

JULY, 1925 25 CENTS

# Wireless Age

The Radio Magazine



F. KEED

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# Wireless Age

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Vol. XII

No. 10

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### Your Authors

**LAURIE YORK ERSKINE** (Kandy Kitchens and Married Life) is the author of the famous "Renfrew" stories. He is the author of "The River Trail", "The Laughing Rider", "The Confidence Man", "Valor", and "In the Event of Death". His first contribution to Wireless Age was "The Voice from the Cabinet". "Kandy Kitchens and Married Life" deals with the high tension business life of a chain store magnate mixed with the early experiences of domestic interests into which is introduced the soothing atmosphere of outdoor things and radio. Mr. Erskine has added to his reputation in producing this interesting short story.

**DONALD GORDON WARD** (The Vacuum Tube as Amplifier) was born in Portland, Maine, and received his early education in the schools of that city. His first experiments in the radio field consisted in assembling two arc light carbons, a sharp needle, a single 75-ohm telephone receiver, a dry cell battery and a four-wire 20-foot antenna into a receiving station that had a range of 2½ miles. Since then Mr. Ward has made progress so that from a position in the Navy, during the War and later Technical Instructor of the Radio Institute of America, he entered the engineering field and conducted research work. He has recently been co-operating with Captain R. H. Ranger, radio engineer of the Radio Corporation of America in his photoradiogram tests that have proved so successful.

#### PUBLISHED MONTHLY AT WIRELESS PRESS, INC., 326 BROADWAY, NEW YORK

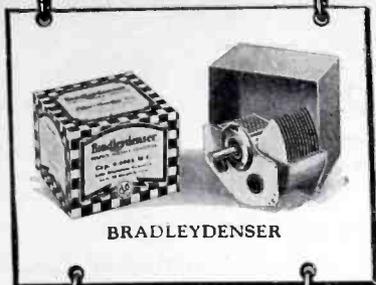
Los Angeles, Calif., 1116 Chapman St., Coast Publishers Co. Chicago, Ill., Wrigley Bldg., Wheeler & Northrup. Boston, 18 Stewart St., Charles M. White.  
 San Francisco, 821 Market St., Coast Publishers Co. Great Britain, 12-13 Henrietta St., London. Australia, 97 Clarence St., Sydney, N. S. W.  
 Yearly subscription in U. S. A., \$2.50—Outside U. S. A., \$3.00; Single Copies, 25 cents. Entered as second class matter Oct. 9, 1913. Post Office, New York, N. Y., under the Act of March 3, 1879. Copyright, 1925, Wireless Press, Inc. When subscription expires you will find a renewal blank enclosed. Return with remittance promptly.

James G. Harbord, Pres. Pierre Boucheron, Vice-Pres. and Gen'l Mgr. L. MacConnach, Secy. George S. DeSousa, Treas. H. H. Reber, Bus. Mgr. C. F. Boag, Adv. Mgr.  
 C. S. Anderson, Managing Editor R. A. Bradley, Technical Editor

Because certain statements and expressions of opinion from correspondents and others, appearing in these columns from time to time may be found to be the subject of controversy in scientific circles and in the courts either now or in the future and to sometimes involve questions of priority of invention and the comparative merits of apparatus employed in wireless signaling, the owners and publishers of this magazine positively and emphatically disclaim any liability or responsibility for any statements of opinion or partisan expression if such should at any time appear herein. Printed in U. S. A.

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# The Allen-Bradley Line of Perfect Radio Devices



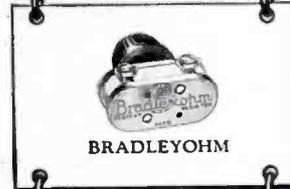
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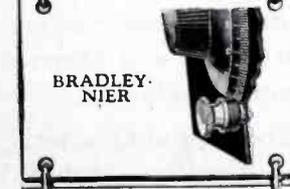
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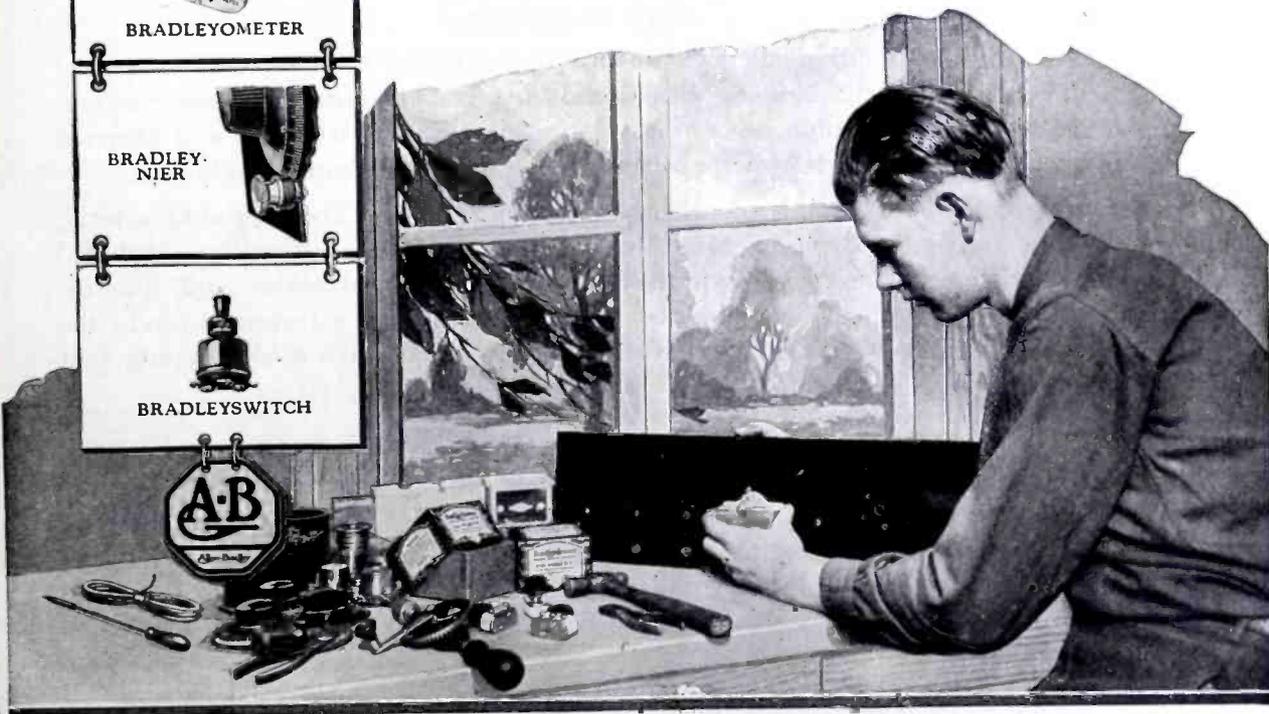
EVERY amateur yearns for perfection in his radio receiver. Better quality, greater volume, and closer selectivity are the requirements of discriminating radio enthusiasts, and the circuits which meet these requirements are inevitable favorites.

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# Editorial Chat

**P**HOTORADIOGRAMS again become an absorbing topic of discussion for those interested in developments of the radio art. Last year the successful transmission of pictures from London to New York was accomplished to the amazement of the general public. Now, we learn of the transmission by radio of pictures over a still greater distance across land and sea from Honolulu to New York. Kenneth MacDonald in "Photoradiograms" tells you all about it in this issue of WIRELESS AGE.

## *The Cross Word Contests*

A general summary of our Cross Word contests with interesting comments from our readers and fac-simile reproduction of some of their work as well as a list of prize-winners will be found in this issue. This is presented with the thought of informing the others of the WIRELESS AGE family what some of the members are doing and thinking—the two pages of text on this subject will prove interesting to our readers.

## *Of Interest to Women*

Read "M. Berard, Chef de Luxe," for tips on the culinary art. "The Servant Problem" in these days of radio broadcasting offers valuable suggestions in the adjustment of domestic difficulties—get acquainted with modern methods and save yourself worry and care that perhaps interferes with social functions and enjoyment.

## *General Interest*

Our fiction this month deals with modern high-tension business life associated with the difficulties of early domestic affairs and the effects of radio as a universal solvent amidst the soothing influence of outdoor things—"Kandy Kitchens and Married Life" is good, wholesome fiction with perhaps a moral and also some real humor.

Our broadcast artists this month are May Singhi Breen, The Strand Quartette, Queen Titania and Betty Bronson, Miss Maxine Brown, not to mention those included in Dorothy Brister Stafford's H. I. in Broadcasting—the illustrations and descriptive text affords you a closer acquaintance with artists that have entertained you by the air route, and WIRELESS AGE comes to you with this service each month hoping that you enjoy it.

## *Technical*

Dr. Minton has another interesting instalment on "Loud Speakers," and the articles on the "Triple Torus Tuner," "High Frequency," "Production of Electric Current," "Review of Broadcasting," "The Vacuum Tube as Amplifier," "Kinks," and the "Information Desk" merit your attention—You will find it up to the usual WIRELESS AGE standard.

—THE EDITOR.

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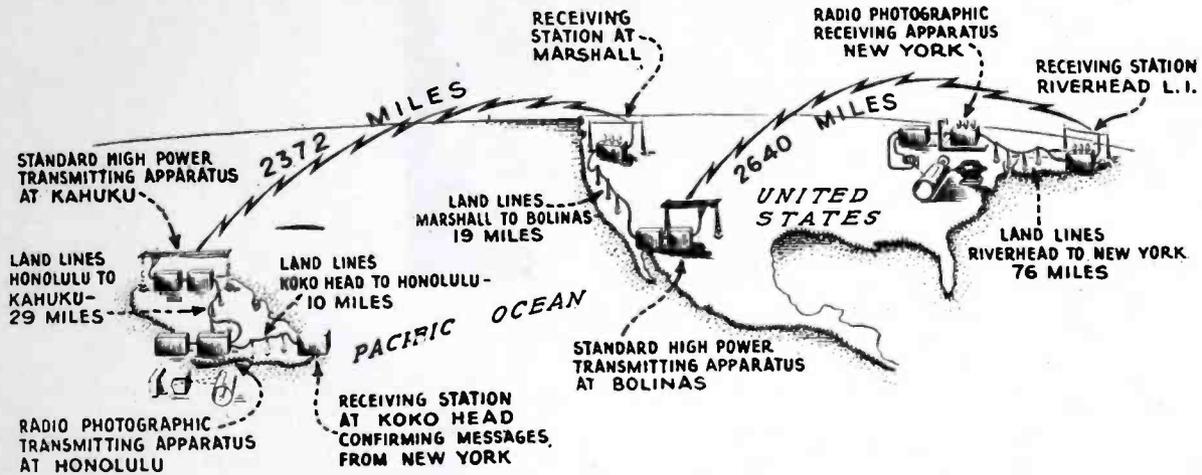
Ten dollars is still the price. But uncountable are the hours of fun and interest and gaiety it will give.

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# PHOTORADIOGRAMS

Pictures Transmitted in Honolulu Received in New York City

By *Kenneth MacDonald*

FOR the second time in a year, Captain R. H. Ranger, well known radio engineer of the Radio Corporation of America, has astounded the radio world with his accomplishments in the transmission of photographs by radio. Last December 1st, all the daily papers carried feature articles regarding the transmission of pictures by radio, from London to New York, this remarkable feat having been accomplished the previous day in the presence of a notable gathering of radio engineers.

To Captain Ranger and the engineers of the Radio Corporation of America involved in the work this accomplishment was simply one milestone passed in the journey towards the ultimate end when the apparatus will be turned over by the engineering department to the traffic department, for regular commercial work.

Development has progressed to such a stage that it seemed feasible to attempt to transmit pictures from Honolulu to New York, and about the first of April of this year, Alfred Koenig, Captain Ranger's right hand man in the picture work, was started on his way to the Island of Oahu with the radio photo-transmitter.



Photoradiogram of Admiral Coontz sent from Honolulu

A few days after this young man arrived at Honolulu he radioed Captain Ranger that everything was in readiness for the preliminary tests which were to show whether the attempt was to be successful or otherwise.

The results of these first tests showed that the transmission of pictures from Honolulu to New York was to be a huge success and a date was set for a

public demonstration to which anyone was welcome and at which time, those interested in the work could actually see the receiving apparatus functioning.

May 7th, 1925 was the eventful day and from early in the morning until the following afternoon the transmission and recording of pictures proceeded. The complete transmission of one picture took about twenty minutes and to give a general idea of the equipment involved in the transmission of one of these pictures, we will follow the path and the construction of the picture from start to finish.

The subject to be transmitted is first photographed by means of an ordinary camera. The negative thus obtained is attached to a glass cylinder, which revolves, with film attached. In the center of this rotating cylinder there is a powerful little light which shines through the film and strikes a sensitive cell. The degree of light penetrating this film is variable depending upon the density of the film through which the light shines at any particular instant.

These varying light values which strike the sensitive cell are changed by the latter into varying electric current values and these varying currents op-

erate the apparatus which governs the functioning of the master photo-transmitter relay. The output of this last relay is in the form of dots and dashes which are unintelligible to the human being, but which are translated by the photo-receiving equipment into a picture of the subject which was photographed prior to transmission.

In the Honolulu-New York tests, the master photo-transmitter relay put direct current pulses on the 29-mile land-line to the commercial radio transmitter located at Kahuku. These direct currents were applied to the relays which controlled the output of this transmitting station, (call letters KIE). Thus, the direct current dots and dashes which arrived at the transmitting station over the land line from Honolulu were changed into radio-frequency energy and as such were sent out into the ether on a wavelength of 16,975 meters.

These radio signals were received at Marshall, California, 2372 miles away, changed from radio-frequency to audio-frequency and then to direct current signals and as such were made to operate the relay which put the control current on the 19-mile land line to another high power commercial radio transmitter at Bolinas, California, (call letters KET).

At Bolinas the direct current pulses from Marshall operated the relays which controlled the radio-frequency output from this station and here again the signals were sent out into space as radio-frequency energy. These signals sent out from Bolinas, California, on a wavelength of 13,100 meters were picked up at the receiving station at Riverhead, Long Island, 2640 miles away where they were amplified, heterodyned, detected, amplified again and sent in to the New York office of the Radio Corporation of America over the 76-mile land line, as audio-frequency signals.

At the design laboratory at the New York office they were again amplified, then changed to direct current and as such were applied to the photo-receiver apparatus which proceeded to translate this unintelligible code into a perfect likeness of the original subject.

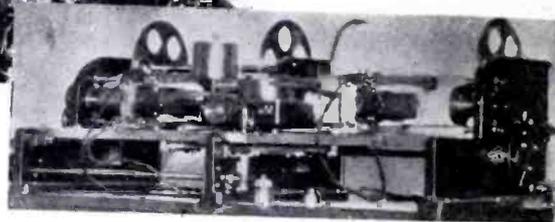
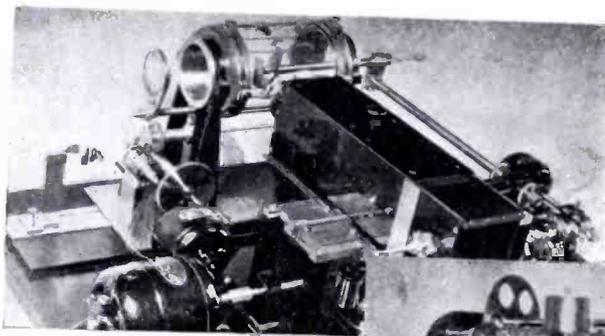
In the course of reception, a pen, which vibrates in synchronism with the master relay of the photo-receiver, makes a dot on a piece of ordinary paper, which is attached to a cylinder that rotates the same as the transmitting cylinder, every time the master



Photoradiogram of W. P. S. Hawk, general superintendent of the Radio Corporation of America at Honolulu

relay makes a dot. When the relay makes a dash the pen makes a longer mark, or a dash, on the recorder paper. The received picture then is composed of minute dots and dashes, the speed of which is so great as to bring out the various tonal values of which the picture is composed.

One very interesting feature of the demonstration was the following: When the demonstration tests had been completed, Mr. H. L. Brownlie, the engineer behind the receiver in New



(Top) The transmitter (Bottom) The receiver

York sent a wire to Honolulu stating that the attempt had been a complete success and the late Honolulu evening papers came out with the story of the tests. A picture was taken of a section of one of the newspapers and this picture was transmitted by radio, early the following morning, thus making a section of a Honolulu paper available in New York a few hours after it had appeared on the streets of Honolulu.

## Low Wave Development

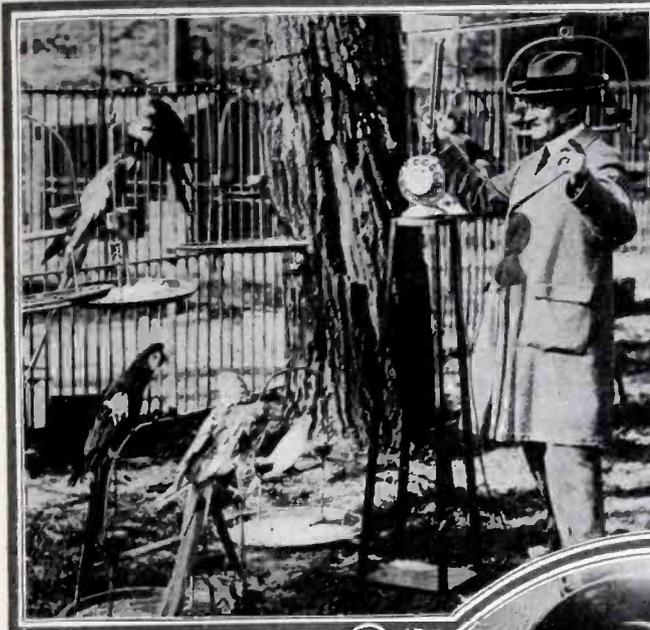
At a meeting, with Commander Donald B. MacMillan, the arctic explorer present, to finally determine on the type of new short wave radio transmitting and receiving equipment with which the expedition is to be equipped this year, those present were startled by the statements made by John L. Reinartz, when he described the phenomena encountered by him in reaching down to almost unheard of low radio wave lengths. Phenomenal daytime code work has been accomplished as low as 10 meters. Mr. Reinartz's latest phenomena have appeared when working with parasite frequencies, in other words, wave lengths below the possibility of measurement by present day instruments. To put it in more simple language, wave lengths below one meter, and closely approaching the frequency of light. When this frequency is applied solid metal plates in a tube become transparent without apparent heat. This result is instantaneous as the current is applied and before heat could possibly be developed. The meaning of this phenomena is that frequencies occurring are so extremely high that they are actually approaching the speeds of molecular vibration, of which the element is composed. The theory advanced by some of the scientists present is that if even higher frequencies could be obtained, the actual metal and glass composing the vacuum tube would be caused to disintegrate and possibly disappear, or at least, not reassume its original molecular structure.

Unquestionably radio history will be made on this expedition. It developed at the conference that the 20-meter wave length at high noon daylight was inaudible under 500 miles, but at greater distances without difficulty, transmitted signals stronger than those possible at night with higher wave lengths.

It was pointed out at the conference that there is no standard transmitting or receiving

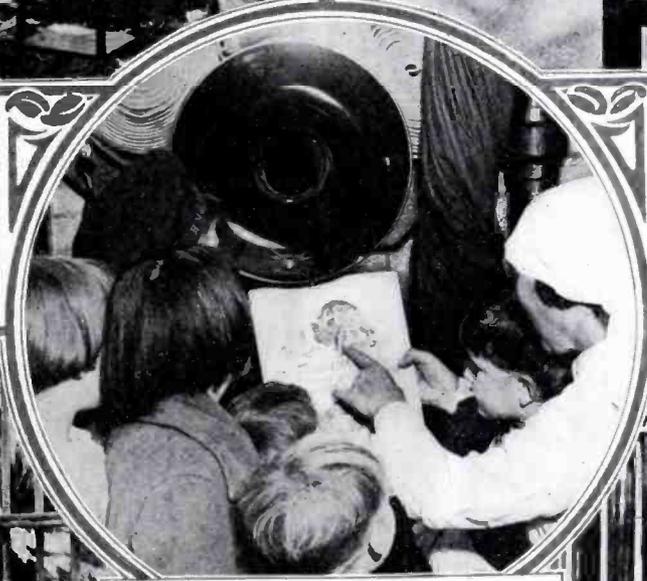
apparatus for sale capable of working on 20-meter wave lengths, and it will be necessary for the American amateur to build his own apparatus which he can do at relatively low cost. The amateurs are urged to start work now on their transmitters and receivers so as to conduct a series of experiments before the expedition sails and be familiar with the new thrills that 20 meters holds in store for them.

# Animal Broadcasters

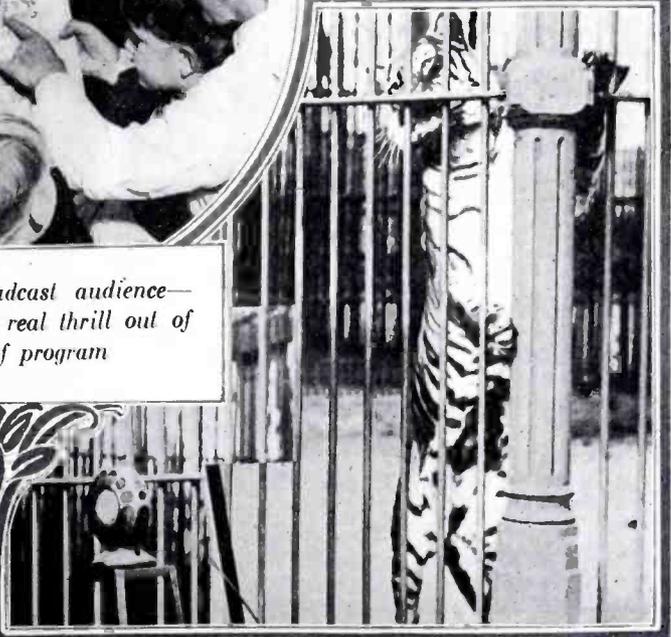
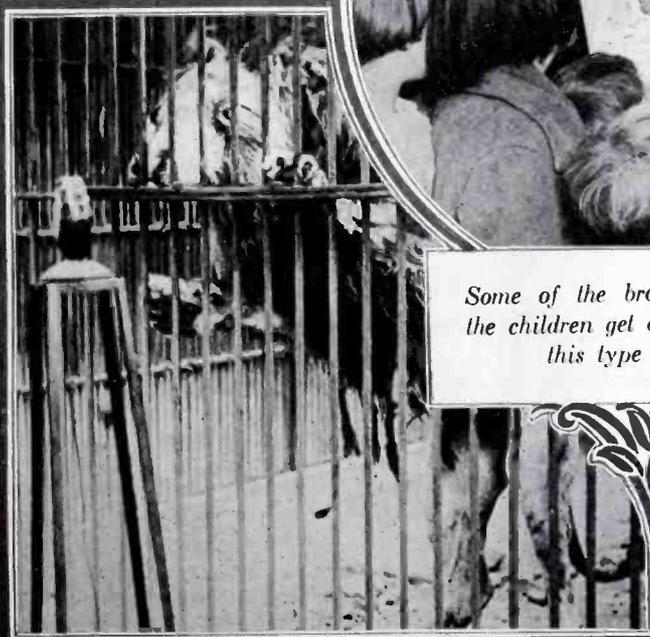


*Polly and his companions broadcast a most eloquent chorus to the amusement of listeners*

*At the conclusion of the parrot chorus a French Cockatoo usurped "Mike" and told his story*

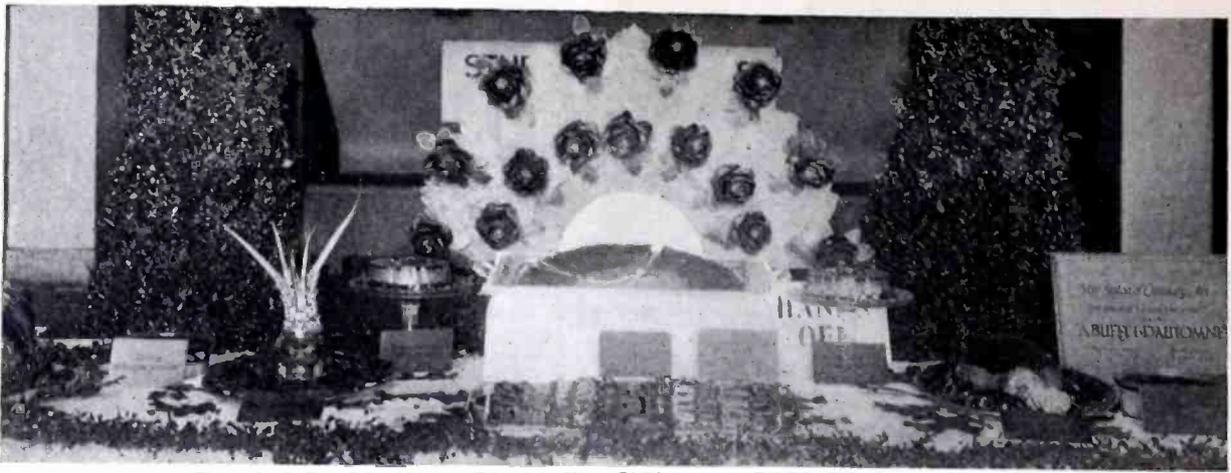


*Some of the broadcast audience—the children get a real thrill out of this type of program*



*The "king of beasts" thundered forth his message and nearly blasted the microphone*

*The Bengal tiger rose to the occasion, and gave the kiddies a real thrill with his growls*



This cake dedicated by Pierre J. Berard to Mary Pickford at the Exhibit Culinare won first prize

# M. BERARD CHEF DE LUXE

Describes the culinary art to broadcast audiences

By Izzetta Cox

**J**UST tune in and we will bring you the advice of America's foremost chef. M. Berard, chef at R. H. Macy's Restaurant has three times won first prize in the Exposition Culinare, in which America's chefs compete, which places him at the head of the class. Before accepting his present position he had been chef at the Ritz-Carlton Hotel; has been in the service of several of New York's millionaire families and a number of first-class clubs. Chef Berard was born in Ville-neuve Loubet, near Nice, adjacent to the home of the famous Escoffier. He is a graduate of the Schools of Arts and Crafts of Paris; speaks several languages, is a scholar, a student and a philosopher. During the war he served in the French army and later in the American army.

Beside being a master of his profession we found him to be a charming and courteous gentleman, willing to interrupt his work during the busiest hour of the day to be of service to us. He bent every effort toward making us feel at home in his great kitchen. We were just a bit frightened at the size of the place; at the sight of immense copper kettles and machines for heaven-knows-what, so he led us to his private office and gave his undivided attention.

M. Berard is deeply interested in furthering an improvement in the cuisine of this country. Although he is unmistakably French in his manner,



Pierre J. Berard, the chef de luxe, himself

he speaks excellent English with a charming accent. He speaks of Americans as "we" and decries the lack of interest that the women of our land display in this very important art.

He says, "there is no doubt as to the

practical value of a knowledge of cuisine. The American housewife realizes that the day of waste and experiment has passed. So long as this was a sparsely settled country abounding in food and game—and servant girls—the study of this art was relegated to the background and each successive generation of housekeepers followed in the steps of the former generation. They have seemed to regard cooking in the light of a necessary evil rather than as an enviable accomplishment.

"It is a far cry from the day when men ate with their hands to the day of the finger-bowl, and in between is the history of the evolution of cooking. Plain cooking was the rule for centuries, but the time came when people grew rich enough to look for luxuries to tickle the palate. At first the rule was a progressive variety of foods, the more of them the better, even if the meal lasted all night. Later, however, some of the first principles of the gastronomic art began to be understood and it is well-known that in the days of Lucullus, the Roman gourmet, a manual of cookery was extant.

"It must be recognized that it was in Italy that the history of modern cookery began, but from the time Catherine de Medici brought Italian cooks to Paris, France has held the palm for catering to the fastidious palates of mankind.

(Turn to page 15)

# K ANDY KITCHENS

By Laurie York Erskine and Married Life

**E**VEN a chain store magnate is human. Although Tom Flugrath was deceptive that way. He had built up his chain before he was thirty-five years old, and the process had so married him to his business that Jane sometimes wondered whether the ceremony she had shared with him was even mildly effective.

But fostering a chain of candy stores against the sort of competition Tom enjoyed is an engrossing occupation. You can't run two hundred such establishments as easily as you can sell two hundred bonds, and because Alexander January, which is the name of the young man who sold the bonds, had lots of time to take her out, and Tom didn't, Jane would often upbraid the chain store magnate and lightly deride him.

"Be human," she would say.

But Tom Flugrath was more human than she knew, for all the time he mused over the many details of his stores he dreamed of the day when he could put his work aside just as a small boy dreams of a day when he can put away his school books and go camping. Moreover that is just what Tom meant to do, and before Spring was over he had bought the camp. An island in the Adirondacks where he would take Jane and show her what recreation really meant. At which point he would descend from his dreams to the dust and attack the problems presented by those iniquitous Sweetness Shops, Inc., as if his unfortunate competitor was a black plague in the candy business.

Everybody in chain store circles remembers that war between The Sweetness Shops, Inc., and Flugrath's Kandy Kitchens; how Sarsfield opened his Shops next door to all Flugrath's Kitchens, and how Flugrath harried him from one end of the country to the other. But few know of the magnificently simple manœuvre which gave Flugrath the victory. It consisted simply of packing a trunk in the heat of battle and the heat of July and retiring to the Adirondack mountains. Thereby Flugrath, to whom the mention of his competitor's name had become dangerously irksome, avoided the nervous



GEORGE F. USTICK

"Doesn't anyone ever use these woods?"

breakdown which laid Sarsfield low, and he won the battle on the reserves he brought down from the mountains with him. Tom took his business very seriously; devoutly; intensely.

**J**ANE had prepared the island camp for his coming and for the coming of many more, for Jane's idea of a summer was an idea of uninterrupted gaiety.

Tom, expecting to find a wilderness retreat—found out instead why Adirondack camps cost so much. It was like walking into the lobby of a country club. . . . There was even a dancing floor and the phonograph gave off Paul Whiteman in the same manner as a buzz saw might. They greeted

Tom with cheers and the clink of ice.

"A nice, cool thirst quencher, Tommy," cried Mr. January, pouring. Tom stared at him in dumb amazement; stared at his striped knickers in consternation.

"Jane," he murmured feebly. "Is this right? Am I in the great open spaces, or did I take an Atlantic City train by mistake?"

"You're right, Tommy dear," she assured him. "Everything's wide open here. Ask Alexander."

"Open is right," said Mr. January wittily. "Here's your drink, Tom." And he swung away with Jane into a dance.

Tom, not ignoring the drink so much as deprecating it, walked sombrely out of the house and down to the landing. From this point the insidious grandeur of the wilderness lake almost overcame the iniquitous sounds of the phonograph. The trees sighed a little in the cool breath of the placid mountain air, and the water sparkled with an irresistible allure. There was a man with a pipe on the landing stage who seemed impervious to the phonograph and this encouraged Tom to speak with him.

"Doesn't anybody ever use these woods?" he demanded.

"Not a lot," said the man with the pipe; and Tom saw that he was a woodsman by the boots he wore. "They like to stick around the house."

"If you do want to use them, how do you do it?" asked Tom.

"Fur five dollars a day I'd take you out into them muhself," said the man handsomely.

"Alright, get your traps ready and we'll start after lunch," snapped Tom, for all the world as if he was buying a candy store.

"Fur how long?" questioned the man cannily.

"Two weeks."

"Two weeks?"

"Sure, two weeks, and my wife will come along."

"That'll be six dollars and a half," said the man quickly.

"O.K. What's your name?"

"Jake. Jake Tutewijer. What's yours?"

"Tom Flugrath."

"Eh, you own this island?"

"Sure."

"Then it don't cost you a cent. You're paying me wages to work for you, an' I don't only look at the water."

**T**OM walked back to the house and cut in on Jane to dance her out onto the porch.

"Pack your duffle bag," he said. "We're going into the woods for a couple of weeks."

"You're crazy."

"Sure. Pack your bag."

"I will not." She stared at him with a slightly worried look. "Tom, you're not going to do anything foolish, are you?"

"No," he said. "I'm just going to use what I've paid for. It cost a small fortune to come up here and I'm hanged if I'm going to use the place like a Park Avenue apartment. You're in the woods now, woman, and you'd better turn off that jazz music before I break the machine with my scout axe."

"You're just talking foolishly," she said coldly. "I couldn't go out in the woods with you even if I wanted to. We've got a party of eighteen people here tonight, and tomorrow we're picnicking over at the lean-to with dancing after lunch. On Wednesday we have a swimming dance over at the Pomroys and then dinner—Where are you going?"

"To make my pack. We set out with canoes at 2 o'clock."

"Tom!"

"Jane!" he came back to her. "You'll come?"

"Nonsense. You stay right here. Why, Tom!" her voice held pleading. "You can't leave me all alone after we haven't seen each other for so lo-o-ong?"

Impatiently he pulled himself away.

"That's up to you," he said. "You can come right along if you want to."

She bridled.

"All right then. Go!" And her voice was full of unmentionable things. "Go on!" Again he turned away.

"But Tom!"

Again he faced her.

"Come back soon," she crooned.

He stood and regarded her, puzzled.

"I'll come back in a few days," he said.

"I'll come back Thursday. See if you can be ready to go with me then."

