

PRICE SIXPENCE



KEEP IT GOING!

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Tablets.—Sweetening
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Y-MAKERS ANDED

IN SHIPS

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T FOR NEW CIATION

BONE MOVE

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vise of a Professor

north-east of Scotland was shot into
the sea by a Beaufighter of Coastal
Command.

Eighteen of our bombers are
missing.

The Germans admitted that damage
was caused in several places in
W.

Enemy plane was destroyed
over this country on Monday night.
No bombs were dropped.

MILLION RADIO SETS IDLE

A million wireless sets are con-
tinuously out of use in this country.
This is one set in eight, and the num-
ber is growing. Because of the
number of wireless engineers who are
being taken into the Services, repairs
never catch up with breakdowns.

The Board of Trade has given per-
mission for the completion by next
spring of 125,000 sets in course of
production, provided labour is avail-
able.

The introduction of a utility set is
out of the question at present.

BARRYMORE'S FEAR

From Our Own Correspondent
LOS ANGELES, Tuesday.

The fear of the late John Barry-
more, the film actor, that he might
be buried alive was disclosed in his
will filed to-day. Executors are re-
quested to employ doctors to ascer-
tain that "I am in fact dead and not
in any way state having semblance
to life."

He will also provided that all his
two divorced wives should be ex-
cluded from participating in his
estate valued "in excess of \$2,500."

HARDER TIMES AFTER WAR

BANKER'S WARNING

A warning against optimism about
economic conditions after the war
was given by Sir William Clark
when he was re-elected president of
the Manchester and District
Bankers' Institute to-day.

Owing to the shortage of man-
power and materials after the war, the standard of
living must be lower than in pre-war
days, whatever the wage level may
be," he said.

"I believe it is a duty no public
man should shirk, to make plain the
vast and fundamental change they
will have to face after the war, in-
stead of which one seems to vie with
another in promising a new earth, if
not a new heaven."

concentration camp.

M. Claude F. H.
archaeologist, who is
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Strike Inquiry.

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north-west factory w
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Labor inquiry.

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of 21 days, to assume
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Savings Bank

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Savings Bank has
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over the amount in S

Machine Tools to

Henry Grady, cha-
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From All Quart

MOTHER AFTER RE

Mrs. J. J. W. Mrs.
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March 1918. Her mur-
dered husband's inter-
marriage on March 23, has been
prison. A trial
before her husband
said, "If anything sh-
me, don't take up the
Follow me and bring
you." Mr. Justice
when he passed the
said to her, "You ar
the lusts of the we
earth."

Call-up for I.O.M
service is to be applic-
Home Guards and w

KEEP IT GOING!

*A handbook
of helpful information for all
listeners, compiled from the
experience gained by radio
dealers whose job it was to
“keep it going” for you in
peacetime*

PUBLISHED BY
MURPHY RADIO LIMITED
WELWYN GARDEN CITY
HERTS

FOREWORD

You will hardly need to be told that it is not as easy to get service for your wireless set to-day as it was in 1939. Indeed it is a sad but true fact that hundreds of thousands of sets are no longer in use, either because the owner cannot get service or because the wireless dealer cannot get the necessary parts.

Conditions vary, of course, from one place to another. In many parts of the country there is still first class wireless service available, and everywhere dealers are doing their best. One object of this book is to make it easier for dealers under present difficult conditions to give you the best possible service.

There is no need to set about explaining why dealers generally cannot be expected to give "pre-war service", but I wish I could tell you some of the very moving stories of what has happened to wireless dealers up and down the country. We have always kept very close contact with our own dealers, and what has happened to them is a true picture of what has happened to all wireless dealers. Some have been "blitzed". Some are still being blitzed and carrying on. Many of them have seen their customers move away in thousands. Many of them have voluntarily closed down good businesses to volunteer for service in Navy, Army or Air Force. Almost without exception they have seen their skilled Service Men leaving to join up and have had to carry on—if at all—with the help of "the missus and a small boy". These are people who served you well and faithfully in the days of peace. Now they are having a pretty tough time and, as I said, one aim of this little book is to help them in their job of serving you.

Another object of the book is to make *your* "listening-in" more secure. I have no doubt in my own mind about the vast importance of the radio in our millions of homes. We've had some pretty bad news to swallow during the last three years. Radio has done a great job in helping us to hold up our heads and our chins. When I remember even one single inspiring talk at a critical time—as in the dark months when France fell—I feel that nothing has such power to hold us all together as "the wireless".

In the early months of the War, I hoped and hoped that the wireless industry would be able to keep up at least enough production to replace worn-out sets. But the needs of the Services for wireless equipment, the demands on shipping, the calls of our

allies, all grew heavier and obviously the claim of civilian radio had to take a back seat. Not one of you would wish it otherwise.

This falling away of our civilian "contacts" has been hard for us to swallow, because, like many radio manufacturers, we kept in close touch, through our dealers, with hundreds of thousands of people who were using our sets. We have said to ourselves: "If we can't *make* sets for people, what *can* we do for them?" And at the same time remembering the dealers' shortage of staff, "Is there any way that we can help *them* to maintain *their* service to *you*?"

This book is an effort to answer both questions. We hope it will help you to keep your set going when you can't easily or quickly get hold of a wireless Service Engineer. We hope it will save our dealers—and for that matter *all* radio dealers—unnecessary service calls, by showing you how to find and remedy simple faults; and make the necessary calls shorter because you can give your dealer, before he comes, some idea of what is wrong.

There has been quite a bit of argument about this book. Some people think it should be far more complete and teach you how to be "the complete wireless engineer". Others think it risky to let you touch a set in case you electrocute yourself! I think that, within its modest limits, it should prove useful to many of you. And with the warnings throughout the book, you would have to be very careless to run into any danger!

I have also been warned not to paint the "wireless service" picture too black. Many dealers *are* carrying on, and if you need service you will find them willing to look after you. If you can't find a dealer, then, of course, write to the makers of your set, tell them what the trouble is, if you can, and they will advise you on the best thing to do. Between us, we manufacturers and dealers will certainly do our best to keep your wireless going when you really need our help.

When we've won this war and dealt with those who brought it on the world, we'll go back to our peace-time building. Once again, I hope there will be good, well equipped, well-staffed dealers in each locality, "men you can trust", able and ready to give you the skilled service that a radio set needs. But to-day the war is on, and it is up to each one of us to do as much as he can for himself, to make as few calls as possible on the scarce and valuable skill that is still available to keep civilian radio going. If you use this book sensibly, you will save yourself money, for Service costs have, of course, increased enormously in every way. And you will be a "good neighbour" by leaving skilled men free for urgent jobs.

My good wishes to you "till we meet again".

E. J. P.

CONTENTS

	PAGE
FIRST —Read the Introduction	5
SECOND —How a Wireless Set Works	7
THEN —Battery Sets or Mains Sets	24 or 26

*and you will get the greatest value
from this book*

CHAPTER	
Foreword	2
Introduction	5
One —How a Wireless Set Works	7
Two —Battery Sets	24
Three—Mains Sets	26
Four —Moving House?	28
Five —Minor Repairs	32
Fault Finding Index and Fault Finding Table	36
General Index	39

MADE AND PRINTED IN GREAT BRITAIN FOR MURPHY RADIO LIMITED
BY HUNT BARNARD AND CO., LTD., LONDON AND AYLESBURY

INTRODUCTION

“A MILLION RADIO SETS IDLE ”

This is a very significant statement. It means that two million people at least are cut off from official B.B.C. announcements and from the inspiration and guidance which our leaders give to the people in war time by means of broadcasting.

It is an urgent necessity that something is done to relieve the situation. The tools to put the matter right are service men, components, valves, and time. They are precious tools, and our munitions industry and the Armed Forces have, quite rightly, first call on those tools.

This book is an attempt to *ease* the situation.

Many thousands of wireless sets could be put right to-morrow by *set-owners* themselves if they were told a few simple facts about the sets.

We hope this book will tell you the facts. We hope as a result that many thousands of receivers will once again burst into life through simple adjustments, which you may be able to make after reading this book.

Listening in war time is important. This book may be the means of bringing the B.B.C. *news* back into thousands of homes *without* taking up the valuable time of skilled engineers who are wanted for still more urgent jobs, and *without* using up valuable material.

There is another side to the story—Prevention is better than Cure. By means of this book you can locate a fault in your radio set before anything radical gives way. You can save the time of a radio dealer, save him transport, his petrol and his tyres. Consider these examples of unnecessary calls and work by skilled radio engineers.

Just before the war two dealers travelled *in one day*:—

(a) 30 miles to reverse a mains plug!

(b) 40 miles to tighten a mains plug inside the set!

Those journeys represented two gallons of petrol, and a day of highly-skilled men's time. However, that was of small account in those peaceful days, for the result was two satisfied owners.

To-day, unfortunately, things are different. Petrol is rationed to the last drop, and many dealers' Service personnel are "out on more urgent calls"—servicing the intricate entrails of Radiolocation gear, and Army, Navy and R.A.F. equipment.

Now refer to those two examples of service journeys given above, and you will see how useful this book can be to you.

(a) 30 miles to reverse a mains plug! There was nothing whatever the matter with the set, but the owner was not to know that. All she knew was that, when she had moved the set from one room to another it wouldn't work. Very sensibly, knowing nothing about wireless, she called up her dealer. The Service engineer fixed it for her in half a minute, and he told her why such a simple thing could stop her radio working.

(b) 40 miles to tighten a mains plug inside the set! Again there was nothing whatever wrong with the set, but it had been moved rather violently and a small but vital plug inside the set had worked loose and become disconnected, so that no power at all was reaching the set from the mains. It was "a job for the dealer"—and it meant a 20-mile journey each way to carry out a 30-seconds repair.

