



winter and summer. If you received that distance once in a year you would be doing well.

Another advertisement reads—"1000 miles guaranteed with the _____ receiver."

Let me say right here that no one can guarantee the range of any receiver, regardless of the number of tubes used. One tube or a dozen tubes, you cannot guarantee the receiving range.

This is quite a large statement to make,

the receiver used in these tests I have often heard Texas stations. These stations are thousands of miles from my home. Knowing all this, how far would you say this receiver could be guaranteed to receive?

One thousand miles? No, indeed.

Five hundred miles? Again the answer is no.

Fifty miles? Not even fifty miles.

Station WNAC, at Boston, is forty-five miles from my home, and I have never heard this station on my receiver. I am in a fairly good location too, with a good antenna, but the reason why I do not hear this Boston station is that there is a "dead spot" between this city and Boston, and so the signals are unable to get through.

And not only is it impossible for me to guarantee fifty miles range with this receiver, but it is also impossible to guarantee one mile range. I found this out during my tests while looking for spots unfavorable for radio reception.

In one place I found I was unable to receive signals from a 150-watt station located one-eighth of a mile from the receiver. This, of course, is very unusual, and it is rare indeed to find a spot as near to a station as this without being able to get some kind of signals no matter how weak they may be. But let us suppose that I had

sold one of these receivers to a man who lived right there, and guaranteed the range as so many miles. What would he think of me when he found he was unable to hear one-eighth of a mile? Not much, I am

sure, nor could I blame him. But it proves that when it comes to guaranteeing the range of a receiver it cannot be done.

The question now comes to mind: "Why cannot the range be guaranteed?"

There are many reasons why, as I have said before, but I will go over them in detail. In the first place, no receiver, no matter how sensitive, can receive good clear signals if they are not above the "static level." By that I mean that if the static is of greater intensity than the incoming signal, no matter how many stages of amplification are used the signal will not become greater in intensity than the static. The limit of any receiver's range is reached when the signals are below the static level.

Of course there are methods of receiving whereby it is possible to get a better signal-to-stray ratio; it is possible by some methods to get a greater intensity of signal-to-static over the whole range of the receiver, but even then the range of the receiver is limited.

Then, too, the location of the receiver has much to do with the receiving range. Given an ideal location—and these are few and far between—I do not believe you would have to use more than three tubes to cover the whole U. S. But how many of us have ideal locations? Not many of us I am sure. I have lived in many places, and operated receivers in many more locations, but as yet I have not discovered an ideal location.

It is interesting to note the way receivers will act in different locations. For instance, when I build a new receiver to be described in *Radio in the Home*, it is tested by myself right here (Continued on Page 40)

HOW FAR WILL THIS SET RECEIVE?

By W. FRANCIS GOODREAU

and if I could not prove it I would not care to make it. As I can prove it, however, I do not hesitate to make it.

For almost a month I have carried out experiments with radio-receiving sets in the city where I live, to find out what the conditions are for radio reception in all parts of the city. I also made a radio map of the city, marking out "dead spots," weak spots, fading spots, and anything unusual in any way.

In most of my tests I used a Goodreau split variometer receiver, using UV200 as a detector, and two UV201-A tubes as audio amplifiers. This circuit is well known to the readers of this magazine. Some of you have reported receiving up to 2500 miles on the loud speaker with three tubes, and in my home in Providence, R. I., with

WHEN a man is about to buy or build a new receiver, the first question he usually asks about it seems to be "How far will it receive?" The answer usually given is "_____ miles."

The answer that should be given is "It depends on many things, such as location of receiver, skill of operator, etc." Many manufacturers make a practice of stating in their advertisements the number of miles that can be received with this or that receiver. This would lead one to believe that this certain distance can be covered by any one in any location, provided he uses this or that receiver.

Let us go over some of these claims. Here is one—"800 to 1000 miles on a crystal set."

