across the secondary of the audio transformers and has a capacity of .00025 mfd. D1 and 2 are crystal detectors, one of which is fixed and the other adjustable.

P is a standard 400-ohm potentiometer and F a standard 6-ohm rheostat.

The coil L2 may or may not be used. If sufficient turns are used on the loop aerial this coil is unnecessary. However, if it is found that the higher wave lengths cannot be reached the coil may be inserted in the circuit. In case the coil is used it should be approximately thirty turns of No. 22 double cotton covered wire on a tube two inches in diameter.

L1 in the diagram is the loop antenna. This may be constructed in many different ways. However, it is suggested that a diamond-shaped loop similar to the one shown in the photogarph be used. This may be made from cross pieces of thoroughly dried wood. It should be about one meter square and should have approximately fourteen turns of No. 18 double cotton covered wire for the winding. A box-shaped loop may also be used if it is desired. This type of loop is not suggested, however, as its directional characteristics are more pronounced. This in turn makes the tuning more difficult.

A loop antenna is normally used with this receiver. However, if exceptionally great volume or extreme distance reception is desired an outside antenna and ground may be used. The outside antenna may be connected in one of two ways. First, it may be connected to antenna and ground binding post shown in the diagram, and if this method is used the loop aerial is left in the circuit and used as a tuning inductance. Another method of connecting the outside aerial is to disconnect the loop aerial and connect the secondary winding of the vario-coupler in its stead. The primary of the vario-coupler is then connected to the aerial and ground. This method affords greater selectivity while the volume and sensitivity are practically as great.

When building this receiver the parts may be arranged as shown in the accompanying photograph. However, if this arrangement is not used care should be taken to see that the plate wires and grid wires are as short as possible and separated from all other wiring. The wires in the battery circuits may be run parallel to each other, but should be as short as posisble. In all cases an effort should be made to avoid inductive loops in the wiring. Body capacity effects may also be materially reduced by connecting the rotor plates of the two variable condensers to the low potentiometer or battery side of the circuit.

The accompanying photograph shows how the parts may be arranged on the panel. The dial at the extreme left controls the 17-plate variable condenser which is connected in shunt with the loop aerial. The dial on the right controls the condenser used to tune the first radio-frequency transformer. The small dial on the lft is the filament rheostat and the small dial directly to the right of this is the potentiometer adjuster. In the center and near the top is the rod which controls the adjustment of the crystal detector and in the center near the bottom is the telephone jack.

The other photograph shows how the apparatus is arranged in the rear. It will be noted that the five vacuum tube sockets are mounted in a row and directly in front of three of these sockets are the corresponding radio-frequency transformers. The two audio-frequency transformers are mounted underneath the sub-panel. This arrangement makes possible the shortest possible wiring in the radio-frequency circuits.

Tuning the Receiver

The tuning of this receiver is very simple. The vacuum tubes are first lighted to normal brilliancy by aid of the filament rheostat and the receiver is then brought to a point of maximum sensitivity by turning the potentiometer control to the point just before the tubes spill over. The two variable condenser dials are then rotated simultaneously until the station is heard. If the music is distorted the potentiometer adjustments may then be retarded. Also when the loop aerial is used greater signal strength will sometimes be obtained by rotating the loop.

BRITISH ENGINEERING STANDARDS ASSOCIATION

In accordance with a scheme to widen the scope and influence of the work of the British Engineering Standards Association, the Main Committee of the organization has decided to enlarge the membership so as to enlist the active support of all the great industries of the country.

The new membership is to include professional engineers, industrial firms and business men, who are invited to become members of the B.E.S.A. at a minimum annaul subscription of two guineas. The Prime Minister has addressed a letter to the Chairman, Sir Archibald Denny, Bart., expressing the hope that the Association will be successful in this effort, which he feels sure will contribute materially to maintaining and improving the efficiency of our national industries.

AUSTRALIAN SHEEP FARMERS AND WIRELESS

A unique wireless service to be established shortly for the benefit of Australian farmers has been described by Mr. E. T. Fisk, Chairman of the Amalgamated Wireless (Australasia), Ltd., in an interview with The Morning Post. The projected service will establish wireless communication between the remotest sheep stations and the nearest telegraph stations. These will be linked to the Central Wireless Station, which will be in direct touch with the outside world.

Mr. Fisk, in company with Mr. G. Mason Allard, Chairman of the Amalgamated Wireless (Australasia)), Ltd., is at present on a visit to England for the purpose of completing arrangements for "beam" wireless communication between England and Australia.

POPULAR BROADCASTING STATIONS

WLW, CINCINNATI, OHIO

The present super-power broadcasting equipment used by WLW in Cincinnati is the fifth broadcasting station owned by Powel Crosley, jr., president of the Crosley Radio Corporation. Each of these stations has been a great improvement over the preceding one. Still, their owner is looking forward to the time when the present 5-kilowatt station will be inadequate to take care of the advances in the science of radio communication.

The first station was in Crosley's home and had a power output of 20 watts. The next one had 100 watts; then, two stations succeeding them had 500 watts, and the present super-power station near Harrison, Ohio, has a power output of 5,000 watts.

WLW was the first super-power station authorized by the Department of Commerce to utilize its full strength. While the results of its use during the summer months have shown a great improvement in reception by radio listeners, greater power is needed to override completely the static level.

It is also claimed that the station was the first remotely controlled super-power transmitter. Its owner was a member of the Hoover Radio Conference and an advocate of having high-power station located outside of thickly populated cities, so as to cut interference to owners of receivers to a minimum, when full power is used.

Telephone lines connect the station, about twenty-five miles from the studios, with the amplifying panel and control room, in the main building, 3401 Colerain Avenue, Cincinnati. Lines also connect the churches, hotels and auditoriums from which remote programs are picked up. National events are brought to WLW through the system of telephone lines from any point.

A new departure in design of broadcasting studios is found in the ones in WLW. There is a large ensemble studio and a smaller one for solo work. These studios adjoin each other, with swinging doors between them. They are handsomely furnished and are treated especially to have the best accoustical effects. The ceiling is composed of padding, over which has been stretched an especially-treated cloth, while the walls are covered with drapes of heavy monks' cloth, so as to omit any reverbration. There is no echo in the studios.

In a handsomely appointed auditorium adjoining the two studios, ample room has been provided for over 100 guests. Heavy plate glass partitions separate the auditorium from the studios, and visitors may see the artists broadcasting and hear them by means of two Musicones placed upon brackets on the wall. In this way, it is possible to enjoy the work of the artists and yet not interfere with them while broadcasting before the microphone.

It is no longer necessary to ask the radio audience to "wait a minute" while the studio director arranges the studio for the artist who is to follow the one just heard. The engineers of the station have developed a new type of stand for use in connection with the microphones which signals the artists when to "prepare" and when to "broadcast." For example: An artist is in the solo studio and the sign in the microphone stand is illuminated to show "broadcast," while in the adjoining studio the sign shows "prepare," and there the artists are ready to play when the switch is turned to "broadcast." Not only does this do away with long waits between numbers, but it eliminates any confusion upon the part of the artists who are to broadcast their specialties.

Two Baldwin grand pianos are used in the studios. A Wurlitzer unit organ is installed adjoining the ensemble studio with the console in the studio so that visitors may see the organists. Music stands, chimes in the large clock and the music library give the artists every benefit of playing or singing in the finest studios in America, if not in the world.

Should the occasion require a dance floor, the rugs can be taken up from the floor of the auditorium and ample space is provided for dancing, with music supplied by the orchestra in the adjoining studio. There is a portable stage which is used in the studio for certain types of programs, such as the broadcasting of ballet music while the dancers are performing upon the temporary stage in the studio.

An hour's automobile ride to the WLW super-power station at the top of one of the high hills near Harrison, Ohio, discloses the very newest type of broadcasting station, installed by the Western Electric Company. A view of the surrounding country from this point fills the beholder with the beauty of nature in winter or summer. It is from the antenna, stretched between two 200-foot towers, that the name of "Cincinnati, the Radio Capital of America," is broadcast to the world. A red and a green light shine at night from the top of the tower, one on each tower, to serve as guides to aviators flying during the night.

A beautiful building is beneath the antenna where the broadcasting equipment is installed and where the resident operator lives with his family in an apartment on the second floor.

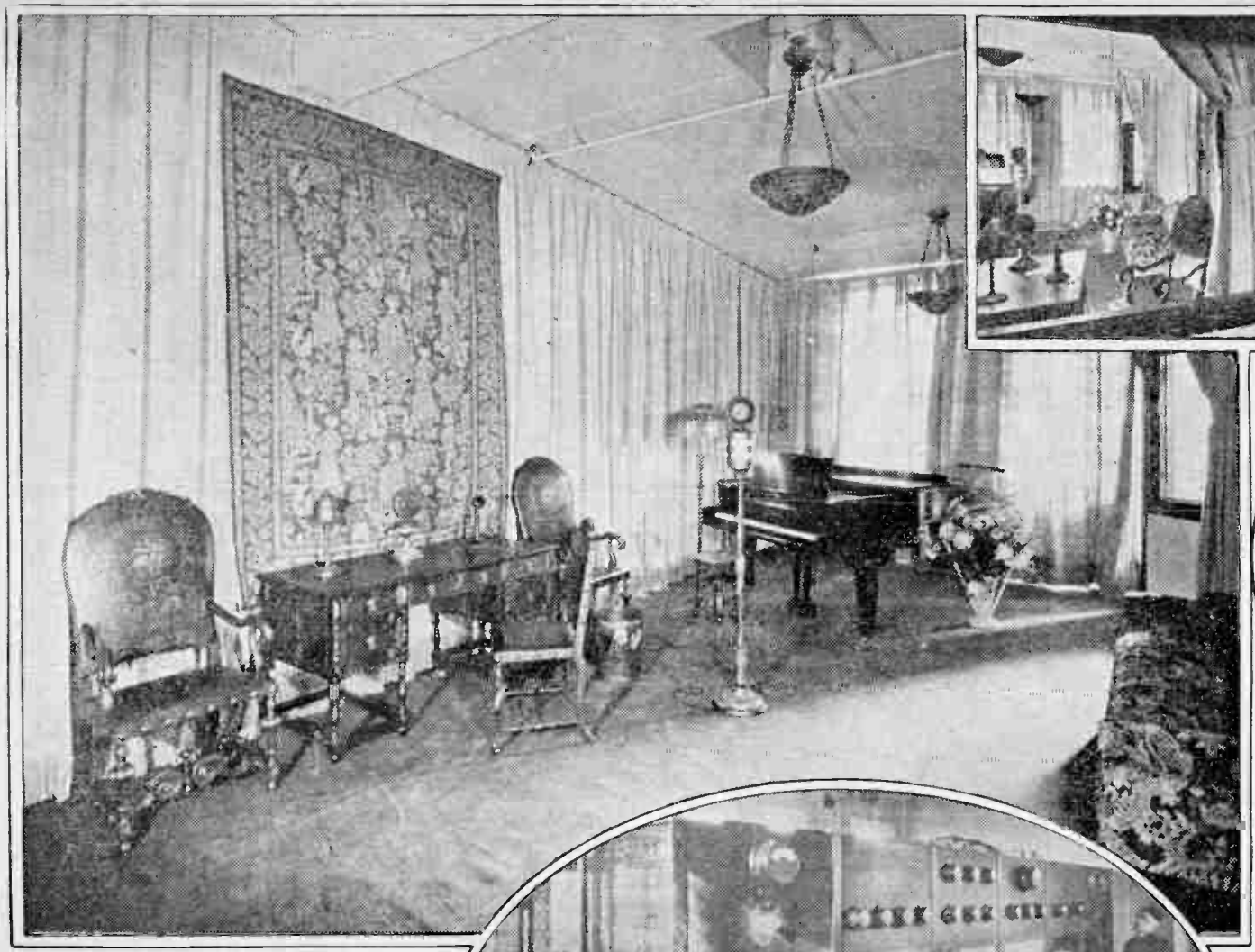
MANY CANADIAN RADIO SHOWS WILL BE HELD THIS YEAR

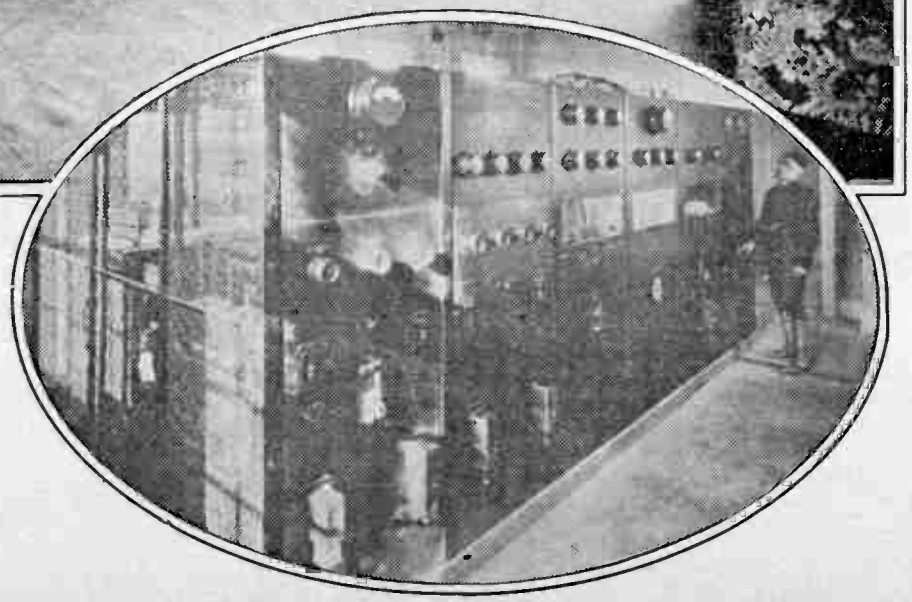
Great is the growth of the radio industry in Canada, and all its branches are anticipating a record business to develop this Autumn, and continue. Evidence of the progress radio is making is found in the fact that four pretentious Canadian Radio Shows are being conducted this Fall, covering the Dominion from coast to coast.

These exhibitions take place at Vancouver, Winnipeg, Montreal and Toronto, in the order named. Leading manufacturers, wholesalers and jobbers have extended generous support to the enterprise of the Canadian Exhibition Association which conducted the successful shows in Montreal and Toronto last year and is staging this year's exhibitions on a considerably larger scale. Hearty co-operation is being given by the broadcasters and in addition to elaborate showing of the wares of all the principal makers of radio equipment, unique an dinstructive programs have been arranged, all along the line.

The Vancouver show, which heralds the commencement of the radio season in Canada, opens at the Hotel Vancouver, Sept. 3rd, continuing for one week. It is designed to serve the whole trade on the Pacific Coast. The Winnipeg show, at the Royal Alexandra Hotel, Sept. 14th to 19th, is to serve the three progressive Prairie Provinces. The Montreal show, at the Windsor Hotel, October 12th to 17th, is to cover the trade in Quebec and the Maritime Provinces. The exhibition at Toronto, in the King Edward Hotel, Nov. 2nd to 7th, is to serve all those interested in the trade in the Province of Ontario.

The enthusiasm manifested over the shows in each district is truly remarkable.





Above: The solo studio of Station WLW.

Right: Front view of the super-power transmitting set.

Above: The glass partition which separates the auditorium from the studio at WLW.

Below: Powel Crosley, Jr., president of the Crosley Radio Corporation and owner of the super-power station.