To get the *best* from this book, in the *easiest* way, read the next chapter, "How a Wireless Set Works". It will tell you a lot about your set in a free and easy way. After that read either the chapter on "Battery Sets" or the chapter on "Mains Sets", depending upon the type of set you own. If your set goes wrong, turn to "Fault Finding" on page 36.



WARNING.—If, having made all the minor adjustments and tests we have suggested, you still find that your set won't work, please don't entrust it to the care of a well-meaning friend—even if you have to offend him by refusing his aid. Take it to your dealer.

"Neither a radio-fixer nor a mender be:
For 'mending's' apt to spoil both set
and friend——"

While apologizing to Shakespeare's shade, we feel sure he would have made Hamlet say that if the king had offered to adjust the trimmers of his radio. And, talking of trimmers, if a friend approaches your set with a screwdriver—shoot him!

—Read this book carefully and thoroughly—

—Keep it handy—by the set—

Good hunting!

HOW A WIRELESS SET WORKS

A wireless set is an instrument for *re*-producing speech and music, **not** a machine for *making* music. This is a very important point which is far too often overlooked. Remember that your set cannot *improve* upon what the broadcasting station sends out; in fact you have got to keep the set in as good order as possible if you want to hear anything like a *true* reproduction.

In this chapter we tell you how a wireless set works. You will be able to see, with the help of the simple chart at the end of the book, how a programme is converted into wireless waves, how it travels through space, and how it finally reaches your set, where the wireless waves are turned back into sound that you can hear.

With the exception of the few simple but important adjustments which we will show you how to make, you will see that we do not wish to worry you with a difficult study of the "innards" of your set. Regard the set itself as you would regard a gramophone—a self-contained "box" for reproducing music—and a "box" that you do not have to bother about.

To get the best out of your gramophone you do three things:—

- (1) You keep it, and its records, clean.
- (2) You make sure you have a good needle.
- (3) You keep the spring wound up when you use it.

In the same way, to get the best out of your wireless set you should do three very similar things:—

- (1) You keep it clean.
- (2) You make sure that you have a good aerial and earth, and that the connections to the set are good—for they collect the programmes from the air in very much the same way as the needle collects the programmes from gramophone records.
- (3) You keep the power supply at its best—for no machine will work without power, and your batteries or household mains provide the power for your wireless set in much the same way as the spring provides power for the gramophone.

In short, you would not think of playing a dirty gramophone record with a blunt or loose needle, and a nearly unwound spring! The results would be terrible! And if your gramophone



music sounds "wrong" you immediately look for the simple, obvious troubles, and you cure them yourself.

You do not blame the gramophone until you have looked for all the more likely things that may be out of order.

This book has been prepared to enable you to take exactly the same steps towards looking for, and curing, the more likely things that may be out of order with your wireless set.

To give you some idea of the importance of these simple, likely faults, here is a short description of all that happens, from broadcasting studio to your set, when a wireless programme is sent out over the air. **While reading this description, unfold the chart at the end of the book. You will find it easy to follow.**

The Broadcasting Station

(1) The announcer speaks (or the orchestra plays) into a microphone. His voice causes the air to vibrate, and this in turn makes a part of the microphone vibrate.

(2) The microphone changes the small "voice vibrations" into feeble electric impulses.

(3) These are the impulses which, after a long and tiring journey through space, must eventually cause part of your loudspeaker to vibrate.

(4) As these little impulses are so feeble, they cannot manage the journey alone and unaided. They would fade away before they had travelled an inch from the broadcasting aerial. So two things are done for them. **First**, they are strengthened and built up (**amplified by valves**).

(5) Next, they are provided with a means of transport! Silly as this may sound, it is true! Many valves and enormous power are used in the broadcasting station to manufacture another set of very strong electric vibrations. These vibrations, or waves, are created specially to carry the feeble electric vibrations of the voice on their journey. They are known as the "Carrying" or "Carrier" waves. They have no other use, and once they reach your set they have to be got rid of at once. Sometimes, when the set goes slightly wrong, they are not cleared out of the way—and **the result is a whistle!** It is really very much like ordering a parcel from a shop in a distant town. The parcel cannot travel by itself, so the assistant puts it in a van. But you don't want the van in your house! You take

the parcel in by the door and forget all about the means of transport.

(6) Anyway, having manufactured the strong "Carrier" waves, and having turned the voice waves into electric vibrations, the two are sent out by the last valve at the broadcast station, one literally riding on the other. Only one more thing is necessary.

(7) The broadcasting station has to send out its programme on a definite **wavelength**—so that, when you see **Home Service** in the newspapers, you know exactly where to find it on the dial of your receiver. So the "carrier" wave and its passenger, the "electric voice vibrations", are passed through a **tuning device** which consists of coils and condensers. This device adjusts the measurement—or length—of the waves. The operator at the broadcasting station can alter their length (their **wavelength**) by turning a knob, just as you can choose different lengths of wave (different **wavelengths**) by turning the **tuning knob** on your set.

(8) The waves are now passed to the aerial and earth wires at the broadcasting station, and flung out into space, to your waiting aerial.

Your Receiver

(9) *This is where your care and attention are most necessary.* To get the best out of your set you **must** put the most into it. The little electric voice vibrations, *and* their "carrier" transport are very tired and feeble by the time they arrive at your aerial. Your aerial (and earth) must not be "leaky", otherwise much of what strength is left in the waves will be lost. **More important still**, bad joints in wires cause noise in the set, and as you have now got to strengthen (amplify) the weak waves, **the unwanted noise is also amplified; so make sure there is as little as possible!**

(10) The weakened waves are led into your set (you have selected the ones you want by turning your **tuning knob**), and they are taken straight to a valve which builds them up.

(11) This first valve **builds up everything** that reaches it—**noise**, voice vibrations, **and** "carrier" waves—because we don't try to get rid of the carrier before ensuring that the electric voice vibrations are strong enough to finish the journey alone.

(12) The waves then travel on to the next valve, and the "carrier" wave, or whistle, is got rid of.

(13) More valves, one after another, take over the electric voice vibrations and build them up.

(14) The electric voice vibrations are finally made so strong

that they are able to vibrate the moving part of your loud-speaker. This causes the air in the room to vibrate, and so you hear the air vibrations as *sound*.

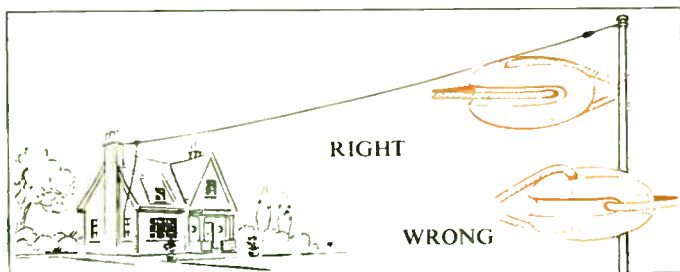
Now, from all this you will have seen **two** important things:—

- (a) Bad aerial and earth connections "let in" noise.
- (b) The weaker the waves when they arrive, the more you have got to turn up the volume—so amplifying that noise.

But you will also understand several other things:—

- (a) **Any** bad connection will cause noise—leads from batteries or mains—leads from set to loudspeaker—leads from aerial and earth.
- (b) Since **power** is needed to build up the electric vibrations as they travel from valve to valve, unless the power supply (batteries or household supply) is in apple-pie order, you will not be giving your set a fair chance to do its job.
- (c) We mentioned the phrase "leaky" aerial and earth. Well, the same applies to every other part of a wireless set. The waves are weak when they arrive, and the job of the set is to build them up. Dirt, and neglected wires cause leaks and bad joints, which lead to noise and crackles.

All these things mean that you have to run your set at far greater volume than you need, so calling for more amplification than should be necessary—and **when you amplify the programme you are bound to amplify any noise that is there as well.**



Since aerial and earth provide the way in, it is obvious that to get the best results you will want to make sure that you have them in good shape. So we will deal with them first.

(Note.—It is quite wrong to believe that wireless waves arrive by the aerial only. If you remember the days of crystals and cat's whiskers, you will recall that a set would not work at all without aerial and earth. We want to keep this book simple, so we do not propose to start explaining how modern sets manage

to work without an earth, and why portables work without either aerial or earth connections. They do. But believe us, unless the circumstances are exceptional, your set will give an all-round better performance if it has a good earth.)

The **Aerial** may be a wire strung around the room, or it may be a magnificent affair hung across the garden from a pole to the chimney stack. It doesn't matter what it looks like so long as it is in good condition. That is to say:—

Indoor Aerials

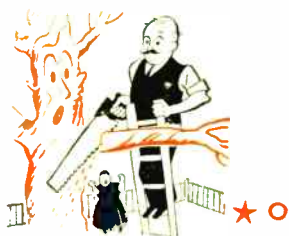
(1) If an indoor aerial, it should be a length of about 20 ft. of insulated wire, the wire itself touching nothing except the set—*at the proper connecting point*. Secure it behind the picture rail with small brads or staples. Take care not to drive them through the wire, or “leaks” may occur, particularly in damp weather (i.e. much of the remaining strength of those weak electric vibrations will be lost). It is possible to erect a good “outdoor type” aerial **indoors** if your house has a loft, and the results will be better from distant stations than if an ordinary “picture rail” indoor aerial is used. Suspend your length of insulated wire from end to end of the loft, and lead the free end down to the set by the most direct route.

Outdoor Aerials

(2) If an outdoor aerial, it should be insulated at each end from the ropes, pole and house by means of insulators. These are made of glass or china, usually egg-shaped, and can be obtained from your dealer for a few pence. The diagram on page 10 shows you how to use them. Bring the aerial lead into the house either by insulated wire or by a special “lead-in” tube. It should touch nothing but the set—*at the proper point*.