If this advertiser means that you can receive code signals from this distance using a crystal, well, it can be done at times in the average location. If he means concerts and speech, again it can be done under unusual circumstances, but it cannot be done with the average crystal set in an average location. Local stations are all that can be expected on a crystal set in the average location, and in some places not even local stations can be received.

Another advertisement reads—"2650 miles with the _____ one-tube receiver." It is possible to reach this distance with a one-tube receiver, but this is not the normal range of the set, and this distance could not be received consistently

on jack number 14 to B battery binding post on transformer number 4.

From next to top blade on jack number 14 to plate binding post on transformer number 4.

From next to bottom blade on jack number 16 to plate connection on socket number 9.

Diagram number 5—coil secondaries: From grid connection on transformer number 3 to S2 on counterformer number 5.

From S2 on counterformer number 5 to rotor connection of variable condenser number 12.

From rotor connection of variable condenser number 12 to rotor connection of counterformer condenser number 15.

From stator of counteracting condenser number 15 to number 3 contact on double pole, double-throw switch jack number 18. (Number 3 meaning number number 3 from the bottom.)

From S1 on counterformer number 5 to stator plates of variable condenser number 12.

From stator plates of variable condenser number 12 to grid connection of socket number 6.

From grid connection of transformer number 4 to grid connection of socket number 9.

From grid connection of socket number 8 to front connection of grid condenser and grid leak number 7.

From back connection of grid leak and condenser number 7 to S2 on counterformer number 10.

From S2 on counterformer 10 to stator plates of variable condenser number 19.

From rotor plates of variable condenser number 19 to S1 on counterformer number 10.

From S1 on counterformer number 10 to positive filament connection on socket number 8.

Diagram Number 6—switch connections: From aerial binding post on binding post block number 1 to center blade of jack switch number 11.

From top blade of number 11 to P1 of counterformer number 5.

From P2 the mid-tap of counterformer number 5 to bottom blade of jack switch number 11.

From P3 of counterformer number 5 to ground binding post on binding post block number 1.

From blade 1, or bottom, on double pole, double-throw switch jack number 18 to blade 6 on that same switch jack.

From number 3 on that switch jack to number 4 on that same switch jack.

From plate binding post on socket number 6 to number 2 blade on switch jack number 18.

From blade number 5 of jack switch number 18 to top blade of jack number 14.

From P1 of counterformer number 10 to blade number 1, or bottom, of switch number 18.

From P2 of counterformer number 10 to connection between blades 3 and 4 of jack switch number 18.

There; that's all.

How Far Will This Set Receive?

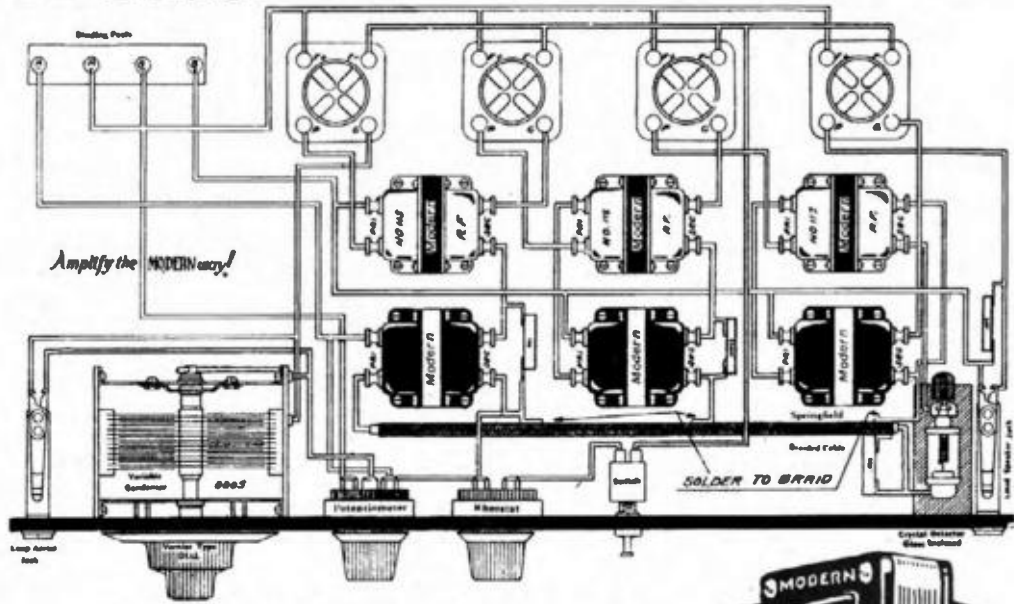
(Continued From Page 36)