"You'll be sorry," were her last words, and he didn't answer as he retired to clatter about among his outing things, for he darkly



GUSTAV DISTERHOFF

suspected that she spoke the truth. He was sorry already.

**J**AKE TUTWILER was a good fellow. Once you got him out in the open where his pipe was hardly noticeable he made a congenial companion, and when you had your back toward him as Tom did, for Jake paddled stern, you didn't see enough of his face to disconcert you. Jake was a conversationalist of extraordinary durability, and his attitude regarding really important things was infallibly right. Thus he heartily agreed with Tom's estimate of the Sarsfield crowd and the inferiority of Sweetness candy. He never ate candy himself, but he knew from what Tom said about Sarsfield that their product couldn't be any better than it ought to be. And he confirmed Tom's settled opinion that there was no understanding women.

"You try to please them," he pointed out. "And what do they do?"

"That's it exactly," nodded Tom vigorously.

"You get no thanks," pursued Jake.

"They're never happy unless you rush 'em around."

"Nell's the same way," agreed Jake, his voice warming to the subject. "Just rushes around. Plays 'round with the children and gossips. That's all. And what thanks do you get?"

"None," said Tom.

"That's just it," said Jake.

Two days of fishing, swimming, and conversing; of shining waters and cool breezes, of the deep and impenetrable mysteries which pressed about them; and then they were encamped in the evening on a sandy headland at the end of a long lake.

"If you'll wait here, Jake," said Tom, "I'm going back and see how things are at the island."

"Three days of paddlin'!" warned Jake darkly.

"One and a half. We've dawdled."

"But we used two paddles. Besides you'll be buckin' the wind. Why d'you want to go?"

Tom looked off across the lake.

"I'm expecting a business call."

"The missus will take it." Jake knew well



"He turned and glared at them all"

to stay," Jake pointed out, for Jake felt he knew his man, having in mind the knickers of Alexander January. "Black and blue stripes. Little boy's pants with black and blue stripes in 'em. My God," he reflected.

And Tom, with much the same thought in mind, went puttering up the lake in the dew of the morning.

**M**R. ALEXANDER JANUARY however, despite his ice cream pants, had a heart of gold. Like gold it was yellow, and like gold it was among the softest of precious things.

The yellow part of it caused Alexander to think so long before undue intimacy with another man's wife that such undue intimacies never developed; and the soft part made him sympathetic to the point of finding that abstinence very hard.

For instance, he did not fail to notice Jane's despondency following the coming and the going of her husband, and it troubled him to such an extent that he had to walk forth into the twilight with her and ask her in dulcet tones what the matter was.

"I think Tom might have stopped over for dinner in passing," she explained brightly.

"Don't worry about it," proffered the comforter wisely.

"I don't, she lied. "But I hoped that when he got up here he would show me some of the attention his business never gave him time to show me in New York."

"But you've got your friends."

"That was an easy one, wasn't it?" she answered.

"How do you mean?" Alexander used the tone he reserved for customers who questioned his bonds.

"You solved the problem so neatly," she explained.

"Oh, yes," he laughed, and wondered what it meant.

"As a matter of fact," resumed Jane rather flatly, "I've got too many friends. It's the friends that pall on little Tommy, I think."

"Oh, do you?"

"Yes, I do. Why don't you try it from time to time?"

"Don't be rash. How do the friends—er—pall?"

"He wants to come home and have a quiet evening, and finds you here, and the rest." She gazed reflectively through the fifth stripe of his many striped necktie. "Some effort to make home attractive for him is indicated," she decided aloud.

"Let's go out in a canoe," suggested Alexander.

"Let's go up and have some bridge," she replied.

They walked silently up to the house. As they approached the porch Alexander reflected on his chances.

"When will Tom be back from the great open spaces?" he asked.

Jane, knowing what was on his mind took great glee in her rejoinder.

"Thursday. It doesn't leave much time, does it?"

Alexander gurgled and was moved by a penitence born of that guilty feeling to appear more eager than necessary to solve this crisp young lady's problem for her.

"Jane's right," he informed Ivy Rutherford who was his partner at bridge. "We ought to do something to make Tom want to stay at home."

Ivy smiled.

"Better take the morning train back to town, Alec," she suggested. "That ought to help."

He blushed.

"No," he said seriously. "I'm serious."

"Then trot over to our camp tomorrow morning and bring back our radio set. If there's a man in the world that can resist those little knobs," she said, "I'd like to meet him. Tom's never had a radio to play with, and I'll bet if he finds one here when he gets back, he won't leave the house 'til he goes home."

**T**HE profound wisdom of this suggestion so impressed Alexander that he spread the good news then and there to the complete confusion of four bridge games, and the radio outfit was transferred that very night by a party that filled three motor boats and two canoes while banjos played and youthful voices sang to the moon. It was all very gay, and Jane herself connected the battery wires to the aerial and wondered why it wouldn't work.

But it was working all right when Tom arrived. He came chugging up to the landing stage an hour after they had finished luncheon. Jane dashed exuberantly forward.

"We've got a surprise for you!" she cried. He kissed her.

"What is it? Waffles?" he beamed.

"Oh, he hasn't had any lunch!" crooned Jane. And the whole gang stood about his chair and chattered while he gorged himself with the appetite of a man who has plied woodland waterways for three good days.

That was a tactical error on Jane's part, and if she had divined the growing bitterness with which he greeted the assault of their shallow chatter; the savage dissatisfaction with which he compared this environment with the camp fire on the headland, or the revulsion with which he regarded Mr. January's knickerbockers as they appeared against the white expanse of Jane's sport skirt, she would not have committed it. As it was the poor girl had no inkling of how deeply Tom's heart sank as he stowed away the pancakes; and she could not know how impatient he was to whisk her away from this pandemonium into the paradise which in three days had been revealed to him.

"Here's your mail," said Taze, looking amazingly grotesque in the luxurious dining room.

Tom looked once at the batch of envelopes and put them aside with a distasteful grunt. For the first of them bore the imprint of the Sweetness Shops, Inc., and the very name

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enough what that business call was. He, too, had not approved of Alexander January's ice cream knickers. "Ferget it," he advised.

But Alexander January was not to be forgotten. A lounge lizard, that's what Alexander was, reflected Tom bitterly; and while he would have trusted Jane to the ends of the world, he didn't see any reason why Alexander should monopolize all her time. The memory of Alexander January ate into Tom's agitated heart.

And then an attenuated woodsman chugged out of the forest in an asthmatic motor boat and beached her below the headland. Jake called him Taze.

"Saw you comin' down the lake," explained Taze. "Thought you might like to come up the mountain."

"Give you five dollars if you'll run me down to Sparrow Island," said Tom. "We'll start in the morning."

So it was arranged that Taze would do this good and remunerative service while Jake went on to the mountain cabin. Tom would rejoin him there or send back word by Taze.

"Mrs. Flugrath might be would want you



May Singhi Breen with some of her many musical instruments

# MAY SINGHI BREEN

This famous artist has delighted many radio audiences

By  
*Harriet Works Corley*

**W**ARM lazy days on golden sands; the gentle rolling of azure seas; brilliant plumaged birds flashing in and out of vivid forests; riots of color everywhere spilling to earth; the scent of the hibiscus flower stealing through the swiftly falling tropic night. All these close in around the radio when May Singhi Breen the girl wizard of the ukelele, starts strumming into the microphone.

Hawaii is with you, pouring its magic into the air from the fingertips of this girl who is reckoned as perhaps the most skillful player of the ukelele this—or any other—side of Honolulu; the greatest authority on all phases of this instrument which comes to us across the western sea.

Oddly enough the medium which brought her to fame was never a favorite of hers, although it stood alone among musical instruments on which her disfavor was conferred. She never liked the strange harsh music of the ukelele when it was at the height of its vogue several years ago. She didn't even want to own one although her collection included far less popular instruments.



The family pet, Rita Breen

Then one day an admirer, looking at her banjos, guitars, mandolins and other pieces which all but fill her little sitting-room, observed the lack of the ukelele and sent her one as a Christmas gift.

Miss Breen looked it over and decided that to keep anything which she disliked so much would bring bad luck. She took it to the store from which she believed it had come, a well-known department store—and asked to be allowed to exchange it for a bathrobe.

This permission was denied her however, the manager suggesting tactfully that the instrument probably didn't come from them in the first place as it was a better one than they usually had in stock, worth the price of their best bathrobe many times over.

Among her father's tenants was a music teacher who had all sorts of instruments and who was frequently asked to select them for his clientele. Determined to get her ill-famed ukelele out of the way, Miss

Breen took it to him with the idea of disposing of it to one of his pupils.

But the eyes of the music master shone when he saw her instrument and strumming it gently played an air of such melody that the girl before him, who had not realized the ukelele capable of such harmony, was impressed and decided to learn to play it, instead.

"I had always thought the ukelele suited only to camp ditties," she said, "or else that harsh foreign stuff that the native Hawaiians play. I saw that I was wrong and that anything might be creditably played upon the ukelele. I took a few lessons. And in a little while it became not only my favorite instrument but the one with which I am now chiefly identified."

She, however, does not tell the whole story. She took a few lessons. And in less than three years she was known as the greatest ukelele player in the country, and the greatest authority on all phases of the development of its music.

She began early to set down the arrangements for the popular airs which she loved to play. These she carried from publisher to publisher asking to be allowed to arrange all their music for the ukelele. But owing to the cost of the new cut, the addition of a new line of notes did not seem advisable to any of them although they were well aware of the superiority of her work.

"The ukelele craze is dead," one of them explained to her. But she held her ground.

"This will revive it," she said stoutly. "It died only because people could not get the music to play and so few of them could stop to make their own arrangements. I promise you that if I am permitted to try this plan your sales

on the pieces I have arranged will increase to a surprising degree."

She finally persuaded them and now no fewer than seventeen music publishers avail themselves of her services to make the ukelele arrangements on their entire output, giving her the exclusive rights on their productions.

When she began to broadcast, letter upon letter poured in to the stations to ask who this marvelous young woman was and whether or not it was a ukelele she was playing, it sounded like something so much more pretentious. A letter from the White House brought special thanks for the enjoyment she had given the Chief Executive who invariably listened in when her name appeared on any program.

Native Hawaiians, visiting this country, touring it very often behind their own ukeleles, freely admitted that she far outshone their own people in her playing.

"Let this little American girl teach us to play our native instrument," they said smiling. The joke was on them.

Nor was their acknowledgment tinged in the least with jealousy. For these natives who so highly praised her playing showed their appreciation with gifts of every description—the many varieties of the native instrument, native costumes and odd trinkets which she prizes as real tribute to her skill.

But just as the Hawaiians are eager to admit that her playing excels their own very often, so does she admit that anyone, if he wishes may play as she plays. To this end she has published books showing her methods of handling the instrument, arrangements of old and loved songs not available elsewhere, and a secret or two of technique which she has discovered and which



May Singhi Breen and her banjo

has affected her playing in such a vital fashion.

Notwithstanding her various activities, music publishing houses by day, and concert or radio work at night, she is nevertheless, to an extent not usually found in an artist, a typical home girl.

She lives with her father and sister and her little ten-year old daughter Rita, who is a ukelelist of much promise.

## M. Berard, Chef de Luxe

(Continued from page 10)

"Every nation has its characteristic foods and means of cooking. Always a definite correspondence can be seen between the diet and the physical appearance of a people. For instance, John Bull and roast beef have long been associated, hinting at the ruggedness of the English people. Climate and ancient traditions are accountable for each nation's dietary peculiarities.

"The United States is necessarily an exception to the rule. It is not only a melting pot of the nations, but it is a potpourri of the food of all nations. Sometimes the food is good, sometimes it is awful, but nowhere else in the world is there so fine a field for the art of cooking. Our domestic foodstuffs are unexcelled, our markets bring us the rarest luxuries from abroad and our people have good appetites and the means to enjoy them.

"With me, cooking is not only a fine art, but a beloved one. I have studied it all my life and I know it from both the practical and the theoretical sides. French cooking nowadays is not appreciated and, due to prohibition, is said not to bring profitable returns. My experience proves just the contrary. It gives the chef an almost unlimited range of choice and so, when properly understood, offers him the widest opportunities to please the public. It has two distinct phases, the artistic and the practical. The object of the first is to please the eye and of the second to please the palate and the stomach.

"To the busy and hurried business man, French cookery is not the thing. In his case, lighter foods should be partaken of, such as milk, white meats, vegetables, fruits and puddings. These

are easily digested and readily assimilated.

"For the heavier meal, the proper leisure is required. This meal must not be eaten hastily and demands for its digesting a greater effort from the organic system. Speaking to the gourmet and epicure, it will be a pleasure to me to show them and convince them of food values and combinations, of the elements of nutrition and of the advantages generally of the real French methods of cooking, combined with attractive and delicious garnishes.

"Never have I been more pleased than when I was invited to talk, via radio, to those interested in cooking. Of course, I gave out several of my recipes and already I have received many letters of thanks and congratulations from radio fans. Most of the

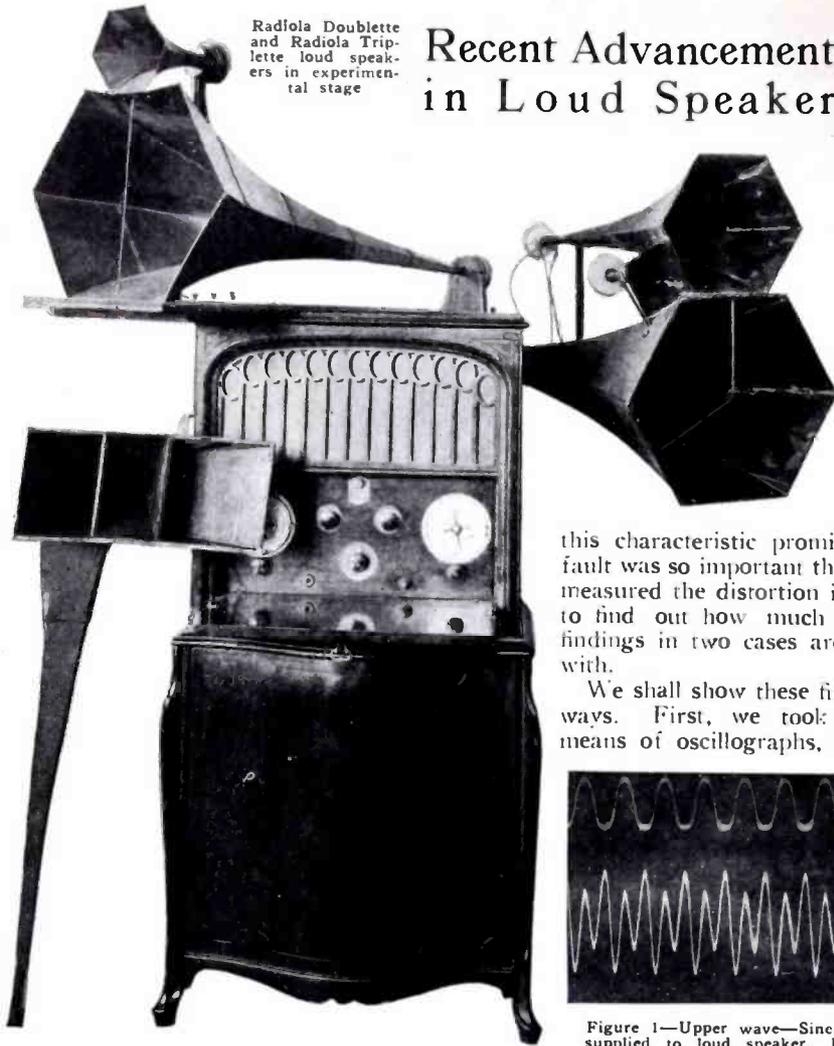
(Turn to page 26)

Radiola Doublette and Radiola Triplette loud speakers in experimental stage

## Recent Advancement in Loud Speaker

# Reproduction

By  
Dr. John P. Minton



this characteristic prominently. This fault was so important that we actually measured the distortion in many cases to find out how much it was. Our findings in two cases are given herewith.

We shall show these findings in two ways. First, we took pictures, by means of oscillographs, of the sound

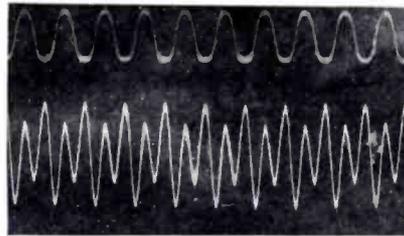


Figure 1—Upper wave—Sine wave current supplied to loud speaker. Lower wave—Sound output oscillogram

**I**N our preceding article we discussed the performance of commercial types of loud speakers and showed the limitations possessed by all of them. These limitations from the point of view of perfect reproduction were two in number. First, energy distribution distortion, and second, spurious distortion. The first limitation is due to the loud speaker not covering the whole audio frequency range with equal sensitiveness. Not enough high frequencies are reproduced and the low frequency sounds are really not produced at all—their harmonics being prevalent. If low frequency currents are applied to the loud speaker they are reproduced with less intensity than are their harmonics because the units and most horns (and cones) are more responsive to the higher frequencies. Our curves on commercial loud speakers given in the last article bring out

waves given off by the loud speakers at low frequency applied currents. One of the oscillograms is shown in figure 1. We analysed this wave after it had been corrected for the characteristics of the testing apparatus and found the following astonishing results: The current fed into the loud speaker corresponds to a pure tone of 270 cycles—just above middle c on

the piano. The loud speaker unit distorted the pure sine wave current, as we call it, by the spurious distortion referred to above. Then the unit and horn distorted the energy distribution in the spurious note by means of the energy distribution distortion. The final outcome was that although we started with what corresponded to a pure tone we finally got out of the loud speaker a very impure note (no tone at all). In this note the second harmonic was over five times as great as the original pure tone itself. The included table shows that even the eleventh harmonic is present to a serious extent.

Tone	Ratio to Fundamental
Fundamental	1
Second harmonic	6.52
Third harmonic	0.79
Fourth harmonic	1.44
Fifth harmonic	0.51
Sixth harmonic	0.05
Seventh harmonic	0.20
Eighth harmonic	0.52
Ninth harmonic	0.74
Tenth harmonic	0.32
Eleventh harmonic	0.40

In the second case we measured the percentage of distortion present. This was done by measuring the total sound pressure at a particular frequency produced by all the tones (fundamental and all) coming out of the horn. Then we introduced a filter in the measuring system so that all of what corresponded to distorted sound was cut out, leaving only the original. The following table gives the results obtained:

Frequency	Percentage Distortion
100 cycles	100%
200 cycles	27%
300 cycles	75%
400 cycles	104%*
500 cycles	86%
1000 cycles	34%

\* The amount over 100% is within the range of the precision of the experimental method employed.

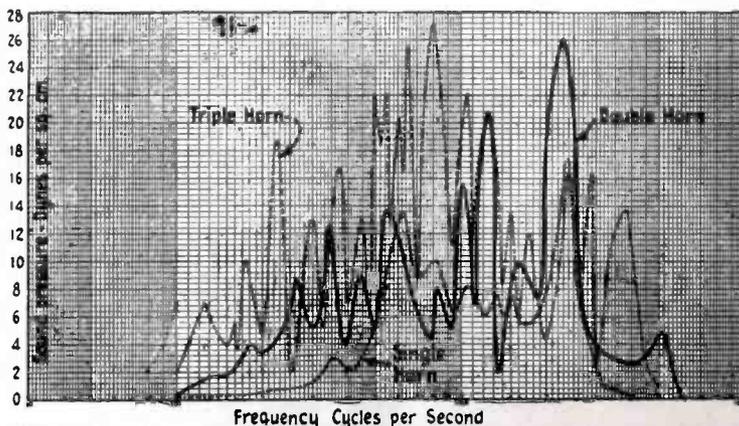


Figure 3—Performance at various frequencies for multiple horns compared with single horn

Not only are high and low frequencies reproduced unfaithfully, but the whole of the intermediate range is not reproduced with the original energy distribution because of the horn and unit resonances. Our curves in previous articles show this well. If the first overtone of a violin note, for example, has a frequency corresponding to a resonant

peak in the unit or horn, then the note may not sound at all like that of a violin.

So two problems were opened up due to the distortion of the first type. We must cover more high and low frequencies and we must cover them more uniformly than we have been able to do in the past. The start of recent developments in loud speakers had their origin right here.

Not only should more high and low frequencies be present and sharp resonance peaks be ironed out, but spurious distortion should be cut down to a minimum. This type of distortion which introduces extraneous sound not present in the original broadcast speech and music should be avoided as far as possible. This opened up the third line of development which we want to discuss in one of our papers. In the loud speaker the horn itself does not introduce spurious distortion; the horn merely modifies it according to the horn characteristics. That is, the horn has its own resonant frequencies and therefore by sympathetic vibrations of its air column the energy distribution of the spurious tones are modified. Of course, if the horn wall should vibrate with sufficient intensity to cause it to rattle, then the horn itself can produce this type of distortion. For ordinary operation, however, the horn does not function in this way. Horns are different and produce different results according to their resonant characteristics which is determined by a variety of factors discussed in our previous papers. These two types of distortion we have discussed have been carefully studied and as a result greatly improved loud speakers have been developed. These we wish to discuss in this and the succeeding article.

The loud speaker problem resembles the wireless telegraphy, telephony or broadcast problems in that a long time was consumed by all investigators trying to get better results by the old methods. Perhaps what was the first glimmerings of wireless telegraph was

expressed way back in 1795 by a Spanish physicist who presented a paper, "On the Application of Electricity to Telegraphy," Dec. 16, 1795, before the Spanish Academy of Sciences. He distinctly suggested a wireless method which, strange to say, eighty-five (1880) years later was found by Mr. J. Gott to work beautifully at the island of St. Pierre.

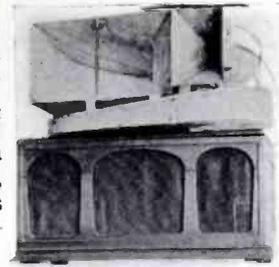
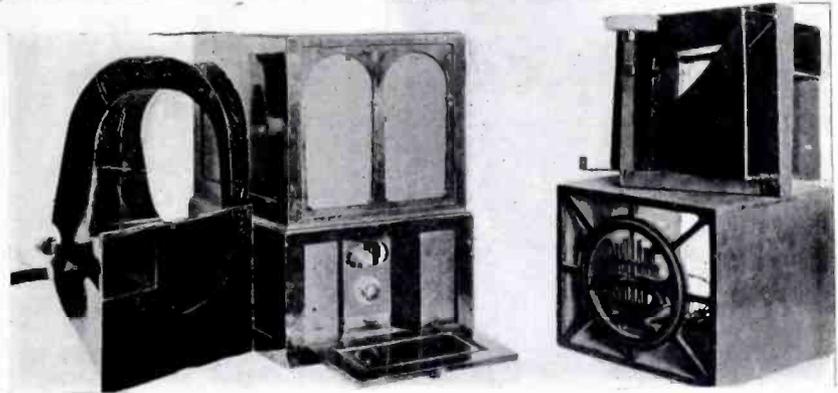


Figure 4.—The Doublette horn bent to fit in a small cabinet



Then about 1835 Mr. J. B. Lindsay had developed the first electric light—long before Edison did. About 1843 or so Mr. Lindsay also invented the first telegraph without actual wires and all the workers who followed him, even up to the very threshold of Hertz's, Righi's and Marconi's great works about 1890 to 1895, patterned their ideas more or less after Lindsay's. New ideas were indeed rare until Hertz's and Marconi's work.

This is more or less true of loud speakers which have been known, I presume, ever since the telephone was invented in 1876. Yet nothing essentially new in loud speakers has appeared until within the last few years. I really think the new work dated from the work of the eminent physicist, Professor Arthur Gordon Webster of Clark University, who died a couple of years ago at the height

of his career. His great contribution to the subject of the horn was published in 1919 in summary form. Much unpublished material, doubtless of real value, of his was lost to the physical and radio world by his untimely death.

Radio broadcast and reception soon after came into being and gave a new stimulus to loud speaker development and study. As in the case of wireless telegraphy, everyone began to try again the old things on loud speakers with the result that no improvement to speak of was brought about. Even today every radio user is on edge to secure a really fine loud speaker. In this field of sound reproduction we have thus far developed no Hertz's or no Marconi's. Perhaps some of those working in this field might pass as Preece's, Trowbridges or Willoughby Smiths.

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Figure 5—The Triplette horn bent and fitted into a cabinet





James Denson Sayers, President of the New York Esperanto Club

# ESPERANTO

as world radio language

By James Denson Sayers

President of the New York Esperanto Club

be a dependable, a confidence-inspiring stability, having back of it an organic law enforced by a thoroughly capable government.

I assume that the readers of WIRELESS AGE are as yet free of prejudices in the question of an AIL (auxiliary international language) for radio. They are desirous only of learning, with as little loss of time as possible, what is what in this new field. They want facts directly and simply stated. And the fact that WIRELESS AGE is presenting the question in such a fair manner should inspire all its readers with confidence.

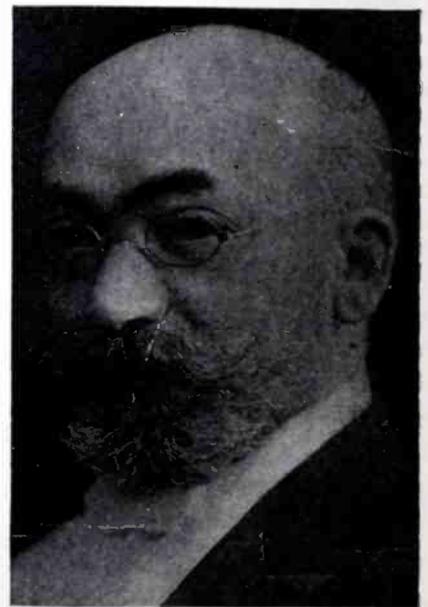
The world, especially that vast portion not included in the Western Hemisphere, stands in vital need of an auxiliary language today, not tomorrow. Dr. Talmey's Ilo, he indicates, is still in a state of flux, unfinished. The experts are still building, working over and experimenting with it. It is evolving much difference from its parent, Ido, and wholly disowns its grandparent, Esperanto.

I will give WIRELESS AGE readers some facts that have in every instance proved convincing, having won out on at least three highly important occasions within the past three years: That of the two-year investigation by the A. R. R. L.; the investigation conducted during three years by the Conference of World Chambers of Commerce, which, just now (May 18th) in its Annual Conference in Paris, has finally decided to urge Esperanto as the common world commercial language; and the consideration given the subject by the year and a half old International Amateur Radio Union, which, by an overwhelming majority (12 countries to 5) decided in its first annual Congress, Paris, April, 1925, to adopt Esperanto as the World Radio Language, in spite of strenuous efforts by one Ildist and two national language advocates.

Dr. Zamenhof was a native of Bielystok, Russian Poland, where five languages were spoken by the populace. Early in his boyhood he was already experimenting with the idea of a universal language. It was an ideal and he worked for and dreamed of it day and night.

With student companions first, and later with more mature co-workers, he studied and experimented in actual practice, pruning away the impractical until in 1887, after fifteen years of intense application, embracing wide research in the field of linguistics, he published the result of his labors under the pseudonym of "Dr. Esperanto," from which the name of the language is derived. "Esperanto" means "One Who Hopes."

Zamenhof was hesitant about publishing Esperanto, even after the years of toil he had put into its construction. He wondered if it were better to withhold it still longer from the public and continue the laboratory work. But knowing that popular usage would be the best pruning hook and vitalizer, and believing that all the basic elements for the building of a perfect language were already applied in his work, he gave Esperanto to the peo-



Dr. Zamenhof, who constructed the auxiliary international language Esperanto

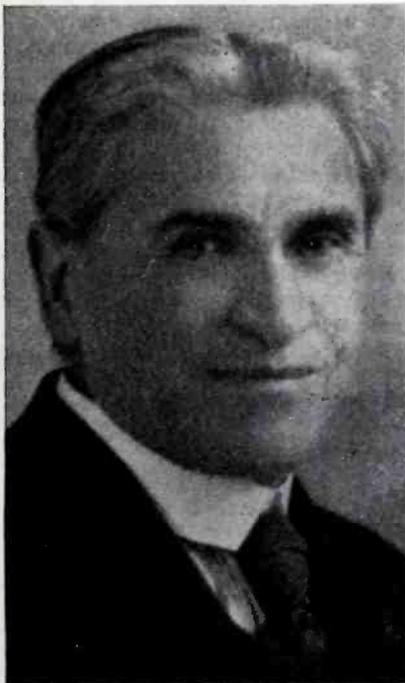
ple. As he had foreseen, there came forward many who had theories for betterment, or objections to certain features of Esperanto. They didn't like the suggestions; they fumed furiously over the marvelous point of

IN considering any question argumentatively it is best to clear the ground by establishing a premise upon which, or around which the discussion is based. In presenting in these articles the case of Esperanto as against Ilo or Ido, the latter having been presented by Dr. Max Talmey in three articles appearing in the April, May and June numbers of WIRELESS AGE, I would like to establish here just what my premise is.

The requirements for a universal language, and more especially so for radio, are these: It must, first and foremost, be a strong language, that is, one with vowels clearly distinguished from each other and with consonants so strong that likelihood of confusion is reduced to a minimum. If the chief object in constructing a language be euphony and softness, then let it aspire to the conveyance of operatic melody, where less importance is attached to its comprehensibility; but when, as in radio, the quality for conveying thought and not mere musical sound, is the chief demand, such a language is bound to lose in competition with a stronger one. Secondly, the radio language, to be universally acceptable to the millions who use radio, must be extremely simple, uncomplicated in grammar, with no exceptions to rules, as easy of pronunciation as possible, consistent with the first requirements of strength, and the less the number of arbitrary words to burden the memory with, the better. (Remember this last, for it is of the utmost importance in considering Ido, or Ilo, as compared with Esperanto. I will take up this point later.) And, thirdly, there must

genius in the language, the accusative "n;" they hated the wonderful table of systematized correlatives; they disliked this and they had an improvement for that.

Dr. Zamenhof refused to submit Esperanto to their whims and fancies. He and the cooler heads among the adepts of Esperanto devised the excellent governing bodies of Esperanto, the duties of which are to guide the development of the language conservatively and safely. On innumerable occasions Dr. Zamenhof made it clear that he did not consider Esperanto the *ultra non plus* of perfection, but he was exceedingly firm in his insistence that the continued development of the language must be conducted under a central, capable authority in order that the standard of Esperanto should be the same throughout the world, uninterrupted by myriad, chaotic proposals from any and everybody. I want to conclude this first article with an outline of the Universal Esperanto Association (UEA), its organization and provisions for initiating and adopting improvements in the language.



Joseph Silbernik brother-in-law of Dr. Zamenhof and chief New York City delegate to the Universal Esperanto Association

But before going to the concluding portion, I would like to state what I believe is the position of every Esperantist who has become fairly conversant with his movement. Realizing the work yet to be done in making a language meet every fine requirement of rapidly expanding modern speech for use by all the races of men, we respond warmly to every suggestion of improvement. We read and con-

tribute to the "Open Forum" (Libera Tribuno) columns of our journals where these proposals are published and criticized. We find merit sometimes in the criticism of the Idists and Illists and would like very much to meet and consider with them how to best secure application of their ideas.

We have no objection to Dr. Talmey or any number of persons carrying on experiments, even if they do use Esperanto elements in their work, but we submit that it is incorrect to represent Esperanto in unnatural combinations of ch's, sh's and oj's piled together in a horrifying array that never did and never can exist in any sample of Esperanto literature? I refer to the specially prepared examples on page 27, May WIRELESS AGE.

The following information about the organization and government of Esperanto is taken from the 1924 Esperanto Year Book, a volume of over 300 pages.

**GENERAL ESPERANTO COMMITTEE.** Consists of six members, elected for three-year terms by the Permanent Council. The Central Committee looks after the general interests, business, Congresses, etc., of the organization. The active head of this committee, therefore the general director of activities of the Esperanto organization, is Dr. Edm. Privat, who is also editor of *Esperanto*, the official organ, 12 Boulevard du Theatre, Geneva.

**PERMANENT COUNCIL.** Consists of one representative of each national organization of Esperantists. President of this Council is John Merchant, Meersbrook Bank, 43 Cliffesfield Road, Sheffield, England.

**UNIVERSAL ESPERANTO ASSOCIATION (Universala Esperanto Asocio),** headquarters office 12 Boulevard du Theatre, Geneva, Hans Jakob, general secretary.

**INTERNATIONAL LANGUAGE COMMITTEE.** This body consists of experts in the language, chosen to represent as widely diverse national language groups as possible. Its number is unlimited, consisting at present of 111 members, representing 22 different national language groups, both Occidental and Oriental, China and Japan being represented. The members are elected for terms of 9 years. The candidates for the Committee are chosen for their competency, by the supreme commission of Esperanto, the Academy. The different national or sectional societies have the right to present candidates, which generally amounts to their election. The Language Committee itself, after investigation of the competency of the candidates, elects new members by majority vote.

The purpose, or duties of the Language Committee are: To conserve



Paul Painleve, twice prime minister of France, who, in a recent statement, declared he had supported Esperanto for 15 years because he believed it to be the solution of the problem of an International Auxiliary Language

the fundamental principles of the Esperanto language and guide its development. It therefore investigates all linguistic questions and decides them in accordance with the said basic principles. It is important to note in the 1924 Year Book, in the statement of rules for the Language Committee, this sentence: "In no way can the Fundamental Principles, nor the Language Committee be a bar to the normal evolution of the language; instead, they assure such evolution." But they assure that this evolution will be conservative and standard throughout the world. They realize that we are building for ages to come.