(3) The aerial wire should **not** brush against the rainwater guttering—or against the branches of trees, etc. This will cause **noise**, particularly in wet weather. If the branch of a tree has grown since the aerial was put up, and if you are a good “branch-cutter-offer”, remove the offending limb—but if you are using ladder and saw, take care to saw on the **outside** of the ladder, or your own limbs may suffer instead.

(4) *Make sure* that the aerial lead is plugged into the proper hole at the back of the set by a proper plug.



(5) *Make sure* that the wire is screwed tightly into the plug, and that the plug prongs are clean, and sufficiently wide open to make proper contact with the hole (socket) in the set (page 20).

★ ○ (7) *If* the wire is just pushed into the hole, and held in place (Yes, our Service man has told us!) by an old matchstick—*do* make sure it is making proper contact, and get a proper plug the next time you pass the dealer!

Earths

The **Earth** wire may lead from the set to a water pipe (which makes a very good "earth"), or it may go to a copper pipe driven into the earth in the garden. But make sure that:—

(1) If it goes to a water pipe, the connection is good.

(2) If it goes to a spike in the garden, the ground round the spike is kept moist, and that the wire has not come away.

★ ○ (3) The same remarks about matchsticks are looked into!

Note.—A window box will **not** do for an "earth"! (Yes, our Service man has encountered even that!) The word "earth" in terms of wireless means a connection with the earth.

So much for **aerial** and **earth**. Examine them now and again.

Look at the point where the lead in enters the window, and if the rubber or other insulation appears chafed, exposing the bare wire, renew the lead. We know that modern sets *will* work without either an aerial or an earth—but **they are not meant to**: The better your aerial and earth, the less the unwanted background noise.

Now for the **Power**. We will assume that the programme vibrations on their "carrier" wave have been led safely along a pair of good wires, past perfect connections, right to the set. Now, if we switch on, we expect the valves and other "bits and pieces" in the set to build up and strengthen those waves, and to deal with them as we have explained, until they are sturdy enough to vibrate the diaphragm of the loudspeaker and *re-produce* the programme so that you can hear it. *Power is necessary for that.*

Power Supply

Some sets draw their power from the household electricity supply, and are therefore called "**Mains Sets**"—others draw their power from batteries, and are known as "**Battery Sets**." It doesn't matter at the moment which yours is, as long as you understand that this **power** question is a very important one.

Since it is the power supply which gives the set all its liveliness, enabling it to amplify the incoming programme, any faults in the power leads will seriously affect the working of the set.

(1) Since "magnification" (we call it amplifying) is involved, any noises caused by bad connections will be magnified as well, and be very loud noises indeed when they leave the loudspeaker.

(2) Since the set cannot work without power, a break in the battery leads, or mains leads, will silence the set immediately and completely. There are no half measures, as with aerial leads.

Power from the Mains

For an electric lamp to light when you press the switch:—

(1) The fuse in the main fuse box must be O.K. You will find out how to change a fuse on page 33.

(2) There must be no breaks in the wires between the point and the lamp socket. You will see how to repair a broken wire on page 34.

(3) The lamp must be making a good contact in its socket.

Exactly the same factors will determine whether electric power is reaching your set. If it *is*, when you switch on the switch at the socket, *and* on the set, the set should work—or at least *the pilot or dial lamp should light*. If it does not, then one of those three factors is probably responsible.

One form of bad contact is the plug not fitting snugly into the socket on the wall. This can often be cured by easing the split prongs of the plug **gently** open with a knife or screwdriver—**But always switch off before withdrawing the plug!**

A set running off D.C. mains will be **completely dead** if the mains plug is plugged in the wrong way round. Remember the 30 miles journey we told you about on page 5!

Another form of bad contact may often be found in the plug itself—the wires loosely screwed to the contacts. You will find out how to make a good job of reconnecting wires to a plug on page 35.

Keep the mains leads against the wall—or where they won't be trodden on and damaged.

Don't pull a plug from its socket by the wires. That's what breaks them.



Power from Batteries

Modern battery sets use two batteries.

(1) The accumulator, or L.T. Battery, which can be recharged.

(2) The H.T. Battery, the "popular price" type of which lasts about 10 weeks on the average set if used sparingly. This cannot be recharged. Give it to the salvage man when he calls—it contains zinc and carbon which can be used again.

The only difference between mains and battery sets, so far as you need concern yourself, are: —

(1) Two batteries mean four leads to look after and keep clean, instead of the two wires to the mains plug.

(2) Batteries run down and have to be recharged or replaced.

H.T. Batteries

The wires which lead to the H.T. battery are firmly fixed to their proper contacts inside the set, and unless they have been roughly handled they should last indefinitely. All you have to do is to see that the bare ends of the wires are clean and bright, and that they are tightly screwed into their plugs.

★ W See that bakelite caps are firmly screwed down on to the brass part of the plugs, and that they are sufficiently wide open to give a snug fit into the H.T. battery sockets. If wax or the black "pitch" has got into the sockets, remove it carefully.

If you take both caps off the plugs together, **make sure you put the red one back on its proper wire.** If you don't, you may connect the battery up the wrong way round—and the set won't work.

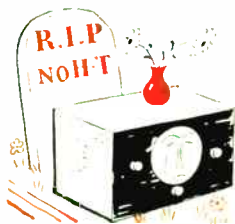
The black plug is H.T. — and fits into the H.T. Battery — or "0" hole.

The red plug is H.T. + and fits into the H.T. Battery + or the hole with the highest figure against it.



★ X You can tell when your H.T. Battery is running down by the fact that (a) the music is noticeably soft, and (b) the set is generally noisy (crackly).

* But don't blame your H.T. for every crackle. It *shouldn't* run down for 10 weeks unless you are in the habit of leaving your set switched on unnecessarily. First try to cure the crackle by looking over the other contacts we have mentioned, and are about to mention, when dealing with L.T. batteries.



An H.T. Battery connected up the wrong way round will make the set appear **completely dead**.

An H.T. battery, though it may weaken gradually, will not start to run down seriously until you start to use it. Once you have used it, it will run down (*slowly*) even if you do not work the set—so its life is *not* 10 weeks if you have not used the set for two years!

L.T. Batteries

The L.T. battery, as you know, is usually a glass or celluloid container in which are metal plates and acid.

The bigger the accumulator, the longer it stays charged. This is because an accumulator merely **stores up the electricity** that the re-charging process puts into it.

Look at your accumulator next time you collect it from the shop. You will see that the **red + terminal** is connected to one set of plates—which will be a **deep, rich chocolate colour**, and that the **black - terminal** is connected to another set of plates—which will be a **pale grey colour**.

That **rich chocolate** that you can see *actually represents the electricity that is in the battery*.

It will vanish, slowly, as you use the battery, until it leaves the + plates a pale brownish colour, with a lack of contrast between the two sets of plates. And when *that* happens, the battery is **run down**. That is a useful tip. When you are in doubt about your L.T. battery—look at its plates.

As with the H.T. battery, the leads to the accumulator will be firmly fixed in the set. They are fitted with proper terminals (or should be, unless you have let one drop off and have not put it back!) which look like this:—



Care of the Battery Leads

Because the battery has *acid* in it (which creeps) the leads will tend to corrode, and in time, if not checked, this will eat its way into the wire and rot it. So you may have a connection which looks very good, but which is really very **bad**.

So keep the wires, *and* accumulator and spade terminals **clean** (sand paper), and smear a *little* vaseline over the metal parts.

Remember:

- (1) If you take both terminals off the battery at the same time (it's best not to!) **put them back on the right screws.**
- (2) The same applies to the leads. Otherwise you may connect the battery up the wrong way round—and the set will not work properly. **In many sets it will cut the volume by half.**
- (3) Screw the terminals down **firmly**—particularly when you have vaselined the contacts. Loose accumulator contacts—or dirty contacts—will cause loud crackles, and may even stop the set working altogether.

Warning! Never allow the accumulator leads to “wave about” loosely in the set, so that the spade terminals (or bare ends of the leads if the terminals have come off!) can touch the H.T. plugs or the actual sockets of the H.T. battery, or the plugs or sockets of the grid bias battery. If this happens, **all your valves may be damaged beyond repair in a split second!**—Watch this point particularly when you are removing the accumulator for re-charging. Push the leads well out of the way.

If You Spill any of the Acid:

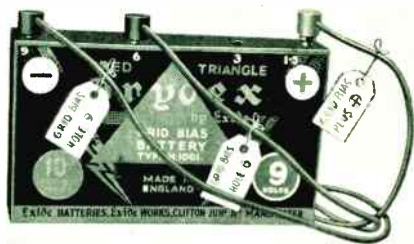
- (1) Wipe it up at once with a damp cloth.
- (2) Sponge the patch with a mixture of ammonia and water.
- (3) Use a little soda dissolved in water if you have no ammonia.

★ Y Grid Bias Batteries

The separate grid bias battery is not found on modern sets, but you may find one on an old battery set. Its use is to “balance” the power fed from valve to valve by the H.T. battery. (This is done automatically in modern sets.)

A grid bias battery has a long life, and apart from keeping the leads and terminals clean and tight, it need not

normally be touched between renewals. But as a run-down grid bias battery increases the drain on the H.T. battery, we advise you to renew it with every third or fourth H.T. battery.



If the *H.T. battery* starts to run down, you can often make the music a little better (less harsh and even louder) by shifting each of the grid bias battery plugs to the next hole on the battery towards the + end. (See the chapter on Battery Sets, page 25.) ★ Y

A grid bias battery *always has* two leads running to it—usually three—and maybe four. So before moving them about, or removing them to clean them, tie little labels on them so that you will know where to put them back.

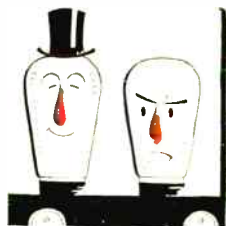
Note.—To conserve your H.T. battery, use the highest grid bias tappings that will give you good-quality reception.