ACOUSTIC PROPERTIES OF ROOMS

Interesting Facts on the Effects of Echo, Reverberation and Resonance

By Harry A. Gaydon, A.M.I.A.E., A.I.P.I.

In studying the science of sound, no aspect is perhaps more fascinating or interesting than the acoustic properties of rooms. Very small rooms naturally do not lend themselves so readily for experiments in this science, as a variation in the behaviour of sound in any two rooms of about the same size would be in most cases so minute that they would not serve for practical purposes. With rooms of fairly large dimensions, however, it is quite a different matter, and often a very little difference in the construction, size, shape or material will make a considerable difference in the acoustic properties. For the better consideration of this subject, it will be as well, first of all, to get our minds clear on the questions of echo, reverberation and resonance. Let us, therefore, imagine that we are in the exact centre of a perfectly spherical rooms, occupying a point of space only, the surrounding wall completely enclosing us. Fig. 1 may help to give the idea.

Our hypothetical room would have to be constructed of a perfectly smooth, non-resilient material, capable of reflecting every scrap of sound without loss. The wall at any point would, of course, be exactly the same distance from the centre. Now, if a non-directional sound be produced at the centre, it would travel away in all directions and reach every part of the wall simultaneously. As it would strike the surface at every point exactly at right angles, it would be reflected back along the same path by which it came, and would be returned without loss or modification to the centre from whence it originated, all at precisely the same moment. Incidentally, it will be seen that the greatest concentration of sound will be at the centre, and anyone listening here would get the impression of greatest volume. As the sound waves radiate from the centre, so will the power or amplitude of the waves diminish, and if listened to at various points between the centre and the wall, it would be found that the least concentration, or power, or amplitude, or volume, whichever way you prefer to think about it, will be at the surface of the wall.

Echo

Sound travels, as is well known, at approximately 1,100 feet per second in still air at a temperature of, say, 0 deg. Centigrade, or 43 deg. Fahrenheit. Also it is computed that sound persists on the ear for one-tenth of a second after the actual sound vibration has stopped. This would be represented by a distance of one-tenth of 1,100 feet, which equals 110 feet. Therefore, to obtain a true echo, that is, to hear the reflected sound in its entirety after the originating sound is finished, we shall require a space of a certain size. The size will be governed by the length of time occupied to complete the original sound. As an instance, let us take a sound of one second's duration. A single note of a whistle, two or three spoken words, or whatever you wish, then the wall or reflecting surface must be sufficiently far away to take the sound at least half a second, plus one-twentieth of a second, to reach it, when it will take the same time to return, making one second, and a tenth of

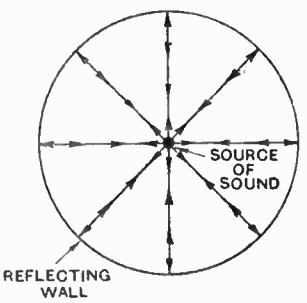


Fig. 1—Representing a spherical room

a second together. The tenth of a second, of course, is to allow for ear persistence. The reflected sound would then be heard at the centre of the room after the originating sound was completed, and a true echo thus produced. The room then would have to have a minimum diameter of 1,210 feet, that is, 1,100 feet plus 110 feet. If a little larger, there would be a lapse of time between the completion of the originating sound and the reception of the reflected sound, the length of which would be in proportion to the extra size.

Supposing now a sound of one second's duration is produced in a room 550 feet across, the wall would be in this case 275 feet away. The reflected sound will commence to arrive back in half a second; in fact, before the originating sound of one second is finished. The result of this would be that the reflected sound would, as it were, mix with the originating sound for part of the time and the effect of a true echo not be produced. For the sake of simplicity, we will, for the time being, ignore the question of ear persistence. Anyone listening in the centre of the sphere, taking a simple sound, as, for example, a single note of a whistle, would at first hear the originating sound at its natural volume for half a second. The returning sound will now commence to arrive and add its volume to the original for another half a second and the intensity of the sound will be doubled. The originating sound now ceases, but the reflected sound will continue for another half a second at the original intensity. The observer will thus hear half a second of natural intensity, half a second of double intenstiy, and another half a second natural intensity again. The effect produced during the second half a second is known as reverberation. Due to this phenomenon, the true sound is often greatly modified, its length of time extended, and the volume varied.

Reverberation

Now if the sound is prolonged, it will be seen how, under certain conditions, it can be greatly amplified without undue modification. This may be looked upon as a form of resonance, although resonators as employed in some musical instruments are quite small affairs, and their length has a direct relationship to the wavelength of the particular note that is being reinforced. This, however, is another matter. With a simple sound, as before mentioned, this may or may not, according to circumstances, be an advantage, but when we come to complex sounds, such as the spoken word, it will be realized that the modification will have the effect rather of mixing up the words and making them unintelligible. Let us take two simple words—NOW and THEN—and let us suppose that each takes half a second to pronounce. We first utter the word NOW. This travels towards the wall and returns just in time to mix itself up with the word THEN. We are looking at the problem in its simplest possible aspect. We are imagining, in fact, that the sound travels once only straight to the walls and back to the centre and then stops entirely, but were it possible to conduct the experiment above propounded, it would probably be found that the sound would continue for an indefinite period of time, thus adding further confusion. From the foregoing, we shall now see that it is reverberation that we have principally to deal with when considering this question of room acoustics, for

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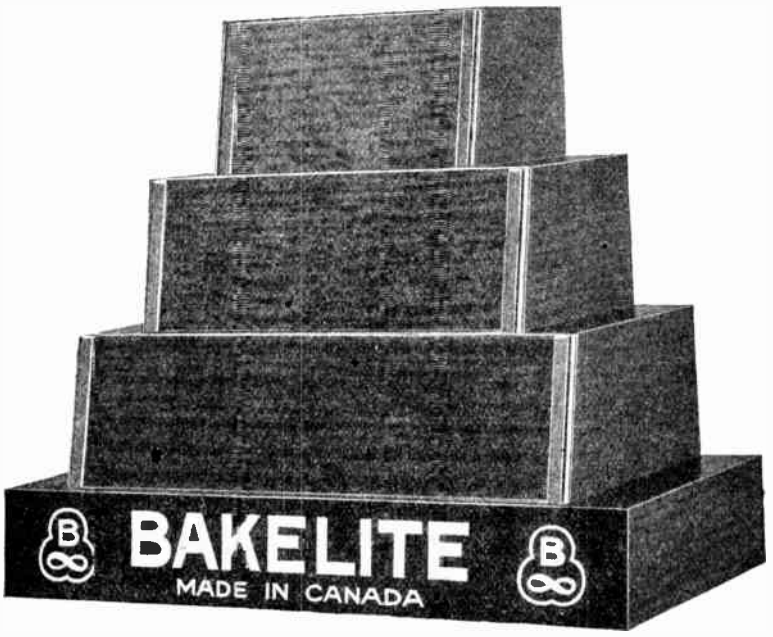
Where Quality Counts

This Cabinet is on the Counter



The Genuine **BAKELITE** Radio Panels are sold only in the golden-rod and black packages, as shown above.

NOW, when you are building your new set, you will have no difficulty in getting the one panel which will be a fit basis for your work.

If, when you enter a dealer's store, you see the cabinet illustrated above, you will know at once you can buy with confidence.

In this cabinet are genuine MADE-IN-CANADA **BAKELITE** panels, and the prices are as low as charged for **BAKELITE** Radio Panels in the United States.

In front of the cabinet is a **BAKELITE** RADIO PANEL of each of the three beautiful finishes.

It is very easy to inspect these finishes before making your choice between mahogany, walnut or polished black.

You are assured of satisfaction when you buy your **BAKELITE** RADIO PANEL at this counter cabinet.

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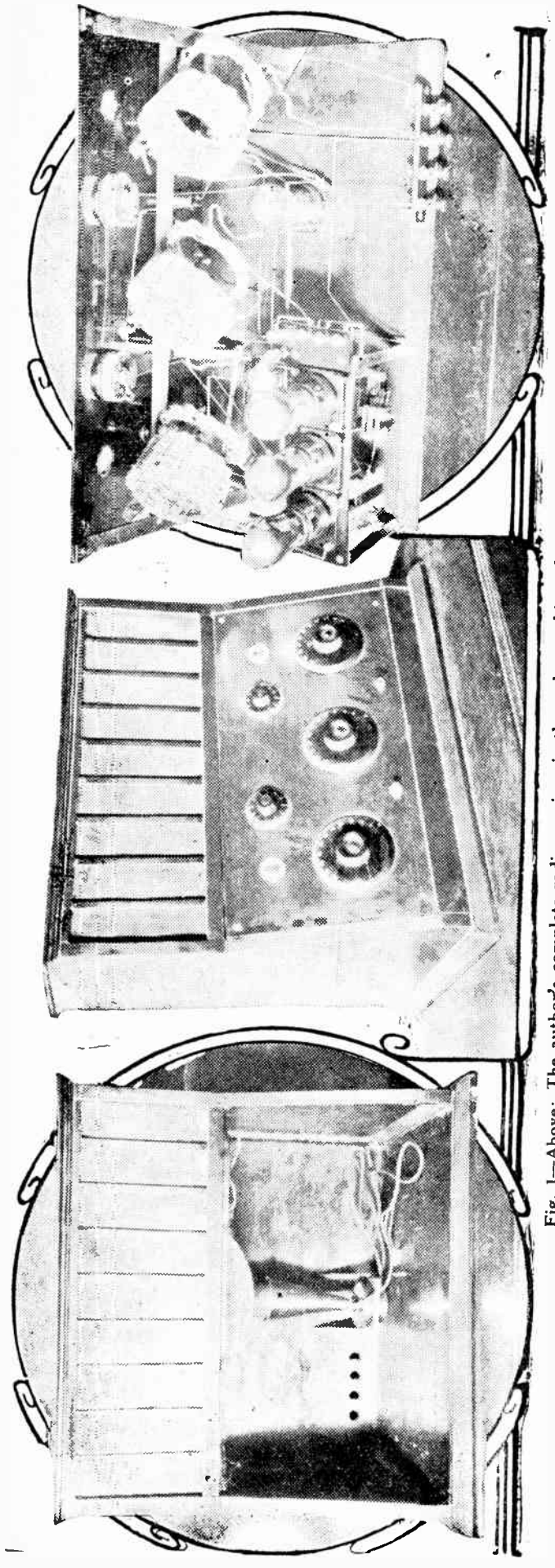

Fig. 1—Above: The author's complete radio receiver in the walnut cabinet described herein. Fig. 2—Left: The method of mounting the loud speaker. Fig. 3—Right: Back view showing apparatus.

CONSTRUCTIONAL DATA ON A HOME BUILT CABINET RADIO RECEIVER

A Novice-Constructed Set That May Take Its Place Beside the Living Room Furniture

By H. A. Fischer

How often has the radio novice declared that he would conceal from view his unsightly loud speaker or horn? I am afraid the answer to this is "many, many times." To have a well finished receiving set in one's living room and to have a separate horn is not much in the line of beauty. Of course, in some cases a phonograph attachment is used and the horn is eliminated. This latter method is about the most economical for the man who buys his set already made and works out very satisfactorily.

Now that set building for the everyday man has been reduced to a practical basis it is possible, with few tools and the radio parts available on the market, to construct a self-contained outfit that will harmonize with the furnishings of the home and be an added beauty.

The receiver about to be described is a five-tube neutrodyne making use of several novel features. The cabinet is entirely homemade, and the parts of the set proper are home assembled. Also, the coils are homemade and are of the basket-weave type of the low-loss inductance.

Panel Scheme

The first thing which was done was to select a panel of convenient size. A 10 x 20-inch mahoganite panel was selected, and the general mahogany finish scheme was carried throughout. Mahoganite dials with gold letters were used, and the cabinet was finished in mahogany.

Most descriptions of radio sets describe the receiver first and cabinet last, but in this case the cabinet will be described first, as it is the belief of the writer that this constitutes the most unique part of the outfit. While efficiency of the set is of prime importance, great stress is placed on appearance in this case.

The reader is referred to the completed view in Fig. 1. All sides and top were made from three-ply veneer. The bottom was made of a 1-inch thick board and the strip along the bottom of the panel was made also the same thickness. Looking at the cabinet from the front it would appear that the sides of it were constructed from 7/8-inch stock, but this is an optical illusion. The veneered wood of which the sides were made is only 3/8-inch thick. Strips of black walnut 7/8-inch wide were glued to the edges of the sides, giving the finished cabinet a much heavier appearance.

The top was made of this 3/8-inch veneer underneath the edge of which small molding was glued. This also gives the top a much heavier appearance.

The base, although 1-inch thick straight through, is not all black walnut. Only the part which shows is walnut, the concealed part being of a softer, lighter wood. Strips of walnut were glued about the edge of the soft wood base to give a better finished appearance.

The vertical strips in front of the horn opening are also of walnut. Thus it will be seen that the entire front of the cabinet, except the top and its molding, is of walnut.

A glass bezel was placed on each side of the panel through which light from the bulbs may be seen. With this feature it is possible to see that the bulbs are not left burning when

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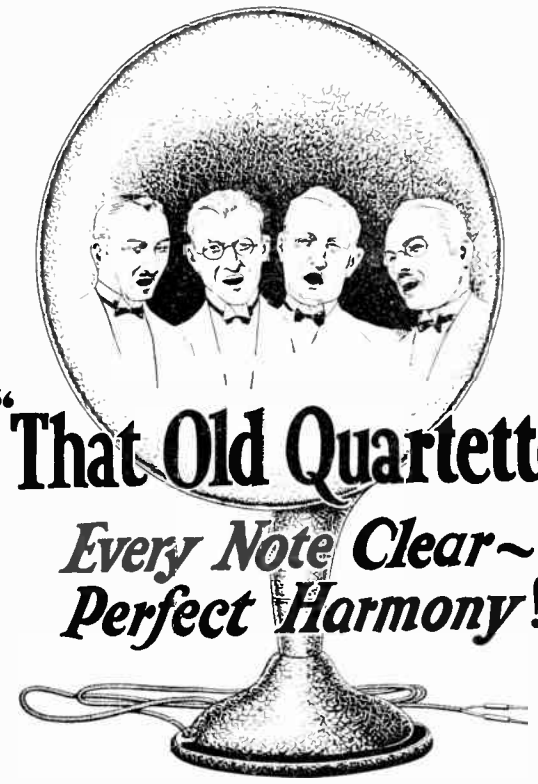

"That Old Quartette"

Every Note Clear~ Perfect Harmony!

Brings the artists into your very room, so realistic is its reproduction.

Piano music, the most difficult to reproduce, sounds so natural that you are carried away by its beauty.

Vocal selections retain all of the colorings of the artist.

Orchestra music is a treat, every instrument can be heard, clear and full.

Magnetic diaphragm control—used exclusively in the Kellogg unit—is the new principle that performs these wonders in radio reception.

No excess vibrations, no chattering, every tone true.

The Kellogg Unit is available for use with a phonograph, and will reproduce voice or music with a full, sweet, clear tone.

A popular Instrument—the Kellogg Symphony Reproducer—is a revelation in Tone—Volume—Clarity.

At your dealers—Hear one to-day.

With Every Kellogg Product, Use -- Is the Test

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Toronto, Ontario

ACOUSTIC PROPERTIES OF ROOMS

(Continued from page 36)

true direct echoes of the sound of one second's duration or over could only occur in buildings of very large dimensions, and then only under very special circumstances.