**THE ESPERANTO ACADEMY.** This is the supreme linguistic authority of Esperanto, the final arbiter in all questions concerning the improvement and evolution of Esperanto. Its members cannot at any time exceed 18 in number. They are chosen for their especial competency from among the members of the Language Committee by majority vote of the latter. They are all scholarly men by profession outside their Esperanto activities. The President of the Academy is Prof. Th. Cart, 12 Rue Soufflet, Paris V, France. The work of the Academy is divided among its members. Some specially fitted for such, have charge of the technical vocabulary, others of the regular literary vocabulary, others of the grammatical section, while still another sub-committee has charge of reading new works.

# TRIPLE TORUS TUNER

By K. M.  
MacIlvain

A multi-stage radio frequency receiver  
that maintains stability

SINCE the advent of broadcast receivers having multi-stage radio-frequency amplifier units ahead of the detector there have been many theories advanced as to the best method of maintaining stability in the radio-frequency amplifier.

The problem has been attacked from various angles and radio engineers in general are agreed that it is not the capacity coupling between stages, alone, nor the inductive coupling, alone, that causes unstable operation. It is the combination of the two.

In the neutrodyne receivers, attention has been centered upon a method of neutralizing the capacity coupling between stages and the secondary thought seems to have been the elimination of inductive coupling, for the coils in a neutrodyne receiver are tipped at a definite angle from the horizontal plane so that the lines of force emanating from one coil will pass through the neighboring coils in such a direction that these lines of force will be parallel to the turns of wire in the coil that they pass through and thus tend towards zero coupling.

Experimenters soon learned of the difficulties involved in placing each of the tuning coils at the "zero coupling" angle. This angle is a definite and critical point and considerable ingenuity is required to get it exactly right. You see, in the type of coils that are

used in the neutrodyne type of receivers, a large stray field is produced around the coils by the currents flowing through the turns of wire of which the coil is composed. The problem, then, is to eliminate the effect of the stray field after it has been produced.

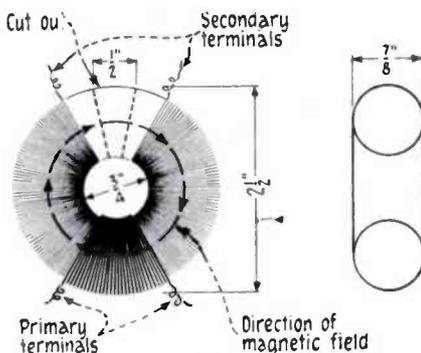


Figure 1—The torus coil and method of winding

In the torus receiver, the problem of attaining stability has been approached from an entirely different angle. In the first place attention has been centered on the elimination of undesirable inductive coupling and the idea involved is to so construct the radio-frequency transformers that currents passing through the windings will not produce a large stray field, thus the coils can be placed in any convenient position with-

out any regard to angular displacement.

In the second place, the thought involved in this receiver is, that, if the inductive coupling is reduced to a great enough degree, the capacity coupling, under many operating conditions, will not be great enough to produce instability and therefore no attempt to eliminate capacity coupling is necessary.

A summary of the first part of this article is as follows: It is the combination of capacity and inductive coupling that causes a radio-frequency amplifier unit to become unstable.

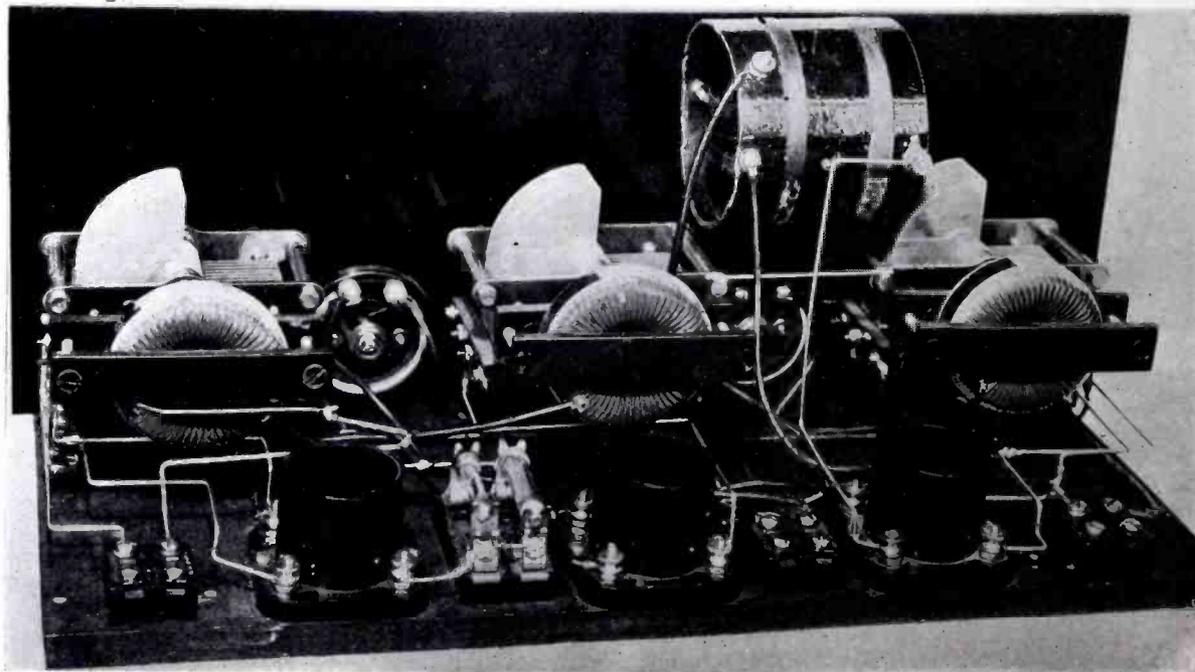
Therefore, in the course of design, attention may be centered on the elimination of one or the other or both capacity and inductive coupling.

It follows, however, that in those instances where a method of neutralizing capacity coupling is effected, it is also necessary to establish some system for eliminating inductive coupling as well.

On the contrary, where inductive coupling is eliminated, this, in the majority of cases, is sufficient to establish a stable condition of operation without any thought for capacity coupling.

Does it not seem logical, then, to center our efforts on the application of coils in our radio-frequency unit that will have a small enough stray field to effect very little coupling between successive stages of radio-frequency amplification.

The radio-frequency transformers



Rear view of the Triple Torus Tuner

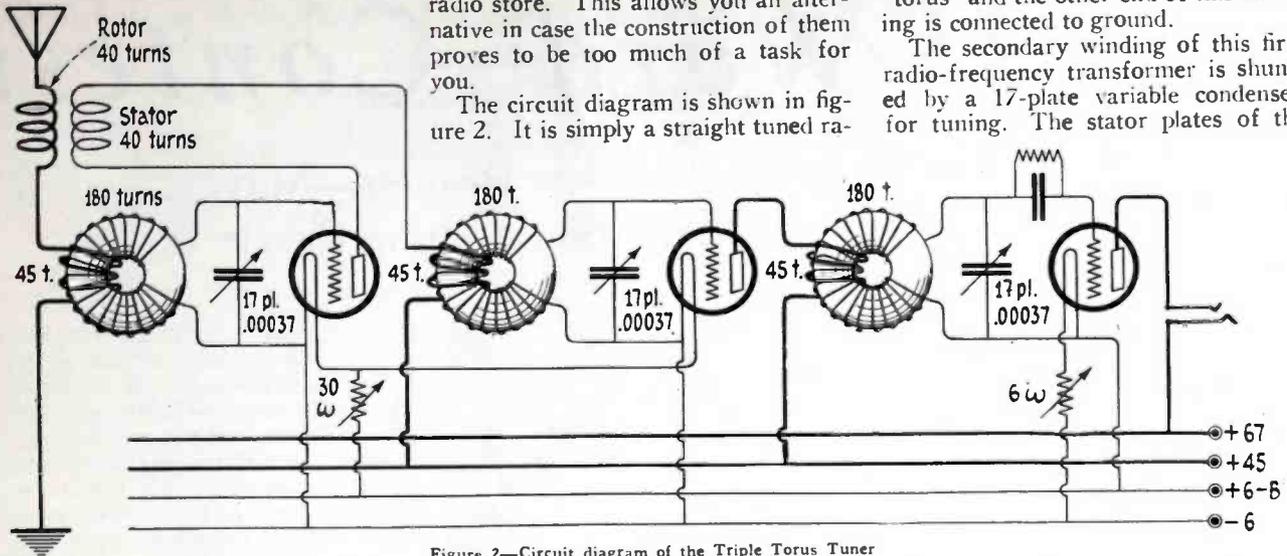


Figure 2—Circuit diagram of the Triple Torus Tuner

used in this circuit are constructed in the form of a torus. A torus is a toroidal coil of circular cross section as shown in figure 1 and the magnetic field around this coil is also shown in figure 1.

As you see from the sketch, the field is not external to the coil but passes right through the center of the core, so, in this case, instead of producing a large stray field and then attempting to eliminate its effect, we have eliminated the large stray field to start with and therefore do not have to worry about getting rid of its effect.

I have enjoyed the use of a receiver of this type for some time, but refrained from writing an article about it, due to the amount of time and patience required in the construction of these toroidal transformers. However, at the present time these transformers are being built commercially and you will be able to buy them in any large

radio-frequency circuit with a feed-back system applied to the first tube.

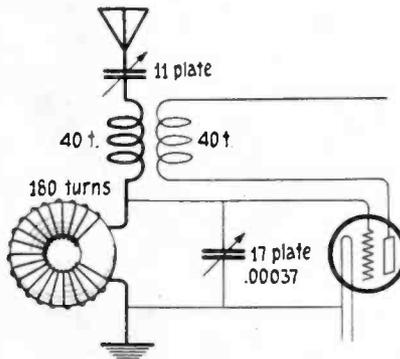


Figure 3—The antenna connection of the first transformer

The antenna lead is connected to one end of the rotor winding of a coupler, the other end is connected to one side of the primary winding of the first

“torus” and the other end of this winding is connected to ground.

The secondary winding of this first radio-frequency transformer is shunted by a 17-plate variable condenser, for tuning. The stator plates of the

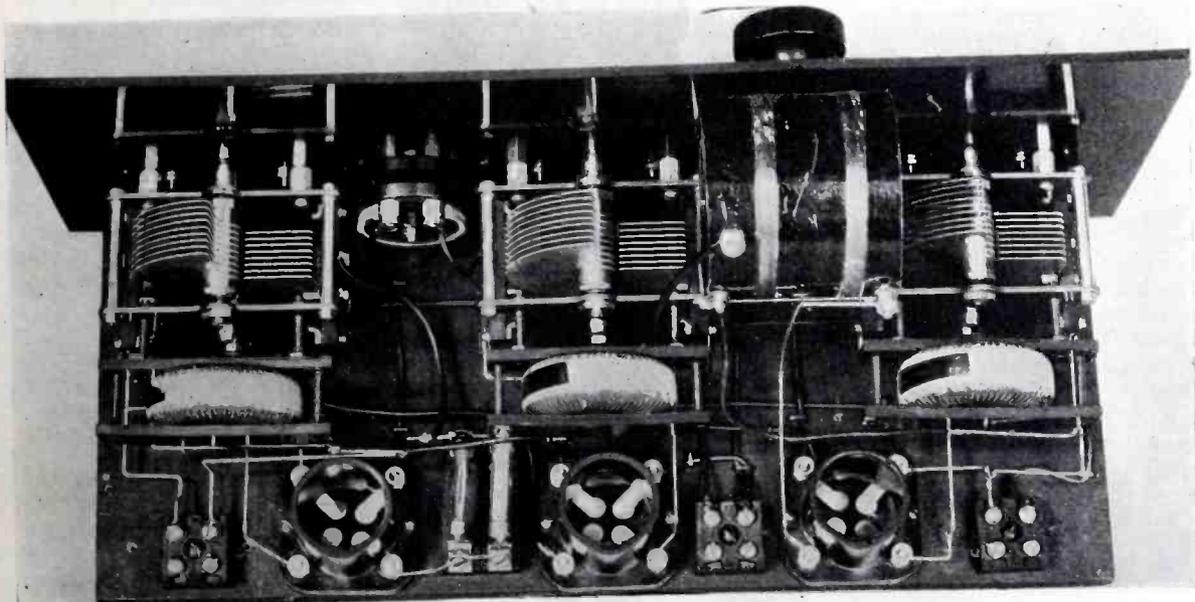
condenser are connected to the grid of the first radio-frequency amplifier tube and the rotor plates of the same condenser are connected to the negative filament terminal.

The plate of the first tube is connected to one end of the stator winding of the coupler and the other end of this winding is connected to one side of the primary winding of the second “torus.” The other side of the primary winding of this second transformer is connected to the positive “B” battery lead.

The secondary winding of this transformer is also tuned by a .00037 mfd. (17-plate) variable condenser and here again the stator plates of the tuning condenser are connected to the grid and the rotor plates to the filament terminal of the succeeding tube.

The plate of this second radio-frequency amplifier tube is connected to

(Turn to page 58)



Top view of the Triple Torus Tuner

# Cross Word Contest

Comments of Wireless Age Readers—May Contest Winners—Solution to June Puzzle

IT IS not necessary to be a cross word puzzle enthusiast, nor even interested in such contests to appreciate the thread of human interest running through the hundreds of letters received by WIRELESS AGE in answer to a request for suggestions toward improvement.

We were impressed mostly with the one general thought which seemed to be in the minds of readers, whether in Maine or California, Florida or Washington, and that thought conveyed to us in the majority of letters was to the effect that WIRELESS AGE needs no improvement—it's just right!

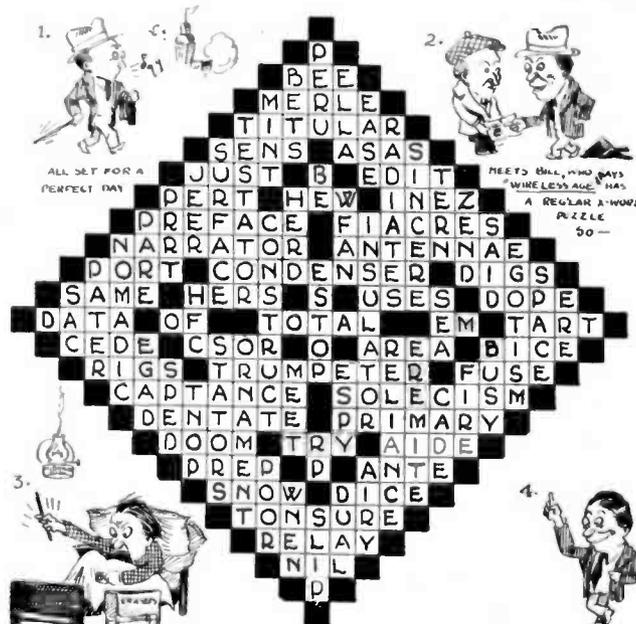
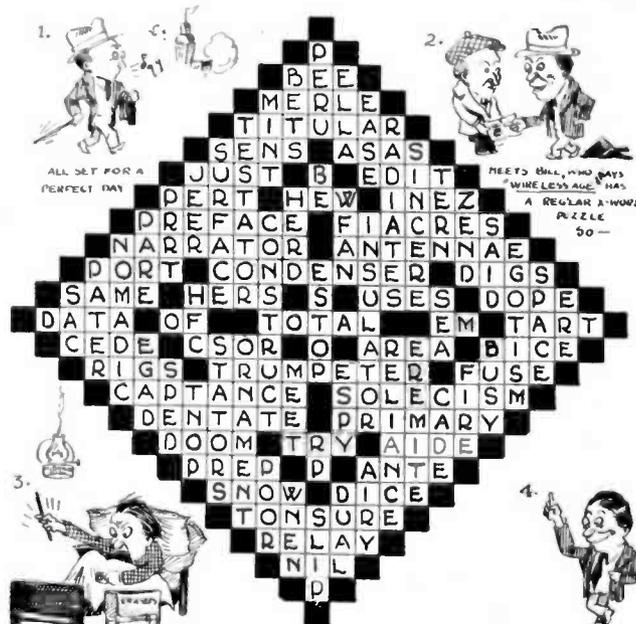
"Suggesting an improvement in WIRELESS AGE from the readers' point of view is a contest in itself, let alone a cross word puzzle thrown in. "My only suggestion is a page of radio humor," writes George William Bruffey of Washington, D. C.

Miss Inez M. Peck of Lynne, Conn., says that the May issue contained such an interesting variety of articles to appeal to all types of readers it made it too difficult for her to suggest improvement.

"WIRELESS AGE covers the radio field so efficiently that to suggest any improvement seems almost impossible. The only fault I can find is that the time between numbers is too long," says H. Peyton Hopkins of Quincy, Mass., who adds the suggestion that the magazine be published twice a month.

This same idea came from several others including Tom A. Carr of Newport News, Va., who sent a wonderfully executed solution, but with two errors; and Earl Fenner of Columbus, Ohio, who says: "I think the magazine is well balanced, but why not publish it twice a month with a few more hook-ups?" Too bad Earl made six mistakes in the puzzle.

"In checking up the merits of WIRELESS AGE from a radio fan's viewpoint, I don't see how much could be added to make it any more interesting than it



ALL SET FOR A PERFECT DAY

MEETS BILL, WHO SAYS "WIRELESS AGE" HAS A REGULAR A-WORD PUZZLE 50-

WENT INTO THE NIGHT GETTING HOT SPRINGS AND CHILLY, OUT -

I DID IT BY GOSH AND SENT 'EM A LETTER REWDS

The contribution from Hubert Uhlmann, who won first prize

only pays a nice compliment, but gives a real practical suggestion: "WIRELESS AGE cannot be improved. Technical articles are lucid; yarns are interesting and amusing, and there is a human interest which is lacking in other radio publications. The giving of free blue print supplements of the set described in the current number, either by coupon or enclosure would enhance the value of WIRELESS AGE."

From Clovis, New Mexico, H. L. Marsh writes: "WIRELESS AGE is our favorite magazine. News dealers never order enough." From New Haven, Connecticut, Mrs. J. P. Earle writes: "Your magazine strikes me as being up to the minute," and adds that more space should be devoted to the women. Mrs. A. A. Rooney of Buffalo, N. Y., also suggests catering more

to the ladies. M. B. Fletcher, Detroit, Mich., says: "Having given deep thought to improvements in WIRELESS AGE, it seems, Mr. Editor, that you are covering every branch of the most wonderful present day invention—Radio, and as I deem your magazine the most perfect printed for radio enthusiasts, will say, one cannot improve Perfection."

## SOLUTION TO JUNE PUZZLE

Winners will be announced in AUGUST WIRELESS AGE



C. F. Burrell of Louisville, Ky., writes: "If all your readers feel as I do, I don't see how you are going to receive many suggestions of improvement to your excellent magazine." He would like more articles of a light technical nature and to have boys in experimental laboratories tell of their troubles and how overcome, and ends with a request that future puzzles be placed so that a good article would not have to be cut and ruined. Several others made the same request, one asking that advertisements be placed on the opposite side of the page. Why cut the puzzle out? It is very easily copied either by typewriter or hand or the words may be listed, then the entire magazine may be preserved. "The WIRELESS AGE is a magazine

which could be considered almost at the pinnacle of perfection. It leaves very little chance for criticism or suggestion for improvement either in its typographical effect or in policy," writes Emile P. Planquette of Brooklyn, N. Y., whose letter consists mainly of suggestions for the classification of reading matter and advertisements, which were excellent.

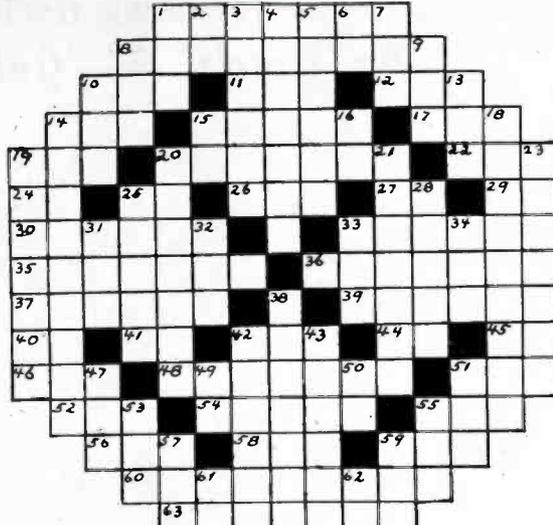
"Off hand it would seem easy to suggest improvement," writes R. F. Joiner of Mt. Pleasant, Mich., "but after studying WIRELESS AGE from cover to cover it seems to be about all that a radio magazine should be."

"Painting a lily white," is proverbially easy compared with constructive criticism in improving the service rendered by WIRELESS AGE," is the rather poetic compliment received from Canada in a letter from J. A. Reen, Esq., Montreal, Que.

# COUNTRY CROSS ROADS

Composed by Helen F. Dittus

Solutions mailed to WIRELESS AGE will be checked and the correct ones listed in August issue.



### HORIZONTAL

- 1—Used instead of headset.
- 8—Electrical measuring instrument.
- 10—Top.
- 11—Dit Dit Dit Dit; Da Da; Dit.
- 12—Put on.
- 14—Perish.
- 15—Not suitable.
- 17—Broadcasting station in New Jersey.
- 19—Procure.
- 20—Authors.
- 22—Dress fabric.
- 24—Pronoun.
- 25—Parent.
- 26—Da Dit Da Dit; Dit; Dit Da Dit.
- 27—Forms plural of some nouns.
- 29—Point on compass.
- 30—To regard with respect.
- 33—Effective motion.
- 35—Receives.
- 36—Aerial.
- 37—Bane of radio fans.
- 39—Crude borax.
- 40—Ordnance Officer.
- 41—Tin (Latin Abbr.).
- 42—Army Medical Staff.
- 44—Lieutenant (Abbr.).
- 45—New Testament.

- 46—Dit Da Dit Dit; Dit Da Dit; Dit Dit.
- 48—Kind of fish.
- 51—Chilling.
- 52—To scatter seed.
- 54—Astringent.
- 55—Beverage.
- 56—Negative.
- 58—Form of verb to be.
- 59—To lubricate.
- 60—Collector of electrical energy.
- 63—A tailor.

### VERTICAL

- 1—Turf.
- 2—Poet Laureate.
- 3—Pertaining to races or people.
- 4—Measures current.
- 5—Piece of iron used to close circuit of horseshoe magnet.
- 6—Suffix meaning little.
- 7—A color.
- 8—Strive for superiority.
- 9—A line or file.
- 10—Illuminated.
- 13—Negative conjunction.
- 14—Converts oscillations into direct current.
- 15—Ireland (Abbr.).
- 16—Radio code for position report.
- 18—Exists when current is in phase with voltage.
- 19—The fire-opal.
- 20—Fertilization of estuary land by flooding.
- 21—Capable of being cut.
- 23—Legal punishment.
- 25—Encounters.
- 28—Assessment.
- 31—Dit Dit Dit Da; Da Dit Da Dit; Dit Da.
- 32—And so forth.
- 33—Insect.
- 34—Incorporated (Abbr.).
- 38—Unit of current (Plur.).
- 42—An arched gallery.
- 43—Fabulous nymphs of Southern Italy.
- 47—Electrical unit.
- 49—Dit Da; Dit Da.
- 50—Knight of Bath (Abbr.).
- 51—Sick.
- 53—Broadcasting station in Iowa.
- 55—Atmosphere.
- 57—Summit.
- 59—Poetic contraction of over.
- 61—Universal radio abbreviation for number.
- 62—Point of compass.

Mr. G. W. Teale of Bethlehem, Pa., offers a practical suggestion: "It is difficult to improve your magazine from the standpoint of general interest, but would suggest that your editorial department, in the parlance of sport 'bear down' on the following subjects: Careful tuning to avoid 'Blooming.' Man-made interference. Interference from power and light company systems. The idea being to secure co-operation of all toward eliminating interference in general."

The most unique suggestion comes from Pittsburgh, Pa. It is to the effect that the magazine eliminate all advertisements, thereby allowing more space for reading matter.

The interest displayed by our readers in these contests have been encouraging to the editorial staff and the valuable suggestions offered will be worked out wherever it is practical to do so.

# THE PRIZE WINNERS

IT was a difficult task for the judges to select the winners from such a large batch of creditable letters and solutions, but they finally came to the following conclusion:

The first prize, a three-tube radio receiver, is awarded to Hubert Uhlmann, Grand Rapids, Mich. Not only was his solution the most clever, but his letter contained several suggestions of practical value.

The second prize, two 201A Radiotrons, goes to Dwight A. Bancroft, operator 9SE, Minneapolis, Minn., whose solution is a real work of art and who offers a meritorious suggestion.

The third prize, pair Brandes headphones, is passed to Clyde T. Haines,

Baltimore, Md. His solution and suggestion was highly creditable.

Fourth prize, Hammarlund condenser, to W. C. Green, Detroit, Mich. His letter is printed elsewhere in this section.

Fifth prize, Accuratune dial, to J. H. Alexander, Jr., Brooklyn, N. Y.

Next five prizes, subscriptions to WIRELESS AGE, are awarded to: Charley R. Estes, Brunswick, Mo.; H. F. Kuhlmann, Milwaukee, Wis.; C. W. Knapp, Fulton, Mo.; F. R. Underwood, Washington, D. C., and Alex Punton, Munhall, Pa.

A few of the others in order of merit, but who did not win prizes are: George C. Haseltine, Fort Stockton, Texas; Dan C. Williams, Terry, Miss.; W. McClara,

Los Angeles, Cal.; John Wasilik, Jr., Franklin, N. C.; Howard Deane, Rochester, N. Y., and William H. Rumpf, Ann Arbor, Mich.

E. W. Mayer, U. S. N. Radio Station, San Juan, Porto Rico, sends several good suggestions, but made five errors in the puzzle. One of his suggestions is to reinstate the "Afloat and Ashore with the Operator" department. N. B. Ellis, radio operator, S. S. Saucon, makes the same suggestion.

Seward, Alaska, was the furthest point heard from and the solution submitted by Guy D. Barnett was correct.

Practically all the remainder of replies received contained from two to a dozen mistakes in the solution.

# the STRAND QUARTETTE

interviews itself

By Golda M. Goldman

AFTER I had been made very welcome and as comfortable as the narrow confines of the dressing-room would permit, the Strand Quartette grouped themselves about me. They were in various stages of attire as I had descended upon them immediately after they had left the stage and they were just getting ready to go home. One was collarless, one had changed into street clothes except for his make-up, and the others were still in full stage regalia; and then I exploded a bomb shell.

"Go ahead," I said, smuggling down in my chair, "go ahead and interview each other." The four gentlemen looked first surprised, then pained, and then decidedly pleased. Here was undoubtedly an opportunity to reveal each other's eccentricities, and they were all ready for the fray.

The first to recover his balance was John Young, the tenor, and he immediately decided that Frank Mellor, his companion tenor, would be his victim, so the party started off like this:—

John: Frank, where were you born?

Frank: Why I was born at Sykeville, Maryland, about 30 miles from Baltimore, and the height of my ambition was to get to Baltimore.

John: And what did you do when you got to the big town?

Frank: Why the first thing I did was to win a four years' scholarship to the Peabody Institute with John Charles Thomas, and then I did church and concert work, and finally went on to Detroit to do concert work there.

John: It seems to me you are leaving out a pretty important fact. Didn't you get married in Baltimore?

Frank: I certainly did. I met a girl in Grace Church in Baltimore. We got

married and went to Detroit where we did concert work together for three years. Then I came on to New York and sang in the Beth El Synagogue and in the old First Presbyterian Church. For the last four years I have been in the Strand Quartette.

Here the interview was broken in upon by George Reardon, the baritone, who wanted to know, "What kind of

"At twenty-one my greatest ambition was politics. I served on the Local Board of Aldermen, and I remember I was flat-busted, and we had to buy a \$65,000 bridge for the city. My greatest ambition however, was always to belong to a male quartette. My wife? Oh yes indeed, I have a wife too. In fact, we're all single here except three. When I was home in

Chicopee, I was probably the best baritone in town, and I knew that New York was calling me. So I came to the big city and I found it was surprisingly full of young fellows who had been the best baritones in their town. Another thing that disappointed me was that at home I read the "New York Journal" and I expected to see a couple of murders weekly in New York. It was a sad day for me when I made up my mind I wasn't going to see any. Say, that's enough about me; you tell about yourself, John."

So John Young boasted proudly. "I am the only New Yorker of the lot and was born not far from the Strand Theatre, down in Eighteenth Street." "Lived there all your life?" asks George hopefully. "Not yet!" answers John, "When I was a kid, up above Fifty-ninth Street was the country. I have seen some changes in this part of the town!"

Then up spoke the quietest member of the quartette, Frederick Thomas, the basso. The boys attributed his quietness in their company to the fact that he is the only unmarried man in the lot and can talk when he pleases and they can only talk when they are away from home. Wives please take notice! Mr. Thomas wanted to know, "John, if you had your life to live over

(Turn to page 31)



The Strand Quartette

music do you like best, Frank?" Frank pleaded guilty to liking the good old songs best and here his associates joined in heartily.

Mr. Young then decided that a few tales ought to be told about Mr. Reardon; so he proceeded to give out the information. "George was born in the village of Chicopee, Mass., a suburb of Springfield," but here George took it away from him.

# A BIRTHDAY ANNIVERSARY AT

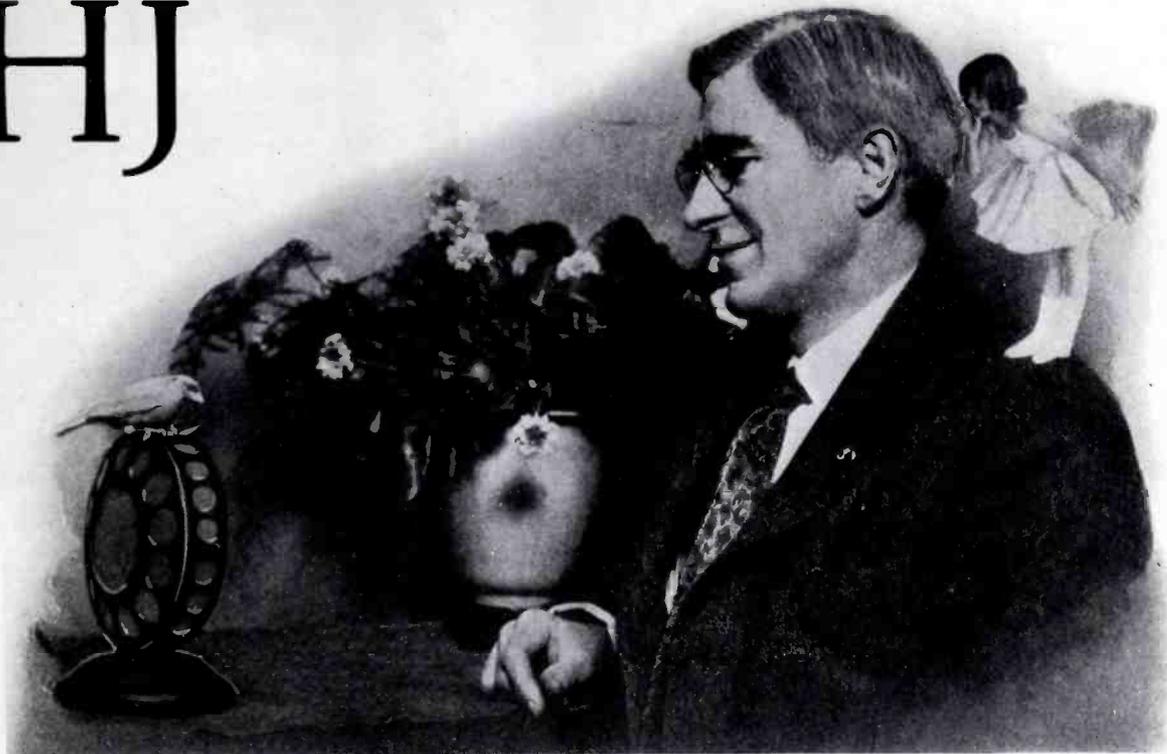
Uncle John,  
KHJ's announcer

# KHJ

By

Dr. Ralph

L. Power



LAST April the Southern California's oldest 500 watt-er had a birthday anniversary. Uncle John, KHJ's announcer, has been on the job since the inception of the station and the three canaries, Kindness, Happiness and Joy (standing for K—H—J), are known throughout all of radioland.

Every night, except Sundays, from 6.30 to 7.30 the children's hour comes on the air from the Los Angeles station and it has many unique features.

For instance there is a little story on American history told by Walter Sylvester Hertzog, and he hasn't missed a lecture in the past nine months.

And another feature of that hour is little Queen Titania, who is known as the Fairy of the Microphone. For nearly two years now she has appeared in a continuity program every Tuesday night on the children's hour, and her father, who also takes part in the program, is known everywhere as the

Sandman has also served for that time.

So the third anniversary program of KHJ was a big celebration that the Sandman had arranged for Queen Titania and Uncle John.

Sharing honors with the little queen was Betty Bronson, the Peter Pan girl, in the evening program that started at eight o'clock as an "Evening of Fantasy."