The Valves

No matter how many valves your set has, whether it be a battery set or a mains set, you can think of them all (for the sake of simplicity) as little magnifying glasses—the gadgets that magnify the programme signals until they are strong enough to work your loudspeaker.

Valves, like magnifying glasses, will not give the clearest results if they are dirty.

Now obviously, since a valve is a sealed bottle, the only parts that can get dirty through neglect are the contacts. Some valves have a little cap, or “top hat” with a wire coming from it; others have only the usual “prongs” which fit into the sockets on the set. **Make sure with the set switched “off” that:**



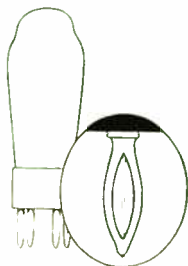
- (1) The caps are screwed down firmly, or pressed home firmly if they are the “push-on” kind. ★ I
- (2) The valves are firmly pressed home into their sockets.

If the “prongs” of a valve are not making proper contact with their sockets, two things may occur:—

- (1) The set will certainly be very noisy (i.e. crackly). ★ P
- (2) The valve in question may not light up, so, if all your other attempts to cure “*crackling*” have failed, and, before deciding that a valve is dead—

- (1) **Switch off.** Remove the H.T. plugs if a battery set. Remove the mains plug if an all-mains set.
- (2) Remove one valve at a time.
- (3) Clean prongs with a bit of fine sand or emery paper.

- (4) Ease them gently open a little with a small knife blade, taking *great* care not to break the fine piece of wire which leads from the centre of the prong into the inside of the valve.
- (5) Replace the valve and switch on.



Simple Tests

★ **K** If you have reason to suspect that a valve has gone faulty—i.e. *burnt out*—you can make quite certain by the following tests.

(1) Switch the set **on** and see whether the valves are glowing. If so, the valve is probably in good order. (Some valves are covered with a silvery coating, in which case make the next test.)

(2) Switch the set **on**—leave it on for 10 minutes (longer for battery sets)—**switch off**—and then feel the valves. A dud will be quite cold; the others (if a battery set) will be fairly warm, or (if a mains set) really hot.

If you think you have located a dud—**switch off**—withdraw it carefully by rocking it in its socket **gently**, and pulling it out by the bakelite base, **not** by the bulb, and deal with it as in (3), (4), and (5), above. A bad contact may be the cause. If you

still get no results, take the valve to your dealer and ask him to test it for you. He will do it gladly, particularly when he realises that you have done your best to save him a journey.

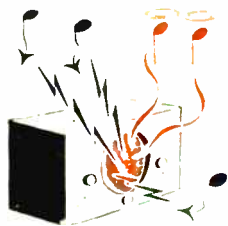
It is quite easy to replace a valve, since the prongs are so arranged that they can only fit into the socket in one way. Don't forget to replace the cap and wire if the valve has one. And,

if you take out more than one at a time (it's best not to) *mark them first so as to be sure you put them back right!*

★ **G** Pilot lamps are the small bulbs used to light up the tuning dial. They are like torch bulbs. To test, unscrew the bulb, and try it in a cycle lamp.

Loudspeakers

And now, having seen how the programme signals reach the set via aerial and earth: how they are built up and strengthened by the valves, we come finally to the large "cloth-covered hole" in the front where the noise comes out!



We say "noise" on purpose, because out of that "hole" comes everything good and bad.

i.e. (1) Clear music and speech from a perfectly working set.

(2) Whistles from the neighbour's set.

(3) The hum from the vacuum cleaner.

(4) The crackles from bad connections (or aerial lead).

(5) The crackles of run-down H.T. batteries.

(6) The crackles due to thunderstorms.

(7) The buzzing due to a fault in the loudspeaker itself.

Loudspeaker Noises

Loudspeakers don't go wrong as a rule. But after long service they may get out of centre (a Service term for the moving parts of the loudspeaker scraping slightly against the other part).

So, before you blame the loudspeaker, make sure it *is* the loudspeaker. A buzzing noise may be the music causing -

(a) An ornament to vibrate in the room.

(b) The set itself to vibrate against the floor or wall.

(c) The back of the set to vibrate against the cabinet, usually due to the fixing screws not being done up firmly.

But, of course, it *may* be the loudspeaker. If it is, the only thing to do is to report it to your dealer. **But whatever you do, don't try pushing it about. Don't prod it. There's nothing you can do but make it worse.**



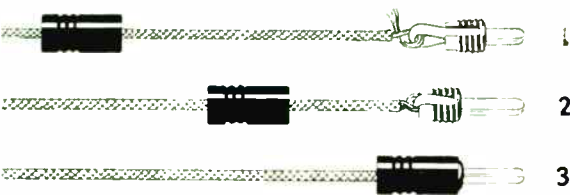
Loudspeaker Plugs

Loudspeakers are sometimes connected (*inside the set*) to the set itself by a pair of plugs which fit into sockets.

(1) These, if loose or dirty, can cause noise and crackles.

(2) These, if they come out (through moving the set about), will make the set appear to be dead. **Switch off** and treat them as we have shown you how to treat other plugs (see page 20).

A word of warning here may save you a lot of worry. *Don't* paint, varnish or "brighten up" the silk in front of the loudspeaker. Paint clogs the little holes, and the sound can't get out: the result is a serious loss of volume and tonal quality.



Connecting Plugs

★ **D** While on the subject of plugs let us generalize. All plugs—H.T., aerial, earth, loudspeaker, grid bias, mains tapping, and gramophone pick-up—will cause noise if they do not fit snugly and tightly into their sockets; they will all give trouble if they are not firmly connected to their wires.

- ★ **J**
- ★ **O** (1) Keep the metal parts clean.
- ★ **W** (2) Open the prongs (*gently*) with a knife until they fit firmly into their sockets.
- ★ **Q** (3) See that the wires are bright and unbroken, and that they are making good, tight connections with the metal parts of the plugs.
- ★ **N**

In the above illustration we have shown, in three stages, how to connect a wire lead to a plug. There are many types of plugs in general use, but the principle is always the same, so follow these directions closely and you will get good results:—

- (1) Remove $\frac{1}{2}$ " or so of the rubber and any cotton covering with a knife; *taking care not to cut the wire strands*.
- (2) Twist the strands into a firm wire end.
- (3) Place the coloured cap over the wire.
- (4) Make a good contact, as above.
- (5) Screw the coloured cap firmly on to the metal part.

Knobs and Switches

Your set, battery or mains, must have the following **three** knobs:—

- (1) The **on-off** switch, which in most modern sets is also the **volume control**. (Sometimes **tone control**.)
- (2) The **tuning knob**.
- (3) The **wave-change** switch, which enables you to change over from Medium to Long waves and to Short waves.

There is nothing you can do if a fault develops in any of these controls, except report it to your dealer. If the knob itself works loose, you can, of course, fix it yourself by tightening the grub screw, which is a small screw fitted in the side of the knob.

★ **T**

Don't be annoyed with your set if trouble develops "in the knobs". Even a door-knob will get loose and will rattle after a few months of service—and a door-knob is a "tough guy" compared with the delicate controls of a wireless set.

The thing to remember is that "switch trouble", or "knob trouble", is rarely so serious that it cannot be tolerated until your dealer has time to fix it.

Of course, if it is only a loose or wobbly knob the remedy is obvious—tighten in the way we have already suggested, but do be careful to use the right sized screwdriver for the little grub screw, otherwise you may damage the knob in such a way that your dealer will find it very difficult to put right.

At the moment, however, we are not so much concerned with knobs that fall off, as with the things that happen when the knobs are twiddled. It is not uncommon for sets to make the most alarming noises when one of the knobs is handled—even quite gently—and it is as well to know what you can do about it when any particular knob develops these symptoms.

First, then, the On-Off Switch and Volume Control

This may get noisy after a while. You may find that it "scrapes" when you turn it, or that it develops a spot where it "cuts out" altogether. Unless it gets so bad that you can only use it **full on**, you will be helping your dealer no end if you report it in its *early* stages, so that he has plenty of warning, and then "making do" with it until the poor fellow is able to walk, pedal or saddle his horse and reach you!

It will often be found that a noisy volume control, *or* a noisy tone control, can be cured temporarily by turning the knob backwards and forwards several times (treating it gently, of course!). But as the noise rarely occurs except when the knob is turned, find a good position and leave it at that if you can.

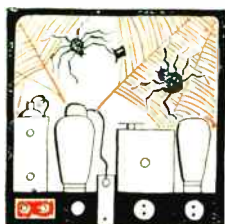


Second, the Tuning Control

This knob rotates one set of metal plates between another set of fixed metal plates. One probable cause of noise when it is turned is—dirt and dust inside the set. So keep the set clean (**switch off first! and remove the mains plug if a mains set**) Take off the



★ T



back two or three times a year and blow out the dust, dead flies and spiders!

If, when you blow, there is a cloud of dust like a sandstorm in Libya, you will know that you have done a good morning's work. And *don't* let it get like that again!

But *don't* bang about with a duster inside the set, because you will probably do more damage than good.

Third, the Wave-Change Switch

This knob does a complicated job of work in the set. It is actually the same as about a dozen electric light switches, all operated by one handle, and, as you know well, even the contacts of a light switch can be very troublesome after years of work. (When this happens the light seems to flicker as it goes on—and there are moments when it goes off altogether.)

Instead of the "flickering" of your electric light, you get in the set a "flickering" of the programme—and moments when it goes off altogether. The switch sometimes works badly on one or two wavebands, and maybe not at all on the other. This is merely due to bad contacts—either as a result of a spring getting tired, or of dirt or corrosion. If you live near the coast, it is possible that the sea air is causing corrosion of the contacts.

You can test a faulty wireless switch by rocking and pushing it **gently** with the set switched on. This will aggravate the noise, and will tell you at once you have found the fault.