and results are carefully noted. This is a fairly good location. Then I send the set to one of my friends in a better location and note the results he gets. Next time the set goes to another friend in a poor location and his results are noted. In this way I am able to check up on the receiver and see how it compares with other receivers.

Let us take, for example, the spider-web portable set I described in one of the past issues of this magazine. When tested at my home I found that it was a fairly good receiver—not as good as some I have—but here it had a range of about nine hundred miles. I sent it to one of my friends in a good location, and he reported ex-

(Continued on Page 62)

MODERN Super-Six Reflex



The Set You Will Eventually Build

Large size wiring diagram and list of parts necessary to build this set sent on receipt of 4c in stamps.

The Modern Electric Mfg. Co., Toledo, Ohio

FREE RADIO EQUIPMENT

Here is your opportunity to secure any radio set or parts absolutely free.

You may be in need of condensers, couplers, transformers, honeycomb coils, tubes or batteries; a loud speaker or a headset. You may wish to possess a tube-testing outfit, or a Grimes 3XP Inverse Duplex, or a Harkness Counterflex, or any other good standard set.

These sets and parts are available to you free of any cost in exchange for your help in introducing RADIO IN THE HOME to your friends. This is your opportunity to earn a satisfactory reward in the form of radio equipment.

We are listing here some of the sets and parts which you may wish to obtain, and have indicated the number of subscriptions required to secure the equipment. If you need any equipment not listed here, tell us what you want and we will let you know how many subscriptions you need to secure in order to get the equipment free.

You remit the full amount collected with the names and addresses of subscribers, and ask for the apparatus that your subscriptions entitle you to, or you can continue sending in subscriptions until you have accumulated a large credit and then order the equipment you want against your credit account.

SUBSCRIPTION RATES

- 12 months for \$2.00—Credit for one full subscription
- 6 months for \$1.00—Credit for one half subscription
- 12 issues back numbers for \$2.00—
- (see page 46)—Credit for one full subscription

Grimes 3XP New Inverse Duplex

(Described and illustrated in RADIO IN THE HOME for June, July and August, 1924).

Quantity	Number Subscriptions
2 .001 fixed condensers	1
3 Tube sockets (Kellogg)	3
2 .002 fixed condensers	1
2 Audio frequency transformers (Jefferson Star)	12
3 Honeycomb coils (75 turns)	3
1 .0005 fixed condenser	1/2
2 .0005 Acme variable condensers (Brass plate, silver plated, inclosed in celluloid box)	24
1 Pyratek fixed crystal detector	1 1/2
1 Bradlystat	2
7 Pby binding posts	1 1/2
4 Switch points, nuts and 2 stops	4
1 Panel (7 x 24 inches) Black Radion	4
Total	52 1/2
For use with a loop aerial add:	
1 Double Circuit Jack (Pacent)	1 1/2
1 Potentiometer (Pacent)	2
1 Calvert Loop	12
Total	63

The parts named in the GRIMES sets were used in our laboratory tests. We know that these parts will give satisfactory results. However, you can use other well-known brands if you wish to do so, and obtain equally satisfactory results. If you want to use other makes of parts not listed on this page, tell us what you want, and we will let you know how many subscriptions should be secured to get these parts. For additional information regarding our free parts plan write to

Circulation Dept., RADIO IN THE HOME

608 Chestnut Street

Philadelphia, Pa.