Many of the old KHJ favorites were there also—Calmon Lubovisky, violinist; Claire

Forbes Crane, concert pianist; Grace Curry, harpist; Melba French Barr, soloist; Louis F. Klein, auto harp; Joseph Heindl, flutist, and more than two score folks who are known to radio fans everywhere.

One of the most interesting parts of the birthday party of KHJ was the part taken by Betty Bronson and little Queen Titania—both of whom are known in screenland as well as in the vast world of radio.

So another milestone of the Los Angeles pioneer station goes down in history. KHJ has welcomed and entertained many famous guests during its brief history and Uncle John is known as a king among hosts.

When the station was but an infant Douglas Fairbanks and Mary Pickford made their radio debut in that studio on the roof of the Los Angeles Times Building. Mary Garden took part



Queen Titania and Betty Bronson, the Peter Pan girl, as they appeared on the anniversary program



The morning mail from some of Queen Titania's admirers

in one of the KHJ programs two years ago and sang for the first time over radio in Los Angeles. Likewise, Herbert Hoover, secretary of commerce, made his first Los Angeles radio address from KHJ.

Carrie Jacobs Bond, famous Amer-

ican composer, and Charles Wakefield Cadman, interpreter of the music of the American Indian, both artists of international reputation, are frequent KHJ entertainers.

When Curtis Wilbur, secretary of the navy, was in the Pacific South-

west less than a year ago he journeyed to KHJ for his first Los Angeles radio talk and the guests took part in a huge watermelon feast presided over by Uncle Remus, KHJ's comedian. The microphone was left open and radioland received a big thrill.

## M. Berard, Chef de Luxe

(Continued from page 15)

letters ask me to send recipes to the writers and this I intend to do. For many years I have worked to achieve an interest on the part of the public in this important work, and I believe that beyond a doubt radio will be the means of best furthering the publicity necessary to arouse interest."

M. Berard is not the first of his line who have followed the vocation of cooking. His uncle was for twenty-nine years chef to Prince Radziwill. The uncle's assistant was capable of making decorative figures only by the use of molds. There was a splendid party planned and, with but a few hours left, the assistant had the misfortune to break a wonderful horse of tallow which was to crown the feast. Consternation reigned until Pierre, who was visiting his uncle, offered to carve one for them. The uncle, pleased and amazed, watched his

nephew work, proud of his ability as an artist, but when the work was finished he begged Pierre to follow in his footsteps and be a chef and use his ability as a sculptor to beautify his work, to delight the eye as well as the palate, all of which is a good chef's job.

So Pierre studied at Ville-neuve-Loubet, the home of the famous chefs, and at the Beaux Arts for three years, and afterward a year in England. Truly an artist is Chef Berard, capable of delicate sentiment. He fashions roses from petals of wax that look as though the dew were on them, and the plaster pattern over which he shapes the leaves of the roses brings memories of a sister who lived in England and who used to write to him and inclose flowers in her letters. These were treasured and the plaster shapes made from them, so that now each rose which decorates an imposing

delicately tinted mound of pastry or confectionery has lurking in its petals a memory.

His wife, too, is an inspiration to him and the model for the sculptured figures with which he decorates some of the goodies. He showed us a number of sketches which he had made of her. These he keeps in a scrap book containing many interesting pages. Here are some more flowers, which were picked, dew-drenched, years ago in Nice, some by an assistant long ago under the sod of France, and used at that time as inspiration for decorative ideas. Here also we find the history and names of dishes which date back to ancient Egyptian days. Another book lists, in M. Berard's handwriting, the names of all conceivable kinds of edible fish, and the seasons when they are in their prime. So with vegetables,

(Turn to page 42)

What the layman should know about

# HIGH FREQUENCY

By J. E. Smith

President National Radio Institute

THE average radio enthusiast has a very hazy notion of what goes on in his radio receiver. He may have familiarized himself with the function of the various elements of his set, but without a basic conception of just what radio frequency or high frequency currents are, he cannot visualize all the explanation in the world. Even some technical experts, thoroughly familiar with the design of apparatus, are not always able to make clear to the novice just what the differences are between high and low frequency currents, beyond stating that high frequency currents are of very much higher frequency than low frequency currents.

The distinction between these two kinds of electric currents and the properties which they possess is as marked as the difference between heat and light waves. It is easier to observe the difference between heat and light waves because they cause response to different sets of nerves in the body. But electric currents, whether of low or high frequency, cannot be seen and even if they did cause some form of response to the eye, it would be of such infinite rapidity that distinctions would not be possible.

If you pass a low frequency current through a pair of headphones, it causes an audible sound, its pitch depending upon the frequency of the current. A high frequency current, passing through headphones, causes no sound, for two reasons: first, it is mechanically impossible for a telephone diaphragm to vibrate a million times a second or more, and second, if it could, the ear would not respond to the air vibrations thus set up, because frequencies higher than 7,000 to 10,000 do not cause any impression upon the nerves of the ear.

Low frequency currents are often spoken of as audio-frequency currents, because, when converted into sound waves by a telephone receiver, they cause an audible response. The terms low frequency and audio-frequency are therefore synonymous.

In general, low frequency currents are less than 10,000 cycles, and high frequency currents more than 10,000 cycles. In practice, however, we rarely encounter high frequency currents of less than 100,000 cycles or alternations per second, while broadcast

transmitters operate at frequencies between 550,000 cycles to 1,350,000 cycles. For convenience, a unit of kilocycles, one of which equals 1,000 cycles, is used. Thus the broadcast band is from 550 to 1,350 kilocycles.

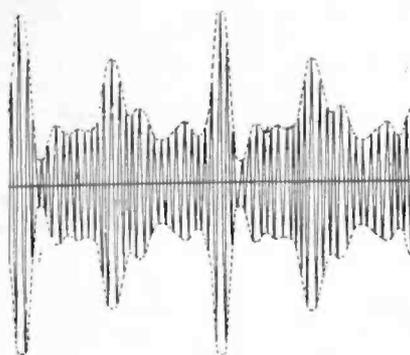
Now let us consider the electrical difference between low and high frequency currents. If we charge and discharge a condenser with a low fre-

ser. In order to improve the radiating properties, the condenser used is a very large one. Usually the ground or earth is used for one plate and a highly elevated mass of wires, known as the aerial, forms the other plate. This elevated and widely spaced capacity causes the maximum disturbance or radiation in the ether medium, thus giving maximum sphere of influence or range for a given amount of power.

Do not assume, however, that high frequency currents travel through the ether. They set up electro-magnetic or ether waves. A comparison will make this clear. If you look at a candle across a room, your eye does not respond to the flame itself. The flame, like the radio transmitter, sets up an ether wave, capable of traveling through space. The eye is an organism which causes nerve response to ether waves of extremely high frequencies—millions of times higher than used in radio. You do not see the flame any more than you see the high frequency currents at a transmitter. Your eye responds to an ether wave set up by the candle light. You can see a star millions of miles away. It takes hundreds of years for the light from some stars to reach your eye.

Now the color of a light depends upon the frequency of the light source. Red is the slowest rate of vibration to which the eye responds; violet the highest. Green light, for instance, has 47,393 wavelengths per inch. This is a wavelength of .00000536 meters. A 300-meter broadcasting station sets up an ether wave just as does a distant star or a candle. The only difference between the ether wave used in broadcasting and that set up by green light is that the radio wave is about 560,000,000 less frequent. No sense of the body responds to such comparatively slow waves; hence you are in no way conscious of the ether waves set up by broadcasting stations unless you set up a special apparatus—a radio receiver—which converts them into air waves of such a frequency that one of our senses, hearing, responds. Broadcasting transmitters today are of such a nature that we can convert their output into sound waves which the ear distinguishes; when we have radio motion pictures, they will be convertible into light waves.

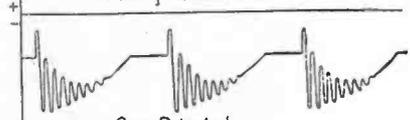
(Turn to page 53)



Carrier wave modulated by sound waves



Incoming Oscillations



Grid Potential

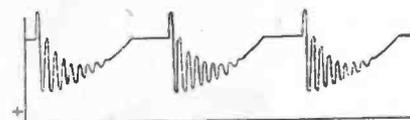


Plate Current



Pulses in phone

Series of operations of a vacuum tube used as a detector of radio-frequency oscillations

quency current, it has a very minute effect, if any, upon the surrounding ether. On the other hand, if we charge and discharge it with a very high frequency current, it has a marked influence upon the ether in its vicinity. It is upon this phenomenon that radio transmission depends.

A radio transmitting apparatus is simply a machine for producing powerful currents of high frequency to charge and discharge a huge conden-

# The *H.I.* in Broadcasting

By  
Dorothy Brister Stafford

"A RADIO MOVING-PICTURE" seems to be the only description one can give to the feature, that in this reviewer's opinion (which amounts to whatever you like), stands out as the most original, unique and all-around enjoyable entertainment we happened upon during the season, outside the realm of music.

It was Merian C. Cooper's talk on the Eveready hour a few months ago, and "talk" is a very inadequate expression; it was more properly a brilliant word-drama, that left all the thrill of a movie.

We confess we approached it with misgivings. Hugh Walpole is the only writer we had ever heard who could talk—and when a man has been in the French Flying Corps, has explored and adventured all over the earth, and written a book like "Grass," it seemed to be asking a good deal to expect him to be able to talk about it in a manner that would hold our attention, particularly when one could not see him. But we had reckoned without knowing Mr. Cooper.

And the announcement of "incidental music" likewise caused us to shy, though it was couched in the more elegant phrasing "musical portrayal." We loathe all incidental music—possibly it is a hang-over from the days when they used to play "Hearts and Flowers" at the big moment in the drama. At any rate we awaited the hour in a very critical state of mind, and received the surprise of our life.

With no apparent attempt at oratory, Mr. Cooper, by his skillful painting of word pictures and his amazing artistry of description held us absolutely spellbound for an hour. If, by any chance, you didn't happen to be among the thousands who heard him, it was a condensed version of what happened on the pilgrimage Mr. Cooper and two companions made with the wild Baktyari

tribe of Persian outlaws, who are forced, at certain seasons of the year, to migrate miles across mountain ranges in search of grass for their herds.

This, on its face, doesn't sound so extraordinary, but when one considers a caravan of 50,000 people—men, women, children and beasts—with all their belongings, trailing over icy mountains, barefooted in the snow, and fording streams, with no boats—a pilgrimage that takes forty-eight days to reach the fertile valleys, wherein grows the necessary grass; and then after a few months to go trekking back over the same trail—it is an exodus worth travelling far to see, photograph and write about. Mr. Cooper's description of the fording of a rapid river of icy water, with no more equipment than rafts made of rugs, supported by inflated goat-skins, and guided through the torrent by swimming men, when accompanied by the simulated voices of thousands of men, women, babies and animals and the rush and roar of the water, brought the scene before our eyes as vividly as though it were flickering on a screen; and (must we admit?) the despised "incidental music" aided in the working up of the climax, till one perched fairly breathless on the edge of a chair, waiting until the crossing, which went on for days, was accomplished.

Moving-day on such a superhuman scale is bound to excite one's imagination, and Mr. Sherwood, when reviewing the moving-picture in "Life," said he was overcome with shame when he thought of the fuss he had made over carting his belongings from 88th to 52nd street last Fall!

The climax came with Mr. Cooper's description of the climbing and crossing of a snow-covered mountain range, where the vanguard cut footholds in the ice, the multitude swarming after them, bare-legged in

the snow; and when a beast slipped and rolled down the precipitous incline, with a woman tumbling after—the entire Eveready group turning themselves into wailing Baktyari for local color—one's hair fairly stood up with the tremendous reality of it all. We know when we are privileged to see the actual pictures made on the journey, they will seem like old stuff, so vivid was this radio presentation.

Rarely does one happen upon such a personality as Mr. Cooper. Most men with the courage to undertake perilous adventures are unable to write interestingly about them; and as we believe we said before, most writers are poor talkers; and many people who can talk, can't get their personality over the radio. Mr. Cooper has succeeded in doing all these things, so one may be forgiven for a little unusual enthusiasm in regard to his accomplishments. And as our opportunities for hearing entertainment of this character are all too rare, a little appreciation may bring us more of them.

The man who looks his gift-horse carefully over must have had some trouble determining exactly whether this feature was an Eveready ad, clever propaganda for the Putnam's book, or moving-picture publicity; but whatever materialistic motive was behind the project, he had an hour of radio enjoyment he is not likely to forget.

△ △

"IT'S FUNNY," said the dealer in radio sets, "the reasons people give for becoming interested in radio. So many of them have taken to air entertainment through sickness and physical infirmities that they sound like testimonials in 'Science and Health.' There doesn't seem to be one in ten who buys simply because he knows he is going to get some wonderful entertainment. They learn that later."



Giuseppe di Benedetto



Vera Nadina



Cesaré Sodero

He is evidently right. There still seems to be a great, unenlightened multitude which does not regard it as strictly *au fait* to become violently interested in anything so wholly within the reach of the "common pee-pul" as radio. Having been accidentally responsible for selling four hundred and twenty-five dollars' worth of superheterodyne to one of this classification the other day, we cheerfully pass the idea on to any enterprising radio salesman, who may run across a similar proposition, though it is scarcely likely to happen twice in a lifetime.

She was one of those lonely women, who wander about apartment hotels, aimlessly killing time from Monday morning until Friday afternoon, when the husband returns from his "trip." The masculine half of these sketches is usually engaged in that mysterious operation, known as "promoting a company." They never live longer than six months or a year in any one city, and the woman has little, or no opportunity to make acquaintances or social contacts. There are hundreds of them in every large city, and unless they possess within themselves the rare faculty of finding interests, they are the loneliest people in existence. This particular representative of the class began: "A'hm so homesick. Ah hate this lil' ol' town. How do yo-all ever stand it? Ah sit up theh in that lil' ol' apahntment every night till Ah think Ah'll lose mah mind."

Expression of polite sympathy on our part, and the tentative suggestion that she might become interested in radio. The familiar, superior smile appeared.

"Oh, no. Ah can't stand that stuff. Yo' see A'hm musical mahself. Ah had yearhs of voice cultuh in the convent, and that radio trash gets on mah nerves."

With memories of Mario Chamlee's voice ringing in our ears from the night before, we felt moved to argue over that "radio trash," but felt a practical demonstration might vindicate our peculiar preference for radio entertainment more fitly, and set about twisting the dials. We soon realized, to our dismay, that it was one of those hours when radio seems to register absolute zero.

Pittsburgh was broadcasting for South Africa or Mars, making up in quantity, what was decidedly lacking in quality: Hawaiian guitars were wailing slightly off



Merian C. Cooper, author of "Grass," who appeared at WEA-F recently

Inset—Mr. Cooper as he appeared while journeying with the Baktyari in Persia

key in Chicago. Schenectady was telling how to build a knock-out, one of the western bed-time story ladies was at her saccharine worst, and our most dependable New York station was putting on a harmonica contest! There seemed to be nothing to appeal to an artistic soul, and the lady made no effort to keep the bored expression from registering.

"Do yo'-all really like that sot of thing?" she asked, curiously.

And then we had the inspiration. A glance at the time, and we yanked the loop toward the south. And he responded like a true southern gentleman.

At once a flushed, excited little woman leaned forward eagerly.

"Mah goodness! Where's that man? He talks like home folks. Who—"

A twist of the control, and out rolled the inimitable drawl.

"T-h-e At-lain-tah Jour-nal. At-lain-tah, Gaw-ga."

And we stayed right there until the loquacious Mr. Kay signed off, and then our guest demanded to hear somebody talk from "Bummin'ham." Being unable to accommodate in that respect, we finally got Memphis' steamboat whistle for her, and then listened to a long account of how her friend, Mary Jo Grainger, of Mo-beel' had married a man from Memphis. She finally left, after extracting every particle of information we possessed in regard to radio sets, and the next morning in the elevator we fell over the most elaborate outfit she could buy, being borne upward to her apartment.

That night we had to go up and help her log everything south of the Mason-Dixon line. She was simply starved for the sound of southern voices, and the radio brought something into her lonely life she could get in no other way. We wondered how soon she would get tired of it, but the next time we met her, she was enthusiastic over a Brunswick concert. Also she had the grace to say:

"Ah just told mah husband yo' neveh know anything about radio till yo' get to foolin' around with it yo'self."



CASUALLY dropping in one evening upon a friend, who is "blessed" with the most superlative of flapper daughters, one was started on a new train of thought in regard to radio. The sixteen-year-old was shouting into the telephone:

"No, we can't dance here tonight. There is some old opera coming over the radio at ten o'clock, and Dad and Mother are perfectly possessed with the idea of listening to it. Yes, and all that good dance music going to waste. But the old dears must have their cultuh."

Her father shook his head, as he adjusted the dials.

"And it's costing me eighteen hundred a year for her at Miss Brown's. She could get just as much knowledge of good music right here at home, if she had it in her. But it is a case of no brains."

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Elvira Boni



Imerio Ferrari



Olive Cornell



Miss Maxine Brown enjoys the sport of rolling o'er the country highways

# that GREATER DAY in radio

Miss Maxine Brown, well-known musical comedy star

*Interviewed by Russell Raymond Voorhees*

THE birth of the moving picture cast a very drab gloom over the entire amusement field and for a time most everybody believed that the theatre was doomed to an early grave. But finally the stray cat that had been left at the doorstep was found to be an honest-to-goodness pedigreed pussy and so the moving picture and theatre has lived more or less happily ever since aided and abetted by the skilled censoring of Will Hays for the party of the first part, namely the movies and the super intellectual play censor committee for the party of the second part, namely the theatrical producers.

But just as things began to get really harmonious somebody had the nerve to drop another stray cat at the doorstep—radio—and now both the movies and the theatre are all het up, boiling and effervescing over the rather drab gloom that they feel has been cast over their combined future.

But while everybody is arguing over the stray cat, whether it is only a stray cat or whether it is a pedigreed one Miss Maxine Brown, a well known musical comedy star leaves the legitimate stage and goes in for radio. She is the first musical comedy star to forsake the musical comedy stage and become a professional radio star. In musical comedy she was getting real money, because she was worth it. In radio, during these first experimental

stages the money won't be so great. Certainly there must be some big reason in back of it all. And that is just what there is. Maxine has seen a vision and she is getting in not on the ground floor, but a couple of stories under the sub-cellar and in due course of time will grab the bacon that everybody is always trying to bring home.

"I realize that now radio is not well organized and no one seems to know just what is ahead for it but I think I see a vision of the future expansion that it will take and I am preparing myself now to take advantage of it then," said Miss Maxine Brown in discussing her departure from the legitimate stage to become the first paid radio artist. "Although there is some very fine entertaining features on the air today, the entertaining end of radio is not well organized and in many instances the talent that is furnished is not of the best. Naturally this is to be expected in view of the fact that payment for services is frequently not the order of the day. But I see a bigger day dawning when all talent will be paid for and paid for liberally.

"But I see even a greater change than that. There is what we know of as the theatrical managers that practically controls the legitimate stage. They own the theatres, they are the biggest producers and they put on the

shows that get the money. In time, and I don't believe that time will be very far off, I believe this same combination, or call it what you will, will take over the entertaining features of radio and will furnish radio programs just as they now furnish theatrical productions. Of course the method of paying for this talent and all of that will have to be worked out, but that will all come in due course of time. But I firmly believe that the entertaining features of radio will ultimately come under the same control as the legitimate stage and the movies, too, for that matter.

"But there will even be a more valuable alliance than that. A musical show will have its run and will close. While waiting for the new show the star will go into radio and broadcast for a few months, making a tour of the country just as productions do. Then when the new show is ready, the star will quit the radio and go back to the stage. Possibly when that show closes, there will be no opening in radio and then if she screens well she may go into the movies for a picture or two until there is an opening in radio or in another legitimate production. I see the stage, the movies and the radio all linked up together, all under practically the same control and using the same people.

"Think of the vastly increased work

that such a combination will offer to the really talented? Think of the opportunity for continuous work and think of the chances to make a vast number of friends and fans out of the public. Your public will be movie fans, stage fans and radio fans.

"People have wondered why I quit the stage to go into radio when I had reached stardom, the place where every girl wants to reach. I have just given my reason. I see a change coming, and when it does come I will have made as great a reputation, I hope, in radio as I have in musical comedy and then the managers who know what I have done on the stage will also know what I can do on the radio and some real jobs will be open to me.

"No, I don't see anything to be alarmed over in radio. On the contrary, I think it will be the making of the stage, and the movies too, along the lines I have just indicated. I am a radio fan, a stage fan and a movie fan because I see in them all entertainment."

That is why Maxine quit the "Plain Jane" company and went in for radio. She saw the vision and had the nerve to lay plans accordingly.

She has already done considerable broadcasting from Chicago stations and is rapidly making the same hit with her audiences that she has made on the stage. Those of us who have

heard her say that she has a voice that tells you that "she has always been the sort of a girl that every mother would want her daughter to be." Maxine is the new type of stage star, the type who got to stardom by selling her ability—but nothing else. Her legitimate stage audiences soon saw what



Miss Maxine Brown, musical comedy star, turns broadcast artist

type of girl she was and they liked her for it. Her radio audiences feel the same thing even over the air and they like her for it, because the whole world admires the clean girl, after all. And that is just what Maxine is. She does those appealing, human interest songs on the radio. She did them on the stage.

In that greater day that is on the way when stage and radio will get together Maxine will be on both.

## Strand Quartette

(Continued from page 24)

would you join another quartette?"

"No sir," answered John, "I'd join the same one! I am a soloist at the Dutch Reformed Church . . ." Here he was interrupted by George who felt that the tenor was not doing himself justice.

"Listen to this," said George, "I will tell you how good he is. They were giving 'Elijah' at Carnegie and the late Evan Williams, tenor, was singing the leading role. Mr. Young was sitting in a box. Suddenly Mr. Williams was taken with huskiness; he saw Young sitting in the box, beckoned to him to come down and without making an announcement to the audience asked him to finish the oratorio in his place. The next day, the papers said that Mr. Williams had never sung better in his life."

"Well," said John, "if you are going to tell that kind of thing you might also add that I am the proud father of three children!"

Attention was now focussed on Frederick Thomas, who was persuaded to talk about himself. "Well," said the basso, "I was born in Clayton, Indiana. I am a Hoosier, and I have had a checkered career." "Maybe," interrupted Mr. Mellor, "that's why he's the cross word expert of the lot. He is an egoist. An egoist is one who does cross word puzzles with a fountain pen." Ignoring this completely, Mr. Thomas went on, "I attended two colleges, earned a Phi Beta Kappa Key, all I suppose," he added, "for the purpose of becoming the cross word puzzle expert of the Mark Strand male quartette! First I went to DiPauw and then to Johns Hopkins. I was studying for a Greek professorship, but had to go to work so I became a pedagogue. For eight or ten years I taught in Indiana, and Colorado, and Montana, and Illinois. Then I started studying singing in Chicago and later in New York. At first I found some work in some of the Brooklyn churches and then in St. Edwards, the 'little, low-high church' of New York, and then I joined this crowd and here I am."

Having thus disposed of their past histories they looked as if they felt that they had done their duty, but I felt otherwise. "Oh, come on," I urged, "tell a few tales out of school; isn't there any scandal?"

"Well," said Frank, "Frederick Thomas may look quiet, but he taught all of us to drive, and he is the best one-armed driver of the lot. I guess the rest of us got married too young."

"Well," said Thomas, "now I will tell one. John Young can hit more chords on a piano in a minute than can

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# Production of ELECTRIC CURRENT

By  
S. Miller

A. I. R. E.

Continued from February Wireless Age

## SECONDARY OR STORAGE BATTERY

The elementary form of a storage cell is made by immersing two lead plates in diluted sulphuric acid. The principle involved in the storage cell is the chemical action produced by a current causing such changes of the lead plates in the acid, that upon the cessation of the current, if the two plates are connected by a wire, a current will flow in the opposite direction from the original one and the plates will tend to return to their original condition.

The action of the current coats the plate that is connected to the positive pole of the charging source with peroxide of lead, and reduces to a spongy metallic condition the surface of the plate connected to the negative pole. When the plates are connected to any instrument which draws current from the battery, the peroxide coating tends to be reduced back to lead sulphate and the spongy lead on the other plate to become oxidized to lead sulphate. The plates thus becoming alike, the current will cease to flow and the cell is said to be discharged.

Various methods of manufacture are intended to give the plates more capacity; that is, to make the battery as compact as possible. Strips or grids of lead, filled in between by various processes with the oxides of lead, have been found to be effective as plates.

Two kinds of plates are used in a cell, one set chocolate brown in color and the other a grayish leaden. When these are placed in the hard rubber or glass jars with an electrolyte of sulphuric acid the two kinds of plates represent the zinc and carbon respectively of a primary or dry cell, the grayish plates acting as the zinc and the brown as the carbon. A cell composed of a set of grayish leaden plates and a set of chocolate brown plates will give 2 volts when in a charged condition.

The standard storage battery used in radio reception for lighting the filament of a UV-200 or UV-201A Radiotron is of the six-volt type. Therefore in order to obtain six volts in a battery, three cells, each giving 2 volts, must be used in an adding combination. The three cells are placed in a suitable wood container and held securely by pouring a layer of pitch over the top, allowing openings for refilling each cell and for bringing out suitable heavy lead lugs for connections.

## OPERATION OF A STORAGE BATTERY

In normal operation, the plates of a lead battery are heated to a certain extent by the passage of the charge and discharge currents and therefore tend to expand. The lead sulphate, however, does not expand as much as the plate and so tends to force the active material out of the plates. This material gradually collects at the bottom of the cell and eventually short-circuits the plates, thus accounting for the deterioration with age of the capacity of the battery and the necessity of cleaning out the battery once or twice a year.

If a lead battery is allowed to remain idle for any length of time, and especially at a low stage of charge, a permanent sulphating of the plates takes place. To arrest the formation of the sulphate, a battery should be put on charge for an hour or two, once in 10 days or so even though it may not be used at all. Also, if the level of the electrolyte is too low in the battery, the acid has a tendency to creep up, causing a sulphating of the plates sticking above the acid. The uncovered portion of the plates then cannot be restored to the lead peroxide and spongy lead coatings when the battery is recharged.

The best test of the condition of charge of a lead plate storage battery is the specific gravity of the electrolyte. This is measured by means of a hydrometer. The specific gravity is lowered with discharge because the sulphuric acid, which has a high specific gravity, is replaced during discharge by water, with a specific gravity of 1. Thus, the specific gravity of the electrolyte under full charge is between 1.260 and 1.300, and as the acid is broken up with the formation of lead sulphate, it drops slowly to between 1.150 to 1.200. When this point is reached, the battery should be taken out of service and placed on charge. A lead battery should never be fully discharged as there is danger of injury to the lead plates. In preparing the electrolyte, sulphuric acid should be diluted with sufficient distilled water to bring the solution to the desired specific gravity. Pour acid into the water, not water into the acid, as a large amount of heat is given off when the two are mixed, and if water is poured into the acid, the liquid will boil violently, spattering acid around badly.

## THE EDISON STORAGE BATTERY

This type of battery is not as extensively used in radio reception as the lead cell type, but is mainly used for the propulsion of electric trucks, for lighting trains and for supplying electrical energy in a submarine, where a lead cell type would be detrimental to the lives of those aboard, due to acid fumes generated.

The Edison storage battery was designed by Thomas A. Edison about 1904 and comprises elements of a positive plate of nickel hydrate, a negative plate of iron and iron oxide and an alkaline electrolyte of potassium or sodium hydroxide.

The Edison battery, although it enjoys many advantages over the lead cell type, has a very poor voltage regulation as its voltage will drop very rapidly when in use. The lead cell storage battery has a very good voltage regulation and will keep practically a constant voltage for a given length of time. This accounts for the extensive use of lead cell storage batteries in radio where, as stated earlier in the article, a steady source of voltage is required for the proper operation of a vacuum tube.

## SOURCE OF VOLTAGE IN A MECHANICAL DEVICE

In the discussion of the primary cell, it was found that a source of voltage was obtained due to a chemical action within the cell which could cause a current to flow. A source of voltage can also be obtained from a machine, driven by a mechanical force, which converts the mechanical energy into electrical energy by electro-magnetic induction.

There are two classes of machines generating electrical energy: the dynamo and the alternator. "Dynamo" designates a machine that produces direct current. The "alternator" is a machine that generates an alternating current. In broader sense, the word "generator" is used to denote any machine generating electric current by electro-magnetic induction; the term includes both dynamo and alternator.

## OPERATION OF A GENERATOR

A generator does not create electricity, but generates or produces a source of voltage or electromotive force, which causes a current to flow through a circuit in much the same way as a force

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Martin P. Rice, manager of broadcasting at the General Electric Co.

# REVIEW of BROADCASTING

By *Martin P. Rice*

A REVIEW of the broadcasting situation today shows emphatically how completely radio has been welded into our daily life. Without replacing or seriously modifying any other channel of communication, news or entertainment it has supplied a new agent which has become the recognized means of reaching all the people everywhere instantaneously, and the possibilities of development along these lines are just beginning to be realized.

A survey of the field still shows a comparatively large number of stations undertaking broadcasting as a form of advertising novelty. It is doubtful if such stations can maintain the standard now expected by the public, and, in fact, many of the stations dropping out are in this class. When the pos-

sibilities of broadcasting are fully understood it will not be undertaken by any who are not prepared to render a real public service.

Stations not appreciating the highly technical nature of broadcasting cannot be expected to do the job well. There are all sorts of opportunities to spoil a broadcasting station's output, and whenever the operation is left to chance or to unskilful assistants, quality drops, but, in general, broadcasting stations are improving technically because improved apparatus is available and operators are becoming more familiar with the equipment.

Some confusion is resulting from the reallocation of wavelengths, and the difficulty is increased by unthinking listeners who are opposed to

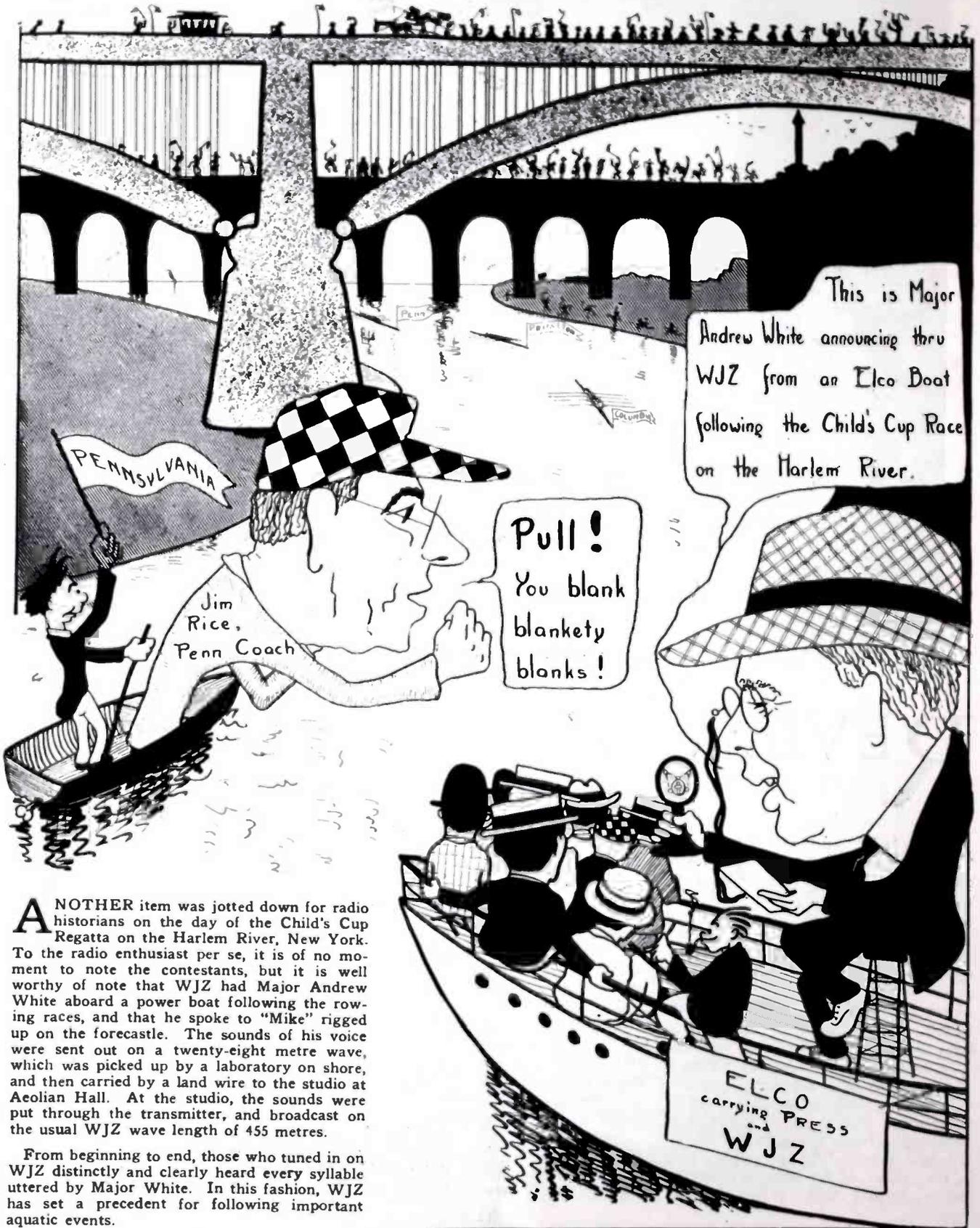
changes of all kinds and who promptly protest without giving any opportunity for readjustment to the new conditions. In the localities visited the earnest endeavors of the Department of Commerce to improve conditions seem to be understood and appreciated. Long distance reception is still a fascinating and valuable phase of the art, and those interested in it express the wish that the first class stations operating at relatively high power might be given a free wave path across the continent so that San Francisco may receive New York and vice versa.