Sometimes this treatment will even cure the trouble temporarily! Another method (again **gently** please) is to turn the switch half a dozen times in the normal way. Then, when you get the results you want, leave it alone and *don't try to improve matters!*

So when you see this trouble developing—and it nearly always develops slowly—tell your dealer in good time. You can then put up with the slight inconvenience for a short while, until he gets time to come your way to fix it. He won't keep you waiting intentionally, you can be sure of that, but petrol is scarce, and he will always try to arrange his trips to cover a number of calls altogether if he can.

The "On-Off" Switch

(Usually part of the Volume Control), is sometimes a separate switch. If it goes faulty, test it and treat it (*gently*) as above.

Outside Interference

Earlier in the chapter we have dealt with noise caused by bad joints, faulty insulation and loose contacts. Those are noises you can cure. We now deal with those types of noise you cannot cure, because they are not caused by faults in your set; they are the result of outside electrical interference.

Man-made Static

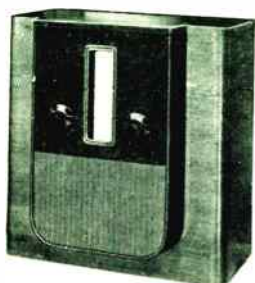
Certain types of electric motors will cause very bad interference, i.e. motors used to drive lifts, refrigerators, etc. The interference which they create is radiated in much the same way as a broadcast programme is radiated, and is picked up by your receiver. A special aerial with a screened lead will often improve matters when such types of interference are encountered. You can distinguish this so-called "man-made static" interference by its rhythmic character. You will find it to be much more severe on the short wave bands than on the medium band.

Atmospherics, another form of electrical interference, are caused by disturbances in the atmosphere, such as lightning. There is nothing you can do to cure this trouble.

Two programmes at once. If you live close to a main B.B.C. station, a background of another programme may be apparent on occasions when you are tuned to the local transmitter. The causes of this are too technical to be discussed in this book, but don't blame your set! Try experimenting with short indoor aerials (about 10-ft.) in different directions, also with different earth connections, i.e. buried pipe, water pipe, or radiator (gas pipes should be avoided), using whichever you find best. ★ Z

Fading

Fading or variations in the volume of the programme may be due to excessive distance of the receiver from the transmitter. There is no complete cure for this trouble, but it can be minimised by providing the best possible aerial and earth. Fit an outdoor aerial or improve the present one. Fading is often accompanied by acute distortion and blasting: for a few seconds volume is normal, then it increases in strength and speech becomes almost unintelligible. This phenomenon is rarely encountered in the daytime, but is at its worst just before sunset and in the early part of the evening. Removing the earth connection sometimes improves matters and is worth trying, but there is little else which can be done, so don't worry the dealer! ★ O



BATTERY SETS

All Battery sets except portables must have the following connections, and they are nearly always located at the *back of the set*.

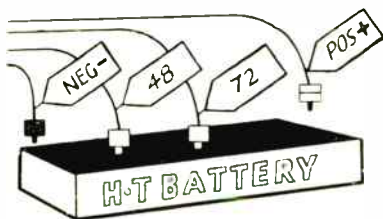
(1) Aerial and Earth

These are usually little sockets into which the aerial and earth leads can be plugged. (See opposite page.)

(2) H.T. (+) and (-)

On most modern sets there are only two H.T. leads, + being **red**, and - being **black**. All H.T. batteries have a number of holes, marked with voltage figures, and the first and last holes are always marked (+) and (-). Notice which lead goes into which hole.

Older sets sometimes have three or even four leads going to the H.T. battery. Notice which leads go to which hole! Label them all before you take any of them out to change batteries!



★ × As the H.T. battery runs down the crackling gets worse, but on sets with more than two plugs you can often increase the volume by moving the middle plugs to holes of higher value. (A sure sign that the battery is "on its last legs.")

But it is a good plan to label them first—or you may not remember where they came from when you fit a new H.T.

(3) L.T. (Accumulator) (+) and (-)

These two leads will be found on **all** battery sets, and there are **never** more than two of them. They are usually fitted with "Spade Terminals," the (+) being **red** and the (-) being **black**.

Nearly all accumulators (L.T. Batteries) have one **red** terminal with a **red** mark: sometimes +, and sometimes just a red disc underneath the terminal. The other terminal is usually **black** or **blue**, again with a **black** mark: sometimes with a black or blue -, or a disc underneath the terminal. Have a look at yours.

If the spade terminals have come off, put labels on the leads. This will help you to re-connect them to the proper battery terminals until such time as you are able to fit new "spades" to the leads.

(4) Grid Bias (+) and one or more (-) leads

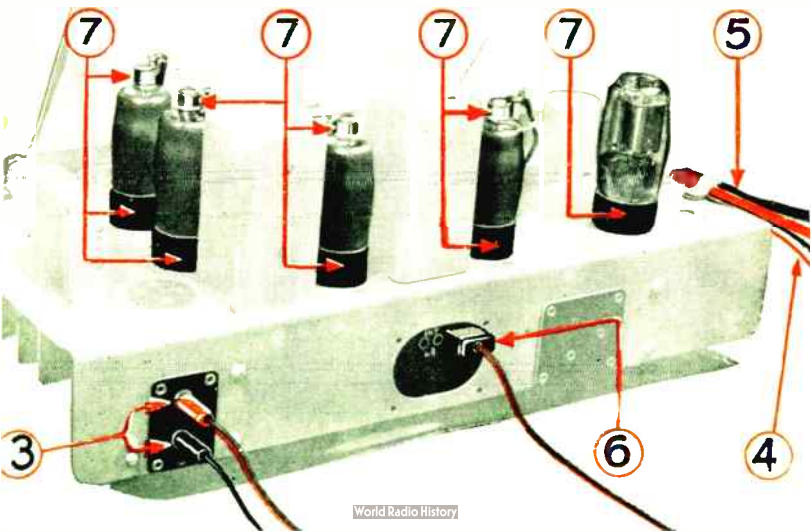
★ Y

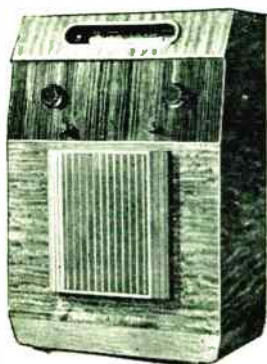
If your set has a Grid Bias battery (see page 16) there may be three or four wires leading to it. So number them before removing the battery for renewal. Keep leads and plugs in trim as described on page 20.

*Refer to
Pages*

SUMMARY OF THINGS TO DO

- | | | |
|--|--------|------|
| (1) Keep inside of set clean and free from dust | 22 | |
| (2) Keep aerial and earth in good condition | 11 | |
| (3) Keep aerial, earth leads and plugs clean and tight | 12, 20 | ★ O |
| (4) Keep H.T. plugs clean and tight | 14, 20 | ★ W |
| (5) Keep L.T. leads clean and spade ends tight, and vaseline accumulator terminals | 15 | ★ V |
| (6) If loudspeaker has a plug or pair of plugs (inside set) see that they fit well | 19, 20 | ★ J |
| (7) See that valves fit firmly and caps are on tightly | 17 | ★ IP |
| (8) If grid bias battery is used, keep leads and plugs clean and tight and test for better results by shifting plugs | 17 | ★ Y |
| (9) Keep L.T. Battery well charged. If going away take it to your dealer for recharge | 15 | ★ U |
| (10) Remember a "dying" H.T. battery is greatest cause of noise and weak programmes | 14, 24 | ★ X |





MAINS SETS

All mains sets have the following connections:—

- (1) The mains lead and plug (see opposite page).
- (2) The aerial and earth sockets (see opposite page).

Most mains sets also have sockets for the following:—

- (3) Extra loudspeaker.
- (4) Gramophone pick-up.

We will not deal with either of these last two pairs of sockets

here, since this book is intended to cover essentials only. If you wish to fit either an extra loudspeaker or a gramophone pick-up, please get in touch with your dealer and he will advise you, or will put you in touch with us direct if it is necessary.

The position of the *Aerial* and *Earth* sockets may not be as indicated in the sketch opposite, but you will always find every socket marked on the detachable back of the cabinet, or on the chassis itself.

Power Supply

Most districts have an A.C. supply, in which case it does *not* matter which way round the plug is plugged into the socket.

Some districts have a D.C. power supply, however, and in that case it is most essential to **plug the mains plug or adaptor the right way round, otherwise the set will not work at all.**

The voltage of the mains may vary from 200 volts to 250 volts. Therefore it is important that your mains **transformer** or **resistor** (page 30) should be given the right voltage. A little plug is fitted, and a number of holes will be seen on a panel, known as the mains tapping panel. It is possible that this plug may be loose.

★ D Note.—Many dealers, when they instal your set, fit the little plug in the hole which covers a **higher** figure than the voltage figure you will find on the electric light meter, because the set then gets a **lower** voltage than it can take, and so is not working at full pressure, which means that the life of the valves will be increased.

So, if you find your plug in a hole with a **higher** figure, you can be sure it is meant to be there. **Never put the plug into a hole with a lower figure.**

Unless you change houses, or unless the plug works loose, there is obviously no need to touch it. But if you do have to touch it, refer to Chapter Four, "Moving House?" and **switch off at the wall and withdraw the mains plug.**

Some sets are fitted with protective fuses. If one of these fails **★ C** it will show the same symptoms as a disconnected mains plug (i.e. a reading lamp plugged in will light, but the set's pilot lamp will not). These fuses vary in appearance in different sets, but are usually small, glass tubular affairs, located at the end of the mains lead. If the thin wire in the glass tube is broken, the fuse has gone. Replace a broken fuse by another of the same type.