Completely Built Grimes 3XP New Inverse Duplex Operating on Indoor and Outdoor Aerial

(Without Accessories)
(Advertised on page 35 in the September issue of RADIO IN THE HOME)
1 Completely built Grimes Set (without accessories)95 subs.

Grimes-ed Neutrodyne

(Described and illustrated in RADIO IN THE HOME for September, 1924)

Quantity	Number Subscriptions
9 Eby binding posts	2
1 R3 Acme radio frequency transformer	6
1 Type 41 Jefferson audio freq. transformers	5
2 Jefferson Star audio freq. transformers	8
2 Pada Neutrodons	3
3 Pada Neutroformers	18 1/2
4 Na-ald tube sockets	3 1/2
1 Pacent potentiometer	2
1 20 ohm Pacent rheostat	1 1/2
1 6 ohm Pacent rheostat	1 1/2
1 .0025 Dubilier Micadon condenser	1/2
1 No. 62 Pacent jack	1
1 No. 55 Pacent jack	1
2 .002 fixed condensers	1
1 .001 Micadon condenser	1/2
1 .0005 Micadon condenser	1/2
1 .0005 National DX variable condenser	7 1/2
1 Panel, black Radion, 7 x 24 inches	3 1/2
Total	66 1/2



\$4.00 COD SPECIAL
INTRODUCTORY PRICE
 For a limited time only, and to introduce this new and superior Storage "B" Radio Battery to the Public, we are selling it for \$4.00. Regular Retail Price is \$6.00. You save \$2.00 by ordering NOW. A finer battery cannot be built than the World Storage "B" Battery.

12 CELLS - 34 VOLTS.

For ten million homes with Radio Sets—and in countless millions of automobile factories—the WORLD Storage "B" Battery has a new use. Millions of battery owners and car factories have in a battery that gives for itself in a few weeks will last for years and can be recharged at a negligible cost. And you save \$2.00 by ordering now.

A Superior Battery Equipped With Solid Rubber Case Has heavy duty 2 1/2 in. x 1 1/2 in. x 1 1/2 in. plates and sheets of solid composition. Extra heavy glass panels allow ready observation of charge and prevent leakage and evaporation of current. It holds its charge when idle, at constant voltage. You will find this battery a boon to long distance reception. It does away with a great many losses of time blamed on "fading." Read your radio.

SEND NO MONEY
 Just state number of batteries needed and we will ship the order in prepaid EXTRA ORDER 4 batteries in service (25 cents, 100.00). Pay Express when shipping battery. We are not allowed to ship by mail with order. Send your order NOW and save \$2.00.

WORLD BATTERY COMPANY
 Agents of the famous World Radio "A" Storage Battery
 1219 S. Wabash Ave., Dept. 24, Chicago, Ill.
SAVE \$2.00 BY ORDERING NOW!

How Far Will This Set Receive?

(Continued From Page 49)

ceptional range and volume. He said that he could go out in the street and listen to this receiver on the loud speaker with ONE tube. He proved it to me, too, and has one of these receivers for his own set.

I was very pleased with this showing, and sent the receiver to a friend in a poor location. He could not hear anything at all except local stations, and those were very faint. Needless to say, I was not quite so pleased with that showing, but it proves location has a great deal to do with receiving range.

The skill of the operator has much to do with the range of a receiver. Of course you have noticed how easy it is for you to tune your own set after you have had it a while. It's as easy as falling off a log. But when you change to some other receiver, that for some reason or other is supposed to be better than the one you have, the first time or two you use it, don't you wish you had your old receiver back? Seems as though you can't cover any distance at all with the new receiver. But when you finally do get wise to its tricks, then you begin to pull in those DX stations that you knew were there.

What was wrong? Was it the receiver? No, it was you; you simply had not had the receiver long enough to get used to tuning it.

Let us take another example: Let us suppose that a man who has never owned or operated a radio receiver in looking over his newspaper sees in the radio programs that a friend of his is to come on the air at a station 500 miles from where he is. Perhaps he wants so much to hear this friend that he is willing to buy a radio set right away in order to hear him.