There seems to be a general desire on the part of broadcasting stations to increase power. In some cases it seems to be a logical effort of a station broad-

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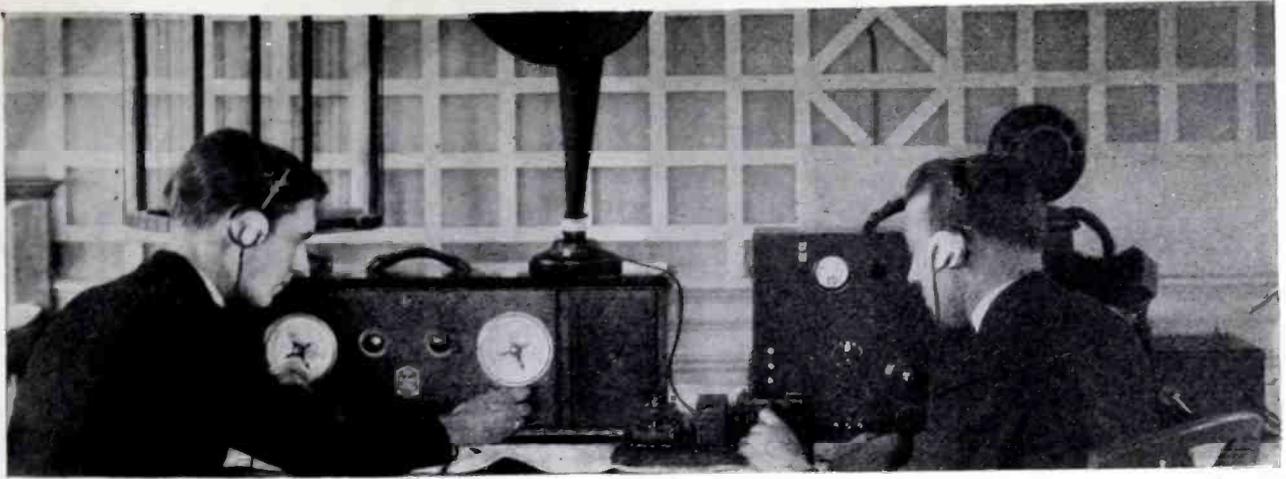
# Radio Regatta

By Ed Randall



ANOTHER item was jotted down for radio historians on the day of the Child's Cup Regatta on the Harlem River, New York. To the radio enthusiast per se, it is of no moment to note the contestants, but it is well worthy of note that WJZ had Major Andrew White aboard a power boat following the rowing races, and that he spoke to "Mike" rigged up on the forecastle. The sounds of his voice were sent out on a twenty-eight metre wave, which was picked up by a laboratory on shore, and then carried by a land wire to the studio at Aeolian Hall. At the studio, the sounds were put through the transmitter, and broadcast on the usual WJZ wave length of 455 metres.

From beginning to end, those who tuned in on WJZ distinctly and clearly heard every syllable uttered by Major White. In this fashion, WJZ has set a precedent for following important aquatic events.



The relaying station at Hotel Ten Eyck, Albany

# SPEED on water, rail and air—

## Broadcasting the Baby Gars IV and V race with the Twentieth Century Limited

By *W. T. Meenam*

**W**ING-FOOTED Mercury was in his element if he chanced to be over the Hudson river on a morning last May when the gas-gulping speed boats of Gar Wood exploded their way from Albany to New York. On the 150 miles waterway explored by Hendrik Hudson in the Halfmoon, the Messenger of the Gods witnessed an exhibition of speed on water, rail and air as the Baby Gars IV and V, using the Twentieth Century Limited as a pacemaker, etched two foam flashed paths on the river.

Above the roar of the power boats and the thunder of the crack train of the New York Central, as it rolled along with smoke trail flattened to the coach rooms, sped six planes, including three Curtiss Orioles with photographers, two army De Haviland planes and a twin-engined Sikorsky transport with ten passengers, including news writers and camera men. There was another exponent of speed, invisible, but heard by thousands in constant attendance on the train and power boats with their speed of sixty miles an hour and on the planes that can do 111 miles an hour. It was radio which consistently does 186,000 miles a second according to scientists who have "clocked" its speed.

Radio, the Messenger of Man, carried a vivid picture of the progress of the power boats to thousands remote from the scene. From one to two thousand feet above the river, Captain H. M. McClelland of the United States air service, described the position of the boats. Sometimes fog obscured his view of boats and train, but he kept his story going.

One day's postponement of the race, gave plenty of time for the perfection of the radio broadcasting plans.

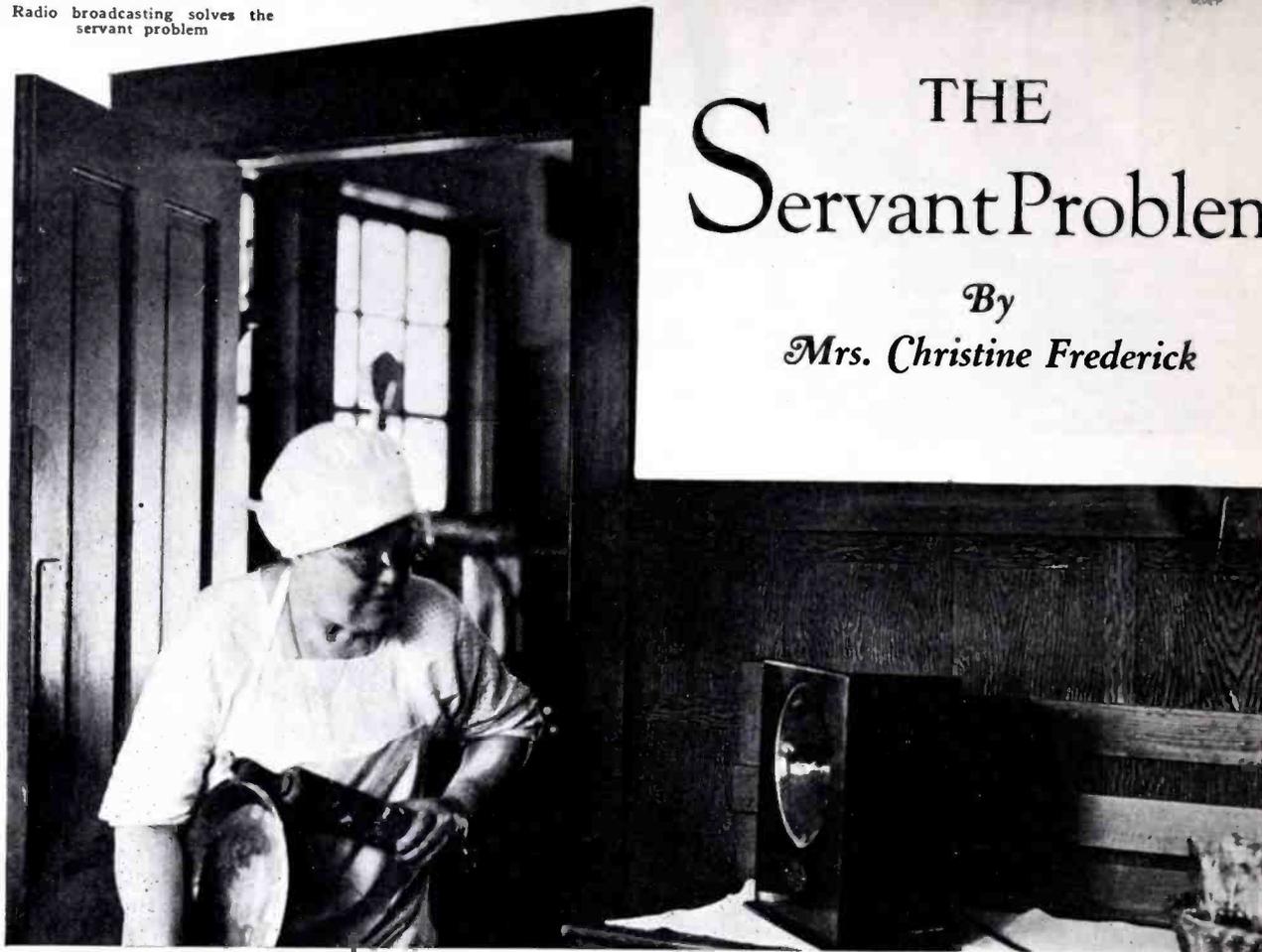
Instead of starting at 7:27 on the morning of the race Gar Wood took after the first section of the Twentieth Century which left Albany at 6:49. This start found the air reporters still

on the ground. When Captain McClelland, piloted by Lient. Connell, got into the air, he was forced to spend several minutes trying to locate the speed boats through the fog on the river. As a result the radio report did not start until after Hudson was reached. From that time on Captain McClelland was in constant touch with the boats and gave an excellent description to the radio audience.

To give the audience WGY and WJZ a story of the race, three listening relay or retransmitting stations were established, from which it was possible to maintain constant contact with the comparatively short range transmitter of the plane. These were at Albany, Poughkeepsie and New York. A sensitive receiver located on the roof garden of the Hotel Ten Eyck, Albany, picked up the voice of Captain McClelland during the early stage of the race. The plane signal, received at this point, was amplified and sent over wire lines to the transmitting apparatus of WGY in Schenectady and to WJZ in New York. When the plane reached Catskill, the Poughkeepsie land station took over the pick-up. At Harmon, the WJZ station at Van Cortlandt Park came into the circuit and retransmitted the description of the final leg of the race.



Lieut. H. B. Chandler, pilot of auxiliary plane; Capt. H. M. Clelland, announcer and Lieut. S. M. Connell, pilot of the broadcasting plane



# THE Servant Problem

By  
*Mrs. Christine Frederick*

EVERY woman who uses help in her home knows what a nerve-racking task it is to handle "the servant problem." It has been getting worse rather than better of late years, because there are no servant girls coming over from abroad, and also because those who are in that class now have become very hard to handle.

My husband says the one black mark against modern women is that they do not seem to be able to solve the servant question. He asks why if women believe they are so capable and want to do things, don't they tackle the job right on their own door-steps?

They *are*, now. And radio is one of the tools with which they are accomplishing it. They are making use of many tools—the modern household is today filled with mechanical devices where once it was almost barren of them. All of them—the vacuum sweeper, the electric sewing machine, the electric washing machine, the electric cooking devices, are all part of modern woman's "kit of tools" to solve the servant problem. And now *radio!*

You see, immense numbers of women today live in suburbs; some of the more well-to-do ones out further still into the country, nearby the larger cities. They are precisely the families

which most usually employ servants—yet their troubles are greatly heightened by the fact that they live in suburb and country. Almost to a woman, these servants would much prefer the city—even if they got less money. Nicer rooms, healthier surroundings, etc., mean little—the great trouble is the same old bugaboo of woman—isolation. The servants rebel at being in a quiet village or the country at night when their work is done. Their friends are far away. There are often not even movies to go to. The place is too quiet for them, and if they're young, they want a lot of company and beau. But mainly it's the daily repetition of isolation they feel most. Housewives have their husbands' home-comings to look forward to—but what have the servants? A dull evening in their room, as a rule.

Frankly, I don't blame the servants for being discontented. They're human, and business men have been learning the lesson that housewives must certainly now learn—that they must make life more liveable for servants, or have trouble. The last ten or fifteen years have seen great strides in adjusting relations between workmen and employers. It is now well understood that workmen are better workmen if their housing and recreational

life, even their domestic relations, are well taken care of.

But it's been a disgrace until recent years how servants are treated in homes. No wonder that they deserted domestic service. Women acted like autocrats to them, treated them as slaves, over-worked them, cared nothing about their recreational life, and gave them unhealthy and often unsanitary quarters to live in.

To-day the modern woman is taking a different point of view regarding servants—just as their husbands have taken a different point of view about workmen. Nor need we give women credit for much philanthropy in the matter—any more than men deserve such credit. The scarcity of labor, and the demands of labor have driven both business man and housewife to change their views and practices. To-day many housewives complain of the attitude of servants, and their demands. They do less work and are paid more than ever before. It is quite true; but what women forget is that this is America, and that even servants are entitled to some semblance of an American standard. We got through with slavery way back in the Sixties. To-day we know that no woman ought to expect a servant to live the life of a drudge; she is a sister in a democracy

who must be granted her chance at the good things of life.

What has all this to do with radio?

I'll illustrate. My home is in the country commuting section around New York, like thousands of others. To get a housekeeper and other servants has always been hard. They felt the isolation too much. Even if they bravely stuck it out and didn't complain, the first thing I'd discover, after a while, was the outcropping of a queer streak, or a tendency to go on a "toot." They would go off and get drunk, or develop imaginary ailments, or start a rumpus of some kind. Others would stand it just about so long and then frankly tell me they "couldn't stand the quiet."

Always, always something developed after a time; and I had to hunt for somebody new. I was annoyed, depressed, indignant by turns, because I never could see why they weren't happy. I'd see them depart for some squalid tenement in New York perfectly happy—or a job with less pay, smaller room, more work, etc.

Then I did some real thinking one day, and decided that I'd invest in things that might take away the curse of isolation. We had a good radio set, and occasionally we would invite the servants to listen; but I determined on a new move. I had a special aerial put up and a new set installed in the housekeeper's room, and I also invested in new chairs and curtains for that room. I realized for the first time how cheerless it was for the servants to go to their bedrooms after their work was over, while we were in the living room, with a fire in the fireplace and the radio going merrily.

Sometimes their rooms were not even warm, for even steam heating plants do not perform an even job.

The housekeeper's room became a rendezvous and all the programs were listened to with great zest. Servants get the radio fever more intensely than other folks, perhaps. They actually had to be scolded about keeping such late hours at the radio.

Before long the effects became very noticeable in greater cheerfulness and in less frequent upsets, temperamental outbursts, and I haven't changed a servant since the radio set was installed. If I do change it will probably be for other reasons, and on my own decision, not the servant's, as they seem entirely happy.

I confess I am not perhaps fully able to appreciate how much radio means to them. In my living room are books, pictures, phonographs, grand piano with player attachment and radio, together with the entire family's company, and visitors. The servants have none of these things, nor have they any inner resources. I often wish I had a chance to be alone, with no people or music about me; I'd like to be in the Canadian wilds for months. But people with cultural backgrounds have many resources to draw from, in their own minds, while the average servant is not at all good company for his or herself. They sometimes hate desperately being alone, even for an hour.

See, then, what radio does for such people. It makes life bearable that was unbearable before. It brings human voices into their rooms, and that is the breath of life to them. It doesn't much matter what's "on the

air"—if it's something with cheer and song to it, it's acceptable. I caught one of my servants one evening with the radio set turned in to a man speaking on the theory of relativity. I was amazed, but still more so when I discovered that she wasn't paying attention to the ideas presented at all; she was merely listening to a human voice.

"I like to hear a man's voice," she confessed, innocently. She who appeared to have given up thoughts of beaux, and was a quiet sensible girl! But when I thought of it later, I saw what a pathetic commentary the incident really was. She rarely talked to a man—the house was filled mainly with women, and when the men folks arrived at night she was usually in her room. She went to the city only once a month. Therefore she listened to a man's voice on the radio! I have heard stories like that of mining camps, where a woman's voice was a rarity, and they played the phonograph incessantly to hear women sing. Such a situation is an indictment against those who complain about servants.

Do you wonder that after this incident I felt sure I had done a good thing? I strongly advocate that suburban and country people invest in a radio set for their servants. I know some wealthy people who have two or three sets for their servants! I designed the kitchen and servants' quarters for a very wealthy woman on Long Island some time ago, whose house was on the shore-front—four miles from the railway station, along a lonely road. This woman thoroughly appreciated the servant problem, and she saw to it that the servants' quarters

(Turn to page 61)



A moment snatched from housekeeping to enjoy the broadcast music

# AIL U. S. Ilo Organizations— Their Function and Activities

By Oscar C. Roos

**A** GREAT many radio fans are wondering whether the adoption of Zamenhof's old system for international code work at the Paris Amateur Congress, recently concluded, signifies anything. It does. In our judgment the "handwriting on the wall" means—since there are two varieties of Zamenhof's work—that the old kind called Esperanto, is afraid of the new, called "Nov-Esperanto," which is a step away from Zamenhof's printing and telegraphic troubles.

The International Committee of Radio Experts, also sat in Paris the same month, but they did not enter into any such indorsement. In England an attempt to get the united radio clubs to endorse Zamenhof's system failed completely. Hence, under the circumstances, more light is needed on these diversities in amateur and professional votes on the A. I. L.

Dr. Talmey's articles on the A. I. L. in the April, May and June issues of WIRELESS AGE have given a general outline of the origin in ILO. He has shown that the competitor of this system is correct when it refuses to recognize Ilo as a child or descendant.

Ilo is not a descendant of anything—except in a parliamentary sense. If it is now being improved, such improvements are of a very minor nature and allow the student to follow natural languages like English, German and French much more closely word-by-word, than is possible with any other system.



*My dear friend Herr Dr. Max Talmey  
Albert Einstein May 1921*

## DID PROF. EINSTEIN ENDORSE ANY INTERNATIONAL LANGUAGE SYSTEM?

**PROF. ALBERT EINSTEIN** approves of the AIL idea in general. He has never endorsed any special system offered as solution of its problem for the simple reason that he has no time to make himself acquainted with any system and he is not the man to give an opinion on a subject which he does not know thoroughly.

The writer, a personal friend of the professor (see "Albert Einstein, Biographical Sketch" by Dr. M. Talmey, Sentinel, Chicago, Oct. 3rd, 1924), in May, 1921 had the pleasure of a conversation with him in the course of which he asked him what he thought of the IL movement. The professor expressed the opinion that an auxiliary intern. language would be invaluable in scientific work. This was all he cared to say about that subject.

The writer had previously translated into Ilo Prof. Einstein's original article on the relativity theory. To show him the great efficiency of that system he gave the professor a copy of that translation with the remark that only with improved Ilo is it possible to translate his article satisfactorily, and that Zamenhof's project, for instance, would be entirely unfit for that purpose. The professor accepted the translation with a good deal of interest.

A rumor has been spread that Prof. Einstein has explicitly endorsed Zamenhof's project. The above facts show that this rumor belongs to the realm of fiction. That eminent scientist would hardly put the stamp of approval upon a system that he does not know, especially after his intimate early friend, whom he knows as a painstaking student of the AIL problem, has described to him that system as being unfit for the role of the AIL.

The man who has to buy an automobile requires several demonstrations—with himself as driver—on various types of car, before he can possibly decide. The trouble with this publicity about congresses, governments and individuals preferring this or that A. I. L. scheme is that the public can never be stampeded into permanently adopting any scheme—no matter how good.

It will be a matter of use first and then slow growth. Such growth can only come about by trial and improvements. It is perfectly possible for a language which needs more time to learn than another one to conquer this handicap by its accuracy and logicalness. This is the only factor which will permanently keep the interest of students who tackle Ilo.

If Latin were simple—even Medieval Latin could be used by the 950,000 odd Latin "graduates" who pass the college exams, yearly. Alas, it is not so; they do not keep it up. Not one in ten thousand could correctly translate or write even simple Latin after five years' absence from the classroom.

It is therefore the duty of every moving spirit in the work now being done for the A. I. L. to present enough data, at least for his or her ("lua" in Ilo) favored system to enable a trial to be made at home by the man-in-the-street. The following data are here offered for that purpose:

In North America we have a neutral in-  
(Turn to page 54)

# Lessons in Improved Ilo

By Dr. Max Talmey

**I**NTRODUCTORY remark—it has been shown<sup>1</sup> that fundamental principles determine the essentials of the Auxiliary International Language (AIL) and thus render it in the main independent of the arbitrary decisions of authors. Systems constructed without regard to these principles, such as Zamenhof's project, those closely imitating the latter, simplified Latin, etc., will therefore never be universally acknowledged. It is a waste of time and energy to make experiments with any one of them for the purpose of finding out whether or not it is fit for the role of the AIL.

The ingenuity of authors is of great importance in teaching the proper application of those principles and in elaborating all linguistic details of the AIL. These, too, must be in strict conformity with sound reasoning. For the AIL must be rational throughout because in a constructed language there is no justification for any logical incompatibility; it can and must be avoided, and if through some error it has not been avoided from the start, it can and must be eliminated as soon as recognized.

Of all the systems that are being offered as solutions of the IL problem the Language of the Delegation

1. Wireless Age, June, 1925.

## PART 1. ACCIDENCE.<sup>1</sup>

FIRST LESSON: ARTICLE, SUBSTANTIVE, AND ADJECTIVE.

1. Pronunciation. The vowels have the continental pronunciation, i. e., a, i, and u sound like in calm, mill, and put; e like in bed or like the first e in there; o like in dog or like in home. Of several successive vowels each one is to be pronounced; the following vowel combinations occur: au, eu, ia, ie, io, iu, ua, ue, ui, uo.

Remark. The pronunciation of e and o like in there and home is called the closed one and is used in open syllables, i. e. such as end with the vowel: be-le, beautifully; do-mo, house. The pronunciation of e and o like in bed and dog is the open one and preferable in closed syllables, i. e. such as end with a consonant: pen-dar, to hang; lon-ga, long. As a rule one consonant following a vowel belongs to the next syllable so that in this case the closed pronunciation of the vowel is to be used: pe-do, foot; bo-na, good. However before c, r, s, x, and z it is preferable to pronounce a preceding e open: ec-es-o, excess; er-ek-tar, to erect; ex-em-plo, example; ra-pi-dez-o, rapidity.

The consonant c is pronounced like ts in wits; g like g in go; j like j in French (s in pleasure); s like in son; x like ks or gz (excuse, example); y like y in yes. All other consonants and the combinations ch, qu, sh are pronounced as in English.

The names of the consonants are: be, ce, fe, que, re, se, xe, ze, etc.

The word accent rests on the last syllable (vowel) in the infinitives (-ar, -ir, -or) and on the last but one in all other words: sendár, to send; bakir, to have baked; táblo, table; agreábla, agreeable. Simple (non-compound) words in which i or u precedes immediately the grammatical ending (see §2) have the accent on the third vowel from the end: filio, child; perpétua, perpetual; asócias, he associates; atribuis, he attributed; but omnadía, daily; fishglúo, fishglue.

Proper names and all their derivatives and the vocative at the beginning of a letter are spelled with a capital: Londonano, inhabitant of London; Kara Amiko, Dear Friend.

## PARTS OF SPEECH

2. The whole elementary grammar of Ilo is con-

1. "Accidence," as a grammatical technical term, denotes the part of grammar that treats of the changes undergone by words to express the relations of case, number, person, tense, etc., in contradistinction to syntax, the part of grammar that treats of the sentence and its construction (Stand. Dict.).

tion (LD) is the only one that complies with those principles, and therefore it is the only one that forms the basis for the AIL. But further improvements of the LD are very much needed and must be introduced without delay for the reasons already stated.<sup>2</sup> The improvements proposed by the writer in several publications<sup>3</sup> have been approved theoretically by many able students of the LD and have been put to extensive practical use with great success by some of them. He has therefore felt justified in incorporating those proposals in the following Lessons on Improved Ilo.<sup>4</sup>

2. W. A., April, 1925, p. 32.

3. Exhaustive Text Book; Lektolibro di Ilo; Filologia Temi; Raporti.

4. ARULO=Auxiliara Racionoza Universala Linguo=Auxiliary Rational Universal Language. A teacher of psychology at a prominent university in this country who at first had given full and hearty approval to the name Ilo found later this fault in it that the name is rather short, not sufficiently "mouth-filling." This is, indeed, a drawback from the point of view of mass-psychology. That scholar proposed the name ASULO=Aux. Synthetic Univ. L. This name has certainly a pleasant sound and embodies two essential features of the AIL. But the term "Synthetic"="Sintezala" in Ilo, cannot be used because "sintezala" means "non-analytic," and Ilo is, must be, analytic like most modern languages. The writer has, therefore, replaced the letter S by the letter R which stands for "Racionoza" (=rational; or for "Reguloza"=regular). Rationality (regularity) is even a more important quality of Ilo than being synthetic and "Arulo" seems to be even more euphonious, more musical than "Asulo" with the letter S, which has always the sibilant sound in Ilo. The name "Arulo" by no means excludes the name "Ilo"; both may be used to advantage according to one's taste. The writer offers that additional name merely as a suggestion, and would be very much pleased to receive expressions of opinion on it from the readers of Wireless Age and from all those interested in the AIL-problem.

tained in this short rule: the main parts of speech, substantive, adjective, adverb and verb, are recognizable by characteristic affixes, called grammatical endings. This rule is sufficient for understanding a given Ilo text as far as grammar is concerned. There are 14 grammatical endings, as follows:

Every word of two or more syllables ending in

1. -o is a substantive;
2. -a " an adjective;
3. -e " an adverb (sometimes a preposition or conjunction);
4. -u " a pronoun or adjectival substantive denoting a person;
5. -i " a plural;
6. -n " an accusative;<sup>1</sup>
7. -ar " an infinitive of the present;
8. -ir " " " " past;
9. -or " " " " future;
10. -as " indicative of the present;
11. -is " " " " past;
12. -os " " " " future;<sup>2</sup>
13. -us " a conditional;
14. -ez " an optative (imperative).

## I. ARTICLE

3. The indefinite article is un, a, an: un manuo, a hand; un fingro, a finger; un anjelo, an angel; un arko, an arc. There is no indefinite article in the plural: kindi, children; libri, books; monti, mountains; blumi, flowers.<sup>3</sup>

The definite article is la, the, for singular and plural. It may be combined into one word with preceding prepositions that end in a vowel, the a being elided, as with the prepositions a (ad), to; da, by; di, of; fro, from; pri, about; etc.: al, dal, dil, frol, pril, etc. The a of the article may be elided before a vowel, and this is to be indicated by an apostrophe: la matro, the mother; la domi, the houses; l'arto, the art; l'ondi, the waves; al maro, to the sea; frol urbo, from the city.

1. The original (not derived) adverb forsan, perhaps, will not lead to a misunderstanding as the ending -an (accusative of an adjective) occurs but very rarely.

2. The subjunctive ends in -al, -il, -ol (§§ 14, 50). It is extremely rare in Ilo and therefore these endings need not be enumerated among the grammatical endings.

3. The LD has no indefinite article. About the great desirability, not to say necessity, of such an article see Prog. II, 390; III, 275; Suplem. at Raporto 28.

(Turn to page 50)

# The Vacuum Tube

as

# AMPLIFIER

The curve of operation of the vacuum tube when used as an amplifier of audio or radio frequency energy and what it means in a good receiver

By Donald Gordon Ward

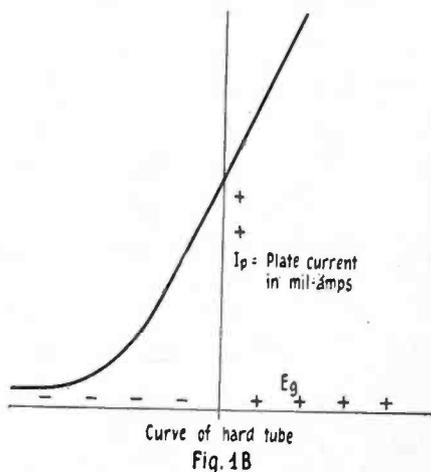
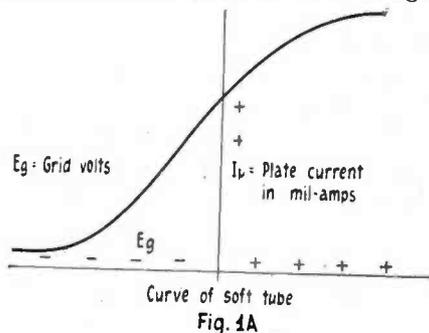
**I**N THE two previous articles of this series which have been published in preceding issues of WIRELESS AGE the general discussion concerned itself with the development of characteristic curves of vacuum tubes and with the explanation of the curves of the vacuum tube as a detector. This, the third of the series, is intended to convey the general ideas concerning the curves of operation of the vacuum tube when used as an amplifier of either radio or audio frequency energy.

From the meaning of the term amplifier one would be led to believe that the actual mode of operation was for the tube of itself to take in a small amount of energy to its grid filament, i.e., input circuit, and deliver to its plate filament, i.e., output circuit, a correspondingly large amount of energy, but such is not the case. As a matter of fact the tube itself acts purely as a controlling or relay device to control the energy from a source of power which is entirely distinct from the incoming source of energy—in other words, the power which is applied to the plates of the tubes through the medium of the "B" battery. When properly operated the frequency of the input and output energy to and from the tube is identical although the amplitude of the energy in the output circuit may be many times that in the input circuit due to this tube relay action.

Previous to the advent of the vacuum tube amplifier, many schemes were tried for the amplification of signal energy which were almost invariably mechanical devices and therefore, having limitations as to speed of operation, etc. they were not what could be called pronounced successes. The appearance of the vacuum tube on the horizon however entirely altered this state of affairs, as at last there was available a device which, as it was entirely electrical in its actions, had no tendency to lag behind any type of a signal no matter how fast its speed of vibration, and the only difficulty then lay in discovering the best method for causing it to function.

Let us look for a moment at the

types of characteristic curves of vacuum tubes to see just what is the result of applying a voltage of varying amplitude to the input or grid filament circuit of a tube that is employed as a detector. This is illustrated in figures 1A and 1B in which 1A is the curve of a soft or low vacuum tube and 1B is that of a hard or high



Characteristic curves of detector tubes

vacuum tube. It will be recalled from the previous article of this series in which we dealt with the operation of the vacuum tube as a detector that, in order to obtain rectification of radio frequency energy we operated the tube upon the bend in its grid potential-plate current characteristic curve which gave us rectification of energy with a resulting audio frequency signal production. Now of course it would be impossible for us to operate our tube as a radio

frequency amplifier on the bend of the curve as it would result in having a detector instead of a radio frequency amplifier. This oftentimes occurs in a badly constructed radio frequency amplifier. Nor can we operate our audio frequency amplifier on the bend of the curve, as again we would have rectification with a loss in signal energy and a resulting distortion which happens in poorly constructed audio frequency amplifiers.

The point on which to operate our tube as an amplifier is between the knees or bends of the curve, and we must exercise great care that it is operated along the straight portion only and not allowed to run over the bends of the curve if we wish distortionless audio frequency amplification and "squeal-less" radio frequency amplification.

In order to study more carefully the operation of our tube as an amplifier let us look at curves figs. 2A and 2B which are two curves taken of the same tube, but using two different plate voltages, and as will be noticed, the curve with the higher plate voltage is the one having the steeper slope in this particular case, but this does not always follow, as there is a certain value of critical plate voltage for each particular tube and if the value of plate voltage is increased above that amount the slope of the curve tends to decrease in steepness.

Now let us apply the same value of grid potential variation to these two curves and we shall readily see that the greater current variation in the plate circuit is secured from the steeper of these two curves and therefore we shall obtain the greater amplification with the steeper slope. This, however, does not mean that we shall necessarily obtain the better all around results, for it may happen that our grid potential variations may be greater than the limit set in the illustrations and, in fact, they may be even great enough to permit operation over the bends of the tube curve with a resulting distortion, as with the same grid voltage variation in both cases we get a greater plate cur-

(Turn to page 42)

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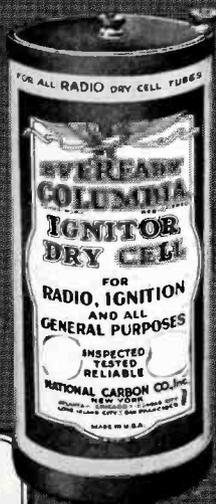
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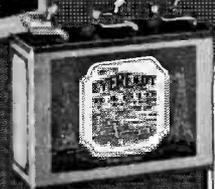
No. 766 22½-volt Large Horizontal Price \$2.00



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No. 771 4½-volt "C" Battery improves quality, saves "B" Batteries Price 60c



"Quality Goods for Quality Readers"

### The Vacuum Tube as Amplifier

(Continued from page 40)

rent variation in the latter case.

That working upon the straight part of the curve produces distortionless amplification will be apparent from the curves 2A and 2B in that, when the alternating potential of equal values in both a positive and a negative direction is applied to the curve the corresponding positive and negative variations of the plate current about the axis  $s$ , which is the value of plate current corresponding to a grid potential with no signal input, are equal in value.

For a rather exhaustive study of the functioning of the tube as an amplifier it is necessary to construct a large number of curves of operation instead of just two curves. This result is illustrated by figure 3 which is known as a "family" of tube curves. As will be noted from this group of curves, each one is taken with a certain specified plate potential. After the plate potential has reached a certain value such as 120 volts in this group the slope of the curve decreases in steepness, showing us that some abnormal action is occurring within our tube. In fact we would be running our tube in an overloaded condition if we did so, in addition to which we would have even less amplification than it is possible to obtain with a plate potential of 120 volts. The action of running at an abnormal plate voltage would be readily recognized in a tube into which it is possible to look into, by a characteristic blue glow filling the entire interior of the tube, but of course we do not see this under ordinary operating conditions as the tube is never allowed to approach this critical value of plate potential. Usually distortion occurs before this value is reached unless special precautions are taken to prevent its occurring.