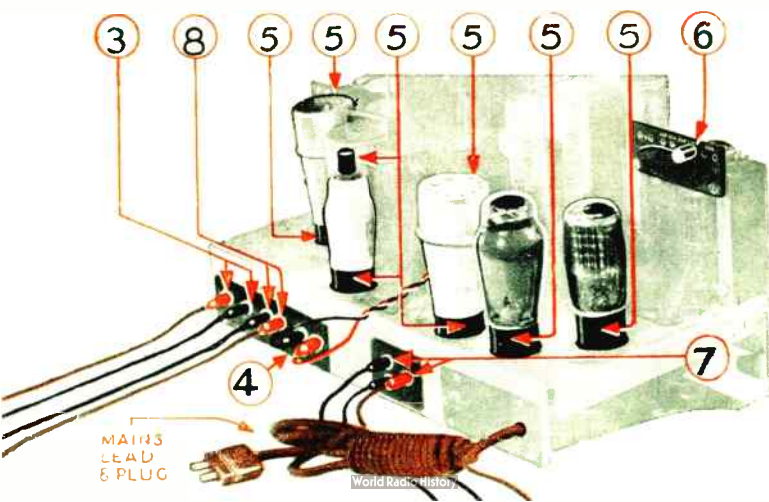
Note.—If the new fuse blows, consult your dealer.

SUMMARY OF THINGS TO DO

Refer to
Pages

- | | | |
|---|------------|------|
| (1) Keep the inside of the set clean and free from dust | 22 | |
| (2) Keep Aerial and Earth in good condition | 11 | |
| (3) Keep Aerial and Earth plugs clean and tight | 12, 20 | ★ O |
| (4) If loudspeaker has plugs see that they fit | 19, 20 | ★ J |
| (5) See that valves fit firmly and that caps are tight | 17 | ★ IP |
| (6) If Mains tapping plug is loose, tighten it | 20, 26, 30 | ★ D |
| (7) Check over Gramophone pick-up leads | 20 | ★ MN |
| (8) Check over external loudspeaker plug and leads | 20 | ★ Q |

Never take off the back of a mains set until you have switched off and withdrawn mains plug.



“MOVING HOUSE?”

Many families have, through choice or bombs or reasons of work, had occasion to move from one house to another since the war began, and have had to call in a dealer to “fix” the set. Now that dealers are short-staffed and tied down by lack of petrol, this chapter should be of great help to those who have to move in future.



There is nothing very difficult about it, provided you follow these directions precisely:—

Mains sets are made—

- (1) For D.C. Mains.
- (2) For A.C. Mains.
- (3) For either A.C. or D.C.

Household supplies may be either—

- | | | |
|--|---|--|
| <ol style="list-style-type: none"> (1) A.C. with voltages 200–250 (2) D.C. with voltages 200–250 | } | or unusual voltages
which are dealt with
on opposite page. |
|--|---|--|

So you have to—

- (1) Find out the nature of the supply, A.C. or D.C.
- (2) Find out the new voltage.
- (3) Adjust your set according to the examples given on opposite page.

What Supply Must the Set Have?

To find out whether your set needs an A.C. or D.C. supply, look at the back.

You will see, probably on a metal plate, either—

- (a) A.C. 200/250 v. . . . , which means your set needs A.C.
 or (b) D.C. 200/250 v. . . . , which means your set needs D.C.
 or (c) A.C./D.C. 200/250 v. . . . , which means your set will work on either an A.C. or a D.C. supply.

If the voltage shown on the plate is an unusual one (i.e. not 200/250) it means that your set will **not work** at your new house unless that, too, has an unusual voltage. See opposite page.

Will the New Supply Do?

When you get to your new house look at the meter or ask the electricity company:—

- (1) Is the supply A.C. or D.C.?
- (2) What is the voltage?

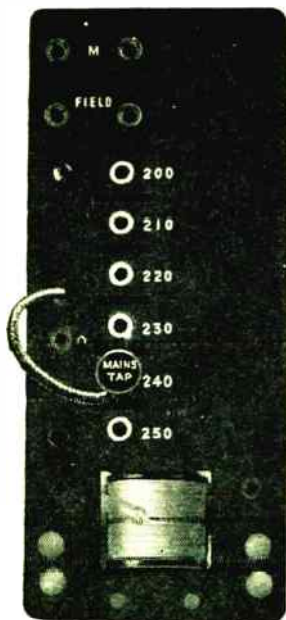
The following examples cover all cases:—

1. Q. My set needs A.C. and my new house has D.C. What do I do?
A. You can do **nothing**—see your dealer.
2. Q. My set needs A.C. or D.C. and my new house has D.C. What do I do?
A. (1) If the new voltage is the same as your old house voltage, **just plug in.** (Try the plug both ways round.)
(2) If the voltage is different, remove the back of the set and push the plug into the right hole (see page 30). After that—just plug in (try the plug both ways).
3. Q. My set needs A.C. or D.C. and my new house has A.C. What do I do?
A. (1) If the *new* voltage is the same as your old house voltage, **just plug in.**
(2) If the voltage is different, remove the back of the set and push the plug into the right hole (see page 30). After that, just plug in.
4. Q. My set needs D.C. and new house has A.C. What do I do?
A. Do nothing, report to dealer.
5. Q. My set needs A.C. and the new house has A.C. What do I do?
A. (1) If the voltage of the new house is the same as your old house voltage, just plug in.
(2) If the voltage is different, adjust the plug (see page 30).
6. Q. My set needs D.C. and new house has D.C. What do I do?
A. (1) If the voltage of the new house is the same as your old house voltage, just plug in.
(2) If the voltage is different, adjust the plug (see page 30).

Unusual Voltages

7. Q. My set has an unusual voltage marked on the plate at the back. It is lower than 200, 250 v. What do I do?
A. Ask your dealer's advice before doing anything.
8. Q. My new house has an unusual voltage. It is lower than 200, 250 v. What do I do?
A. Ask your dealer's advice before doing anything.

★ D D.C. Tapping Panel



numbered like the illustration on the right.

Note.—The numbers are those you will find on **Murphy** sets. Other makers may print different ones, but the principle is the same, whether A.C. or D.C. panel, **fit the plug or screw into the hole marked with a higher voltage than that marked on your electric light meter.**



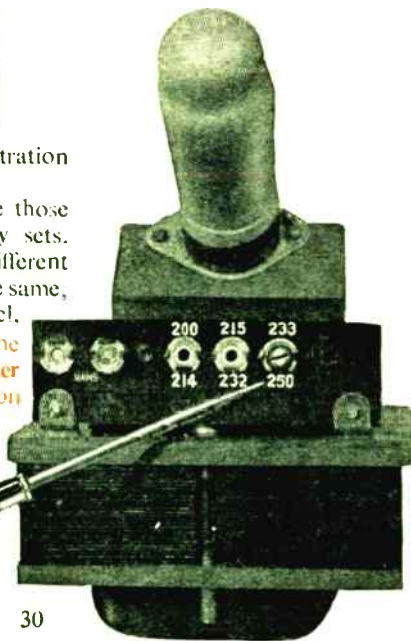
Here are two types of tapping panels. You will see that one has no plug, but a screw. For adjustments, move the screw about exactly as you would move the plug.

Making the Adjustment

Now, if your example on page 29 tells you to adjust your set for a new voltage, **don't plug in**, but remove the back of the set. You will easily recognize the tapping panel. If a D.C. set, the holes will be numbered like the illustration on the left—in 10-volt stages from 200 to 250.

If an A.C. set the holes will be

A.C. Tapping Panel



Example 1.—If your meter says 230 volts,			
the screw MAY be put into the hole marked			215 ●
			232
It is BETTER if put into the hole marked			233 ●
			250
			200
But NEVER put it into the hole marked			214 ●

Example 2.—If your meter says 230 volts, the plug **MAY** be pushed into the 230 hole. It is **BETTER** if pushed into the 240 hole. But **NEVER** put it into the 220 hole.

Having screwed the screw or pushed the plug into the **right** hole, replace the back of the set and plug into the mains.

That's all there is to it!

Note.—Differences in voltages in two different houses need not necessarily mean moving the little plug. Let us assume that your present house is 240 volts, and your new house 250 volts. A glance at the holes on the panel will show you whether the last hole is all right for voltages between 233 and 250. Therefore that position is in order for both houses—**no change!**

Having made sure that the supply is correct, and that the voltage has been adjusted at the panel—

- (1) Plug in the mains plug. (*Try both ways if D.C.*)
- (2) Switch on the mains supply switch.
- (3) Switch on the set.

If nothing happens, the fuse has probably “gone” in the household fuse box. To repair that see Chapter Five.

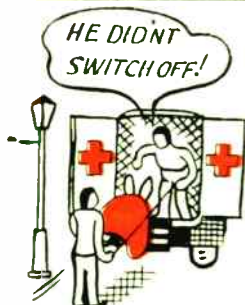
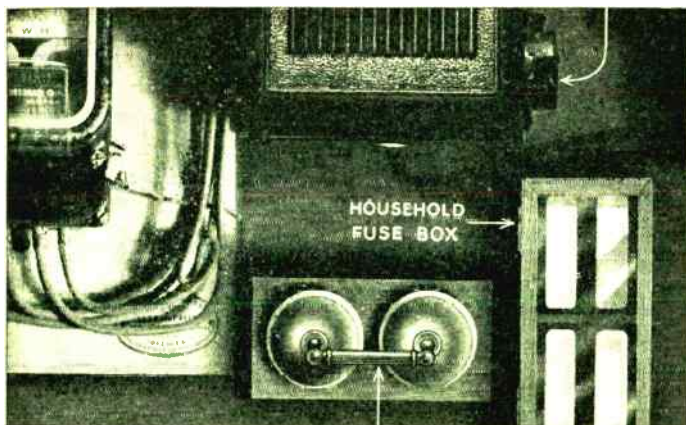
MINOR REPAIRS

1. How to Change a Fuse.

- ★ **A** *Check the supply point:—*
 If your mains set goes dead and the pilot lamp does not light, electricity may not be reaching the supply socket to which the wireless plug is connected. Check this. Remove the wireless plug and substitute a reading lamp in the socket. If the lamp lights, the supply circuit is in order. If the lamp fails to light, the
- ★ **C** *trouble is probably due to a "blown" house fuse.*

You will nearly always find the household fuse boxes by the meter. And, most important, also by the meter you will find the main switches.