If the originating sound was less than one second's duration, then the building could be proportionately less in size, but owing to ear persistence, this cannot be reduced beyond certain limits.

Under certain circumstances, indirect echoes might be obtained in a much smaller chamber than that required for a direct echo and yet produce a similar effect, for instance, by the sound being reflected back and forth from wall to wall and eventually returning to the observer by divers routes, but it will be found on examination that the length of path travelled will equal that of a direct echo.

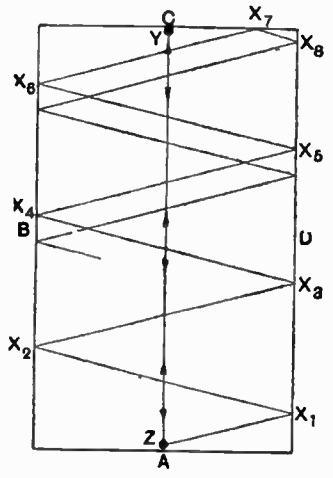


Fig. 2—A rectangular room with smooth walls, A, B, C and D, and source of sound, Z.

Now up to this point we are taking only the simple aspect in order to get a clearer understanding, and have not, therefore, limited ourselves entirely to practical considerations. In practice, however, rooms exist having an almost infinite variety of shapes and sizes quite apart from the material of which they are built, and it will be seen that the reflection of sound causing reverberation begins to become very complex.

Example of Room with Smooth Walls

Fig. 2 is a representation of a large rectangular room bounded by smooth walls—A, B, C and D—there being no obstructions whatever. Let a source of sound be at Z. This will then travel towards walls B, C and D, the sound being close to A cannot travel in this direction. Immediately in front of Z the sound will strike wall C at point Y and be returned along the same path, thus obeying the law known as "Angle of Incidence," which simply is that at whatever angle sound strikes a flat surface, so it will leave, but in the opposite direction. For the benefit of those who are not familiar with this law, Fig. 3 will make matters clear. A is a flat surface. If a sound is projected towards A from point D, which is exactly at right angles to surface A, then it will strike the surface and be reflected back along the same path. If at B_1 it will strike surface A at a certain angle and be reflected to B_2, at exactly the same angle in relation to the surface. The same will happen with C_1.

Owing to the nature of sound vibrations, sound tends to disperse in all directions, although its greatest intensity will travel, for a considerable distance at any rate, in the direction of its propagation. In the case of a speaker, either of the human or mechanical variety, standing at Z and directly facing Y, the greatest intensity would, of course, reach Y and be reflected back, as before explained, but all the sound does not reach this point. Some of it will strike wall D at a lesser intensity at, say, point X_1, and will be reflected to X_2, and so on to X_8, and continue until it dies away, or is, in other words, absorbed or destroyed. Also it will strike wall B at this and other angles and in addition, above and below the level of the speaker, and a little thought will soon convince what an infinite number of paths the originating sound will travel in a room of this shape. It will be seen now that this study is beginning to become complicated, and when one takes into further consideration the floor, the roof, and the fact that sound will travel backwards and forwards in some cases many times before finally dying away, the matter becomes still more involved. Added to this, many rooms, and especially halls, have supporting pillars, recesses, projections, and so on, all of which have their influence. It is not at all an easy matter, as will be seen, to design a room and know definitely before it is built what its acoustic properties will be when completed, but all the same some conclusion can be arrived at by very careful study.

Best Position for Speaker

Take, again, Fig. 2. It will now be obvious that the position of the speaker will also have its influence, and in many places will make a very great difference in the resulting effect, for to vary this position means creating new conditions.

Whilst on this point, it may be well to mention that there is a best position for a loud-speaker, gramophone, or come to that, a singer or instrumentalist, in every room, and often a little experimenting in this direction will repay the time and trouble expended.

In an oval building, such as, for example, the Royal Albert Hall, London, in which the writer has conducted many experiments—and most interesting and instructive they were—the results obtained could well be accounted for by the above explanation.

On the behaviour of curved surfaces, one way to study these is to consider it as being composed of an infinite number of flat surfaces. The angle of reflection can then be worked out quite easily.

It is generally acknowledged that a certain amount of reverberation improves the tone of some instruments, or combination of instruments, such as a piano, organ, orchestra, etc., but the conditions that would suit these would not necessarily improve speech; in fact, in most instances, it would prove detrimental. Most are familiar with the excellent tone of a good piano in a fairly large empty room, and how this tone becomes deadened on the introduction of furniture, carpets, curtains, etc., or in the case of halls, how different one's voice sounds before to what it does after the arrival of the audience. All of these

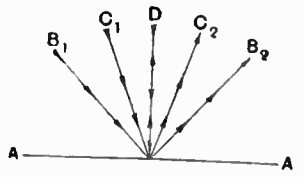


Fig. 3—Explaining the "Angle of Incidence" law.

have the property of absorbing sound, and thus reducing or entirely preventing reverberation, and it follows that a few heavy curtains placed correctly in some rooms or halls that are so bad for speech that words cannot be distinguished will often effectively remedy matters.

Under certain conditions, too complicated to be gone into here, sound can be made to destroy itself, and it is not impossible to design into a room having properties of this nature and so prevent undue reverberation. As in the case of light, a perfectly smooth reflecting surface will not scatter the sound waves, but an uneven surface will do so. With light, everyone knows that a perfect surface will reflect the rays without distortion; thus we have a mirror where it is possible to reflect an object almost to perfection. This is because the lines of light are not deflected. Take, now, the same mirror and cause its surface to be frosted, or in other words, roughened, no image will be visible. The surface now possesses a very large number of different angles, and the light is thereby scattered. Light waves are exceedingly minute, so much so in fact, that they are affected in this way, even by the very

slight roughness caused by the processes of frosting, but in the case of sound, a frosted surface would not perceptibly affect it. This is owing to the comparatively exceedingly long waves that comprise sound, and to scatter it in a similar way the surface would have to be very rough indeed. Nevertheless, it is a condition that is sometimes met with, and, in the writer's opinion, does not always receive the amount of consideration it should do. Temperature and air currents also have their influence, as well as the material of which it is built. Some materials absorb or destroy sound more readily than others; thus it comes about that the results in two rooms of identically the same size and shape will produce widely different results.—Courtesy, "Wireless World," England.

SPECIAL RADIO CONCERTS IN WINNIPEG PUBLIC PARKS

Another one of CKY's dreams has come true. A year or more ago the Winnipeg station suggested to the radio trade that it would be an excellent idea if arrangements could be made with the City Parks Board whereby loud speaker sets could be placed in the parks and special concerts broadcast by CKY for the entertainment of visitors to the parks, particularly at that time when these visitors are feeling tired after their day's outing and the kiddies are wondering what to do next. Following the organization of Associated Radio in Manitoba, which includes representatives of the broadcasting station, the radio trade and the listening public, it has been easy to obtain the co-operation of the Winnipeg Parks Board, and now it is announced that radio sets will be installed in the three principal parks. The first program so received was broadcast from CKY on Sunday evening, June 21, and included service from Broadway Baptist Church, followed by a splendid instrumental and vocal concert from the Canadian Pacific Railway's Royal Alexandra Hotel.

AMERICAN RADIO DEFICIT

The first deficit in its history has been reported by the Radio Corporation of America, the last quarter's earnings showing a net loss of $391,000, compared with a net profit of almost $2,000,000 in the March quarter.

The chief cause of the decline is stated to be the price cutting of rival companies, the Radio Corporation having refused to lower its prices. Seasonal conditions are also regarded as partly responsible for the unfavorable results.

WEATHER BROADCASTS FOR SHIPS

At the expense of fitting a small broadcast receiver, any vessel in the vicinty of the British Isles may now obtain weather forecasts for the succeeding 12 hours as a result of a new arrangement made by the Board of Trade. Provision has been made for broadcasting certain portions of the weather Shipping Bulletin by coastal stations and by the B.B.C. The Daventry Station broadcasts the Meteorological Office forecasts at 9.30 a.m. (G.M.T.), and the stations at Liverpool, Bournemouth and Newcastle transmit local forecasts between 9.20 and 9.35 p.m.

JAZZ MUSIC FROM CHINA

A new manifestation of the "yellow peril" is observable in the recently published programme of the Shanghai broadcasting station, which includes two hours of jazz band music each day. The station transmits daily, except Sunday, on a wavelength of 350 metres, opening at 9.45 a.m. (local time), and closing at 11 p.m.

At Tintsin, the Japanese firm of Giussho & Co. transmit daily gramophone selections on 350 metres between 7 and 9 p.m. It may be pointed out that time on the East Coast of China is 8 hours fast of Greenwich.

CONSTRUCTIONAL DATA ON A HOME BUILT CABINET RADIO RECEIVER

(Continued from page 38)

one is finished using the set. A switch is provided in the A battery circuit and a phone jack in the detector circuit. These two items will be explained later.

A sub-base was used to mount the instruments on. This base, the panel and the strip at the bottom of the panel are all fastened together and bracketed, so that in case of necessity the entire receiver, exclusive of the horn and batteries may be removed in a compact unit.

Method of Mounting the Horn

The reader is next referred to Fig. 2, where the inside of cabinet and horn mounting are shown. An ordinary composition paper horn was used in conjunction with a standard unit. A wooden bracket was fastened to the back of cabinet. In this bracket or shelf is a hole large enough to take the unit so that the flange on same supports the entire horn.

The four holes to the left accommodate the aerial, ground and A battery binding posts. These four posts, mounted on the sub-base, project through the back of the cabinet so that connection is made from the outside.

The upper part of the cabinet, each side of the horn, is the B battery compartment, a shelf having been placed both sides of horn to support these batteries. This space is large enough to accommodate six large upright 22½-volt B batteries with ease.

The entire upper part of the cabinet is open to the front, only a golden colored havy silk cloth enclosing it. The horn, it will be seen, occupies only a small portion of this opening. Any one who is handy at the construction of horns could make a built-in horn of wood, taking in the entire opening as the mouth of the horn. This, of course, would take up the space now occupied by the B batteries and they would have to be placed outside of the set.

Interior of Receiving Set

The reader is now referred to Fig. 3, which shows the interior of the receiver proper. As stated previously, this is a complete unit which can be removed from the cabinet. This feature is convenient for inspection, changing of tubes and repairing.

The circuit is the regular five-tube neutrodyne, which has been published time and again, consequently it is not given here.

Referring to Fig. 3, the two radio-frequency amplifying tubes are mounted on the baseboard between and below the neutroformers. The detector and two audio-frequency amplifying tubes are mounted on the shelf to the left, the detector being the left hand tube.

Twenty-three plate condensers were used and are mounted directly on the panel. These are hidden from view in the photo by the neutroformers. Seventeen plate condensers would do as well here and still cover the entire broadcast wave-length range on the dial. Better tuning would also result in that the tuning would not be quite as sharp as with the twenty-three plate condensers. This is due to the decreased capacity of the seventeen plate condenser.

The neutroformers are of the low-loss type wound on fourteen pegs of No. 18 double cotton covered wire. The secondary of each neutroformer has sixty turns, while the primaries have ten turns. They were wound on a form three and one-half inches in diameter, made of long wire nails driven into a wooden block. The heads of these nails were cut off so that the coils could be slipped off of the form when completed. Before the coils were removed they were tied securely with string. This gives practically a self-supporting coil.

Method of Mounting Coils

The primary and secondary of each neutroformer were assembled with two flat fiber strips, one inside and one outside of the coils. Small brass machine bolts hold the strips together, and the three units are fastened at the proper angle to a wooden strip which is suspended between the panel brackets. The neutrodons, or balancing condensers, were made of buss-bar with a spaghetti tubing covering, having a short length of brass tubing to slide back and forth for adjustment.

The best position of primary and secondary coupling was determined by experiment, about one inch being right in this case.

The audio-frequency amplifying transformers were mounted hanging down from the under side of the tube shelf.

The four binding posts on the back of baseboard are for the aerial, ground and A battery. These protrude through the four holes in the back of the cabinet, as explained previously.

A push-pull switch is placed in the A battery circuit to cut off the current from all tubes. Thus it is not necessary to turn off the rheostats each time. Once the rheostats are set it is not necessary to adjust them again except to regulate volume.

A filament control jack is placed in the detector circuit for using phones. When the phones are plugged in the two audio-frequency amplifying tubes are put out, thus making this part of the set automatically controlled. The horn is connected to the amplifiers at all times, so that when the phones are removed from the circuit, the horn is on without further adjustment.

The five binding posts on the right hand end of the tube shelf are the horn and B battery connections. Connection to the B batteries in the upper compartment is made by means of flexible cords.

No great distance records have been broken with this outfit, but it should give the results of any five-tube neutrodyne if properly constructed. The successful operation of any radio set is based on the parts and construction. With average care good results should be obtained. Do not buy a part just because it is cheap. Pay a bit more and know that good parts are assured.

Care should be taken not to run grid and plate leads parallel, as this makes the set unstable and difficult to balance out.

Quality of tone was the keynote in the construction of this set, and same has been successfully obtained.

DIRECTIONS FOR BREAKING INTO RADIO

Securing a Wireless Set and Having It Installed and Provided With Accessories is Easy and Inexpensive if the Tricks Suggested in this Article Are Employed

By Marshall D. Beuick

Unlike many dangerous or hazardous hobbies, radio does not require the taking out of an accident insurance policy. It does not require a uniform, like golf or a standard encyclopedia, like cross-eyed puzzles. Feeble-mindedness, however, eliminates any aspirant to radio fannery.

Almost needless to say, if you have a loud speaker in your family, you will find radio a great relief. Perhaps it is your older brother who is contemplating his law course who is the loud speaker in your house. You have heard him explain to the assembled family the different between a tort and a crime until you were about ready to commit one of the latter. With a radio in the house, you can drown brother out and meet his dissertation on proof of intent in the case with "Tell It to the Judge, 'Cause Your Mammy's Heard That Line Before," played by Sam Whiteblack's Orchestra.