Now that we have had a general explanation of the curves of operation of our tube as an amplifier, let us look at several practical applications of our curves from an operating standpoint. One of the first points we would like to know is "How can we economize on tube and B battery life"?

Now looking at figure 4 which is a single curve of a hard or high vacuum tube, and assuming that the incoming energy to the grid of the tube has a voltage variation as per the grid wave illustrated, let us apply that grid voltage wave to two places on the curve, one of them at the lower end of the straight part of the slope and the other at the upper end of the curve. We will call one of these waves  $G_1$  and the other  $G_2$ . Now the plate current waves will be represented as  $P_1$  and  $P_2$  respectively, and it will be readily seen that as the slope is the same at both places that the output variation in plate

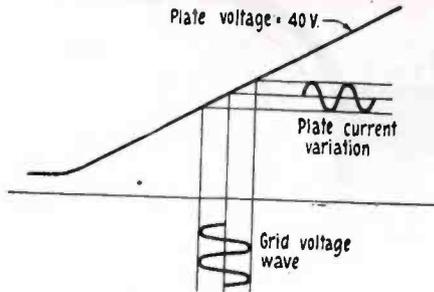


Fig. 2A  
Showing low amplitude of plate current variation

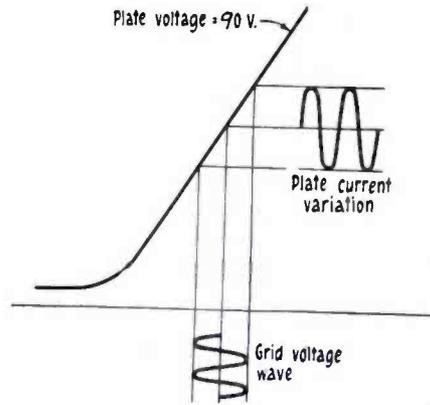


Fig. 2B  
Showing high amplitude of plate current variation

Curves of amplifier tubes under varying conditions

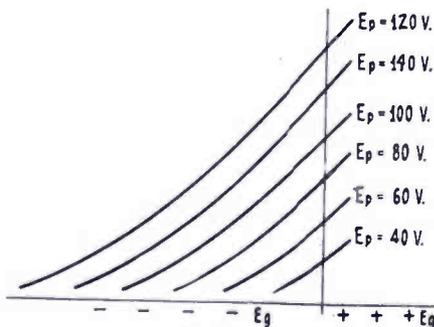


Fig. 3  
Family of tube curves.

NOTE: The steepness of the curve decreases in value when plate potential of over 120V. is used.

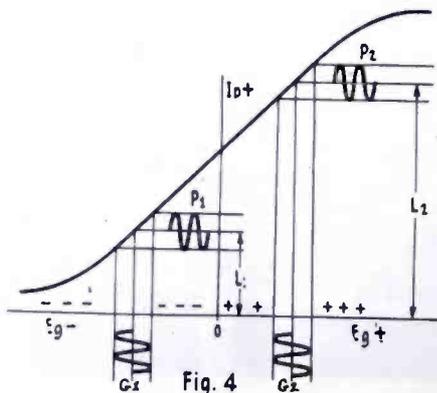


Fig. 4  
Curve of hard tube

current is the same for both conditions or in other words the signal energy amplification is the same in both cases.

However, though this is true, it is not true that both places are equally efficient points about which to operate our tube, as the "B" battery and tube load is not proportional to the signal variation—as proportional to the value of  $L_1$  and  $L_2$  in the drawing—and it can therefore readily be seen that it is much more efficient to operate our tube with a negative potential on the grid as a starting point than with a positive potential as a starting point for a grid wave, and it is for this reason that it is advisable to use a "C" or grid bias battery in order to decrease the load on our batteries and tubes.

Another reason for the use of the "C" battery is to prevent the signals from operating over the bend on the curve.

### M. Berard, Chef de Luxe

(Continued from page 26)

fruits, etc. These notes M. Berard will incorporate into a book on cookery which he intends some day to compile.

Also in this scrap book is pasted a letter from Mary Pickford congratulating B. Berard upon receiving first prize in the exhibit, with his cake dedicated to her, and expressing regret that she could not be one of the lucky ones to taste it. It is interesting to know that Chef Berard conceived the idea for this marvelous dish after witnessing Mary's performance in "Rosita."

"Another thing which we need in this country," says M. Berard, "is standardized cooking so that a dish served under a certain name in Boston or Philadelphia will not come to the table in an entirely different guise in St. Louis or Los Angeles. But that, too, is a matter of education, of publicity, and I believe radio will be the means by which we will accomplish much in this direction."

As M. Berard escorted us toward the door, he said, with that charming accent, "Recently I was talking with a school teacher on the subject of the lack of interest in cuisine in this country and I asked her why it would not be a good idea to train our boys in this important work so that we would not need to import our chefs. She asked me if I intended making a chef of my own son, and I said that certainly, if my son wishes to be a chef, he shall be one and I will give him every aid."

"How old is your son, M. Berard?" we asked.

"Just twenty-two months!" he answered, with a hearty laugh. And we had visions of a baby dress in a white uniform with a towering white hat—and we laughed, too.

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# THE INFORMATION DESK

The Information Desk columns this month contain an innovation in the presentation of information to our readers in that no letters are published. In place of the letters there is a general discussion of subjects taken from a large number of readers' letters so that a digest has been formed of the answers to the contents of these letters. This, we feel, is more helpful and somewhat relieves the task of answering so many letters as well as making the Information Desk easier to read and of more interest to the reader.

Conducted by R. A. Bradley

## The 60-600 Meter Tuner

IN the October issue of WIRELESS AGE there was described a 60-600 meter tuner by Mr. Robert Alan. This tuner has performed some record-breaking feats and has given all around satisfaction to everyone who has constructed it. There are one or two points in its construction which we would like to go over now for the benefit of those who wrote us concerning it. The radio frequency choke caused some misunderstanding. Some tried to use honeycomb coils and others iron core chokes (which are audio frequency chokes—not radio frequency chokes) and some omitted it entirely. When the phones alone are used on the detector tube this choke coil is not necessary. The purpose of it, of course, is to let the radio frequency currents pass to the plate coil instead of the phones or transformer. In other types of receivers it is customary to put a by-pass condenser across the primary of the first transformer. If we were to do this here it would mean the same thing as putting the condenser across the grid and plate terminals of the tube which would render the set inoperative and accomplish nothing. In order to make a shunt feed receiver like this operate properly, the choke coil is just as necessary as the by-pass condenser on other types of sets. We do not know of any firm manufacturing a radio frequency choke at the present time for broadcast receivers. This choke coil will have to be made at home. An ideal choke for this purpose can be made by securing a one inch mailing tube and winding on it about 100 turns of No. 28 d.c.c. wire. This winding will take from 2 to 3 inches of space on the form. The number of turns is not critical. One of our readers used what we believe to be an innovation in this line by taking an old phone plug which had a cylindrical insulated stock and wound his choke coil on this. This choke was then mounted near the plate terminal of the detector tube socket. Honeycomb coils will not operate satisfactorily, neither will audio frequency chokes with iron cores.

## More About the D-Coil

THE D-coil is still exciting nation-wide interest. Everyone is reporting excellent results on Mr. McIlvain's receiver. We are still getting letters asking questions about the receiver and we will attempt to answer some of them here. The receiver's operation is greatly improved by placing a .006 mfd. fixed condenser between the A minus binding post and the B plus binding post which furnishes the plate voltage for the radio frequency tubes. If you have succeeded in using the entire amount of plate voltage which you have on your audio frequency tube, on your radio frequency tube, then the one terminal of this fixed condenser should go to that post. The purpose of this condenser is to allow the radio frequency current to have a free and uninterrupted path from the plates of the radio frequency tubes through the plate coils, to the filament return, through the grid coil and

back to the grid. We know of several D-coils in which this one addition made the set work well when it had refused to do so without the condenser. Some of our readers wrote in and asked us if rheostats could be substituted for the Amperites. Of course they can, but unless an exceptionally good rheostat like the Bradleystat or Marshallstat is used, little advantage will be realized and only added controls result. If this is your first set, don't try to use the double sectioned rotor variable condenser for tuning two coils, because it is very necessary to secure exactly the same inductances in both coils which this condenser has to tune, and the leads must be the same length and the detector tube and second radio frequency tube must be matched. If you are new at the game, by all means use the third condenser with the separate dial to control it. If you are going to use 23-plate condensers follow Mr. McIlvain's specifications for winding the coils, that is 10 in the primary and 40 in the secondary. If you are going to use .00025 mfd. condensers it is necessary to use 55 turns in the secondary instead of 40 in order that you may cover the entire wavelength range. In January WIRELESS AGE Mr. McIlvain brings out a new D-Coil in which regeneration is used. Our advice to those of you who have successfully made one or more D-Coil receivers is to try Mr. McIlvain's addition of the tickler coil on the last astatic transformer because it certainly performs wonderfully. Don't try this unless you have successfully made your D-coils operate without regeneration. Now please don't write in to us asking if Mr. McIlvain's first receiver is better than his second or if his second is better than the two control D-Coil, because this depends entirely upon yourself. If your experience in set building is limited we recommend that you build the one which seems the simplest to you. This will probably be Mr. McIlvain's original D-Coil receiver which appeared in the June, 1924, issue of WIRELESS AGE.

## The Super DX Hi-F Receiver

THIS amazing short wave receiver continues to give exceptional and startling results to the many readers who have constructed it after the article in the April issue of WIRELESS AGE. We have experimented with it in many forms, but the layout and the tapping of the tuner gave best results just as was described in the article, and no further changes are recommended.

Reception of English stations and French stations is a nightly occurrence, and it has been somewhat of a task to build a transformer which could be heard as far as the receiving range of this set. I think no one will dispute that Mr. Bogardus made an excellent layout of apparatus in his design of this receiver, and that it would be difficult to improve upon it.

The three tuning controls on his original receiver are now calibrated directly in wavelengths so that the two wavelength control dials, those attached to the two variable condensers, are placed at a marked setting and the wavelength of the receiver is immediately

known on the dial. Of course the tickler, the extreme left-hand dial, cannot be calibrated with any degree of accuracy even though tubes and batteries remain unchanged. Mr. Bogardus has taken the greatest of care to make all these calibrations with his best and most sensitive UV-201-A in the detector socket, and another 201-A in the amplifier socket known for its high amplification factor. These tubes are never changed in their sockets; the rheostat settings are barely moved for minute adjustment of the filament temperature. This gives him a receiver which he knows will work all the time and which is likewise an accurate wavemeter on the stations received. He can instantly give to the man at the other end the exact wave he is operating on. There is a certain fixedness about the whole receiver which makes positive this calibration and our readers would do well when designing and building a receiver to follow Mr. Bogardus' construction ideas and make their receivers a finished job.

## The 5-Tube Quality Receiver

THIS receiver has been pronounced by many of our readers as the best receiver of the year. They give as their reasons simplicity of operation, distant reception, and remarkable clarity of reproduction obtained with the resistance-coupled amplifier. Many have asked if the usual transformer-coupled audio frequency amplification could be used in place of the super amplifier. Of course this is possible, but its only advantage is that it requires one less tube, making the receiver a four-tube outfit instead of a five-tube, and the transformer-coupled receiver would require somewhat less B battery for satisfactory operation. When we speak of more or less B battery we refer entirely to voltage and not to up-keep, as the resistance-coupled amplifier requires less B battery current though more voltage than the average no C battery audio amplifier.

We have been wondering why people continue to ask "is it possible to wind the coils for this receiver at home?" Surely it is, but the manufacturing of radio parts has reached such an advanced stage that the manufacturer turns out a product far superior to that which can be made on the kitchen table at home. The inductances used in this receiver has practically no support except that which fastens it to its mounting. The coils are wound on forms in the factory, and a specially developed insulating compound is placed on the coils, making them rigid. The form is then removed and the result is a strong, self-supporting solenoid inductance.

One of the outstanding features of this receiver is the ease of tuning. This is accomplished because of the care of the manufacturers in designing two coils of inductance closely approximating the same value. As a result the two tuning condenser dials read practically the same setting for a given station. This is a considerable help as the detector tuning condenser is rotated, keeping the tickler just below the oscillation point,

(Turn to page 49)

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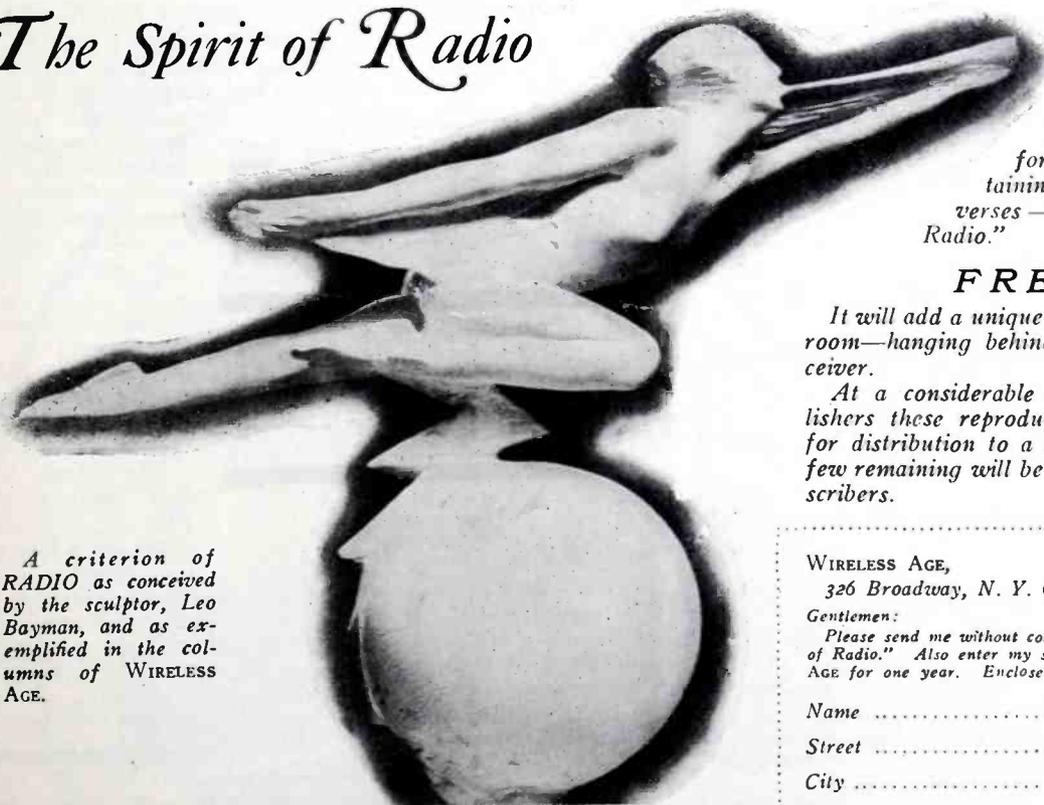
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# KINKS

By W. F. Crosby

## —Panel drilling— Winding Coils—Soldering— Care of Batteries

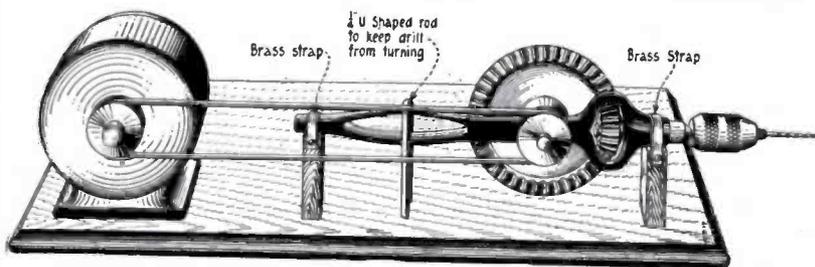
**A** POWER drill suitable for drilling holes in radio panels may be made without difficulty from one of the large size breast drills and a discarded electric motor. Usually these drills are made with handles of adjustable lengths which are held in place with one good sized machine screw. The handle may be removed in a few seconds by unscrewing this part and a small slotted pulley wheel substituted. This, of course, is held in place by the same screw, but in some instruments it may be necessary to secure one, slightly longer.

The drill itself may be mounted horizontally on oak blocks and strapped to them by means of short lengths of sixteen gauge brass. Both drill and motor may be secured to the work bench or to a suitable base board arranged in such a way that the chuck end of the drill is free of surrounding objects.

If, when the radio panel is laid out, the holes are rather deeply center punched, it will be an extremely easy matter to start up the motor and hold the panel vertically in front of the drill. By doing this the time of drilling a panel may be cut in half with usually a far neater job owing to the high speed at which the drill passes through the panel. An ordinary quarter inch sewing machine belt will do nicely with a one-quarter horse power motor.

**I**N ORDER to wind radio inductances or coils satisfactorily it is necessary that considerable tension be applied to the wire. There are several ways of accomplishing this. Usually the spool on which the wire comes may be suspended somewhere conveniently by means of a piece of No. 14 hard drawn copper wire and the wire, to be wound on the form, led from it through a small hole in a piece of soft wood. This piece of wood may be secured to the edge of

the work bench or secured in a small vise. Usually if the wire is fed through this hole and then around and over the top of the wood a sufficient amount of tension will be secured. Care should be taken to see that edges of the hole are smooth so that the insulation on the wire will not be worn off.



Electric motor and breast drill hooked up to drill panels

Another and simpler manner is to take a turn of the wire around the bench vise, secure the wire to the form, and roll it across the work bench toward the vise. In this way a foot or two may be wound on and then the form pulled away at the same time pulling the wire from around the vise. A little care in winding a coil in this manner will produce a winding equal to any commercial product.

Yet another way of securing the same result is to pass the wire under a

tion of a radio set. Especial care should be taken where connections are adjacent to each other such as in a telephone jack, tube-socket or transformer. If too much paste is used it will melt and spread over the surface making a slow leak which may materially affect the reception of distant stations.

The insulation of a jack is particularly apt at soaking up this melted flux with the result that a fairly low resistance "grid leak" is formed directly across the phones or loud speaker. Leaks such as this may cause a set to be noisy and produce a lot of

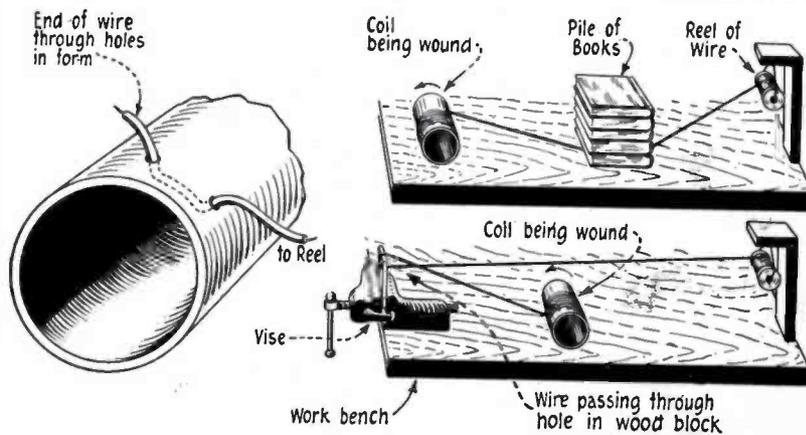
"static" which might easily be eliminated. Rosin core solder seems to be the best, as only a small amount of rosin can be used. Acid core solder should never be used as it will surely affect the copper wire, causing it to corrode and in time may completely rot the wire away.

**E**VERY kind of battery used in a radio set requires a different kind of a test. The B batteries should never be tested with anything else but a voltmeter and this for only a fraction of a second. The voltmeter causes a short circuit which will use up these batteries very quickly.

The ordinary dry A battery must be tested with an ammeter, the higher the reading the better. A voltmeter is almost useless for this work.

The storage A battery must be tested with a hydrometer. Although a low reading voltmeter may be

used it is generally considered best to check it up with the hydrometer. Storage B batteries may be tested in the same manner as the ordinary dry B batteries; with a voltmeter. Most dry batteries, especially B batteries, will have a decided drop in voltage soon after they have been put in use, but in many cases, once this drop has occurred the remaining voltage will stay constant for a long time to come.



Various methods of winding coils

pile of books or some similar weight having the reel on one side and the winding form on the other. Usually the wire is secured to the form by drilling two small holes through the tube, passing the end of the wire down through one and up through the other. This locks the winding in place.

**S**OLDERING paste and rosin should be used sparingly in the construc-

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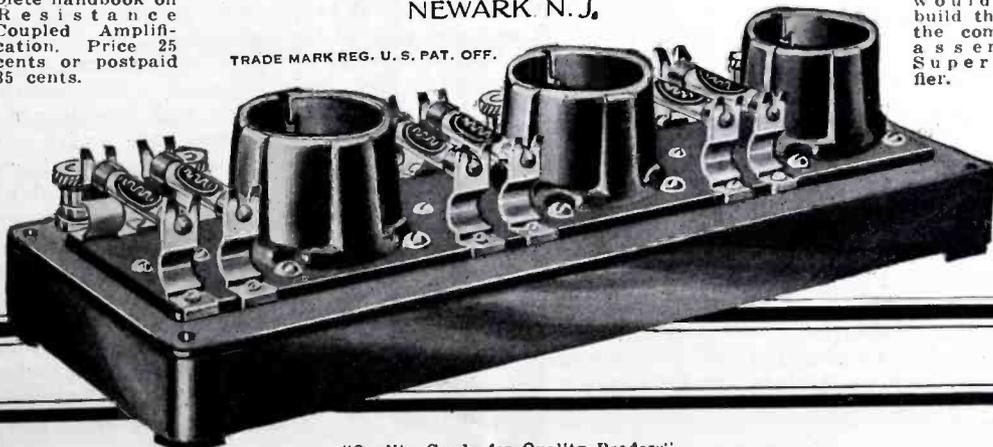
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# Uncle to a Million

the man who is

By E. D. Cahn

WHEN I first heard John S. Daggett, the well beloved announcer of KHJ called Uncle John, I immediately imagined a bluff, chunky figure, ruddy-cheeked, white-haired and jovial in a Santa Claus sort of way.

When I met him I found a tall man of the wiry type, by no means elderly in appearance and certainly not in ideas. A man who did not look like an uncle, but who is of that fine, rare sort that everybody would like to have and mighty few of us ever meet except in our most wistful dreams.

He is a man with a great heart, no frills, no fads—none of that glib patter which so many men before the public deal out. He does not seek publicity for himself; has no axe to grind. He is not getting, but giving, and though he is serving his countless friends in radioland with every ounce of his abundant energy, he never once used the word "survive" in connection with those efforts.

His greatest admiration is simplicity. Simple music, simple goodness, simple, unspoiled things like the birds in his broadcasting room and the children for whom his children's hour is so painstakingly arranged.

He knows the minds of the everyday folks and they are always in his mind. He tries to give them what they want, without any bias, minus all propaganda. He looks upon the microphone as an open forum for all the people. He believes the air should be free and that good music, inspiring and interesting educational talks and clean entertainment should be freely given to all who care to listen.

Radio, he says, is the mightiest agent that modern times has to work with and that its powers for good are unlimited as long as it remains beyond the control of selfish interests. That is, as long as it is at the service of the many and for the good and pleasure of all.

Uncle John is the friend of all artists. Time and time again he has stated that KHJ desires above all things to bring artist and public into close touch with each other and that all those interested in employing the talent they have heard broadcasting under his auspices may reach them through the *Los Angeles Times*.



John S. Daggett, popular announcer at KHJ

No charge is made for the use of the station. No fee is collected from the artist, and nothing breeds wrath in Uncle John so quickly as a suggestion that anyone profits at the expense of the artist. He will not allow his artists to be bled in any way. He insists that they be fairly paid and that all their earnings shall be theirs, without commissions, rake-off or fees paid to exploiters. And, besides this, the *Times* is very generous about the space it gives to the radio talent.

Uncle John rules KHJ with the iron hand in the velvet glove.

Bring him something beautiful, inspiring or educational. Present it well, and he will work with you with all his might to give it to the great family in radioland. But no matter how well known your name or how fine a performer you are, technically, if you are thinking of your own aggrandizement first he will have none of you. If there is no human warmth, no genuine desire to do something for someone else, to give freely of your heart's best to those who are listening in homes and hospitals, in lonely desert camps, in mountain huts, on land and sea, then he will feel the coldness in your soul and not care to spread its chill.

He is an ardent believer in the

power of personality as it expresses itself over the radio—likening the distance which separates and yet unites the broadcaster and his audience to a thin curtain hung between them.

The artist or the thinker speaks from his side of the curtain in his everyday voice to his friends beyond it who get his mood and the true inwardness of his message from the tones of his voice as well as the substance of his words. For the cheerful, the human, the sympathetic, the truly friendly know no barrier and are hampered by no accident of distance when the radio is the medium.

These are the things that Uncle John believes in and wants most of all to broadcast. These are the things most appreciated and most often spoken of in his tremendous fan mail.

By the way, he makes a distinction between the fans and the real radio family. To him, the fan, pure and simple, is a sharpshooter who is more interested in getting distant stations and in the purely mechanical side of radio than in any program. But what Uncle John calls the radio family are interested in the human side, have their favorite stations and artists and take a family interest in anything connected with them. They are the ones who write in their thanks, make suggestions and ask for favorite selections. Often the first outside appreciation—a young artist receives, comes in this way.

KHJ's free broadcasting service is also at the disposal of its many "god-parents"—men and women who appreciate what has been given them in pleasure and inspiration through the radio programs and, in return, employ their favorite artists to participate in programs arranged as thank offerings. The names of many of these god parents are not broadcast because they prefer to remain anonymous benefactors of artists and public.

I asked Uncle John how it felt to be uncle to a million people—for that, at a conservative estimate, is his radio audience between eight and ten o'clock every night. He smiled, a delightful, whimsical smile that ended in a chuckle. "Pretty fine."

I was surprised to find that he does not visualize a multitude of individual

(Turn to page 55)

**Strand Quartette**

*(Continued from page 31)*

any other man alive. But you will never guess what his hobbies are by looking at Frank Mellor. First of all he is a wonderful cook." Mr. Thomas says that Mellor makes the best biscuits in the world and is brave enough to eat them himself. But Mellor in turn says that he has eaten many a good meal that John Young cooked. The best story, however, is that when the quartette were in Polton, Kansas, the home of the Meusel boys, Frank was found down in a cafeteria one day making a mocha-fudge cake which was later put on the counter and sold and no casualties were reported. Add to this the fact that Mellor collects antiques and has a home full of genuine old American things.

Thomas is an amateur geologist boasting a large collection of eight or ten years growth.

The only one who seemed to be free of a particular hobby was George Reardon, the baritone, who sits back and puffs contentedly on a cigar, while the rest of the world goes by. It was he who said, "Have you noticed that this quartette is made up of the League of Nations?" and then it was that I realized that Frank Mellor was of Swedish descent, John Young of Scotch descent, George Reardon, Irish, and Frederick Thomas, Welsh.

This quartette has probably been in more prologues, than any other quartette in New York. These have all been staged by Mr. Joseph Plunkett, Director of the Strand Theatre, who has developed the motion-picture prologue to the very highest degree. Some of his best recent creations were the prologue to the "Sea Hawk," "The Sainted-Devil," and "So Big." Mr. Plunkett has also worked out a very entertaining feature in the shape of a tintype curtain, through which the boys thrust their heads and feet and do such things as "Sally in our Alley," or their own "Sally King" which is an original song by the quartette.

I am flattering myself, by the way, that I am the only woman for whom they have held a special performance. They asked me whether I ever heard their imitation bag-pipe song, and when I said "No, but I would love to," George Reardon solemnly produced a pitch-pipe and the quartette sang me the song which has never been done on the Strand stage. The main tune is carried by our Scotchman, John Young, and at the end the whole quartette bows over like the wind going out of a bag-pipe. It will be a sensation when they do play it. If you are so unfortunate as never to have had the joy of hearing these boys on the air or on the stage, you will be glad to know that they make records for the Cameo, Brun-

wick, Star and the Jenett Company. Their character songs and their old fashioned melodies are among the most popular that they do and it is certainly safe to say that Broadway boasts no male quartette with a more devoted following than that belonging to the Mark Strand quartette!

**Information Desk**

*(Continued from page 44)*

and the other dial on the radio frequency tube is kept in resonance with the detector condenser.

Concerning the substitution of parts; it is, of course, possible. The receiver could have been made up and operated satisfactorily with entirely different parts from one end to the other. We used the parts specified because they work harmoniously together. There is a reason for every part in the set and no unnecessary parts are used, so stay on the safe side and stick to the list of materials which always accompanies a construction article.

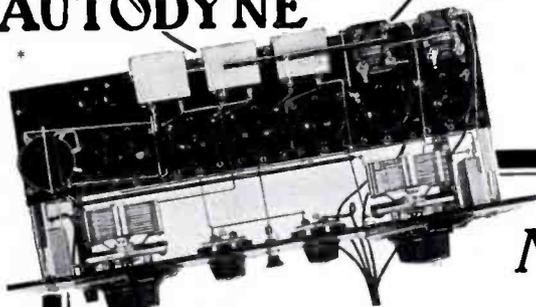
**The Power Amplifier**

**M**ANY readers have written concerning the power amplifier and expressed the desire for a receiver to be described in WIRELESS AGE which would best make use of the exceptional amplifying qualities of this unit. This will probably be done in the August issue of WIRELESS AGE.

Many of them tried to use one stage of the choke coil amplification after two stages of transformer-coupled amplification, and ran into trouble. The trouble mainly consisted of too much voltage impressed upon the grid of the choke coil tube. This resulted in the blocking of the tube and the amplifier was worse than useless. The remedy is the insertion of leaks across the secondaries of the first and second stage transformers of about .5 to .25 megohm. We believe that the Daven Radio Company can amply supply the needs of these people.

In one particular instance the insertion of a .5 megohm leak across the secondary of the first stage of audio, a .25 megohm across the second stage, and 100,000 ohms, or .1 megohm as the leak in the choke coil stage gave excellent results.

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1 Carter 102A Jack .....	1 Carter No. 3 Jack Switch.....	1.15
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Tuning Capacity .....	1 S-M No. 701 Color Cable.....	1.00
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Transformers .....	1 Bakelite panel 7"x18"x3/16",	
8.00	drilled, grained and engraved..	6.00
1 S-M 101B Coupling Unit.....	Sp a h e t t i. bus-bar, lugs	
2.50	screws, nuts, etc.....	1.00
1 S-M 6-Gang socket shell (536-		
201A), 537, UV199.....		
10.80		
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## Lessons in Improved Ilo

(Continued from page 39)

### II. SUBSTANTIVE

4. A substantive ends in -o in the singular and in -i in the plural.<sup>1</sup> It has no declension; nominative and objective case are alike, and the other cases are formed by prepositions: un viro, a man; di un muliero, of a woman; ad un amiko, to a friend; di la (dil) puerini, of the girls; a la (al) patrulo, to the father; a la (al) pueruli, to the boys; di la (dil) patrino (matro), of the mother.<sup>2</sup>

When the objective case cannot be easily recognized as such which occurs in rare instances, the ending -n is appended to the noun: la filiinon il salvis, la filiulo dronverdis (esis dronata), the daughter he has saved, the son was drowned.

### III. ADJECTIVE

5. The adjective has the same form in the singular and in the plural: un bela blumo, a beautiful flower; la grina folii, the green leaves; alta domi, high houses.

When an adjective is used substantively (i. e. without the substantive which it qualifies) in the plural, the latter is indicated by i added with or without a hyphen. The combination ai or a-i is bisyllabic and the accent may rest on the a or on the preceding syllable: redái (or rédai, redá-i, réda-i), red ones (apples omitted).<sup>3</sup>

The a of the adjective may be elided (without an apostrophe), the place of the accent remaining unchanged. It is not recommendable to employ this elision with original (non-derived) and participial adjectives and when the following word begins with the accented syllable: ofical aferi, official affairs; mortiv remanantaji, mortal remains; but mortiva enti, mortal beings; sendita ad Anglia, sent to England.

An adjective ending in -o or in -u denotes, respectively, anything whatsoever (Aristotelian substantive) or a person: la raro, the rare, anything rare; l'utilo, the useful; un saju, a sage; un oldu, an old person. Aristotelian substantives have no plural, and the forms in -u have the plural ending -i: avari, misers.<sup>2</sup>

6. Comparison. The positive is formed by velut, as, like (also by ite...velut or tam...kam, so...as, as...as); the comparative by plu. more; min. less; the superlative by maxim, most; minim, least. The particle 'than' is expressed by kam: saja velut Solon, as wise as Solon; plu richa kam, richer than; min klara, less clear; maxim, minim utila, most, least useful.

The comparative and superlative may also be formed synthetically by the suffixes -ior and -est: faciliora, facilesta (accent on the o and e), easier, easiest. The synthetic forms are necessary in deriving words from a comparative and superlative: la belioro, the more beautiful (anything more beautiful); boniorigar, to improve.<sup>4</sup>

#### EXERCISE TO §§ 1-6

Remark. Words that have occurred in the text of the preceding paragraphs and those which have in Ilo exactly the same form as in English are not cited in the lists of words preceding the exercises.