Well, he goes to a radio store and is shown several radio sets. He tells the salesman he wants to hear a station 500 miles away. The salesman tells him it would be wise to buy a receiver with a guaranteed range of 1000 miles so as to be on the safe side. He does so, and takes a short lesson in tuning in, perhaps on a local station. The salesman says that he will be able to pick up stations within 1000 miles in the evening.

The man takes the set home and gets it all ready for the program he wants to hear. Some time before it is time for his friend to come on, he turns the dials, trying to pick up the station he wishes to hear. As he has had no experience in tuning a set, even if his location is good, the chances are that he will not hear that station that evening. He will, of course, be very disappointed and will no doubt become convinced that radio isn't what it's cracked up to be. And it isn't.

No one thinks more of radio than I do. As a source of entertainment and education it cannot be beaten, BUT I am afraid that manufacturers are hurting radio and themselves by letting advertisements as to the guaranteed range of their receivers appear in magazines. Perhaps they will realize this some day, but as yet they do not appear to have realized it.

In closing, I would like to say that this article is not written to discourage any one from purchasing a radio set. You will find that you will get a great deal of enjoyment from one, and it will be well worth the money spent on it; but when you buy one, have it demonstrated in your own home first and then you will know just what to expect from it in that location. But wherever you live, be it in Maine or California, when you are told by the salesman the guaranteed range of a receiver, tell him you're from Missouri; you know—"You've gotta show me."

I expect to receive quite a few letters from manufacturers about this article, insisting that they can guarantee the range of their receiver, and to them I will say that if they can maintain their advertised range in any location I pick out, I will take back every word I have said in this article.

That's a challenge—let's go.

Manufacturers Organize a National Association to Protect the Industry

(Continued From Page 52)

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The National Board of Fire Underwriters insists that your radio set be protected by an approved lightning arrester.

It is significant that principal railway, signal, police and fire alarm systems have for 18 years depended upon the

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BRACH VACUUM ARRESTER

Used by Radio Engineers since 1914.
 L. S. BRACH MFG. CO.
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Radio Dealers!

The new plan of publishing PICTORIAL DIAGRAMS of hook-ups in RADIO IN THE HOME enables even a novice to build the most complicated sets. These diagrams show every step in the wiring operation. This service creates good will and additional sales for the dealer.

The high standard maintained in the advertising columns of RADIO IN THE HOME, where only quality apparatus which we have tested, is accepted for these columns, guards the fan against using inferior apparatus. This service helps the dealer increase the sale of quality apparatus and gain the good will of the radio fan.

Cash in on this good will and additional sales by bringing RADIO IN THE HOME to the attention of your radio fan customers.

For full information write to

RADIO IN THE HOME
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AMPERITE
 The "SELF-ADJUSTING" Rheostat

PERFECT for CIRCUIT
 Simplifies wiring
 Eliminates hand rheostats

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 40 Franklin St., N. Y.



\$1.19 From Your Dealer

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HERE IS A CRYSTAL that is worth its weight in gold to any radio owner. It is sold on the very broadest guarantee to SATISFY THE PURCHASER, and thousands of letters of grateful appreciation testify to the merits of B-METAL LOUD TALKING CRYSTALS. Get it from your dealer, but remember that there is no substitute for B-METAL CRYSTALS.

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Make \$100 Weekly—sell RADIO

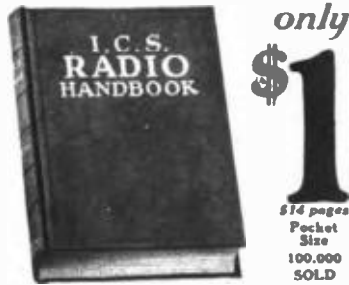
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I enclose One Dollar. Please send me post-paid—the \$11-year I. C. S. Radio Handbook. It is understood that if I am not entirely satisfied I may return this book within two days and you will refund my money.

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