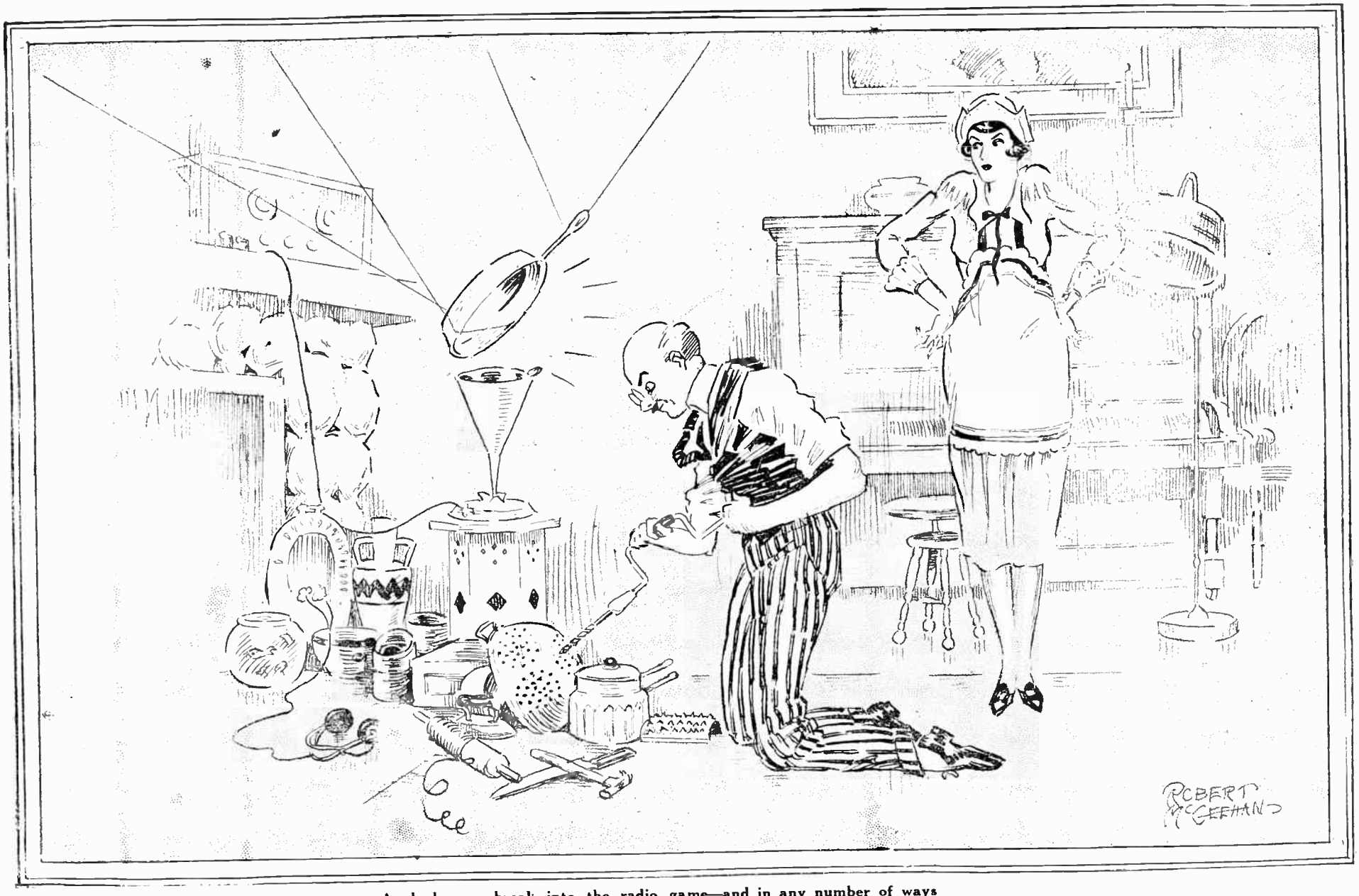
But, how to break in? Don't ask much advice from your radio fan friends. Particularly don't ask what is the best set on the market. That would be a waste of time. Each friend would give you an astoundingly different line and probably all of them would try to sell you their first set cheap.

My advice is to start off with a sound financial scheme in mind. Buy several magazines and at least six newspapers and write to the numerous radio manufacturing companies for literature about their sets, parts, tubes and all sorts of accessories. Then make arrangements with the family for a number of laundry bags.

Within a day or two, several postmen and Canadian mail delivery trucks will appear at your door with second-class mail with nice new stamps on it. Stow these pamphlets away in the laundry bags until Saturday afternoon. Try to take a Saturday off and carefully bale all the radio literature. Later in the afternoon, call a paper and rag man or two and offer your bales of paper to him. Make him weigh it before you and count your bills carefully.

You should now have enough money to buy an excellent loud speaker, a few tubes and a battery. All you need now is a set and an antenna. Go to a newsstand and hunt through the magazines until you come to an article about "how to build a single-control reflex receiver" with twelve hairpins, a buttonhook, a

(Continued on page 48)



Anybody can break into the radio game—and in any number of ways

INTERVIEW WITH MR. G. FRANKEL, PRESIDENT OF THE MOHAWK ELECTRIC CORPORATION

What Class of Dealer Will Ultimately Sell Radio

I have recently completed a tour of the East to observe conditions as the retailer finds the radio business. Through my observations, I have come to the conclusion that the radio business is reaching a higher standard. The dealer has become educated to the idea that radio is nothing more or less than merchandise to be sold on a basis of both quality and performance, and not on a price basis, such as has been the case during the past few years.

In 1921, when a commercialized radio made its first appearance, I recall on a trip to Toronto and Detroit, that practically every class of merchant was selling radio merchandise. These shops included such dealers as butcher shops, barber shops, cigar stores and almost every kind of a store that was as far removed from the radio business as was possible. Naturally a condition of this kind was really harmful to the industry, because the purchaser could not reasonably expect any kind of service with the machine he purchased. Radio parts were bought in a haphazard manner, reliability being placed upon the reputation of the manufacturer. In many cases, of course, this reputation was flimsy indeed, and the articles were of a questionable nature.

At that time, radio was considered more or less a novelty or a plaything. Humor was added to the situation when a person owning a radio set would call in his friends to listen to broadcasting station, and like a spoilt child, the set refused to perform when called upon. In many cases, it was considered as a huge joke, a fly-by-night idea that would gradually peter out. Some of the largest merchants in the country became skeptical and concluded that radio would never be a successful business. It remained necessary, therefore, for the reputable manufacturer, jobber and dealer to outline means and methods for the education of the public at large as to the practicability of a radio set. It was difficult to convince the music merchant, the hardware dealer and in a good many cases the electrical dealer, that radio was a permanent business, something which he could add to his present lines of merchandise and make a profit whenever sold.

There has never been a parallel for this wonderful industry in Canada or the United States, and for that matter, in any country. It sprang up from nowhere a little over four years ago, until to-day it ranks among the first twenty industries of the United States, and the education previously referred to has been one of the real reasons for its attaining this rank.

Years ago, the automobile was considered a luxury, and few people ever considered it otherwise. To-day, the automobile is as much a necessity as it is a plaything. The same might be said of the telephone, of the phonograph and other important inventions which have done wonders toward raising the standard of living, and radio has now reached that plane. Just imagine the wonderful help a radio set is to the farmer, to the shut-ins in hospitals and thousands of other persons who ordinarily are unable to hear or see various events. It has brought the most expensive entertainment within the reach of the poorest individual.

In the beginning, radio was sold particularly to the boy and man, and it remained for the most part in the hands of such merchants as were good mechanics, so to speak. The music dealer and specialty stores of various descriptions exercised a somewhat "hands off" policy because of the inability to reasonably assure customers that the radio set which they could sell would operate and perform satisfactorily. As time went by, however, improvements were made with remarkable rapidity, and the woman in the home finally became interested. As soon as the swing to the women was noticeable, a few manufacturers deemed it necessary to touch this vital spot of the buying public. In addition to a good radio set that would operate satisfactorily, the cabinet would have to be an adornment to the home, something that may be placed in the finest drawing room or finely furnished living room, where the radio set would be in harmony with the rest of the furniture. This trend naturally gave the better and finer merchant an opportunity to really sell radio and not have it bought from him. Few products that are bought ever remain satisfactorily on a large scale. It is a well-known fact among successful merchants that, regardless of how good the product, it must be sold. Man or woman evidently seems to feel that he will enjoy the use of the article more if a sales person will sell it to him than if he merely goes into the store, picks it out, and walks away. I say this is the case with the average individual, exceptions, of course, holding good in this case. But as a whole, the successful merchant sells his goods and in this way creates a good will that is a boost for his business.

It was just about a year ago that this change seemed to take place. Last season hundreds of leading department stores, fine music dealers, the better hardware dealers, and even in some cases the finer automobile dealers all assumed the task of selling radio. This proved beyond any doubt that the retail organizations realized that radio was here to stay.

Like in every other business, the survival of the fittest will hold good. Within a few years, just how long is hard to say, the time will come when one or two of the above-mentioned classes of dealers will continue to sell radio. It is reasonable to suppose that the progressive electrical dealer will always be one of the outlets, and, of course, the exclusive radio store another. Of the remaining classes mentioned, that is, the class of dealers who realize that radio is something to sell and not a thing to be bought, they will reap the profits of this fast-growing industry. Large furniture stores have also reached the conclusion that radio sets can be sold at a profit to the seller.

It remains up to these individual classes to give the consumer what he wants, and experience has taught the radio industry that the consumer wants not only a fine radio set that will give good reception, but one that will also add a touch of beauty to the home.

ESKIMO JAZZ

The following radiogram was received at the Zenith Arctic experimental station 9XN located at Arlington Heights, Chicago, and dated at Etah, Greenland, 2.00 a.m., August 16th.

"We will broadcast on 40 meters Wednesday night 10 to 12 eastern standard time, August 19th. Tu-nu-ka-ping-wa, the best hunter and the oldest kiloute player in the Arctic and his gang, not Roxie and his gang, including In-you-gee-moo, who was with Peary; Kau-Gah and his tribe, who are the cliff dwellers of the Arctic; Au-kon-o-tes-wa, the oldest Eskimo in the tribe; Koo-e-teg-eto, son of Ootah, who went with Peary to the Pole, and Tow-Ching-Wa, son of Kau-Gah, accompanied by other Eskimo men of the tribe who are not principals, will furnish the music and songs. We may have others, as the natives in small villages for many miles around are coming in with their dog sleds since seeing our planes making their test flights and remembering MacMillan's promise last year that he would be back in Greenland "when the sun comes up again." Each day the population is increasing as the tribes come into Etah, which was composed of only three families when we first arrived. They are coming in to see the men who pass through the air like falcons—and faster.

"They bring their musical instruments with them, of which the kiloute seems the most unique and interesting. The kiloute resembles a tennis racket with the skin of the walrus stretched across the frame, drum fashion and bound together with sinews. It produces a weird trumming sound when beat with a walrus rib. The players roll their eyes and sway their bodies with rythmic unison as all face each other in a circle. It takes them all of five minutes to get warmed up and started for each number and the starting process is not unlike static to our ears. But you dare not laugh or they will stop instantly and beat it. You can laugh when the song is finished but not before, and they seem to take that as a form of applause rather than our being amused by the humorous reaction we get. The harder we laugh the more satisfied they seem to be with their ability as singers and musicians. Their songs and their music they take very seriously, while all else in their lives is nothing but happiness and laughter. These most primitive people in all the world who live in holes in the ground and who, as I have said before and cannot help repeating again, are the most obliging and open-hearted people I have ever met in all my life. Your audience back in civilization misses half the entertainment ye get here by being deprived of seeing them perform, because they act their songs as much as they sing them. If your listeners can imagine when listening to next Wednesday night's program, act one will be dressed in seal skin robes, polar bear pants and seal skin or blue fox 'netcha.' Their songs will be 'The Song of the Polar Bear,' 'The Song of the Fox' and 'The Song of the Conboa,' which all sound alike to us, but I can see that each weird composition has a serious individual meaning to them. I am bringing a kiloute back with me for our new WJAZ studio. The sun was shining brightly as we broadcasted our last Wednesday program during your midnight hour.—(Signed) Commander McDonald."

MERCURY SET GETS REMARKABLE RESULTS

The engineering department of the H. M. Kipp Co. Ltd., 447 Yonge Street, Toronto, have informed us that they have achieved some remarkable results with their new model Mercury receiver.

They sent one of these sets to Northern Ontario to conduct tests, about 160 miles from Toronto. Quite amazing results were obtained. San Antonia, a distance of 1,400 miles, was brought in so distinctly on a loop aerial that summer visitors in camp over one mile away heard the program.

The new Mercury Super-Ten seems to be giving very excellent results, rating even considerably higher than last season.

DIRECTIONS FOR BREAKING INTO RADIO

(Continued from page 44)

lady's metal hat frame and a used ice cream carton. Look carefully at the name of the magazine and make up your mind to avoid it thereafter.

After going through a number of these magazines, you will know which are the six greatest receivers ever designed. Instead, call up the radio editor of your newspaper. Don't write him a letter, but it you should, be sure not to enclose return postage. Newspapers are rich.

The radio editor will not be very busy. He will probably be lolling back in a Morris chair smoking an East Indian hooka and listening to children's hour from station BABY. He will be very happy to hear your cheery voice over the wire, saying:

"Good morning! I want to build a radio set."

The editor will sound surprised. If he asks what you want to do that for, or if he says "so do I," don't let that rattle you. Persist by asking what he considers the best and most reasonable set you can make. If he happens to be doing a cross-word puzzle at the time, he may reply:

"Oh, let me see! In three letters, you say. Well, that must be TRF, the abbreviation for tuned radio frequency."

You will know then that you have been tuned in. Now clinch this opportunity with the remark:

"I am one of the readers of your radio section."

He'll be surprised again at this remark and will probably say:

"No! Well, I am certainly glad to hear the voice of the man I've been editing this section for. Won't you send in one of your pictures showing you seated before a radio set while reading our Evening Moon Radio Section?"

If you are wise, you will run off to the offices of a newly formed radio manufacturing company and tell the advertising manager that you want to have your picture taken with one of his sets as a publicity stunt and that you expect to receive the set as your publicity fee. In a day or so, you will have a set all your own, and the money you got from the bales of radio literature will be enough to buy all the accessories.

In the next week, the two or three hundred radio companies that will start business will keep after you, offering sets for allowing yourself to be photographed before one of their latest models of a heat-the-soup-and-dine.

Now you must put up an antenna. You cannot waste your time being photographed, for you must break into radio.

Look up your friends who have sets. Pick out the one who says he knows the most about radio and who is chock full of advice. Select one of those "I'll-show-you - just - how-to - do - it" fellows. Lead him gently to your roof by a piece of No. 14 stranded copper wire and request him to show you how to put up an antenna.

If he is the kind of man I think he is, he'll put up an antenna for you just to show you how it is done. Thank him for his advice and tell him you will put up an antenna, now that he has explained it so thoroughly, but meantime you want to know how to attach a lead to the thing to let the programs slide down to your set. He'll show you this, too.

After your batteries are all hooked up and you are all set (your friend will show you how it is done), tune in a station. Don't give up hope when you hear a voice saying:

"I always peel my potatoes with a piece of sandpaper attached to the dumbwaiter rope, so that the raising and lowering of the dumbwaiter peels the potatoes entirely clean. Now rinse your potatoes in rose water, to which you have added one-half teaspoonful of lemon oil to give the potatoes an appetizing color."

Tune the household hinter out and pick up another station. Now you'll hear:

"Now, children, all gather around while Aunt Mame tells you the story of the cross-eyed goose who married the weazel wuff. Once upon a time, there was a pretty little cross-eyed goose who lived beside a mud puddle far, far away, where the lavender fairy sits in the green woods smoking her clay pipe"——

That is a Canadianization program for future young Canadians who will guide the destinies of our nation. Some of them will be geese of the species known as lame ducks. Don't bother with that program. You are not intelligent enough and too old to benefit by it.

Tune in around 350 metres and listen. In a moment, you will hear:

"It is every woman's duty to learn how to please her husband. One of the first rules of etiquette in matrimony is that the fork should be used only for banging on the table to attract a husband's attention. Every man has what is known as a mother complex. This is a psychological factor that every wife should deal with in a motherly fashion. It is important for a woman to be a good cook to hold her husband, but it is even more important that she be a psychologist. Don't marry until you have taken a course in psychology. Many a woman finds that she has really something to keep her busy when she studies the complexes of the human race. When you buy a new hat, don't send the bill directly to your husband. First sit on his knee and then after smoothing his brow a few times, begin by saying"——

Of course, you know all about that, so tune farther. Suddenly you will hear a burst of melody. An orchestra is on the air. Sit tight. The gas bill has just arrived. It is $3 more than last month. What do you care, for Miss Pinkus is singing:

"For mamma goes where papa goes or papa don't go out at all."

Your wife asks for an excuse to make to the Jones, so you won't have to visit them to-night. Simple solution—tell her you're dated up for a concert.