Apartenar, to belong	instruktisto, teacher	oro, gold
aqno, water	jorno, day	pano, bread
arboro, tree	kantar, to sing	platino, platinum
arjento, silver	konocata, known	polala, polar

1. The plural of proper names, foreign words, letters, numbers, and particles is formed by i preceded by a hyphen: Cato-i, pound-i, be-i, du-i, ma-i e se-i, Catos, pounds, bes, twos, buts and ifs.

2. The possessive case is formed by the ending -i: l'amikof konsilo, the friend's advice; la kindif ludo, the children's play (see § 31; Rap. 28, Suplemento).

3. An article le is used in the LD to indicate the plural of an adjective: le matura, the ripe ones (frukti, fruits, omitted). To form an Arist. substantive the LD employs the pronoun lo, it, as a sort of article: lo agreabla, the agreeable. These two usages constitute unnecessary anomalies; both can be regularly expressed as shown in §5: la maturai, the ripe ones; la agreablo, the agreeable.

4. The LD cannot derive appropriately words from a comparative and superlative because it has no synthetic forms for them.

avara, avaricious	kontenar, to contain	por, for, in order to
blanka, white	kontenta, contented	puero, boy, girl
bona, good	krucho, pitcher	rendar, to render,
divenar, to become	lego, law	make
duktila, ductile	lernar, to learn	repozar, to repose,
dum, during	ligno, wood	rest
en, in	linguo, language	salubra, salubrious,
esar, to be	lumo, light (the)	healthy
exerco, exercise	luno, moon	sanezo, health
fatigita, fatigued	mala, bad	saucu, sauce
felica, happy	mentio, lie (the)	servisto, servant
fero, iron	necesa, necessary	skolano, scholar, pupil
fidela, faithful	nematura, unripe	somero, summer
fixa, fixed	neutila, useless	stelo, star
flugo, flight	nivo, snow	sur, on
fragila, fragile	nocar, to hurt, injure	tero, earth
frequa, frequent	nokto, night	ucelo, bird
frukto, fruit	nomo, name	vento, wind
grava, heavy	nubo, cloud	vicio, vice
homo, human being	ofrar, to offer	vintro, winter
hundo, dog	okulo, eye	vitro, glass
hungro, hunger	ombro, shade	vivo, life

La folii di la branchi esas grina. L'uceli kantas sur l'arbori en la gardeno. La suno ofras lumo a la tero dum la jorno, la luno dum la nokto. Instruktiva libri esas utila a la pueri. Gramatikal exerci esas necesa por lernar un linguo. Blua okuli esas bela. La krucho kontenas fresha e kolda aquo. Fidela amiki esas rara. La fatigita animalo repozas en l'agreabla ombri dil alta arbori. Un saja instruktisto laudas la diligenta skolani e reprimandas la indolentai. Matura frukti esas salubra, la nematurai nocas la sanezo. La mentio apartenas a la maxim mala vicii. La flugo dil ucelo esas rapida velut la vento. La muliero esis ite inteligenta velut suava e bela. La hundo esas tam fidela kam brava. Aquo esas ite necesa por la vivo velut pano. Oro esas un metalo plu duktila kam fero. Platino esas plu rara kam arjento. La servisto esas plu mala kam neutila. Hungro esas la maxim bona saucu. Avara homi esas min felica kam kontentai. La nubi divenis min frequa e min grava. La polala regiono esas la minim konocata parto dil tero. Sirius esas la nomo dil belesta fixa stelo. Vitro esas plu fragila kam ligno. Bona libri rendas sajiora un homo. La somero esas agreabliora kam la vintro. Drako kreis severa legi, ma Solon boniorai e sajiorai. La papero esas blanka velut nivo. Fero esas un metalo utiliora kam arjento.

Remark. For the sake of practice it will be useful to translate the preceding Ilo sentences into English, to retranslate the English sentences obtained into Ilo without looking at the given Ilo sentences, and to compare the retranslation with the original. Deviations of the former from the latter are to be corrected. This advice should be observed with the exercise of every subsequent lesson.

#### LA CHASO KUN LA LEONO

The Hunting with the Lion

by Martin Luther

by Martin Luther

Un bovo, un kapro ed un mutono asociis su  
An ox, a goat, and a sheep associated (themselves)  
kun un leono, e li iris kune por chasar en un foresto,  
with a lion, and they went together to hunt in a forest,  
e li kaptis un cervo, quan li dividis en quar egala parti.  
and they caught a deer, which they divided in four equal parts.  
Ma la leono dicis: "Nun vi devas savar, ke una parto  
But the lion said: "Now you must know, that one part  
esas mea kom via kompano; la altra apartenas a me kom  
is mine as your companion; the other belongs to me as  
la rejo di omna animalo; la triesman me volas havar,  
the king of all animals; the third one I want to have,  
pro ke me esas fortiora e kuris e laboris pro ol plu  
because I am stronger and have run and worked for it more  
kam vi omna; ma qua volas havar la quaresma, devas  
than you all; but who wants to have the fourth one, must  
prenar ol fro me per violento."  
take it from me by force."

Ita la tri esis koaktata havar kom rekompensu po sua  
Thus the three were forced to have as compensation for their  
esforci nulo altra kam trubo e detrimento.  
efforts nothing else but trouble and detriment.

### Loud Speaker Reproduction

(Continued from page 17)

The results of Professor Webster's work were perhaps too complicated and too little understood to be fruitful at the time. However, a few of us realized the importance of his work and as the result of mathematical training we were able to carry his work forward. This work was carried on independently by Dr. Slepian and Mr. Hanna, two young research engineers of the Westinghouse Company, working jointly; and by myself, working under the general direction of Dr. Alfred N. Goldsmith for the Radio Corporation of America. The two former men published their results in the "Proceedings of the American Institute of Electrical Engineers," while the two latter published their results in the "Proceedings of the Institute of Radio Engineers." Quantitative and precise loud speaker development really dates from the time of these two articles. It is to be hoped and expected that these pieces of work will be a substantial portion of the foundation of the new loud speaker art.

As a result of these two independent researches, the merits of the relative long exponential horn were set forth. The long horns of this type certainly added a great deal to loud speaker performance. This was the contribution of Dr. Slepian and Mr. Hanna. The characteristics of this type of horn has already been discussed in one of our previous articles. The Radiola X receiver was the first set to benefit from this research, for the long exponential horn was incorporated in it.

Mr. Ringel and I, of the Radio Corporation Laboratory, working together, realized from our study the limitations of loud speakers, as set forth in the beginning of this paper, even though the improved exponential horn was used. We wanted to cover a still wider frequency range and cover it more uniformly than had been done in the past. Accordingly, Mr. Ringel and I began the development of a loud speaker utilizing several horns. Both two-horn and three-horn speakers were developed, utilizing several horns, all of which had an exponential shape. They were called the Radiola Doublette\* and Radiola Triplette\* loud speakers. Figure 2 shows the straight forms of these types during the experimental stage.

It was not a particularly easy task to develop these multiple horn and unit types. Much experimenting was done before the two horns of the doublette were developed to a point where they worked properly together. The units for the two horns had to be developed and adopted to each horn separately and to the combination, so that the combination would work properly on

ordinary tubes. We thus had an acoustic problem in the horns, a dynamical problem in the units and a circuit problem in adopting the units' coils to function properly when connected to a receiving set.

The first doublette to be successfully developed was found to be very much superior to any of the loud sepakers on the market. This was not only true then, but it is undoubtedly today. For this reason the first Radiola Doublette loud speaker was placed in the Radiola Super VIII\*; the most elaborate and highly developed set sold by the Radio Corporation of America. The doublette was introduced commercially, into this model late in the summer of 1924. For nearly a year

now the owners of these sets have been enjoying the beautiful music which this loud speaker is capable of producing. A photograph of this particular model of the doublette is shown at the top of page 16.

The reader, no doubt, is interested in the merits of this type of loud speaker as compared with an ordinary loud speaker. This is best illustrated by the curves shown in figure 3. The finely dotted curve illustrates the performance of one of the best of the single unit type of speakers. The solid or continuous line curve shown in this figure represents the performance

\*Trade mark registered in U. S. Patent Office.

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of the doublette type of speaker such as has been in use in the Radiola Super VIII. The curve indicates quite clearly the superior performance of the doublette at both the low and high frequency regions. The long horn with its low natural period, high impedance unit responds to the low frequencies while the short horn with its high natural period, low impedance unit covers the intermediate and high frequencies. The curve indicates quite nicely that the balance between the two horns and their units could hardly have been better arranged. The doublette acts like a single loud speaker horn which gives the desirable low frequency mellow sounds and at the same time the clear, brilliant high frequency ones. This is true, even though the horns are both metallic, being made of heavy galvanized iron. There is nothing "metallic" at all about the sounds produced by these doublettes. The so-called "metallic" quality of a loud speaker is due to the absence of low frequencies and has nothing to do with the use of metal. This perhaps will astonish the average reader, but it is nevertheless quite true. Ask your friend who owns one, if you question my statement. Both horns, of course, are of exponential area and were designed upon a strictly theoretical and experimental basis of which we were quite certain.

Since these multiple horn combinations require what may be termed "long horns" in order that low frequencies may be reproduced, another problem arose, viz: can we coil-up these long horns without losing the advantage of a long horn. These horns have been designed with lengths over seven feet and such horns have been able to reproduce frequencies well below 100 cycles, which is quite a low note to be reproduced accurately in radio. We then desire to know whether or not we can coil it up and put these long horns in a reasonable space. This problem required considerable experimenting for solution. We first tried two extremes—one was for a doublette type with a five-foot horn built with five right angle bends and designed to fit into a space of about one cubic foot. The other extreme consisted in building the long horn with few turns of large radius. These two types are shown illustrated in the photograph in figure 4. Their respective cabinets are shown also in the same photograph.

Bends, no matter how large or how small a radius of curvature they may have, always cause a reflection of part of the sound back in the reverse direction, just where we don't want it to go. The effect of these bends varies with a number of factors, such as sharpness, position in the horn, frequency, etc. Dr. Wolff of this labora-

tory has been engaged in studying this problem, amongst others, in considerable detail. Our tests with the sharp right angle bends showed conclusively that the use of such bends was quite out of the question. Low frequencies were not transmitted to any great extent, even with long horns and their associated low natural period units, around such sharp bends. The tests did show, however, that bends of large radius of curvature did not greatly interfere with the radiation of low frequencies. We wanted the doublette loud speaker, however, to fit into as small a space as possible consistent with good reproduction. Other models with intermediate curvature of the bends were designed and constructed. The limit that we can go, I think, is represented in the central portion of the photograph shown in figure 4 with its associated cabinet. This particular doublette has one fairly sharp bend near the unit where bends have a less effect and then a slow bend which runs thru 360°. This doublette fits into a cabinet about 9 inches high, 18 inches long and 12 inches deep. Its performance is considerably superior to a single horn and represents a very worthwhile advance in the art of sound reproduction. The phonograph shows the small, high frequency horn to the side of the large horn.

Two of the coiled-up triplete horns are shown in the photograph given in figure 5. The larger one represents a longer horn, about 7½ feet in length, and is coiled up less rapidly than the smaller one. These two triplete loud speakers perform very nicely, covering a wider frequency range than the doublettes do. The latter covers the range from about 200 to 4000 cycles in excellent manner, whereas the former will cover a range from about 90 to 5000 cycles. Both these cases are illustrated in figure 3. The large horn of the triplete with its unit covers the range from 90 to 400 cycles. The intermediate horn with its unit covers the range from 400 to 3000 cycles. The small horn with its high natural period unit covers the range from about 3000 to 5000 cycles. The natural period of the low frequency unit is about 250 cycles, that of the intermediate about 700 cycles and that of the high unit about 4000 cycles. With these units and their associated horns sound reproduction in radio reception has really become artistic. The importance of this improvement will be fully appreciated by my readers when they realize that the best of the single horn type of loud speakers do not cover a frequency range wider than a few octaves, say from 400 to 3500 cycles. We have extended then the frequency range so as to cover six octaves as compared with about three octaves as covered by most commercial loud

speakers. This advancement, of course, has added new joy to radio reception and added charm and dignity to music which previously had been of the "Jazz" class, so to speak.

Just one further point in the present article. That is, to what extent have we been able to iron out, so to speak, the peaks. One of the problems, then, which has demanded no small amount of our time has been to obtain a loud speaker that will give a uniform response at all frequencies. This is ideal, of course. We cannot hope to reach it theoretically, but we can hope to do so practically. I am sure my next installment, which will deal with this phase of recent development in loud speakers, will be of unusual interest to my readers. We have extended the frequency range to cover both low and high frequencies with the multiple horn loud speakers. We have been able to cover it with more uniformity than we were able to do with single horn loud speakers. We have not, however, been able to iron out the peaks as much as is necessary. Here we have reached a barrier difficult, indeed, to pass over in horn loud speakers. We have struck out on new lines and in my next installment I shall show how the barrier has been pretty largely passed over by means of new types of loud speakers we have developed.

## Review of Broadcasting

(Continued from page 33)

casting matter of almost national value to reach an audience which may justify the large investment and operating expense. In others, it is merely a desire, stimulated by pride, to operate the most powerful broadcasting station in the community. The public seems to be in sympathy with the Department of Commerce's wise regulations regarding power and is participating in the plan with unbiased judgment. Future progress will require a complete knowledge of the characteristics of all powers at all wavelengths, and these data will be determined by the large experimental station just being completed by the General Electric Company near Schenectady.

Broadcast programs with a few exceptions still seem to be in a somewhat disorganized condition, and the growing tendency of stations to "sell time on the air" will further complicate the difficulty of developing continuity or artistic unity. There are some outstanding examples of constructive effort in programs such, for instance, as the educational courses, and the courses in musical interpretation and appreciation at KGO. The future will undoubtedly see more mature judgment, cultured talent, and intelligent experience devoted to radio programs.

**High Frequency**

*(Continued from page 27)*

Just as different frequencies of light waves cause difference in the resultant sensation of color which we receive, so do differences in high frequency currents cause an ether wave of a different and distinguishable character to be set up. This is fortunate, for it enables us to adjust our apparatus to respond to a definite radio frequency and exclude other sources of radio frequency currents by the process of tuning. If we charge and discharge an antenna system 1,000,000 times a second, we have a 300-meter wavelength; if we do so only 610,000 times a second, we have a wavelength of 492 meters.

Since we have no organ of the body which responds to these frequencies of ether waves, we employ radio sets. The effect of an ether wave upon a receiving antenna system is to cause high frequency currents of the same frequency as that which actuated the transmitter to flow in it. Although the currents so resulting are very minute as compared with those in the transmitting system, they are identical in frequency. Thus a 300-meter transmitter, with its actuating high frequency current of 1,000,000 cycles, sets up a minute high frequency current of 1,000,000 cycles per second in the receiving antenna system.

A tuned antenna system responds to a particular frequency to the exclusion of other frequencies while an untuned system responds to all frequencies. It may be compared with similar "tuning" of light waves. A pair of crystal clear glasses admits all wavelengths of light. But if you wear green colored glasses, only green light waves pass through them.

The radio frequency amplifier of the radio receiver simply increases or magnifies the amplitude of the high frequency currents set up by the distant station in the receiving system. The detector collects them into groups of low frequency. The particular frequency or frequencies into which the detector collects them depends upon the kind of current with which the antenna system is charged. The process of modulation in the transmitter is to combine the high frequency currents of the transmitting apparatus into desired groupings.

We will compare this process with sound waves. Listen to a steady shrill whistle. It may consist of 500 air waves per second. It radiates in all directions but it communicates nothing but a simple sound. In this respect it is like an unmodulated carrier wave. It radiates or carries.

Now control this whistle. Divide it into the dots or dashes of the Morse code and you can now communicate.

This is just what we do with the telegraph key used in a radio transmitter. We cause the continuous wave carrier to be divided into groups, thus permitting the transmission of code signals. This is called continuous wave telegraphy.

Sometimes we use another method. We use a buzzer in the transmitter which turns the carrier wave on and off at definite intervals, as for instance every five hundredths of a second. At 1,000,000 cycles, there are then 2,000 (1,000,000/500=2,000) charges and discharges of the antenna system of 1/500th of a second; then for a similar period, there is no radiation; then follow 2,000 more charges. This is called

interrupted continuous wave telegraphy and is recognizable by its clear pitch.

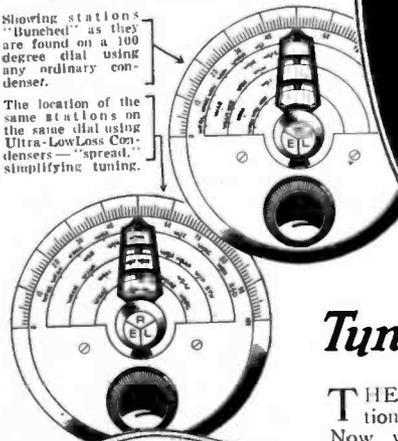
The currents set up in the receiving antenna system tuned to such a transmitter correspond exactly, there being groups of 2,000 impulses each five-hundredth of a second. The radio frequency amplifier augments the currents in the antenna system, while the detector then groups them so that each series of 2,000 charges causes one impulse each five hundredths of a second. This is an audible frequency and it may be amplified by an audio-frequency amplifier.

But the form of modulation which interests the broadcast listener most is

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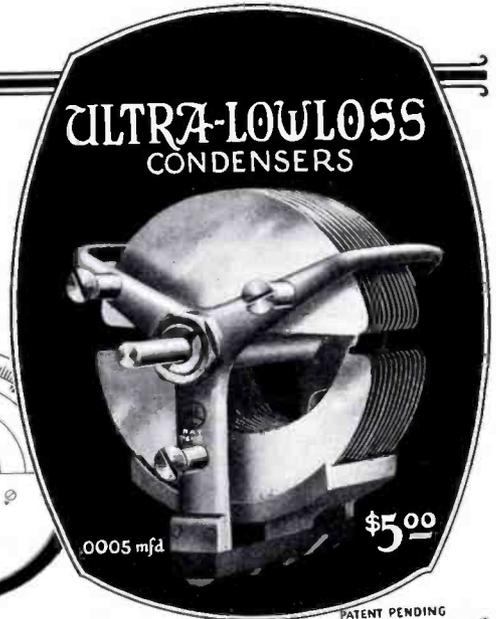
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THE day of tedious fumbling about for your stations is past—science has been brought into play. Now, with the Ultra LowLoss Condensers you can instantly tune in on any station as easy as turning the hands of a clock to the hour.

With one station of known wave length located on the dial, all others can be found instantly. Each degree on a 100 degree dial represents approximately 3 1/4 meters difference in wave length. This applies to both high and low wave lengths. Other than 100 degree dials vary accordingly.

This simplification of tuning is made possible by the new Cutless Stator Plates to be found only in the Ultra LowLoss Condensers. Every feature of the Ultra-LowLoss Condenser was developed with one predominating purpose—to overcome losses common in other condensers. Designed by R. E. Lacault, originator of the famous Ultradyne Receivers and Ultra-Vernier Tuning Controls.

Design of lowloss coils furnished with each condenser for amateur and broadcast wave lengths showing which will function most efficiently with the condenser.

TO MANUFACTURERS WHO WISH TO IMPROVE THEIR SETS.

Mr. Lacault will gladly consult with any manufacturer regarding the application of this condenser to his circuit for obtaining best possible efficiency.

**ULTRA-LOWLOSS CONDENSER**

**PHENIX RADIO CORP., 116-A East 25th Street New York City**

"Quality Goods for Quality Readers"

that used for transmission of speech and music. Instead of such simple grouping as the case of interrupted continuous wave telegraphy just described, we have highly complex grouping of speech currents. The microphone converts the sound waves in the studio into electric currents. These are amplified until they are of the same order of magnitude as the continuous wave carrier which radiates. The magnified audio frequency currents are then used to control the plate potential of the continuous wave carrier, dividing it into audio-frequency groups, but retaining its carrier frequency. Thus high frequency carrier and low frequency studio currents are combined. The receiving system functions in the same way which we have already described, radio frequency amplifying the combined currents; detector dividing them into the audio-frequency groups of the same characteristics as the microphone currents; audio frequency amplification increasing the magnitude of the low frequency current and the telephone loud speaker converting them into sound.

Realizing the characteristics of high frequency currents and their radiating properties, we can now understand why it is important to have low loss condensers and why we must avoid coupling between inductances where a transfer of energy is desired. With this picture of high frequency currents understood, the layman is in a position to comprehend the more or less technical dissertations on receiver design published in newspapers and magazines which refer in such general terms to high frequency couplings, radio frequency losses and disposition of radio frequency elements of the receiver.

## AIL

(Continued from page 38)

corporated body called the I. A. L. Assn. which is making a "work shop" test of Ilo and of Esperanto in the class-room. Dr. H. N. Shenton of Columbia University, New York City, is the secretary. Prof. Thorndike will make tests on the facility of learning several other schemes among both average and high grade pupils. His reputation as a distinguished experimental psychologist is international. This organization now has text books in Ilo (Ido), Esperanto, Nov-Esperanto (Esperantido) Medieval Latin and Latin without inflexions (of which there are several variants).

Next we find that the movement for a Radio Auxiliary International Language Society in Boston, was started in 1922, and we have today a very good cheap "Radio—I. L." Lexicon in five natural languages and Ilo. This society has as executive secretary George Lewis of the Crosley Radio

Corporation, Cincinnati, Ohio. The 450 Ilo students in their "WLW" broadcast lesson course are a nucleus for the Middle West. "CKAC"—La Presse, Montreal, Que., has an enormous B. C. L. group.

The R. A. I. L. S.—as the above society is called—for short, is primarily a radio-correspondence, code and B. C. L. Society. It is not necessarily an Ilo society, but is interested in all A. I. L. improvements. It does not teach any A. I. L. except as it is related to radio. The R. A. I. L. S. is coordinated with the European organization called—the Radio-Ido-Federuro. Radio work in the I. L. is developed for amateur and B. C. L. alike.

The second society is the North American International Language Society and has taken the place of the American Ido Society of Pittsburgh. The general manager and corresponding secretary is O. C. Roos, who revived the I. L. movement in this country when he was radio editor of the Boston Sunday Advertiser. Address 1581 Jerome Avenue, Bronx, New York City.

The above society, called "N. A. I. L. S." is a purely teaching and sales agency for the I. L. It has more than 300 books and magazines from many countries and many pamphlets to distribute for the mere cost of postage. Among the best sold are Dyer's—"I. L. English" and "English—I. L.," lexicons of about 30,000 words each; L. deBeaufront's "Complete Manual" with exercises of 200 pages; Dr. Max Talmey's Exhaustive Text Book and his brilliant reports to the Ilo Academy of improvements to be considered. Any one can obtain copies of back articles about Ilo in the daily radio press and in class periodicals.

As this article is intended more as a preliminary guide for the A. I. L. novice, no attention is here paid to propaganda activities. It is expected that full advantage will soon be taken of the special information service supplied by the I. A. L. A. at Columbia University Headquarters.

This service is gratis and will furnish information concerning teachers of any and all A. I. L. schemes. The I. A. L. A. will also furnish outline, full-term and correspondence courses in these subjects. Through its sales service and its neutral publications it supplies texts and reading matter. However, the largest stock of Ilo books in the U. S. is carried by O. C. Roos, the Corresponding Secretary of the N. A. I. L. S.

It is only just to those who are strictly critical concerning the I. L. that any tendency toward a particular system in a so-called neutral body should be pointed out. From this point of view, the membership of the I. A. L. A.

is officially neutral in all their official acts, but Dr. Cottrell favors de Saussure's reformed Esperanto (Nov-Esperanto or Esperantido), together with his Secretary H. Ward Nicholls. Mrs. D. H. Morris prefers Esperanto and the Ass't. Secretary to Dr. Shenton at Columbia University is President of the Columbia University Esperanto Club.

They all lay weight on the doctrine of justification of any I. L. scheme by popular use. This is an intellectual custom derived from the natural languages where colloquialism and idioms are eventually justified by use, and then sanctified. The Ilists that are trained in the I. L. problem insist that imperfections must be removed by experts as far as possible before the definitive official dictionaries and grammars are issued. For this reason, the Directors of the N. A. I. L. S. are at present working solely as individuals to help the I. A. L. A. test classes in Ilo, but not officially, as they believe that no one in a neutral organization should favor any partisan system. The I. A. L. A. is tackling the problem and the N. A. I. L. S. will assist it in making these tests fair to all.

There are many sub-groups of Ilists in the United States and Canada. They range from labor groups in Pittsburgh and Boston to Theosophical and Rosicrucian Brotherhood groups in Los Angeles. What is needed is one more "Key" organization to handle information in a quick business-like way.

The energy and initiative of Floyd Hardin, 908 Haas Building, Los Angeles, California, has supplied this want. It is the "International Key Society" ("I. S. K. O.") and aims to unite in one great world-wide society all collectors, correspondents, "exchangists," dealers, students, inventors, etc.—who wish to get in touch with fellow-workers in other countries.

It publishes a loose-leaf 24-page magazine and a list of active members. The dues are merely nominal and the ample printing and circularizing facilities possessed by the organization ensure quick service.

In closing this article on the sources of Ilo information in the United States, it will be well to note that the official academy of the I. L. has its own organ, "Mondo." This is obtainable through O. C. Roos, who has been recognized as a member of the Komitato which governs the activities of the central I. L. organization in Zurich, Switzerland. There is also the Swiss Monthly called "Ido," which never fails to appear "on the dot." These are both inexpensive. There is also available 1924 newspaper courses in Ilo. The European Societies and magazines will be reviewed later.

**Production of Electric Current**

*(Continued from page 32)*

pump causes a current of water to flow in pipes. The pump produces a mechanical pressure which may be used to force water into an elevated reservoir against the back pressure due to its weight. The generator, on the other hand, generates an electrical pressure which overcomes the resistance or opposition to the current flow in the circuit.

Generators are manufactured in almost every size and for every need.

Electrical energy is required in radio for supplying the charging current for the storage battery. When many batteries are charged at the same time, a special generator that supplies a large current and small voltage is necessary. A generator made by the General Electric for this kind of work gives 75 amperes at 37 volts.

At the transmitting station, a generator is needed for supplying a very high voltage for the plates of the vacuum tubes that generate and modulate the radio energy. In this case, the generator must supply a high voltage and low current. This generator generates 2,000 volts and is capable of supplying 1 ampere of current.

**ELECTRICAL MOTORS**

An electric motor is a machine which converts electrical energy into mechanical energy. As an illustration, the common electric fan used for circulating air is a mechanical device that rotates by virtue of the electrical energy supplied to it by the local power company. The generator and the motor are almost identical in construction and are sometimes designed to operate as either. The point to be carried in mind by the reader is that a generator requires a mechanical force to drive it while the motor gets its power to rotate from an electrical source of energy.

**MOTOR-GENERATOR**

A motor and generator are sometimes combined into one unit, known as a motor-generator set. A typical example of such an outfit is the motor-generator set used in the radio transmitting station. In a previous paragraph there was described a generator that has to supply 2,000 volts and 1 ampere for the transmitting tubes. The local power company supplies only either 110 or 220 volts and this is far under the voltage required. The motor-generator is the unit that fills the gap. The electrical energy of 110 or 220 volts obtained from the power company is impressed on the motor causing it to rotate. The motor being mechanically coupled to the generator causes it also to rotate and the generator, which is especially designed for the purpose, gives 2,000 volts at the required electrical energy.

**The Man Who Is Uncle to a Million**

*(Continued from page 48)*

nieces and nephews, nor see them as a massed audience. He seems to sense needs, moods, longings and aspirations more than persons.

It is for this reason that he broadcasts so many impromptu features—little dialogues with his juvenile artists, solos by his birds, bits of poetry suggested to him at the moment, old time songs—often given by sweet, untrained voices. And once, in response to a request, he sang Lead Kindly Light for the pleasure of a helpless shut-in, and 'forgot' to announce who the singer was. These are the things which endear him to every one and make him Uncle John in countless homes.

He has been a newspaper man for years and as an interviewer of the great and famous ones of the land, it was always his aim to learn their message to humanity rather than the more frivolous details of their personalities and to interpret their message through the medium of print. Now his medium has changed, or rather, immensely enlarged, and he is still interpreting.

He sees radio as the great educative force of the future. He thinks it not

only possible, but probable, that students will be required to report at points where they will get instruction by radio, education provided by the best brains in the world broadcast by the supreme expert in each subject. The possibilities of radio as an educative, a moral and an ethical force are unlimited as long as the air is free.

KHJ broadcasts sermons given by men of all denominations, for all things good, inspiring and instructive are as welcome as things biased, selfish or narrow are unwelcome.

Unlike many broadcasting stations in the East KHJ welcomes the interested general public to its studio and, up to the limits of its space, allows visitors to be present while its programs are being broadcast. There is a spirit and an atmosphere of friendliness which impresses an Easterner as being of the great Old West of tradition, an absence of formality, a heartiness and easy comradary which warms the heart.

Everybody is busy around KHJ and yet everybody has time for a smile. The spirit of Uncle John pervades everything; friendly, generous-minded and helpful. KHJ, they say, stands for Kindness, Happiness and Joy and, once having met Uncle John, it is not hard to believe that it does.

**Another Good Reason Why You Should Choose**

**NATIONAL  
Velvet Vernier  
DIALS and  
CONDENSERS  
for your set**

**SURBER'S HARDWARE**  
DEALERS IN  
HARDWARE - FURNITURE - IMPLEMENTS  
STOVES - LINOLEUMS - RUGS  
FRANCISVILLE, INDIANA  
November 28, 1924.

The National Company, Inc.,  
Cambridge, Mass.

Dear Sirs:

I have at hand the December QST, and note the National's advertisement of condensers. The records shown are indeed remarkable but I believe that you would be interested in knowing of my DX.

I use a 2-tube low-loss tuner, with two National condensers. With this receiver I have heard either or both New Zealand and Australia eleven mornings out of thirteen. I have carried on two way communication with 2AAA, 2AAG, 2ZAC and A3BQ. I have also heard 2AAX and two other Australians. These distances come close to 8,000 miles.

I am very well pleased with my Nationals and their fine Velvet Vernier Dials.

Wishing the National Company the best luck and continued success, I am

Very truly yours,  
*Stanley Surber.*  
Stanley Surber, 9-EP

**"I am very well pleased with my Nationals and their fine Velvet Vernier Dials," writes Mr. Surber**

The testimony of satisfied users of NATIONAL Velvet Vernier DIALS and CONDENSERS is the most convincing proof of their merit we can offer.

**NATIONAL COMPANY, Inc., Engineers and Manufacturers**  
110 Brookline Street, Cambridge, Mass.

Sole Manufacturers of the genuine and justly famous Browning-Drake Transformer. Patents pending

"Quality Goods for Quality Readers"

# Appliances and Devices

## New Receiver

THE Neutrowound Radio Manufacturing Company of Chicago, presents a new and unusual radio receiver in their 1926 Model Neutrowound. This set employs two stages of tuned radio frequency amplification and detector and three stages of audio frequency. The receiver is of unusual appearance as it is entirely enclosed in a metal



shield which forms its case, and the shielding serves to eliminate outside interference and in addition serves as a protection to the various instruments. It is claimed by the manufacturers that the new receiver is remarkably easy to tune as straight line frequency condensers are employed. The battery connections are made to the rear of the set in a cable providing easy connections to batteries which may be placed out of sight.

## Portable Receiver

THE Port-O-Radio is a new entry in the very small field of portable receivers. It is a self-contained receiver, having a loud speaker and loop in its make-up. There is room provided in the case for dry cell bat-



teries. The entire receiver measures only 16 inches by 16 inches by 6 inches when closed ready for carrying, and weighs but 25 pounds. This receiver has been developed by the American European Radio Corporation.

## Five-Tube Receiver

THE Federal Telephone and Telegraph Company of Buffalo, well known manufacturers of radio apparatus for a number



of years, present their latest development, the Federal Type 141, a five-tube receiver with two tuning controls. It can be operated with either a small or large antenna system and has an exceptional range of reception.

It employs two stages of radio frequency amplification, a detector and the usual two stages of Federal's exceptional audio frequency amplification. The receiver proper is fastened to a rugged framework which draws out from the cabinet, sliding with ease over a special roller-bearing equipment which permits inspection of the tubes and apparatus. The entire unit is enclosed in a mahogany case; two doors in the front, opening outward, give access to the panel.

## Engraving Machine

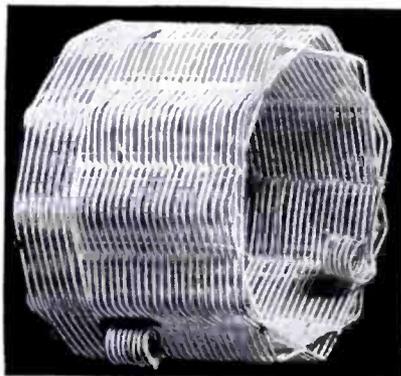
THE Branch Tool Company of Forest-dale, Rhode Island, has developed a little machine for engraving radio panels. It has been designed for the builder of receiving sets and the dealer of radio parts. The



machine is extremely simple in operation and does very good work, and owing to the ingenious method of clamping the panel it is more rapid in operation than a larger machine. It will engrave any hard rubber or bakelite panel of any width up to 14 inches.