Always turn off all the switches at the main board before



touching any electrical connections in the house.

It is a very good idea to find out exactly which fuses in the box are safeguarding the different lights and points in the house. And, having found out, put the details down on a piece of card which you can hang by the fuse box. Do it this way:

You will find that the fuses go in pairs—one under the other.

Locating the Fuses

Now, to find out which fuses cover the various points, set about it *strictly in this order*. **It's quite safe!**

- (1) Switch on every light and every plug point in the house.
- (2) **Turn off the main switch.**
- (3) Pull out **one** fuse.
- (4) Switch on the main switch.
- (5) Go round the house *and see which have gone out*, and write them down with the number of the fuse beside them.
- (6) **Turn off the main switch.**
- (7) Replace the fuse.
- (8) Pull out the next fuse.
- (9) Switch on the main switch.
- (10) Go round the house and make another list.

Do this until you have removed every fuse in turn, and you will then find that you have a list covering every light and point, and that each group of lights is affected by *a pair* of fuses.

So, having numbered them, make a list like this:—

- (1) Stairs, Bedrooms, Bathroom.
- (2) Hall, Front Room, Kitchen.
- (3) Living Room, *Radio plug*, Scullery.

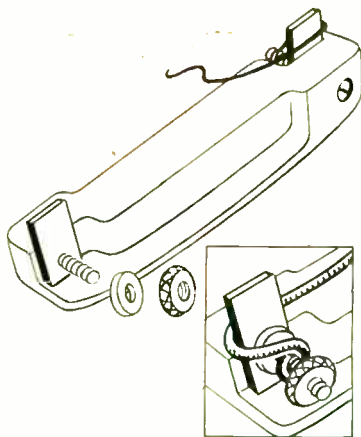
Then, if *any* light goes, you know which *pair* to remove.

Keep by your fuse box: (1) A card of fuse wires (5-amp wire, for lights, 10 to 15-amp wire for power).

- (2) A candle
- (3) A box of matches.

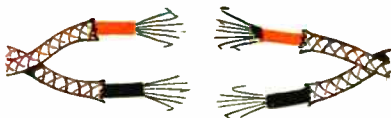
Fuse Repairs

- (1) Light the candle.
- (2) **Switch off the main switch.**
- (3) Pull out both fuses of the pair.
- (4) If one of them has *not* gone, replace it.
- (5) Remove the bits of burnt wire.
- (6) Find the end of the wire on the card, and screw it on to one end of the porcelain holder.
- (7) Measure the length of wire needed, leave an inch spare and cut. (If you try to break it you may cut your hand.)
- (8) Fasten on the other end,
but do not stretch the wire.
- (9) Replace fuse and switch on.



2. How to Repair a Broken Wire or Flex.

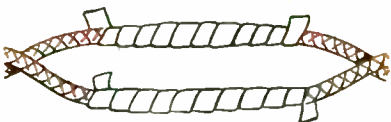
First make sure the wire is disconnected (remove plug from wall), or, if part of a fitting, switch off at main.



- (1) Make a clean cut of both ends.
- (2) Get both pairs of **even length**.
- (3) Slip back the cotton cover to expose rubber.
- (4) Bare the wire (gently so as not to break wire strands) by removing about 1 inch of rubber from each end.



- (5) Twist the two ends together like this (**tightly**).
- (6) Pull back cotton cover as far as the ends of the rubber.



- (7) Bind round **each join** with a 2-inch length of insulating tape. (*Surgical tape will do.*)



- (8) Bind round the *pair* with a 3-inch length of tape.
- (9) Switch on at the main. An electrician couldn't do it better!

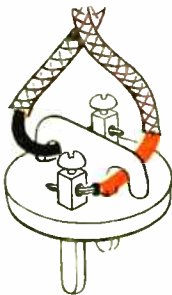
It is a very good idea to check over all lengths of flex in the house, and to deal with any signs of bare wire as in (7) and (8) above.

3. How to test and Reconnect Flex to a Plug.

First disconnect from the supply by withdrawing plug from wall—switch off at main switch.

Unscrew plug or adaptor. Examine each wire for fraying ★ B
breaks. Stretch each wire in turn to detect breaks inside the rubber sleeving. If it looks doubtful proceed as follows:

- (1) Bare wires for $\frac{1}{2}$ -inch as in section on repairing wires.
- (2) Double this bare $\frac{1}{2}$ -inch to make $\frac{1}{4}$ -inch and twist tight.
- (3) Unscrew terminals in plug or adaptor. ★ E
- (4) Put the cap over the flex first (or you will have to undo your work again!).



- (5) Push wires home, so that the rubber touches the terminal.
- (6) Screw up terminals tightly.
- (7) Replace cap.

But, Important Note.—Don't let your enthusiasm carry you so far as to let you attempt to mend the telephone leads if they become worn or frayed. The Postmaster General has very definite ideas about who shall mend his wires.

FAULT FINDING

Use this index and the next pages if your set gives trouble.

Example

The volume is weak from your *battery set*. Under "What's the matter?" you look for "Weak volume." You look across to column 4 ("Battery Sets") and find letters U, O, X, Y, I, P, S. Then, *in that order*, you refer to those letters on opposite page. They will guide you to the page where the information is to be found.

- "U" Check accumulator and terminals. If no improvement,
- "O" tells you: Check aerial and earth leads and plugs. If that does not help, try the next—
- "X" Check H.T. Battery. If that does not do, try—
- "Y" Adjust bias Battery—and so on:
- "I" Check valve top cap connections.
- "P" Check valve pins for good connections.
- "S" tells you to report the fault to your dealer, because there is no more you can do if your treatment has not worked.

(1) <i>What is the Matter?</i>	(2) <i>A.C. Mains Sets</i>	(3) <i>D.C. and A.C. Sets</i>	(4) <i>Battery Sets</i>
Smell of Burning? ..	(Switch off at once) L	(Switch off at once) L	(Switch off at once) L
Does the set appear to be "dead"? If so and if pilot lamp is out look up	A, B, C, D, K	A, B, C, D, G, P, K	U
If so and if pilot lamp is alight look up	J, K, P, I, L	J, K, F, P, I, L	W, I, K, P, I, L
Is the set noisy? If it HUMS look up	H, M, O, P, I, Z, S	H, M, O, P, Z, S	H, M, O, S
If it WHISLES look up	H, Q, O, P, Z, S	H, Q, O, P, Z, S	H, X, Q, O, P, Z, S
If it CRACKLES look up	C, D, O, Z, P, I, J, S	B, D, O, P, I, J, Z, S	W, X, V, O, I, S
If it "PLOP-PLOP-PLOPS" look up	O, Z, I, P, S	O, Z, I, P, S	O, X, I, P, V, S
Does the programme go off and on? ..	J, O, I, P, S	J, O, I, P, S	I, O, I, P, U, V, W, X, S
Weak volume? ..	O, Q, I, P, S	O, Q, I, P, S	U, O, X, Y, I, P, S
Distorted programmes?	H, M, Q, I, P, S	H, M, Q, I, P, S	H, X, Y, I, P, O, S
Fading or Blasting? ..	H, J, I, P, K, Z, S	H, J, I, P, K, Z, S	H, J, I, K, I, Z, S
Controls faulty? ..	T, S	T, S	I, S
Set not tuning at correct point on dial ..	R	R	R

A	Test the mains point with a reading lamp	32
B	Check the wiring to and in the mains plug	35
C	Check the mains fuses and the set fuses (if fitted)	27, 32
D	Check the mains tap	20, 26, 30
E	Reverse the mains plug if 2-pin, if 3-pin, reverse the two wires on the small pins, <i>leave the fat pin alone</i>	13, 26
F	Report to dealer as follows: "Set lights up, no sound"	
G	Test dial lamp(s)	18
H	Try another station	
I	Check valve top cap connections	17, 25, 27
J	Check the loudspeaker plugs and leads	19, 20, 25, 27
K	Test valves. (Should any valve become abnormally hot within one to two minutes, proceed as in L below)	18
L	Switch off immediately. Disconnect leads, and do not attempt any further test. Report to dealer as follows:— My receiver, Model, has the following fault:—	
M	Unplug any added gramophone attachment and switch to radio	27
N	Check pick-up plugs and leads	27
O	Check aerial and earth plugs and leads (include lightning switch). See if removing aerial and earth plugs stops trouble	11, 12, 20, 23, 25, 27
P	Check valve pins for good connections	17
Q	Remove external speaker plugs (if any)	
R	Do not attempt any adjustment, as this may be an electrical or a mechanical fault. Report the symptoms to dealer	
S	Report to dealer. Intermittent signals or Extraneous noises	
T	Tighten grub screws in knobs	20, 21
U	Check accumulator	18, 24, 25
V	Check accumulator leads and spade terminals	15
W	Check H.T. plugs	14, 20, 25
X	Check H.T. battery	14
Y	Adjust bias battery	16, 17, 25
Z	Disconnect aerial and join about 10 ft. of insulated wire to aerial terminal	23