AMATEUR WIRELESS IN EARTHQUAKE

The recent disastrous earthquake at Santa Barbara, California, called forth the pertinacity and resource of two wireless amateurs, Messrs. Brandon Wentworth and Graham George, by whose united efforts the stricken city was first put in touch with the outside world.

Although both their stations were smashed in the general upheaval, Wentworth and George were undeterred. Without delay, they made for the local wireless store, and within an hour of the first shock, they had assembled a three-inch spark coil, a rotary gap, a twelve-volt battery, and a transmitting key. An undamaged superheterodyne receiver from the store stock was commandeered, and the pair then sent out the S.O.S. In a few minutes, replies were received from two ships, which were able to summon naval aid.

Let the Audio-Tone tell its own Story

~ *ask your Dealer for a Demonstration*

THIS set must not be classed with the ordinary factory-built receiver, the quality of its parts and the care that goes into its building stamps it as the ultimate in radio.

The Audio-Tone Super-Five embodies two stages of NON-OSCILLATING TUNED RADIO FREQUENCY and two stages of DISTORTIONLESS audio-frequency amplification. Its remarkable stability is one of its prominent features.

Distant stations may be tuned while locals of two meters' difference in wave length are broadcasting—with no interference whatever. The tone quality is perfect and the squeals and howls are conspicuous by their absence. It will lend distinction to any home—its genuine mahogany cabinet is a thing of beauty. It is guaranteed for one year against defective materials and workmanship.

The Sea-Gull Tube "E"

The Sea-gull Tube "E" is the ideal tube for all types of Receivers, whether used as a detector or amplifier, it gives a volume and clearness that is found in few. Besides these features, it possesses an extraordinary long life.

When you drop into your dealer's store for tubes, don't just say: "I want some tubes, please." Say: "I want some 'Sea-gull Tubes." This precaution will save you considerable trouble and will ensure the best results from your set.

Dealers: ~ Get the details of our dealer franchise at once ~ ~ *it will pay you well*

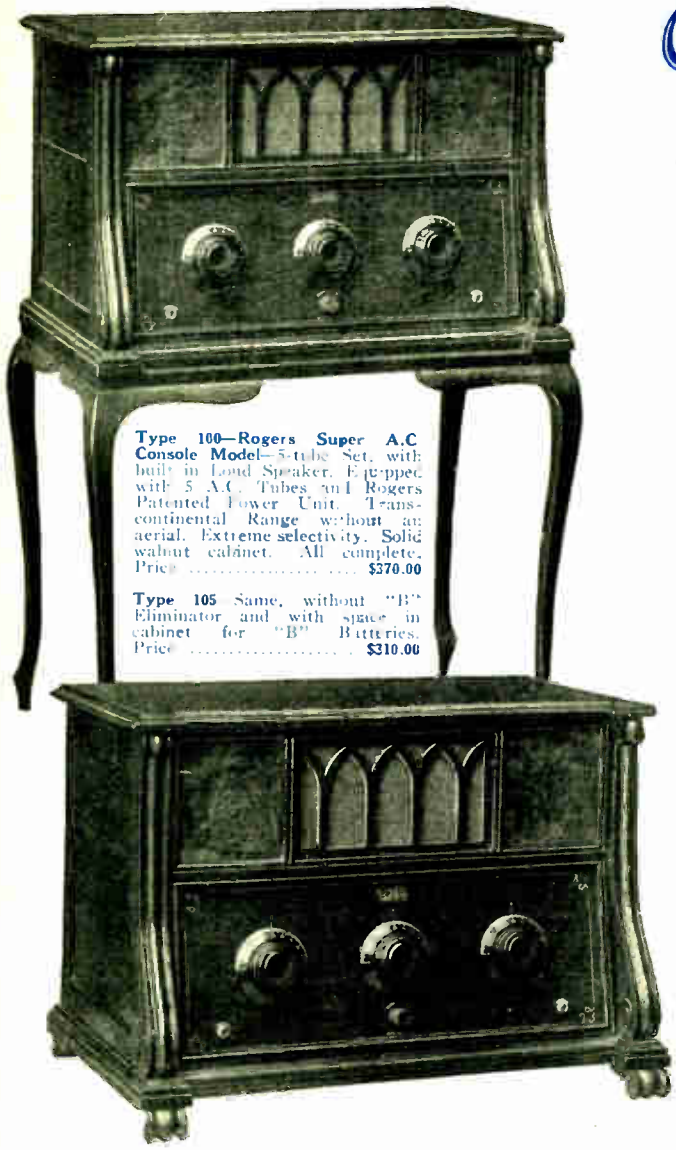
DOMINION RADIO CORPORATION, LIMITED

7237 St. Denis Boulevard ~ MONTREAL, QUE.

THIS IS IT—THE ANNOUNCEMENT THE

ROGERS BATTERYLESS A/C
RADIO RECEIVING SETS

NO "A" or "B"
BATTERIES



Type 100—Rogers Super A.C Console Model—5-tube Set, with built in Loud Speaker. Equipped with 5 A.C. Tubes and Rogers Patented Power Unit. Transcontinental Range without an aerial. Extreme selectivity. Solid walnut cabinet. All complete. Price $370.00

Type 105 Same, without "B" Eliminator and with space in cabinet for "B" Batteries. Price $310.00

Type 110 Same as Type 100, without legs. Price $335.00

Type 115 Same as Type 105, without legs. Price $275.00

Type 120 5 tube A.C. Set, without Loud Speaker. Equipped as Models 100 and 110, with A.C. Tubes and Rogers Power Unit Transcontinental Range on Loud Speaker, without aerial. Extreme Selectivity. Price $260.00

Type 125 Same, without "B" Eliminator and with space for "B" Batteries. Price $200.00

OPERATE
THE ELECTRIC

"Just Plug in—then

Now It's Out!—
A New Era

Imagine it! Radio without batteries or as the switching on of your electric light owner does. Just plugs into his electric the world's best in radio. Clear—full-

PERFORMANCE:

The proof of a Radio Set is in its performance—not in the maker's promises. Exhaustive tests have **proved** Rogers. Here's what the Toronto Star said August 18th:

> The Star was the guest of Mr. Maurice Fiegehen, 37 Grenadier Road, who, with the aid of a new 5-tube tuned radio-frequency receiver, operating off the lamp socket and using no aerial or batteries, was enabled to tune in with over twenty-five stations.

For Homes Possessing No Electric Current

Rogers Radio Receiving Sets are supplied in 3 models of Battery Sets employing the same quality of workmanship and producing maximum results from Batteries.

Write to Us—or

Manufactured under DeForest Canadian Radio
STANDARD RADIO MANUFACTURING
Owners of DeForest

Distributors for
The Q.R.S. Music Co., Canada, Ltd.,
Distributors for
Radio Corporation of Winnipeg, Ltd., Winnipeg, Man., for Manitoba

TRADE HAS BEEN WATCHING FOR!

NO AERIAL

ROGERS BATTERYLESS A/C
RADIO RECEIVING SETS

FROM LIGHT SOCKET

Tune in" is the Slogan

The Set That Marks in Radio

aerial. Radio as smooth and spontaneous —for that is actually what the Rogers light socket and immediately tunes in to toned and dependable.

The Rogers dealer will be the envied dealer.

Every Radio dealer can imagine the effect of this new Radio upon the public, setting as it does an entirely new standard in Radio reception and the public's reception of Radio. The Rogers line will be backed up by most aggressive advertising and dealer helps.

The Rogers dealers will be carefully selected—only one dealer to the average community. A policy of price maintenance will be rigidly adhered to, and a full margin of profit assured.

We are open to receive applications for the Rogers Franchise, and as territories are being rapidly allotted, we advise immediate action.

nearest Distributor

Patents and exclusive A.C. Radio Patents by
CORPORATION, LIMITED, TORONTO
Canadian Radio Patents

Eastern Canada:
Toronto, Ont., for Ontario and Quebec
Western Canada:
Canada West Electric Co., Ltd., Regina, Sask., for Saskatchewan and Alberta

Type 130—3-tube A.C. Set, with Cabinet space for Transformer and "B" Batteries. Complete with A.C. Tubes and Rogers Transformer. Long Distance Loud Speaker Operation. Price **$130.00**

Type 135—3-tube A.C. Set, same as above, in smaller cabinet. Price **$110.00**

Type 20—A wonderful value 2-tube Battery Set. Regenerative Detector and one stage audio frequency. Space in cabinet for Batteries.
Price (stripped) **$38.50**

Type 30—3-tube Battery Set. Regenerative Detector and two stages audio frequency, giving loud speaker volume on long distance stations.
Price (stripped) **$52.50**

Type 30 5-tube Tuned Radio-frequency Circuit of exceptional selectivity. Loud speaker volume across continent. Same cabinet as Type 120, with space for all batteries. Can be used with either storage batteries or dry cells. Price (stripped)...**$130.00**

ALL-AMERICAN BRINGS OUT NEW TUNING UNITS

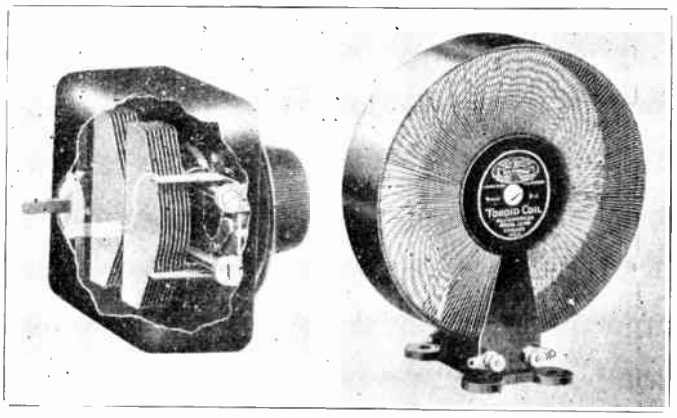
The All-American Radio Corporation of Chicago, widely known for the popular audio-frequency transformers which it has manufactured for years, has just announced new radio frequency coils and variable condensers, which are both of advanced types.

The inductance units are of the toroid or endless-field form, which has been familiar to engineers for several years but which has always been considered a difficult manufacturing proposition.

"In bringing out these toroid coils," says E. N. Rauland, president of the All-American concern, "we believe we are providing what is by far the best and most efficient type of inductance unit, and are producing it by machine methods with the same precision workmanship which has given us our conspicuous success in the transformer field.

"The well-known advantages of the toroid coil are, of course, due chiefly to its magnetic field being circular and endless, so that it is self-contained within the turns of the coil and does not spread itself all over the surrounding space, as the field is sure to do with the ordinary coils. Consequently, the special placing of coils, turning them at particular angles, etc., is entirely unnecessary with the toroid type when properly manufactured. The home set builder can take a set of three All-American toroids and build with them a non-radiating tuned r.f. set without the necessity of laboratory measurements to determine whether inter-stage coupling has been reduced to a practicable figure.

"Moreover, owing to the stronger field which a closer coupling provides, reception of distant stations is very much stronger than with the old types of coils, and at the same time selectivity is much improved."



All-American variable condensers are of the straight-line-frequency type, so that there is no crowding whatever of the short wave stations on the dial. There is a movement of nearly 360 degrees from minimum capacity to maximum, and the minimum capacity is less than one-thirtieth of the maximum, even though these instruments are thoroughly protected from dust by heavy brass shells.

The condenser is furnished in two capacities—350 and 500 micromicrofarads. An important point is the small space required, as compared with the common rotor types—about one-half the panel space, or one-third of the total cubic space is sufficient for the All-American condenser. The insulation is of the highest grade material, making these instruments particularly suitable for reception of the newer short wave stations where the strength of signals is so seriously weakened by any power losses in the tuning instruments.

USE A MERCURY FOR QUALITY, VOLUME AND RANGE

EMPLOYS 10 NORTHERN ELECTRIC PEANUT TUBES IN A NEW WAY

Announcing the New

Mercury Super-Ten

Phenomenal distance on loop aerial—2,500 miles.

Less consumption of electrical current—only ½ amp. per hour from 6v. Storage Battery.

Low up-keep cost—tubes have an exceedingly long life.

Uses Push-Pull type transformers in balanced audio amplifier.

Will work the largest horn to Full Capacity.

Quiet in operation.

★

Realizing that, in spite of the many improvements in radio, the zenith had not yet been reached, our engineering staff have been steadily experimenting to produce a set that would be greatly in advance of anything yet brought on the radio market. This we have achieved with the MERCURY SUPER-TEN. Besides the phenomenal distance it reaches on loop aerial and the clarity and depth with which it delivers the broadcasted music, the MERCURY SUPER-TEN has been so developed that, in spite of its giant power (ten small, but mighty, Northern Electric Peanut Tubes), it uses only ½ amp. from 6v. storage battery; less than 1/3 of that used by a standard 5 tube receiver. One might expect a powerful set such as the MERCURY SUPER-TEN to be of cumbersome design and large size—the MERCURY Panel measures only 6¼" by 18" by 7" in depth—more compact that the average 5 tube receiver. With all these advantages, it is only natural that every week more and more radio fans are turning to the MERCURY SUPER-TEN to bring them the kind of reception that every radio owner desires, and that few obtain.

Selective as a land telephone line.

Compact and beautiful in appearance—measures only 6¼" x 18" x 7".

Simplified so that it may be assembled EASILY in a few hours.

Comes in Complete Kit, with drilled panels, and everything necessary for construction, less Cabinet, Tubes and Batteries.

Simple to Tune.

GIVES DISTANCE DAYLIGHT RECEPTION ON OUTSIDE ANTENNA

PRICES: Complete Kit (less Cabinet and Tubes)	$110.00
Walnut or Mahogany Cabinet, Model D	15.00
De Luxe Solid Walnut or Mahogany, Cabinet, Renaissance Design	30.00
Complete Set, built and tested, with Tubes and Cabinet, Model D	200.00

Write for Proofs of Mercury Performance

DEALERS WANTED!

THE H.M.KIPP CO. LTD
447 YONGE ST.
TORONTO — CANADA

TRADE NOTES - NEW EQUIPMENT

AMPLION MODELS AT THE CANADIAN NATIONAL EXHIBITION

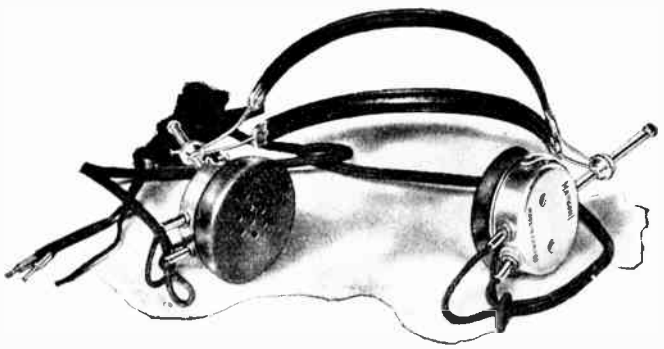
Burndept of Canada Limited, sole Canadian distributors of the Amplion loudspeaker line and Eastern Canadian distributors of the All-American transformers and Balkite power units, will be at the Canadian National Exhibition in the same space occupied last year in the Radio Section in the Industrial Building.

A complete showing of all the most recent Amplion models will be made and there will be a display of certain new All-American units as well as their regular and well-known transformers and equipment. The Fansteel Products Inc., manufacturers of the Balkite power units have recently brought out several new models including a new Trickle charger and low-priced "B" eliminator. Samples of these will be available for showing at the Canadian National Exhibition, although delivery is not expected until late in September.