## Radio Frequency Coupler

THE All-Henry Coil Company of Minneapolis, Minnesota, has brought out a new radio frequency coupler known as the All-Henry Coil. The coil is meant to be used as an antenna coupler for a radio fre-

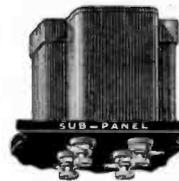


quency transformer and when tuned with a .0005 Mfd. variable condenser will respond to wavelengths between 200 and 600 meters. It is wound in the conventional basketweave style and forms a very efficient unit.

## Thordarson Transformers

AUDIO frequency transformers that have their binding posts underneath to permit concealing the wiring under a sub-panel

are now available for use in home-built sets, it is announced by Thordarson Electric Mfg. Co., Chicago. Aside from the neater assembly this type of mounting makes possible the shortening of leads. The sub-panel



mounting type Thordarsons are identical, except for the location of the binding posts, with the Thordarson standard type audio transformers and come in the same three ratios, viz.: 2:1 3½:1 and 6:1.

## Brandes New Table Talker

THE new Adjustable Table Talker recently announced by C. Brandes, Inc., makers of the famous Matched Tone Headsets and pioneers of the \$10 loud speaker market, is another step forward in the loud speaker development. It is another pioneer-



ing step in that it offers not only an adjustable feature but a gooseneck fibre horn which gives much better reproduction than the ordinary straight-neck horn.

The adjustment lever is located at the back of the base in an inconspicuous place and yet in a very convenient position. This adjustment greatly increases the volume of sound produced and sensitivity of the Table-Talker and makes tuning-in distant stations much easier.

The horn over all is 18 inches high, having a 10-inch bell. It gives rich tones and good volume. It is finished in a neutral shade of dark brown and has a felt padded base. It requires no extra batteries for operation and is finished with a five-foot polarity-indicating cord.

## Kandy Kitchens and Married Life

(Continued from page 13)

of his hated competitor fitted this place and the things which were in his mind as grotesquely as the attenuated figure of Taze fitted that jaunty dining room. It occurred to him that the overwrought luxury of this huge log house was as distasteful as the sound of Sarsfield's name, and he experienced again that nostalgia for the woodlands he had left. He must take Jane back with him.

"And now you must come into the living room," Jane declared as he pushed back his chair. There's a surprise."

He noticed the twinkle in her eyes and the peculiar, complacency of his guests. It made him wary. Was this some confounded joke they were playing on him?

Suspiciously he followed them until they brought him up short before the shining, oblong face of the machine. He stood and looked at it as a babe might look at an incomprehensible new toy. And they silently gazed at him as the loving relatives would without doubt gaze upon the aforementioned babe. He turned and gave back their gaze, puzzled and wary.

"What's it all about?" he asked, laughing feebly. The dials and knobs of this contraption were familiar to him, but as clear as hieroglyphics.

"It's a radio receiver!" explained Alexander shrilly. "Ha, ha, ha!"

"Ha, ha!" responded Tom without mirth. "I thought it was an incinerator!"

"Don't be silly, Alec!" warned Jane. And then, to her husband. "Look Tom, it works like this!"

With a practiced hand she turned the knobs, for she had done nothing else since the night they brought it over. And obedient to her adjustment, a noise came out of the horn.

"WAH, waah, wahair!" said the loud speaker. "You ahhourr urt to weee."

"And, suddenly becoming clear. "The Sweetness quartet, kindly lent to us by Mr. James L. Sarsfield of the Sweetness Shops, Incorporated, will now sing to us—"

What they would now sing to us was lost in an inarticulate cry from Jane which Tom mistook for a laugh because it was in fact, but not in spirit. He turned and glared at them all, especially at the horrified and uncomprehending Mr. January. What shone in his eyes could not be spoken, but it was enough.

So it was a joke! They had planned this elaborate and idiotic surprise as a joke! A joke on him, whose hospitality they enjoyed! And shrewdly they had struck at the thing which occupied him most. Shrewdly—and cruelly.

"Jane!" he cried, and between laughter and tears, no one in the room could move or breathe at the sound of his voice. "It was a good joke, that was. A damn good joke! And now I'm going away to laugh at it! I'm going out into the woods where there isn't any jazz or radio. . . . And if you want me, Jane, you'll find me at Tazewell Cody's shack up on Turtle Mountain."

Which was all he said, and all he heard; for Jane had collapsed into incoherence and the wholehearted laughter with which any woman of spirit would naturally greet such

an occurrence of the kind had faded. Alexander January never got over it. Never.

It was late in the evening when Tom arrived at Tazewell's shack on the mountain after an extraordinarily silent ride down the lakes. He was so hungry that he sat over his supper without a word for Jake and Taze who ministered to him, and he sat smoking after that in perfect silence. His preoccupation was so intense that he took no notice of the matter which engrossed his

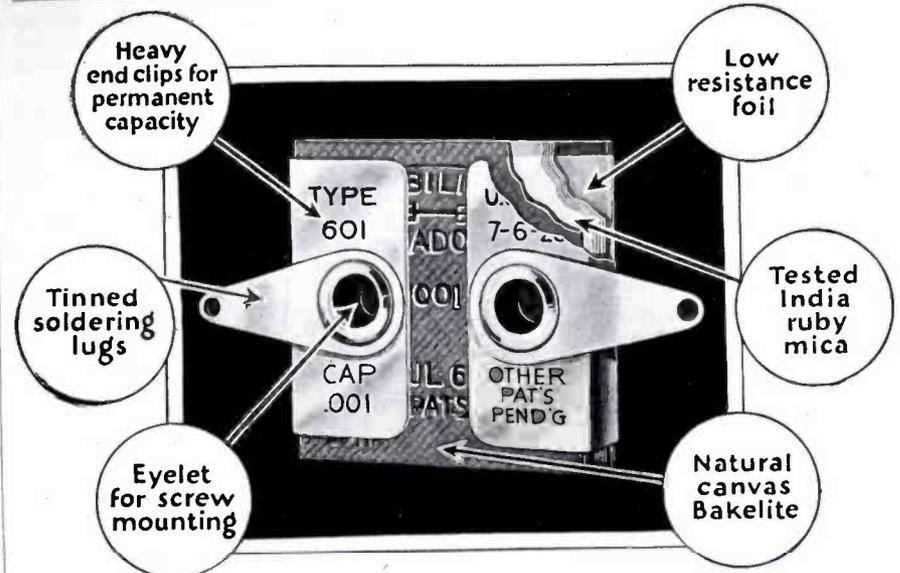
two companions in one corner of the room. They potted and tinkered and mumbled there without disturbing him.

"Want ter listen?" invited Taze finally.

"To what?" snapped Tom, awaking from his musing.

"Ter the radio," announced Taze, proudly; and Tom shrank into his shell like a harried tortoise. Also he swore.

"Don't you believe it," said Taze. "The radio's all right." And he regarded the little



## What Makes for Efficiency in Fixed Condensers?

This diagram indicates the efficient details of construction that have made Micadons the standard\* fixed condensers of radio.

Dubilier engineers have developed these standard condensers of accurate and permanent capacity. Micadons are known the world over—and are used in 90% of all radio sets.

\*STANDARD—anything recognized as correct by common consent . . . of a high degree of excellence. —Webster.

# Dubilier

CONDENSER AND RADIO CORPORATION

## LEARN THE CODE AT HOME with the OMNIGRAPH

"Just Listen—The Omnigraph will do the teaching"



The OMNIGRAPH Automatic Transmitter will teach you both the Wireless and Morse Codes—right in your own home—quickly, easily and inexpensively. Connected with Buzzer, Buzzer and Phone or to Sounder, it will send you unlimited messages, at any speed, from 5 to 50 words a minute.

The OMNIGRAPH is not an experiment. For more than 15 years, it has been sold all over the world with a money back guarantee. The OMNIGRAPH is used by several Depts. of the U. S. Govt.—in fact, the Dept. of Commerce uses the OMNIGRAPH to test all applicants applying for a Radio license. The OMNIGRAPH has been successfully adopted by the leading Universities, Colleges and Radio Schools.

Send for FREE Catalogue describing three models. DO IT TODAY. THE OMNIGRAPH MFG. CO., 13B Hudson St., New York City

If you own a Radio Phone set and don't know the code—you are missing most of the fun

"Quality Goods for Quality Readers"

instrument in his lonely shack with great pride and affection. "There ain't no way to tell what'll come over it," he explained. "But if you take my advice, you'll listen in an' see."

Ignoring the inconsistency of this last remark Tom leaped like a hound at the preceding one.

"No way of knowing what's on?" he cried. "Why not?"

"Because the programs are in the papers an' we don't get 'em in time," said Taze.

And Tom, seeing the light, stared at him with that new light reflected in his eyes. Tazewell, mistaking completely Tom's expression, was encouraging in the extreme.

"There's something comin' from N'Yawk," he invited. "Put on these ear horns an' listen in."

As though moving in a dream, Tom obeyed him. Through the receivers which Taze clamped upon his ears he heard a voice, and it was like a still small voice.

"**B**EATRICE BLIX whose articles in two hundred papers have mended a million hearts and saved a thousand homes will talk tonight on *Some Problems of Married Life*," announced the announcer.

"Oh my gosh!" exclaimed Tom devoutly.

And there came to him the voice of the altruistic Miss Blix, a deep contralto voice which ought to have mended anything it came in contact with. Tom hung on every word, taking his lecture like a man.

"And you husbands," adjured Miss Blix. "Untangle yourself from that web of selfishness which has ruined many a home. We know that your business holds you, and we admire you for it. There is no wholesome American woman who does not glory in the red blooded business achievement of her husband, or pity that sister to whom has fallen a husband who cannot play the game. But remember that marriage is team work, and your wife is a woman. It is wholesome and right for her to desire the pleasures of society. No man falls in love with a wall flower, despite what the dealers in sentiment may say; for the wall flower is a woman who has failed just as surely as the bankrupt is a failure among men. So meet your wife half way. You have married her for her brilliance and attractive charm, for her youth and vivacity. Don't jeopardize your happiness by letting some other man, very probably a man she heartily despises, take your place as her escort. If you do it will be because, after marriage, you selfishly cling to the pastimes your egotistic man soul cherishes. And that is not fair or even sensible. Don't play the fool!"

Tom never knew how much further the prolix Miss Blix elaborated her theme for at this point he tore off the ear phones and sprang to his feet.

"**W**HAT'S the matter?" yelled Tazewell and Jake in chorus.

"I gotta date!" shouted Tom. "With my wife. It's a dance she's having this evening."

"Gosh-amighty!" exploded Jake. "It's the middle of the night!"

"Don't care!" cried Tom grabbing up a sweater. "I'm going to take the boat. I'll send it back in the morning!"

And he was gone into the darkness of the trail before the two woodsmen could collect their scattered wits.

He plunged down the mountain trail with

a recklessness that time and again emphasized the resilience of soft leaf mold; and all the time he stumbled along in the dark, the vision which the platitudinous Miss Blix had aroused in his heart persisted. All platitudes, yes, but a platitude is a platitude because we never heed it. What a fool he had been! What a brute! He had left her to Alexander January, and of course she despised the idiot. He might have known. Lord, had he forgotten that he knew her through and through? Had he forgotten what he knew of her loyalty, her taste and good sound sense? What an idiot he had been! . . . All that sort of thing as he plunged idiotically down the trail.

When he came to the beach, he stumbled about in the darkness looking for the boat, and he almost stumbled upon her as she blundered about in the darkness looking for the trail.

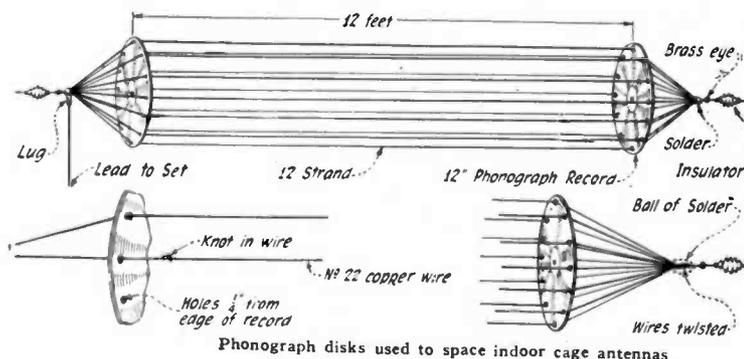
"Jane!" he cried. "What are you doing here?"

stops. These should be tied against the inside face of the records, to prevent them slipping toward the center of the assembled strands and thus collapsing the structure.

Bring the ends of the wires together beyond each record in a cone and twist their ends together and secure them by dipping in hot solder to form a ball. At the same time include a brass eye in the solder as shown.

Insulators should be attached to each eye and they should be attached to the wall and the cage then stretched as tight as practical just below the ceiling, but away from any nearby gaspipe or electric wiring.

This antenna is lightning proof and will be found quite effective. In series with outside antenna it will increase signal strength.



Phonograph disks used to space indoor cage antennas

"Tom!" she gasped. "Where are you going?"

"Home!" he cried. "Oh, my darling, I've been such a fool!"

"And I've been a pig!" she cried. "But we're not going home. I'm going to stay out here in the woods with you!"

So you see he had his way after all. And both of them discovered that a chain store magnate can be so human as to be a little less than wise, and to fall under the influence of such a woman as Miss Beatrice Blix.

### Inside Cage Antenna of Novel Construction

**A** QUITE efficient cage antenna for indoor use in a small room can be made by the radio fan at small cost as shown in the accompanying drawing. It comprises several strands of wire separated by two insulating disks—one end of the wires leading down to the receiving set.

The separators are made from two old 12-inch phonograph records. Drill twelve very small holes around the circumference—about  $\frac{1}{4}$  inch from the edge.

Now cut off 12 lengths of either insulated or bare No. 22 copper wire. Their length depends upon the length of the room, but for the room of ordinary size, cut the strands about 14 feet long. Pass them through the holes in the records and tie a knot, as indicated, in each one to act as

### Torus Tuner

(Continued from page 21)

the positive "B" battery through the primary winding of the third "torus."

The secondary winding of this third transformer is applied across the grid and positive filament terminals of the detector tube. This winding is tuned by a 17-plate condenser having the same capacity as the preceding two tuning condensers and the customary grid leak and grid condenser are used. The grid leak should have a resistance of a couple of megohms and the grid condenser should have a capacity of about .00025 mfd.

The plate of the detector tube is connected to the plate battery through an open circuit jack. The output of this tuner, then, is obtained by inserting a plug in the output jack and the two leads from the plug may be attached to a pair of earphones, an audio-frequency amplifier unit or a loudspeaker.

There is a filament control switch in the positive "A" battery lead. The filaments of the two radio-frequency amplifier tubes are controlled by means of the 6-ohm rheostat in the positive filament lead.

The detector filament is controlled by means of the 30-ohm rheostat in the negative filament lead. (A 20-ohm rheostat will suffice at this point in the circuit.)



Patented April 21, 1921. Other Pats. Pend.

**on super-hets!**  
*improves selectivity*

Replaces your present dials without alterations to your set.

JUST where you need the finest adjustment—a highly geared, absolutely accurate Tuning Control. Accurate controls give sharper tuning and improve any set. Particularly valuable for sensitive receivers whose sharp tuning is essential. Equipped with patented friction clutch. Requires no set alterations.

Your set deserves the best!

At your dealers, otherwise send purchase price and you will be supplied—postpaid.

**\$3.50**

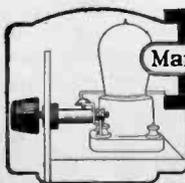
Write for descriptive folder.

MYDAR RADIO CO., 9-A Campbell St., Newark, N. J

**ACCURATUNE**  
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Now, we will consider the construction of one of these toroidal transformers and you can determine for yourselves whether you are going to make them or buy them; you can take your choice.

First of all, procure a dry wooden form of the shape and size shown in figure 1. This form is shaped like a doughnut and has an outside diameter of 2½" and the diameter of the hole in the doughnut is ¾". The diameter of the circular cross section is ⅞".

Mark a point somewhere on the outer circumference and saw through the form on a line between the point on the outer circumference and the imaginary point at the center of the "torus."

Then mark another point on the outer circumference, ½" away from the first point, and saw through the form at this point in the same manner as you made the first cut. When this is done you will find that you have cut a piece out of the ring and the opening thus formed will greatly aid you in winding the coil.

Using No. 24 double cotton covered copper wire, start the winding about ½" from the wedge shaped opening you have made in the core. Wind 180 turns on the core, keeping the turns close together along the outer circumference, thus necessitating a banked winding on the inside. When you have wound on 180 turns you have completed the secondary winding. This winding should take up a space of about 6" along the outer circumference of the core.

The primary winding is to consist of 30 turns of No. 24 double cotton covered copper wire and is to be wound over the secondary winding at a point midway between its two extremities.

If it were not for the opening cut in the rim of the core it would be necessary to pass all the wire required for the complete winding through the hole in the center of the core, each time that you made one turn in the course of the winding. However, with the opening in the rim, this is not necessary and the process of winding the coil is made much easier.

If you buy these coils from some radio dealer, you will probably find that the ends are marked. That is, the wire that is to be connected to the grid, and the end that is to be connected to the negative filament, etc., is so marked.

If you make the transformers according to the specifications laid out in the preceding paragraphs you will find that either end of the secondary may be connected to the grid and either end of the primary winding to the positive "B" battery lead, without making any difference in the efficiency of operation.

Any coupler composed of a stator and a rotor coil, each having about a



**\$3.25 RADIO Storage "B" Battery**

22 Cells 24 Volts Lasts Indefinitely—Pays for Itself Economy and performance unheard of before. Recharged at a negligible cost. Approved and listed as Standard by leading Radio Authorities, including Pop. Radio Laboratories, Pop. Sci. Inst., Standard, Radio News Lab., Lefax, Inc., and other important institutions. Equipped with Solid Rubber Case, an insurance against acid and leakage. Extra heavy glass jars. Heavy, rugged plates. Order yours today!

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40-turn winding, will suffice for the feed-back unit.

If it so happens that you have taken down your outside antenna for the summer months and intend using a very short indoor antenna, I would suggest that you insert an 11-plate variable condenser in series with antenna lead, between the lead-in and the connection to the rotor coil of the coupler, and eliminate the primary winding of the first transformer, carrying the antenna connection to the grid end of the secondary and the ground connection to the filament end of the same winding as shown in figure 3.

Sharp tuning in a radio-frequency amplifier unit is effected by minimizing the radio-frequency resistance of the coils. In the case of coils having a large stray field, the radio-frequency resistance is made a minimum by removing all metals and dielectrics as far out of the field of the tuning coil as possible.

In this case, sharpness of tuning is effected by removing the field from the dielectrics and metals, thus minimizing the radio-frequency resistance. The efficiency of this system is manifested by the extreme sharpness of tuning that is inherent in this receiver.

The tuning is so sharp that it is absolutely essential that some sort of vernier tuning control be used. In this set I have used what are termed "Ultra-Vernier Tuning Controls" and without them I would find tuning very difficult.

The three large Ultra-Vernier Control dials are connected to the shafts of the three tuning condensers that are used to tune the secondaries of the three toroidal transformers.

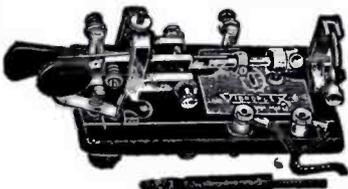
Now considering the rear view of this tuner. The three transformers are shown mounted on the back of the tuning condensers. This is a simple procedure and is much more efficient than you may think at first sight.

A bakelite support,  $3\frac{1}{2}'' \times \frac{3}{4}''$ , is secured at a point about an inch to the rear of the tuning condenser by means of two machine screws which are fitted into two holes that are drilled and tapped in the rear condenser plate or framework.

Two holes are then drilled and tapped in this bakelite piece and another similar piece is secured to it by means of two machine screws, the torus being wedged between the two bakelite supports as shown.

Due to the fact that the field of this coil is not external to the winding, we have not introduced any undue resistance into the winding by putting these bakelite supports with their brass machine screw fittings right up against the outside of the coil. If this was an ordinary solenoidal coil it would be very poor practice to mount it so near

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Vibroplex Bug Lightning Bug

Japanned Base, \$17

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Has  $3/16$  inch contact points to break high current without use of relay. Special model... \$25

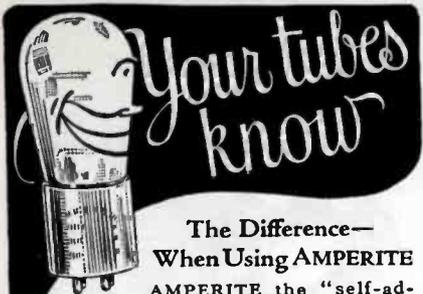
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the condenser plates and put all this dielectric and metal up against it.

The feed-back coupler is shown at the right hand side of the back view. It is mounted near the top of the panel between the first and second tuning condensers.

The necessary external connections are made to three bakelite terminal blocks which are mounted at the back of the baseboard.

The terminal block at the extreme right is for the antenna and ground connections. The one in the middle is for the positive and negative filament connections. The one at the extreme left is for the amplifier and detector "B"-battery connections.

The grid leak and grid condenser mountings are those that you see between the second and third tubes.

**The Servant Problem**

(Continued from page 37)

were comfortable, and that they had recreational advantages. She provided a general living room for them with phonograph, and floor which could be used for dancing. Needless to say she provided radio, too.

The only upset I've experienced with the servants since installing radio was when the housekeeper, following her custom, went to bed and listened to radio while in bed. She forgot to turn off the set or take the earpieces off her head, and went to sleep about 11 o'clock one night. About 11:30 we heard mad shrieks, a great clatter and the crashing of glass. It came from the housekeeper's room. Evidently somebody with a loud, rough voice had come on the air after she had fallen asleep, and her subconscious mind, listening to the broadcaster, had gotten a scare. At any rate she leaped out of bed screaming, the earpieces still on, dragging the radio set on the floor, and with it a tray with pitcher and glasses! It was a wild night. My daughter, who had been listening in on our own set, declares that a hefty baritone had been singing "He had a crazy wife, and killed her with a butcher knife." Apparently our broadcasting needs a censorship if our servants are to do such listening in!

A year or so before I had experimented in another way with radio on my servants. Knowing how jazz peps up the feet, I tuned in during the day while a girl I employed cleaned the living room. She did the job in jig time, and thereafter always wanted to tune in for jazz whenever she was on a job which made it possible. It certainly did speed her feet and hands! I also put a loud speaker in the kitchen one time, connected with a wiring system I have in various rooms in my house, to the radio set in its central location. It was much appreciated

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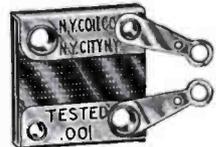
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The finest radio jacks made, for either paneling assembly or usual installation. At your dealer's, 70c to \$1.00 list.

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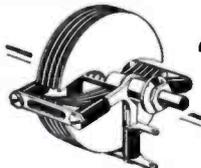
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**PREMIER Quality Radio Parts**

**NO STATIC NO DANGER OF LIGHTNING**

**THE Antennaphone**

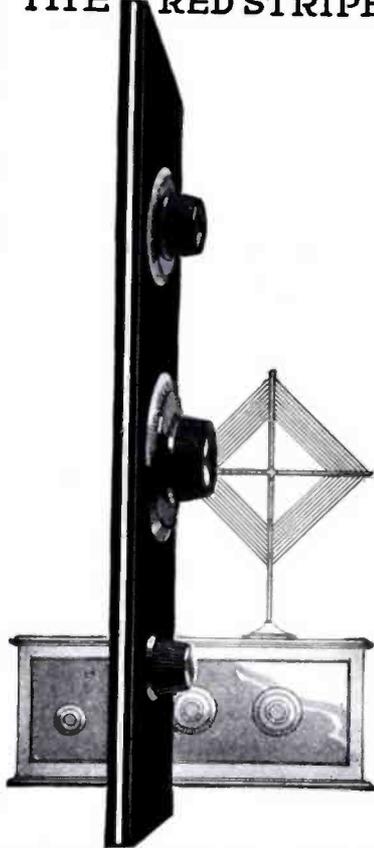
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by the kitchen workers, but of course it was only used occasionally for a stunt. Now they have their own set, and can indulge in all the joys of tuning in, which is half the fun.

Quite true, our own set experienced some interference, but a change of the set, after learning this, to one which gives the least interference, remedies this to a large degree.

It is worthy of mention that one of the most valuable results of the radio set for the servants is the matter of religion. This has always been a friction point. At one time some years ago my husband rose several hours before his regular Sunday rising hour to drive a Catholic housekeeper to mass; sitting outside the church reading the paper until the services were over! This is naturally a dent in the dignity of even the most good-natured employer! But he figured he was helping me keep a valuable housekeeper.

Later when we had a man to drive the car, it was nevertheless a serious matter to get our servants to their respective churches.

And now! Hardly any of them go to church. The housekeeper takes her Sunday morning services by radio. The others listen in at services, morning or evening and seem to satisfy their religious natures fully. I have, in fact, a lovely picture of one of my most kindly remembered servants, a New Englander spinster governess, at prayer by radio.

Yes, I believe radio is a really vital factor in modern servant management, in country or suburb. I have tested it and I know.

## The H. I. in Broadcasting

(Continued from page 29)

"It is nice to think, however," went on her mother, "that there are young people who haven't Gwen's advantages, who do get a lot of these programs."

And thinking back over the years to another young girl, one had an intense desire to take Gwen by the nape of her closely-shaven neck, and endeavor to jar something into that sleek, empty head.

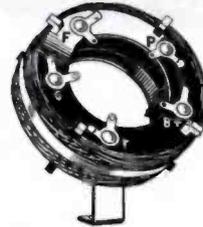
Annie was about eighteen, when she came to preside over our kitchen, and was as un-dependable and shiftless a handmaid as ever left a pail in a dark passage to be stumbled over, or scorched the white sauce. She was gaunt and homely, with enormous hands and an almost subnormal intelligence, yet the Creator had endowed her with the most passionate love of music we have ever encountered in a human being. In her ungraceful throat lived a velvety, contralto voice, which with any sort of training, could have been a perpetual joy to those within hearing. Her greatest happiness was to be left alone with the Victrola, and she gravitated as instinctively toward the better things as a duck to a running stream.

Without the slightest comprehension of what was being said, Annie would play opera selections by the hour, seemingly understanding from the music what she could

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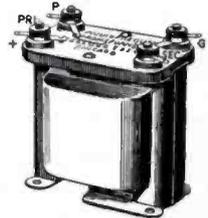


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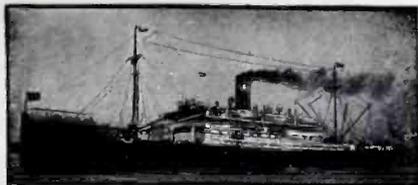
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not grasp from the spoken word. She was so illiterate she could scarcely read, so books on music were of little aid to her. Annie finally fulfilled her destiny by marrying the huckster's boy, and if there is a radio set on that well-tilled little farm, as there surely is, she has in the past winter satisfied that longing which possessed her to hear and learn more of the world's best music.

All of which brings us to what is unquestionably the most important educational development in radio the past season—the broadcasting of grand opera in a condensed form, with concise, explanatory talks and synopses, which has made it possible for those with no previous musical education to intelligently listen to the great music of the world. Not only have thousands of young people, the worth-while type, who are working their way through universities, profited by these presentations; but likewise, a vast audience of older men and women, who either have never had the opportunity of attending the opera, or who have been kept away by the fear that they could not understand.

Luigi Barzini estimated that less than 500,000 of the hundred million persons in this country had any knowledge of opera. And observations among one's own acquaintances, even the college-bred and of average culture, result in the realization that the Soldiers' Chorus from "Faust," the Toreador from "Carmen," the prologue from "Pagliacci" and the sextette from "Lucia" constitute about the whole sum and substance of "opera," as conceived by the popular mind. But the check-up should be vastly different now, after the opportunities afforded radio owners the past winter.

However, it is of the WEAf presentations that we would speak, for by reason of this station's many hook-ups, extending all over the East and throughout the Middle West, these hours have probably reached the largest audience that has ever listened to grand opera. The programs have been presented in a manner, which, from the layman's point of view, at least, seems beyond criticism. Realizing that there is much in every opera that does not lend itself easily to broadcasting, adaptations were carefully made, and the score condensed, that it might be presented in an hour and still include all the great arias and magnificent choruses, which, after all, are what the opera lover goes to hear, rather than the accompanying dialogue. These adaptations were made, and the productions conducted by Cesare Sodero.

Preceding and accompanying the numbers a condensed libretto was given, which seemed to us, should convey even to the most ignorant listener, an adequate understanding of what it was all about. We have heard "La Traviata," "Carmen," "Faust," "Aida," and "Pagliacci" presented by this group of artists in a most sympathetic and intelligent manner. And while there might be an occasional "Gwendolyn," who couldn't be bothered, there were thousands of "Annie's," to whom these programs meant the opportunity of which they had dreamed, but never hoped to realize.

Those singing the principal roles in WEAf productions included Giuseppe di Benedetto, tenor; Olive Cornell and Elvira Boni, sopranos; Vera Nadine and Devora Nadworny, contraltos, and William Tucker, baritone.

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Use the Burgess Radio "A." Test it. Compare the service in any manner you wish.

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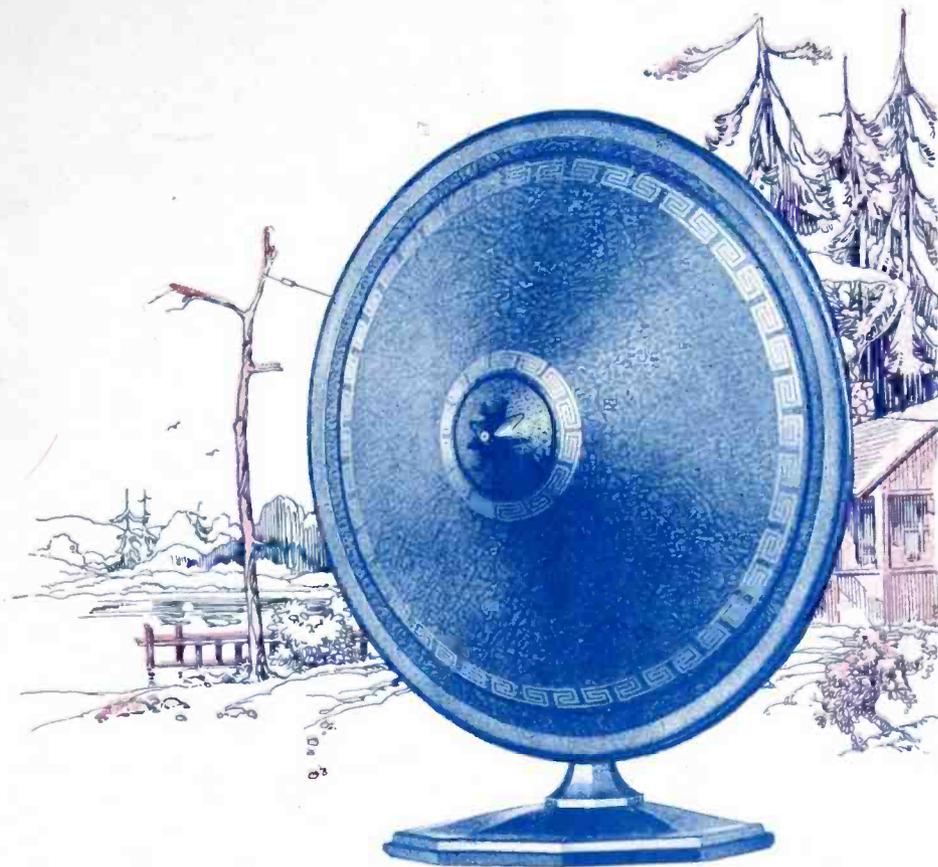
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**The Marvels of Radio!**  
*Incredible to those who don't know!*



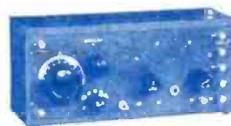
## The Crosley 1-Tube 50

Crosley's development of the famous Armstrong regenerative circuit enables you to "roam" the country and enjoy the thrill of picking up distant stations just as though you owned a multi-tube set,—all with one tube and at \$14.50, without accessories.



## 2-Tube Crosley 51

Same as wonderful Crosley 50 with additional tube amplifier. Local and nearby stations on loud-speaker always and distance up to 1500 miles under average conditions. Much greater range with head phones. \$18.50, without accessories.



## 3-Tube Crosley 52

A larger set for those who want greater reception range on the loud-speaker. Operates on three tubes, using wet or dry batteries. Consistent loud-speaker range 1500 miles or more. \$30, without accessories.



## The Crosley Trirdyn Special

3-Tubes do the work of 5

A unique circuit combining tuned radio frequency, regeneration and reflexed amplification that equals in results the work of 5 and 6 tubes. None re-radiating. \$65 without accessories.



UV-201-A



UV-200



UV-199



WD-11



WD-12



# Vital to every radio fan

In a radio set, it is the tube that detects the sound—that amplifies the sound—that determines in large part the quality and volume of the sound. Therefore the tube—intricate of mechanism and delicate to make—is the vital spot in every set. And it always pays to be sure you use genuine Radiotrons—made with experienced precision

Build any circuit—simple or complex. Buy any set, plain or fancy, simply boxed or elaborately cabinetted. But give it every chance to achieve its best—with genuine Radiotrons. Be just as careful when you replace tubes, too. Always see for yourself that each one bears the identifying marks of a Radiotron: The word Radiotron and the RCA mark.

Radio Corporation of America

Chicago

New York

San Francisco

# Radiotron

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