Information will also be available at the Exhibition concerning the Ekko broadcasting station stamp album, which is expected to be a leading line this year.

Mr. H. B. McKenzie, managing director of Burndept of Canada Limited, and Mr. Elliott Trent, in charge of Burndept sales promotion, will be constantly in attendance and will be glad to give information concerning any of the lines in which they are interested.

FEATURES OF THE MARCONI HEADSET



Incorporates features which our twenty-three years' radio experience has taught us are essential to efficient performance.

Aluminum Earpiece Containers make the phones light in weight and moisture-proof.

Highly sensitive, giving tone-true clarity of sound on either weak or strong signals.

Earpieces of matched capacity, thus delivering exactly the same quality and volume of sound simultaneously to each ear.

Flat wire fabrikoid headband—Cleaner, neater and more comfortable.

Perforated Bakelite Caps—Usually found in the most expensive type of headset.

An exceptionally low price for a phone of this high quality.

Made in Canada.

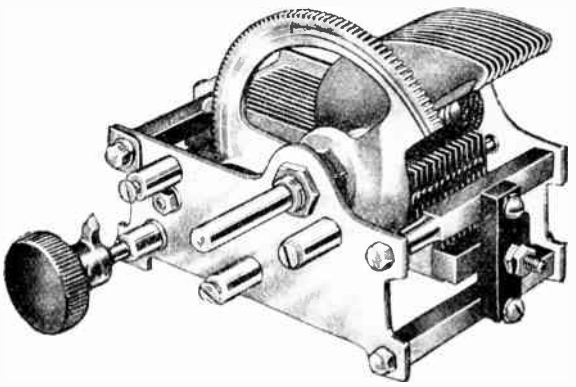
FEATURES OF THE MARCONI STRAIGHT-LINE FREQUENCY VERNIER CONDENSER

Equal Spacing of Stations.—By spacing according to frequencies, and not by capacity or wavelengths, the Marconi straight-line frequency condenser allows of equal spacing of stations on the tuning dial. With this condenser, each division on the dial represents ten kilocycles, which is the separation between stations.

Absolutely Accurate Straight-line Frequency Curve.—The rotor plate tips have not been rounded off as in cheaper condensers and the straight-line frequency curve is absolutely accurate on all wavelengths from 200 to 600 metres.

Measurements show that losses on the Marconi straight-line frequency condenser are about half that of most so-called "low-loss" condensers. Extremely low-losses have been achieved by:

1. Brass condenser plate.
2. Highest-grade hard-rubber dielectric supporting strips.
3. Soldering stator plates to each other at three points and rotor plates to each other at two points.
4. Connecting to rotor by insulated solder pig-tail in place of the usual rubbing contact.



Absolutely rigid assembly of rotor and stator plates is ensured by press fit supporting posts.

Smooth vernier action (Ratio 10 to 1) free from back lash. Vernier and main shafts rotate in the same direction. Vernier gearing is on the inside of the end plates. Separation of 2⅜" between shafts permits of the use of a 4" dial.

Rotor counterbalance weight ensures that the condenser remains set at any desired position without adding to friction in operation.

Extremely accurate construction bearings are designed on correct mechanical lines and have bearing surfaces of dissimilar metals steel on brass. Thrust is taken on a steel ball and bearings may be closely adjusted. Rotation is uniformly free and smooth and will remain so.

Ruggedness.—The condenser is very solidly constructed of the very finest materials. It is so locked and secured that there will be no slip between parts.

Made in Canada.

THE FUTURE OF RADIO, AS OUTLINED IN AN INTERVIEW WITH OSCAR O. KRAUSE

By E. J. Craine

It is a difficult matter to get an interview with Oscar O. Krause, Vice-President, Secretary and General Manager of the Eagle Radio Company; not because Mr. Krause is unapproachable, or one of those executives who is barricaded by a train of lesser importantees, but Mr. Krause has the naive idea that what he has to say is not interesting. I found his views of the greatest interest, and I have a feeling there are many others who will agree with me.

Mr. Krause is wrapped, heart and soul, in radio, and divides this fascinating subject into three queries:

1. What is radio?
2. What will radio be?
3. How can radio be applied to the average citizen?

He answers these questions completely and with authority.

Mr. Krause points out how radio reaches everybody, no matter where, and how a properly built and well-equipped set will bring news, education and happiness to every part of the world. When an airship broke loose, the news was broadcast; when an earthquake shook a mountain, listeners thousands of miles away were informed before the last quiver had died; when the President's loved son was ill, the whole nation listened anxiously for reports of the boy's progress; and when a tornado swept the cities of the South, the North heard of it within a few moments.

Radio is almost like anticipating news, and the fellow who hasn't a radio is a back number, because by the time the daily papers reach him, the news is old, although he can still enjoy reading it in detail and at his leisure.

This age is living so fast, says Mr. Krause, that we should avail ourselves of any important invention or discovery. To the American public especially, radio is so far advanced that there is no comparing it with other developments. Millions of people are rapidly beginning to depend upon radio for stock reports, prices, as well as amusement. Radio has brought the first entertainment to our homes. It is a very inspiring sight to see a whole family gathered around enjoying some beautiful concert or listening to history in the making.

Mr. Krause has a friend who has seven children, and for twenty years, until he had a radio, he did not have the pleasure of having his entire family at home for an evening. Regardless of weather conditions, his children were away from home, and getting acquainted with his boys and girls has been a wonderful adventure.

When asked if radio will last, Mr. Krause said: "Of course." The opinion of many is that radio is so haphazard that it is impossible to determine which equipment is worth while. Radio itself is not to be blamed for this condition. The radio industry has advanced faster in the last two years than the airplane, automobile, telephone, typewriter, washing machines or any other invention. Radio has grown more in three years than the automobile did in ten.

To-day, the little town of Napanoch, Ulster County, New York, or Tombstone, Chochise County, Arizona, has its tiny church or meeting houses for spiritual communion, and ministers do their best to interpret the Bible and deliver sermons that will inspire love and hope. Such churches are, with few exceptions, struggling under mortgages that are never paid up; their pastors are underpaid, overworked and handicapped by limited assistance and opportunities. To those impoverished souls, the radio will

(Continued on page 54)

BROADCASTING TO MacMILLAN IN THE ARCTIC FROM CHICAGO

Every Wednesday at midnight, an unusual radio program has been broadcast from the Chicago Tribune broadcasting station WGN on the Drake Hotel to the MacMillan Arctic Expedition now anchored off Etah, Greenland, within eleven degrees of the North Pole. The programs began on the day that Lt. Com. Donald Baxter MacMillan sailed from Boston—June 17th, Bunker Hill Day—and will be continued until the return of his Arctic Exploring Expedition late in September. Commander MacMillan made special request before sailing for the Arctic that his old friend and college fraternity brother, the Rev. Gardner MacWhorter, of Chicago, should again render the service of weekly communication from home that he gave during the MacMillan Expedition of 1923-24 from the Zenith-Edgewater Beach Station WJAZ.

The new Zenith broadcasting station WJAZ, located at Mount Prospect, Illinois, some 20 odd miles out of Chicago, with the handsome Spanish renaissance studio on the 23rd floor of the new Straus Building, at Michigan and Jackson Boulevards, Chicago, was not completed in time to carry on this unique broadcasting feature, and the Chicago Tribune station was placed at the disposal of the Rev. Gardner MacWhorter during June and July, in order that the weekly midnight programs might be given. At an early date, the new Zenith station WJAZ will be opened and then the familiar call: "This is 9XN calling WNP" will again be heard until the return of the MacMillan Expedition. (9XN is the experimental call letters of Zenith Station WJAZ, and WNP is Wireless North Pole, the Zenith station on board Commander MacMillan's private Arctic schooner "Bowdoin," now on her third expedition into the Arctic.)

The MacMillan programs are sent at midnight, central standard time, and are usually of an hour or an hour and a half duration, consisting of several numbers of music given by friends who have volunteered for this personal service to Commander MacMillan, then a short address by some close friend of Commander MacMillan who has usually come from a distance to speak to the Commander, and the rest of the time is given over to the reading by the Rev. Gardner MacWhorter of personal messages from relatives of the men in the Arctic Expedition's personnel, a comprehensive news digest of the world's events of greatest interest to the explorers, and an occasional humorous incident that may provoke a little laughter in the cabin of the "Bowdoin" or the S.S. "Peary," the sister ship of the "Bowdoin," under the command of Lieut. Com. Eugene F. McDonald, jr., sportsman, Arctic explorer, and president of the Zenith Radio Corporation, Chicago, and also president of the National Association of Broadcasters.

During the past two months, many distinguished guests have taken part in the MacMillan programs from Chicago, including Dean Paul Nixon, of Bowdoin College, Maine, Commander MacMillan's Alma Mater; U. J. Herrmann, proprietor of the Cort Theatre, Chicago, manager of the New York and Chicago "Radio World's Fairs"; Mr. and Mrs. Frederick H. Rawson, of Chicago, parents of Kenneth Rawson, fourteen-year-old cabin boy of the "Bowdoin"; Mr. and Mrs. Elliott Jenkins (Mrs. Jenkins being the former Alexandra Carlisle, who placed Calvin Coolidge in nomination for the Presidency of the United States at the Republican National Convention in Chicago in 1920); S. I. Marks, treasurer of the Zenith Radio Corporation; H. H. Roemer, also of the Zenith Radio Corporation; Jack Gregson, president of the Chicago Bowdoin College Alumni; F. W. Thurnau, J. W. Cook and H. F. Juckett, officers of the Theta Delta Chi fraternity, of which Com. MacMillan is a member.

On one Wednesday at midnight, Commander McDonald's mother and sister came down to the Chicago Tribune broad-

casting station on the Drake Hotel and spoke their greetings and good wishes to him, not unlike the occasion, Christmas Eve, 1923, when Commander MacMillan's sister, Mrs. L. M. Fogg, of Freeport, Maine, and his two nieces, the Misses Lillian and May Fogg, came down to the Zenith-Edgewater Beach Station WJAZ, and sent their greetings and good wishes to him. The most interesting part of the MacMillan programs to the Arctic from Chicago is their delightful informality, and while they are intended solely for the members of the MacMillan Arctic Expedition, many thousands of radio enthusiasts interested in Commander MacMillan and his expedition have listened into these programs and sent word of their appreciation of them.

During the rest of the time that Commander MacMillan is in the Arctic, the MacMillan programs will be given at Zenith Station WJAZ (experimental call letters 9XN) on the 23rd floor of the Straus Building, Chicago, under the direction of the Rev. Gardner MacWhorter. Messages of appreciation have been received from the MacMillan Arctic Expedition asking for more personal news, specific stock quotations and politics, and request numbers from the violin soloist, Miss Catherine Wade-Smith, of Chicago, to play for the members of the Expedition.

RADIO PATENTS ISSUED DURING JULY, 1925

251,391—Thermionic Apparatus—Fernand Holweck—July 7th, 1925.

251,447—Collapsible Radio Loop—Henry A. S. Stahl—July 7th, 1925.

251,654—Signal Receiving Device—Charles V. Logwood—July 14th, 1925.

251,703—Thermionic Tube—F. Trautwein—July 14th, 1925.

251,845—Variable Air Condenser—Allen D. Cardwell—July 21st, 1925.

251,974—Condenser—The Dubilier Condenser and Radio Corporation—Joseph A. Fried—July 21st, 1925.

251,983—Method of and Means for Generating Electric Oscillations—The International Western Electric Company Incorporated—Homer C. Snook and John B. Johnson—July 21st, 1925.

252,151—Electromagnetic Sound Reproducer—The Canadian Brandes, Limited—Cecil E. Brigham—July 28th, 1925.

252,153—Inductance Coil—The Canadian General Electric Company, Limited—Edward M. Hewlett—July 28th, 1925.

252,165—Apparatus for Translating Electrical Energy into Sound Waves—The Canadian Radio Corporation Ltd.—William J. Herdman—July 28th, 1925.

252,186—Wireless Telegraph Receiving Systems—The Marconi Wireless Telegraph Company of Canada, Limited—Henry Joseph Round—July 28th, 1925.

CANDIDATES SUCCESSFUL IN EXAMINATIONS FOR RADIO CERTIFICATE

The Radio Branch of the Department of Marine and Fisheries announce that fifteen (15) candidates were examined during the month of July, 1925, of which the following were successful and obtained Certificate of Proficiency in Radiotelegraphy:

Commercial—1st Class

S. G. Vigars, Port Arthur, Ont.

The following has been further examined and has had his existing Certificate endorsed for additional equipment:

R. J. W. Duchesne, Montreal, Que.

Amateur

J. E. Palmer, Calgary, Alta.; H. B. Snyder, Warner, Alta.; E. M. G. Chisholm, Eburne, B.C.; J. W. Cotter, Ottawa, Ont.; J. A. Thibaudeau, Montreal, Que.

THE FUTURE OF RADIO, AS OUTLINED IN AN INTERVIEW WITH OSCAR O. KRAUSE

(Continued from page 51)

bring men like Dr. S. Parks Cadman, Raymond Fosdick, Dr. Jefferson and Dr. Steinetz. Cardinals and bishops can address the members of the denominations, no matter where they are located. Christmas, Easter and other church holidays can be celebrated the world over from one big church that has a world-famous organ and a choir composed of singers whose voices are perfectly trained. Every denomination will be enlightened and united on different subjects pertaining to their faith. The work that can be done by the churches will be of the greatest benefit to every land and consequently increase church attendance. Dr. Cadman said in one of his talks that radio did more in two years for the spiritual development of man than he had been able to accomplish in thirty years.

Speaking of amusements, moving picture theatres in particular, it will not be long before they will have to use radio in conjunction with moving pictures, and there again, the field is almost limitless. Why shouldn't it be possible for the moving picture stars who are before your vision to say a few words of greeting, or comment, to the audience, giving the performance more human interest. I am surprised that moving picture producers have not made more use of radio. As we visualize radio and moving pictures a few years' hence, the probabilities take one's breath away.

Small theatres in far-away towns can have the benefit of the finest orchestras from metropolitan theatres when plays come to them or they put on amateur shows of their own.

During the war, the need for physical training was brought out very forcibly and now radio is helping the young man to stay young and older men to feel younger. Since physical training was started a year ago by WOR, other stations added this excellent feature. Now the Metropolitan Life Insurance Company has a splendid director who puts us through our paces from one of the top stories of The Tower every morning, and there is nothing like it for driving cobwebs off the brain.

On land, on the sea, and in the air, radio has its place. Long dreary trips can be made to pass happily. A year ago, a receiver was installed on a sightseeing bus and made a host of friends. Any number of people have sets rigged up in their automobiles and get unlimited fun out of long drives, camp trips, and tours. In hospitals, hotels, apartment houses, schools, clubs; everywhere in fact, and it has proved the unlimited value of radio in daily life and business.

Oscar O. Krause

Physicians are making more and more use of radio. A man at sea can be treated by a doctor on land or on another vessel. Hospitals are being equipped with radio that certainly is applicable to the means of cure.

Soon our clock will be regulated by radio, so that accurate time will be kept in the most remote parts of the world. Such a contrivance has already been invented, and I will not be surprised to see it on the market before long.

The one big outstanding factor that will determine the peace of the world will be accomplished by radio, and I will only dwell upon a few ways, as I see it can and will be accomplished.

International conferences, in which every civilized country will participate, can be called on 24 hours' notice, and carried on by the means of radio. Every nation will have its own official broadcasting and receiving station. The conference will be held in a language decided upon—English or French. Any problem that concerns the nations at large can be settled and settled amicably, and far more easily than it can be done by a world court or league of nations. Either one of these two movements could make immediate use of radio to get in closer touch with countries of the world.

With radio to call the nations of the world together, it will be impossible for any over-ambitious ruler or stupid, selfish government to set another great war in motion.

It is my opinion that radio is doing more and can do more for the human race than any agent yet discovered. It is a subject that is so deep and fascinating, so full of possibilities, that one is astounded at its limitless scope, and it is with awe and gratitude that we realize in radio we have found a force that is unquestionably one of God's finest gifts to mankind.

What radio will be depends largely on the radio manufacturer. If he wishes to build honestly, he must never forget the ultimate purchaser. That is what counts. It is difficult for the layman to determine which set to buy. Some must use their pocket books as a barometer to show them the way. Mr. Krause's advice is to listen to a friend's set. If this is satisfactory the problem is solved for the time being. If the set is not the best that is made, the man will later be able to procure better quality, but it is too bad to be deprived of the thousands of beneficial programs put on the air from the better broadcasting stations, because radios of some kind can be procured at a very low price, and the people who believe in waiting until radio is perfect may have to wait until they reach some other plane of existence.

The first automobiles we bought were far from perfect, but we bought them, and it gave us a thrill if the awkward things would go. They looked ungainly and stupid. They had no self-starters, springs or conveniences such as we now expect as a matter of course. The pioneers in the automobile industry ruined their suits and dispositions getting out and under, yet with all these drawbacks, automobiles have always

been a convenience. To-day one gets in a beautiful car equipped with balloon tires, he presses a button and it starts, but even so, the 1926 model automobile is by no means a finished machine, and in 1930 we will look back on our present model as very old-fashioned.

If the DX performer cannot get San Francisco from New York at seven p.m. when all local stations are on the air, he shouldn't feel that he wants to wait until this can be accomplished before he supplies himself with a receiver, because there is a great deal of wonderful music being broadcast, and if you don't buy a receiver until to-morrow, you are missing that which is on the air to-day. High class programs are being broadcasted from Florida to Canada and from the Eastern to the Western coast, and right now international reception is an accepted fact.

In the near future radio will be giving us most gratifying results. As a matter of fact, the development will be astonishing. In the meantime why forego the pleasure of splendid bands, lectures and operas that are being broadcast.

It was my pleasure to hear both President Wilson and President Harding over the radio. The reception was far from perfect, but it was a privilege for which I shall always be grateful. If I had been waiting for a more perfect receiver or microphone I would never have heard the voice of those splendid men. There is nothing to compensate that opportunity. It was the only talk the former President Wilson gave over the radio. Now we can hear President Coolidge's fine messages, and his voice carries from coast to coast and is picked up abroad. It is indeed a privilege to listen to men like that.

If one is of a sporting nature, loving a prize fight, one can actually hear the contact of fist on flesh as the blows are dealt in the ring. Attending an inauguration, a game or a fight, one can hear or see only a part of what is taking place, while with a radio, nothing is missed.

It is surprising how few people realize what can be done with a really good radio, properly equipped, when the tubes, battery, antenna and ground connections are O.K., and the operator possesses an average intelligence. It is most unfair to blame a radio unless one is positive the equipment is right in every detail. In my experience less than 2 per cent. of the receivers calling for service work in our service department were really defective. Inferior tubes, a loose connection, incorrect antenna or worn-out batteries cause 98 per cent. of the troubles.

Radio compares most favorably with every other musical instrument. "To my mind it has no peer," says Mr. Krause.

There is nothing so exasperating as to get a set and have it installed only to find that the installation is poor. If it is not working correctly the first impulse of the new radio owner is to throw the whole thing into the nearest ash can. If a phonograph, telephone, washing machine, sewing machine, or any other machinle gets out of order, a service man is sent for without a second's hesitation. It should be the same with radio.

A little about Mr. Krause himself is that he was born in Norway. His father was an artist and wanted his son to be a landscape painter, but the young man decided that this profession was not sufficiently lucrative. When he was fourteen years old he was thrown on his own resources and when he was nineteen he came to America, landing in Boston with little cash but a great deal of optimism. He adopted the new country, and has visited most of the states.

Mr. Krause says he was forced into radio to his "great disgust." He is president of the Eagle Radio Company, associated with Franklin B. Kellogg, the Three years ago they decided that they would go into the radio business, although neither gentleman expected to take an active personal part in the industry. However, in the natural development of the organization, Mr. Krause, to use his own phraseology, "was capitulated into radio." He soon became fascinated with its marvelous possibilities, and he has dedicated his life to developing the very best that is in radio. The firm built a very good loop receiver. It was so good that one was presented to the Duke of York as a wedding present, and took its place in the home of the young aristocrat.

Mr. Krause analyzed himself with a mathematical nicety. He said that when he was nineteen he was 50 per cent. romantic, 25 per cent. temperament, and 25 per cent. of everything else. His present rating as arranged by himself is 10 per cent. temperament, 10 per cent. romantic, and the other 80 per cent. is practical. I personally do not believe he has lost any of the romance in his nature, but I would not think of disputing with a man who has done so much for the radio industry. However, I did chuck aside all of these figures and set him down as 100 per cent. O.K.

He is tall, has hazel eyes and a very fine, high forehead. He is honest, square, possesses a keen sense of appreciation, humor, a love of the beautiful and a real genius for wanting things made well. He possesses that infinite capacity for taking pains which is an essential part of all men of talent.

Speaking of his early life, Mr. Krause said that in the Scandinavian countries, the winter nights begin to fall shortly after noon, and that he spent those long evenings reading adventurous tales of the old world, and that when he started out he couldn't decide between Italy, France or America as a site for his own great adventure, so he tossed a coin; America won, and when he arrived, he promptly adopted her as his own country.

CANADIAN HYGIENE COUNCIL WILL BROADCAST HEALTH TALKS FROM CKCL

The Canadian Social Hygiene Council is co-operating with CKCL in the provision of a weekly radio talk on Social Hygiene on Tuesday evenings at 7.45 p.m.

Lectures have already been given by Dr. Gordon Bates, Dr. George D. Porter, Professor D. R. Keyes, Professor Peter Sandiford and the Rev. L. Minehan.

THIRD NATIONAL A.R.R.L. CONVENTION, CHICAGO

By James Montagnes, of C-3CK, A.R.R.L.

Monday night and Tuesday morning, August 17th and 18th, saw the various delegates arriving for the Third Biennial National Convention of the American Radio Relay League. Again, as formerly, the convention headquarters was the famous Edgewater Beach Hotel in Chicago. And again as hosts the Chicago Radio Traffic Association outdid themselves to please and welcome each and every visitor.

Contrary to the general impression that a banquet finishes a convention, this convention started its sessions with a banquet. With R. H. G. Matthews, 9ZN, as toastmaster, the evening augured well for the remaining three days of sessions. The officers of the League were present and addressed the delegates on various subjects of interest. Radio Supervisor Beane, supervisor of the 9th U.S.A. radio district, gave a very interesting talk. William R. Dawes, President of the Chicago Association of Commerce, gave a talk on "Opportunity," and Herb Frost, President of the Radio Manufacturers' Association and head of the famous firm bearing his name, spoke on the importance of the amateur to the manufacturing industry. W. M. Bakewell, British 6UZ, gave the members an idea of the difficulties the amateurs of Great Britain have to overcome before being allowed to be transmitting amateurs.

After this banquet, which aroused the enthusiasm of everyone to the uppermost and made everyone feel at home, the convention was prepared to go ahead with the rest of the programme on Wednesday, Thursday and Friday, August 19th, 20th and 21st.

Next morning started with license examinations for all those who wished to participate. Radio Supervisor Beane was ready to put any candidates through their required examination. Following this, all repaired to hear how the League's organ—QST—was made. Mr. Beekley, managing editor, had a very interesting talk arranged on how the magazine is made and how distributed. All new ideas to make QST a better magazine were given freely by the delegates and new departments and new topics can be looked forward to in the official organ of all amateurs the world over.

Tours of the city and its various interesting parts were arranged and partaken of after the "QST" session. A visit to a new super-power broadcasting station, a visit to 9XN, who is keeping such constant touch with the MacMillan Expedition in the Arctic, and a visit to the Rodeo or Wild West Show being held in Grant Park at the time, were some of the drives arranged, as well as a tour of the famous Chicago boulevards.

In the evening, a technical meeting was held, at which Mr. Kruse, of A.R.R.L. headquarters, presided. Professor W. J. Williams, Raenssalear Polytechnic Institute at Troy, N.Y., and director of broadcasting at WHAZ, gave a very detailed explanation of his experiences in studying radio interference. In his talk, he showed how electrical appliances and vehicles and a vast number of other electrical sources caused the great amount of interference that is encountered. His paper was based on probably the most thorough research work done in this line and he has in this work encountered practically every kind of interference. John C. Warner, who is in charge of the small tube department of the General Electric Company Research Laboratories, gave an illustrated talk on the development of the present-day receiving tubes, and showed how the demand for a dry cell tube to operate a loud speaker had been met. He also gave some points on new tubes, which will appear and told of the completion of tube standardization in regard to sockets and bases.

K. E. Hassel, Zenith Radio Laboratories, who started this recent low-loss craze and the development of better tuners on account of elimination of losses, showed the delegates various receiving circuits and gave advice on how to make faulty tuners into good tuners.

A brief discussion was held after each paper and the various individual views of the assembled delegates were thus brought forth.

The morning of the third day was taken up by an important session on traffic. The chairman, Acting Traffic Manager Handy, was introduced by R. H. G. Matthews, 9ZN. Porter Quinby, 9DXY, gave a short talk on the meaning of the Official Relay Station, and the meeting discussed various current traffic problems. At noon, a picture was taken of all those present in front of the Hotel, and this will probably be seen in many a station when the owner gets home.

After luncheon, a meeting on railroad officials' work was held, at which were present many prominent railroad officials and the subject was thoroughly discussed. Railroad emergency work by the amateurs in the past, when land lines were down through storms, has been of great assistance to the railroads and more detailed plans were made for future use. A continuation of the previous night's meeting followed, and all were given a chance to air their views on the various subjects of the night before. W. M. Bakewell, British 6UZ, here gave a talk on radio receiving conditions in England, which proved of great interest to all and was an "eye opener" to many.

The evening saw another technical meeting, mainly on transmission. Dr. A. Hoyt Taylor, in charge of the Bellevue Naval Research Laboratory, gave a great talk on ultra short waves. The crystal controlled transmitters were thoroughly explained and the work done with them at the Naval Laboratory was shown. Mr. W. H. Hoffman, of the Burgess Battery Company, read a paper on "Beam Transmission" and many of the delegates received a clearer idea of this system of transmission from this talk. Mr. Kruse, of Hartford A.R.R.L. headquarters, said his say on five meter equipment and the result should be an overwhelming number of new experimenters on that wave.

Athletic events and radio contests filled the morning of the last day. All sorts of athletic events were partaken of, in which swimming, golfing, tug-of-wars, and races took a prominent part. Prizes for these events were distributed later during the day. At noon, the News Bureau of the A.R.R.L. met to discuss the current topics of this department.

The last technical meeting of the convention took place that afternoon, and it proved to be a very important one. Mr. John H. Miller, of the Jewell Electrical Instrument Company, outlined to the amateurs the contest which his company was offering to them. The idea of this contest is to try to get as many miles per watt as possible out of the transmitter and thus cut down on the number of high-powered sets now in use. He pleaded for the use of better and high efficiency in transmitters and announced that the Jewell Company were offering a 21-jewel watch with hand-engraved case to any member of the American Radio Relay League who attained the most "miles per watt" three times during the year that the contest runs.

More transmitting dope was here discussed and Don C. Wallace, of 9ZT-9XAX, gave an interesting talk on "Power Tube Operation on the 20 and 40-meter Bands."

That evening, a party was held at the Rendezvous Cafe, one of Chicago's most popular cafes. This party took the place of a "Mystery Night" of the previous convention. A theatre party was also arranged for those who wished to go. This ended up the Third National Convention of the A.R.R.L. and as the popular saying goes, "A good time was had by all."

MARCONI LOUDSPEAKER

An unusually attractive and remarkably efficient instrument with a three-way balanced armature and India Mica diaphragm. In addition to the usual factory tests, every Marconi Loudspeaker is given a critical long-distance reception test. You can sell it with the guarantee that it will give satisfaction, just as you do Marconiphone Receivers, which are similarly tested. This is the outstanding loudspeaker of the year.

Write for particulars to Dept. L.

CANADIAN MARCONI COMPANY

TORONTO VANCOUVER MONTREAL HALIFAX ST. JOHNS, NFLD

GREAT WEST ELECTRIC CO., LTD., WINNIPEG
Distributors for Manitoba

INDEPENDENT ELECTRIC CO., LTD., REGINA
Distributors for Saskatchewan

REVILLON WHOLESALE, LIMITED, EDMONTON
Distributors for Alberta

FEATURES OF THE MARCONI IDEAL DISTORTIONLESS TRANSFORMER

Lack of Distortion.—High overtones and low notes, suppressed by the ordinary transformer, are faithfully transmitted, giving a truer, more rounded volume of sound.

Overload Capacity.—By the use of unusually liberal quantities of core iron and copper wire, the Marconi Ideal can handle the heaviest signals without overload and consequent distortion.

Shielding.—The transformer is completely enclosed in a pressed steel case, insuring against objectionable feed-back effects and howling, due to electro-magnetic coupling between condensers in the audio circuit.

Moisture Proof.—Due to impregnation of the windings.

Ratio 4 to 1.—Most successful and efficient ratio devised for audio-frequency amplification.

Low Core Loss.—Ensured by paper insulated stalloy laminations.

Exceptionally Good Insulation has been effected throughout.

Thoroughly tested for:

1. Continuity of windings and number of turns.
2. Ability to handle high overloads.
3. Short circuits or contacts between turns.
4. Insulation resistance between windings and core at high over-voltages.
5. Measured amplification.

Made in Canada.

THE NEW MODEL L-3 ULTRADYNE

By M. L. Muhleman

(See page 15 for illustration)

In looking over the new Ultradyne I was reminded of the progress that has taken place in the automotive field. Cars that were ungainly looking things and in the category of "experiments" have given way to sleek appearing "mile eaters" capable of performing super-tricks and yet as smooth running and as easily handled as the once popular "Electric." Charm and simplicity are the descriptive words.

There has been a parallel progress in the radio field, but the radio public have been more or less dissatisfied with many of the new sets for the reason that the manufacturers have insisted on the continuation of sets with an altogether mechanical appearance.

However, Mr. R. E. Lacault, who designed the new Ultradyne, has passed mechanical appearance on to the ash heap. It is more like a fine piece of furniture than a radio set and from its beauty of type and broad adaptability to "style," one can put it where one pleases without the slightest worry of its clashing with the scheme of a room. That is one reason why I believe the new Ultradyne will appeal to the woman. She does not intend to have the effect of her room spoiled by a set harsh for its "scientific" appearance. She is asking for a radio receiver more on the lines of her phonograph.

The accompanying photograph of the new Ultradyne serves to give you an idea of its combined beauty of design and simplicit yoi make-up. It is knobless and dial-less; the only prominent object is the large circular grill in the centre of the cabinet which conceals the bell of the loud speaker horn. This grilling has a statuary bronze finish and is backed by a meshing of dull gold color. It blends in well with the conservative brown of the five-ply mahogany veneer cabinet. The monotony of the space on either side of the grill is relieved by two tone line cuttings.

If you will look closely at the photograph you will see two small bronze handles situated at the circumference of the grill. These are the station finders. The scalings along which they travel are a part of the grill casting, and though they are easily read when tuning the set, they cannot be seen from a distance.

It is quite a simple matter to select stations; all you have to do is grasp the two handles and move them upwards or downwards until you hear the station you wish. There are no critical adjustments to make, yet the set has an unusual degree of selectivity. Furthermore, the system of selection employed eliminates any chance of "side-band" interference. There is ample scale spacing between stations, that is to say, stations are not "bunched" together on the lower wavelengths as is so often the case.

To the right of the grill and below it is a small knob which controls the volume output of the loud speaker. When turned full to the left the vacuum tubes are turned off.

On the left side of the grill is a small jack where head-phones can be plugged in. The plugging in of a set of phones automatically disconnects the loud speaker.

(Continued on page 63)

EVENTS OF THE MONTH

By Jamer Montagnes, C-3CK, A.R.R.L.

In Memoriam

On July 18th, G. J. Shadick, c-4BR, was drowned while bathing at Regina Beach. After five days' dragging, his body was recovered. His loss is deeply felt by the Regina and Moose Jaw fellows, an dhe is deeply mourned by all who knew him. A real man, a good friend and an excellent scientist, one whose place will be hard to fill.

He had been in the game since prewar days, and was one of the first to open up on C. W. in the West. At the time of his death, he was working on waves below one meter and had devised a very simple circuit for use on these low waves. His contributions to Dr. Jenkins, inventor of the radio picture machine, were noteworthy. He was a real scientist.

Out West, many of the hams are helping the farmers to bring in the crop. Guess we should hear some more westerners in the winter!

---

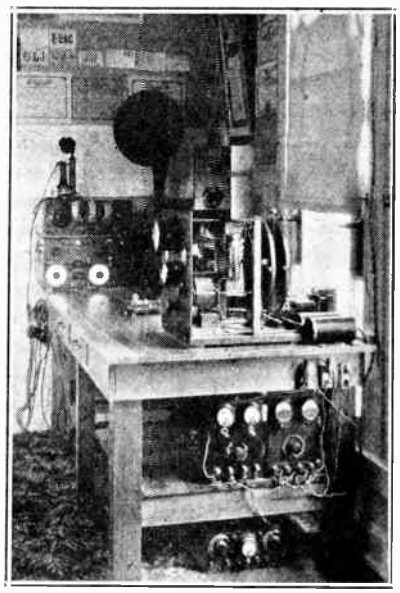
c-4AA is getting out fine on the 40-meter band. He works plenty of u-8's and a few c-3's. He has been in touch with c-3FC of Toronto and this is the farthest East at present in Canada. He recently made a trip to Edmonton and Calgary to visit the fellows there.

The Halifax radio fans and hams had a treat recently when Major Borrett showed them a moving picture of the trip to Paris to attend the I.A.R.U. Street scenes of Paris, scenes aboard ship, and many interesting sights were shown on this film, which Hiram P. Maxim, President of our American Radio Relay League, and the International Amateur Radio Union, loaned to the Halifax amateurs. Major Borrett also gave a very interesting talk on the trip and all enjoyed it, and wished they had been rich enough (?) to go themselves.

During the last month, a new radio paper, exclusively for the amateur, has appeared in Britain. It is called the "T. & R. Bulletin," and is published by the Radio Society of Great Britain, Transmitter and Relay Section. Good hams' news of the Britishers and some really fine technical dope make this a very good paper. We hope it grows with leaps and bounds.

Description of c-3XM by the Owner

"Aha! 3XM! You may hear it, and you may not. 3XM, the station of the City Correspondent for Ottawa, is quite an affair! It comprises one of those sunburned Radiotrons, species UV-203, alias 50 watts; one General Electric "Flying Boat" Dynamotor, as advertised in QST; a whole cupboard full of wrecked car batteries, and a little 2-ampere charger for same that valiantly



Amateur Station 6LJ

tries to keep up the wicked pace the batteries set; and various other parts, some of which are not conducive to the welfare of a ham station."

He goes on to tell how it is possible for him to work some one for 10 minutes, give his batteries a half-hour rest and go another 10 minuts. Nevertheless, he works outsiders on this rig.

---

c-9AL is one of the few stations to be on the job all summer. At home, Mr. Russell operates the regular set on 40, 80 or 120 meters. At his cottage at Stony Lake, some 150 miles north of Toronto, is a portable set, using a small tube with about 300 volts on the plate. With this set, he gets out fairly good, doing distances up to 750 miles with regularity. In trying some experiments with his brother, who is an 8 in Niagara Falls, N.Y., and who comes to visit him occasionally at Stony Lake, it was found that it was easy to span the distance from Stony Lake to Niagara Falls on 40 meters, but impossible to strike Toronto from Stony Lake on this wave. Also it is not possible to make Niagara Falls from Toronto on 40 meters. A series of experiments are intended to find what wave nearest to 40 meters will allow contact between these places.

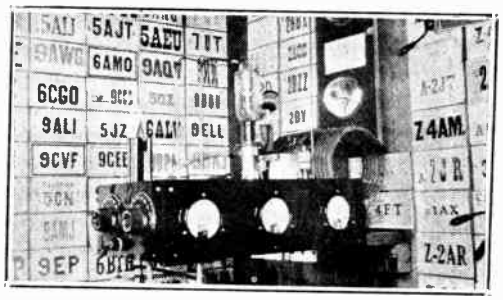
Station 6LJ-6CFT-6XP is another real fine station. It uses either one or two UV-203 tubes in a loose coupled Hartley circuit. The four receivers tune from 15 meters to 24,000, and so everything worth hearing is available. This station has worked nearly every part of the radio world, and has heard amateur stations from every radio center where there are stations.

---

c-3HT, of Hamilton, is on the air now, and this makes one real station for the Ambitious City. So far, he has handled no traffic, but he is all set for the coming season. All messages can go through Hamilton now!!

Among the regulars in Toronto are and 3KQ. Most of these stations have 9AL, 3CO, 3CK, 3VH, 3AZ, 3AJ, 3FC been on the air all summer, and have kept Toronto on the map.

On Sunday, August 30th, a gathering of many of the Eastern Ontario "hams" took place at Toronto Island. Several u-8's and a u-9 were present to this annual affair. A dinner was held and after this came a meeting. Results of this meeting will be published next month, as this is written on August 20th. HI!



Amateur Station 6CGW

This photo of u-6CGW shows the rather unique build of the famous transmitter in use at this station. It stands on a frame and is a beautiful piece of workmanship. Everyone knows that it gets out.

The abolition of the old Paris code by means of which the Eiffel Tower still transmits time signals at 10.45 a.m. and p.m., was recommended by the Commission de l'Heure, of the International Astronomical Union at its recent meeting at Cambridge. The Commission recommended the adoption of the International Code with this difference, that in place of the last three dashes, each of the three minutes shall end with the six dot seconds as transmitted by 2LO.

PREMIUMS

New Radio Books given as Premiums wtth Subscription to RADIO NEWS OF CANADA or books can be purchased outright if desired at advt. prices

HENLEY'S WORKABLE RADIO RECEIVERS

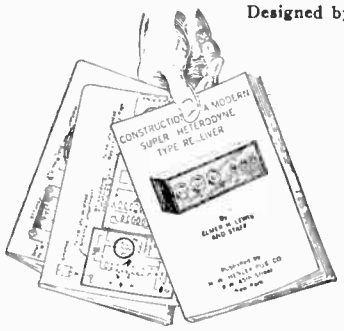
An Authoritative Book on Practical Receiving Sets of Modern Design with Complete and Explicit Directions for Building Them

THIS new book contains complete and detailed descriptions of many types of receivers which, by long experience, have proved to be the most satisfactory from the viewpoints of selectivity, convenience and economy of operation, dependability and quality of reproduction. It gives in greatest detail circuit and wiring diagrams, panel and baseboard layouts and drilling templates, so that any amateur may build a successful receiver from the directions given.

In order to help the Workable Radio Set builder, who may not be familiar with the conventional symbols used in hooking up a set, **most of the receiving sets are illustrated by complete full page diagramatic drawings,** showing just where to attach the wires, location of condensers, rheostats, transformers, vacuum tubes, plugs, jacks, etc. 216 pages. 106 diagrams and illustrations specially made for this book. Price **$1.00**

CONSTRUCTION OF A
MODERN SUPER-HETERODYNE TYPE RECEIVER

Designed by a Staff of Radio Engineers of Wide Practical Experience and Thorough Theoretical Training



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Price $1.00

HENLEY'S 222 RADIO CIRCUIT DESIGNS

A Complete and Up-to-date Collection of Modern Receiving and Transmitting Hook Ups

THIS new book treats the subject in an entirely different and novel way, as it is the only book that illustrates the **complete electrical design of the circuits, showing the electrical values of inductances, capacities and resistances, with the name of each element on the diagram of the circuit.**

It surpasses all other books in the scope of its subject matter, in the simplicity and novelty of presentation, and in thoroughness of detail. 271 pages, 284 diagrams.

Price $1.00

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A copy of either of the above three books will be given to all readers who fill in this form and mail it to us not later than October 30th, 1925.

The book will be mailed immediately we receive your Dollar. Your subscription will commence the month following.

THE NEW MODEL L-3 ULTRADYNE

(Continued from page 59)

The set is designed to be used with either an indoor or an outdoor aerial, as one wishes. The results obtained with an outdoor aerial are a bit superior but not necessarily great enough to warrant its use in the face of inconvenience. A wire strung around the moulding in a room is really sufficient for the average requirements.

Technical Specifications

The new Ultradyne employs six tubes of the storage battery type, three being employed as radio frequency amplifiers, two as audio frequency amplifiers and one as a detector.

Two of the radio frequency stages are tuned; the third is fixed, that is to say it is adjusted to operate over the broadcast band of wavelengths. A resistance system is employed in the second and third stages to prevent the circuits from oscillating or "spilling over" at resonance points. These resistances are included in the input circuits and aside from stabilizing the radio frequency units they tend to automatically "stiffen" the circuits, thus actually increasing the selectivity of the set.

Variable condensers having straight line wavelength curves are employed in the selector circuits and are the principal reason for the simplicity of operation of the set as it is the electrical characteristics of these instruments that provide the perfect distribution of wavelengths on the scales.

Another important feature of the new Ultradyne is the audio frequency and loud speaker unit. Mr. Lacault has found by experience that most cases of distortion in a radio receiver are due directly to improper electrical design and could have been eliminated by the simple process of matching of components. An electrical equality is struck in the new Ultradyne; the loud speaker unit has the same impedence value as the plate to filament impedence of the last audio frequency tube. They work in perfect harmony with each other.

Space is provided inside the cabinet for the "B" batteries which connect to binding posts mounted on the side of the vacuum tube sub-base. Four posts are mounted to the rear of this sub-base for the "A" battery, aerial and ground connections which are run to the posts through holes in the rear of the cabinet.

The cabinet of the new Ultradyne measures 24 inches long, 14 inches high and 14 inches deep. Considering that the set is self-contained, I would say that it is rather compact.

NATIONAL REPRESENTATIVES APPOINTING JOBBERS FOR NATIONAL PRODUCTS

The National Representatives, 582 King Street West, Toronto, Ont., who sell only to radio jobbers, are arranging the distribution to jobbers for the products which they control and the new National Phones are especially popular as well as the National Junior, Intermediate and Senior Speakers.

The jobbers and dealers who have seen the new National Phones are very pleased with the improved appearance, construction and packing.

A special aerial outfit is also just completed which is all boxed as a unit, containing everything necessary to erect aerial and connect the set.

CKY STUDIO, WINNIPEG, MANITOBA

Located in the Sherbrooke Exchange of the Manitoba Telephone System, the studio is large enough to accommodate a band of forty performers and yet possesses that "homey" atmosphere so appreciated by radio artists. The draping has not been overdone to the extent of oppressiveness, but is so arranged as to deaden objectionable echoes without causing discomfort to the vocalists and others who entertain the listeners. Sand color is the general effect, relieved by figured cretonne curtains and French tapestry pictures. The switchboard in the centre background communicates with the operating cabin; with the regular telephone lines, when desired, and also provides facilities for listening in with a crystal set during broadcasting from remote control points. Also, during a studio

CKY Studio, Winnipeg

program, the director is able to listen in on the lines running to remote control points, so as to announce switch-overs at the proper times. Thus, during the noon broadcasts from the studio, the director listens on the lines connecting with the microphone in the Royal Alexandra Hotel, from which the Canadian Club luncheon speeches are broadcast. As soon as he hears the applause indicating that the chairman has risen to speak, the director makes a suitable announcement and signals to the operator to switch from the studio to the hotel. Thereafter, he listens for the conclusion of the speeches with the aid of the crystal set, and announces that CKY is switching back to the studio. At another board, outside the studio, a telephone operator presides at a board connecting the station with the outside world by five lines.

This is Thermiodyne Year

An Entirely New Era in Radio Reception

THERE comes a very definite thrill to the manufacturer who can truthfully announce to the world that he has succeeded in making a product that is far superior to anything else of its kind on the market. Particularly is this true when his product happens to be of a kind that can add greatly to the happiness and enlightenment of a hundred million of his fellow men.

Thermiodyne is just such a product. It not only accomplishes all of the wonderful things that other good receivers accomplish, but, by employing an entirely **new principle** in radio construction, it **out-performs them all.** Nothing like Thermiodyne has even been seen or heard before.

Carl E. Trube, inventor of Thermiodyne, is well known to the radio world as an independent thinker with an enormous capacity for hard work.

In close touch with every forward movement in radio, Trube realized that no receiving apparatus yet devised met all the requirements of the critical user. Centering his attention upon what he knew to be the basic faults of radio reception, his researches led him into newer fields.

All that Trube set out to do has been accomplished. The Thermionic Circuit is the result. In it are embodied ideas so far in advance of anything previously known to the industry that it has been necessary to coin entirely new names and phrases to define properly the circuit and its various elements.

The Thermionic Circuit, incorporated in Thermiodyne, has brought it to a stage of perfection that is truly revolutionary.

In Thermiodyne TF6, which is the first six-tube set to tune successfully **three** stages of amplification before the detector, the evil influences of static are greatly minimized. There is no squealing, howling, radiation or distortion, even when weather conditions are unfavorable to the best reception. No internal noises are audible—Thermiodyne **delivers accurately** that which is transmitted through the air.

These three stages of Thermionic Frequency give Thermiodyne a distance range not to be found in other commercial sets. A thousand miles are brought in easily in **loud speaker volume** under normal conditions, and when conditions are particularly favorable, the distance is amazingly increased.

With greater volume and longer distance, there is also remarkable fidelity in reception. Announcements, lectures and sermons are plainly understood and musical selections are rendered in all their original purity. Every modulation of voice or instrument is reproduced so faithfully that a **new standard** has been established in "radio."

But its famous Master Control—more than any other one feature, perhaps—has helped to give Thermiodyne its instantaneous popularity. The Aladdin-like action of the Master Control holds the listener spellbound as he hears dozens of stations glide in and out, each in its proper place, **as fast as the knob is turned.**

See our Exhibit at the Winnipeg Radio Show, Sept. 14-19.

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