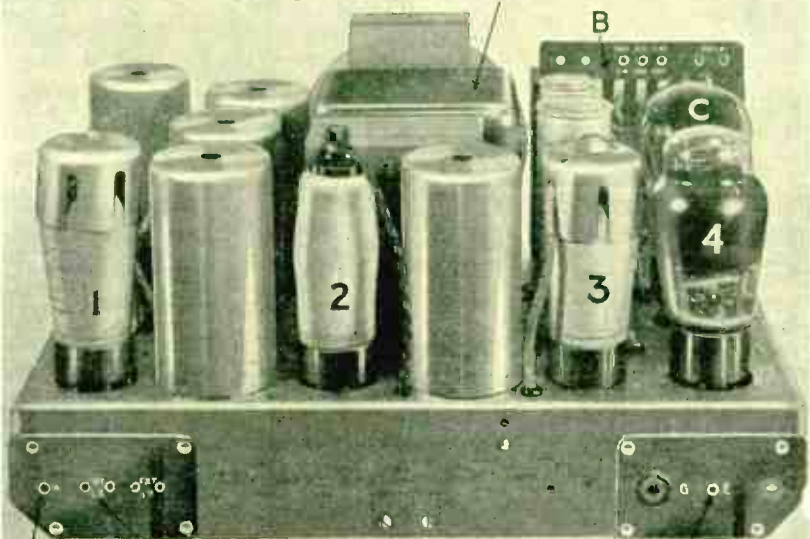
DO'S AND DON'TS

- DON'T** blame your set for every noise and temporary failure. Wartime conditions have imposed a great strain on G.P.O. and B.B.C., and enemy action may quite likely be to blame. In addition, there are many weird and wobbly noises "on the air" to-day that were unknown in days of peace. They can often interfere with and roughen your reception.
- DO** if you can manage it, take your set to the dealer for repairs, rather than ask him to make a journey to fetch it. But first of all make sure that it *is* necessary. And——
- DON'T** forget the wartime law which makes it an offence to carry a portable radio in a car, unless it is dismantled in some way. Leave the batteries at home and be on the safe side. For even though the set is out of order when you take it to the dealer, it will be working when you fetch it back!
- DO** remember to leave your accumulator with your dealer if you go away. He will keep it charged for you. If you leave an accumulator standing unused for any length of time it will spoil.
- DON'T** forget, if this book enables you to "resurrect" a wireless set which has "died", that you must renew your Post Office licence which may also have died!
- DO** above all things, treat the household electricity supply with the greatest respect. This warning applies not only to your radio set, but to every electric fitting you have in the house. If you remember to switch off all switches at the main before touching any appliance, bare wire or plug, you cannot come to any harm. If you grow careless, however, you can quite easily give yourself a very nasty shock.

INDEX

	<i>Page</i>
Acid—if spilled	16
Aerials—how to erect	11
Broken wires—how to mend.	34
Batteries—H.T.	14, 24
Batteries—L.T.	15, 24
Batteries—Grid Bias	16, 25
Connections—to Battery Sets	14, 20, 24
Connections—Flex to Plugs	20, 35
Connections—to Loudspeaker	19, 20
Connections—Mains Leads	13, 34, 35
Connections—to Mains Sets	13, 20, 26, 34, 35
Connections—to Valves	17
Different Mains Voltages	28, 30
Dust—how to remove it	22
Earths—how to connect	12
Fuses—location and mending	33
Fuses—when fitted in Sets	27
Knobs and Switches	20
Loudspeakers	19
Mains Tapping Panels—adjustments	20, 26, 30
Plugs—adjustments	20
Valves—simple tests	18

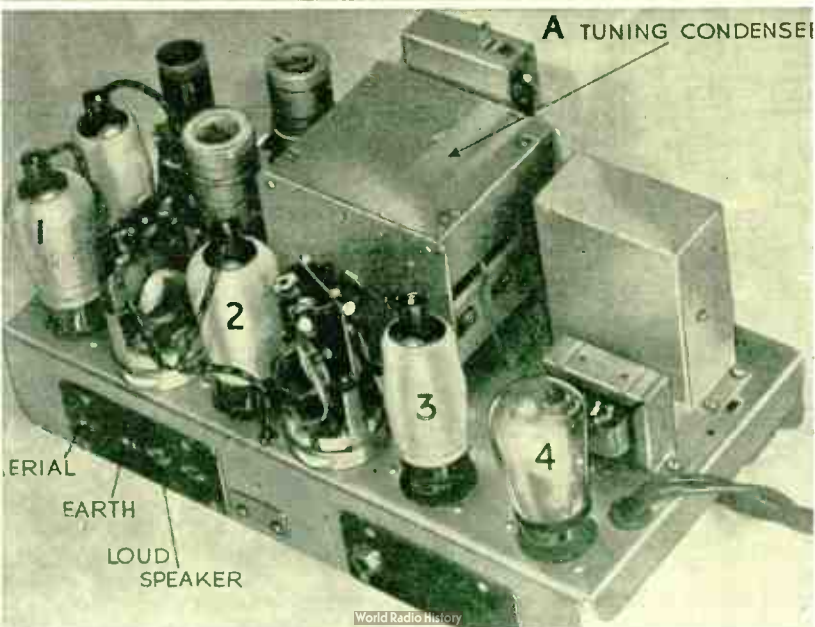
A TUNING CONDENSER



AERIAL LOUD SPEAKER

EARTH

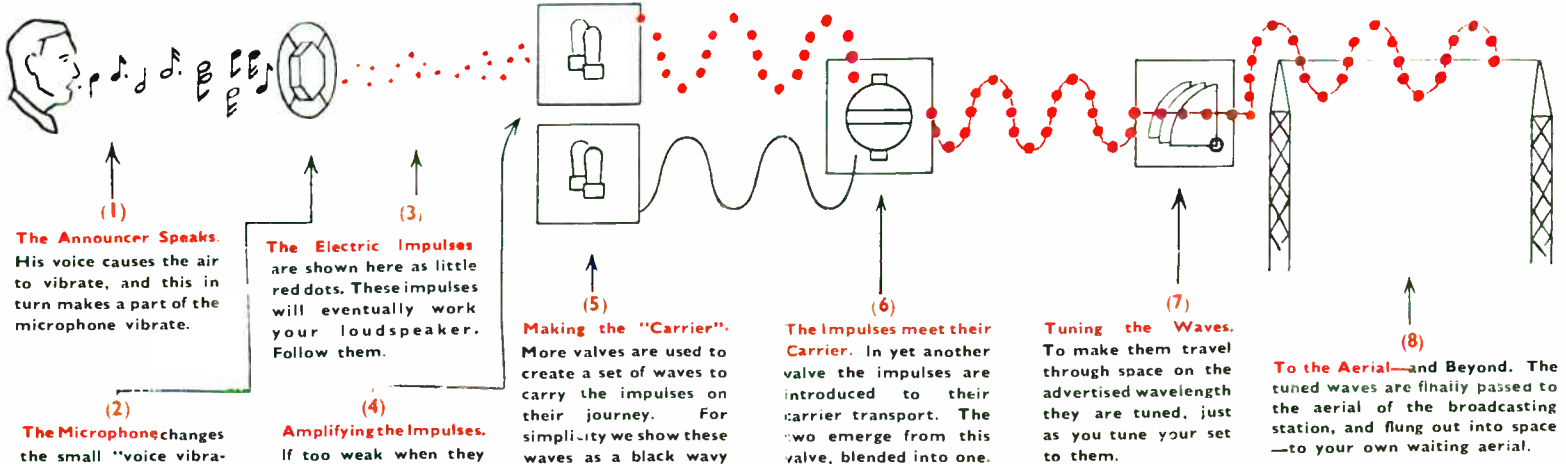
A TUNING CONDENSER



AERIAL

EARTH

LOUD
SPEAKER



(1) The Announcer Speaks. His voice causes the air to vibrate, and this in turn makes a part of the microphone vibrate.

(2) The Microphone changes the small "voice vibration" into feeble impulses.

(3) The Electric Impulses are shown here as little red dots. These impulses will eventually work your loudspeaker. Follow them.

(4) Amplifying the Impulses. If too weak when they reach your set you have to force them—and drown them with noise! So they are made bigger here by valves.

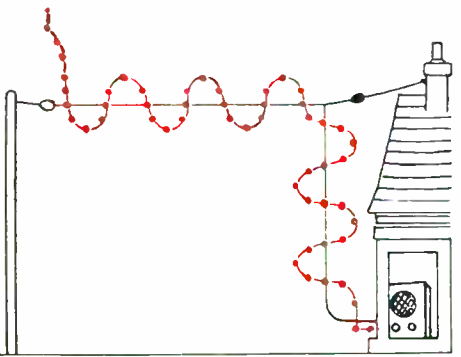
(5) Making the "Carrier". More valves are used to create a set of waves to carry the impulses on their journey. For simplicity we show these waves as a black wavy line.

(6) The Impulses meet their Carrier. In yet another valve the impulses are introduced to their carrier transport. The two emerge from this valve, blended into one.

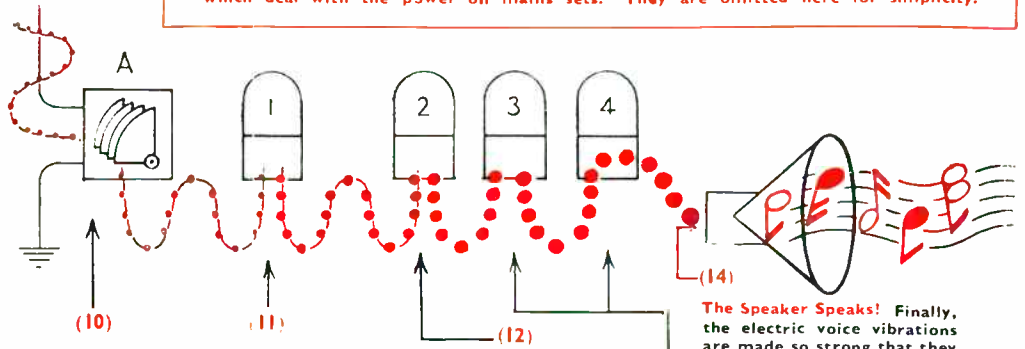
(7) Tuning the Waves. To make them travel through space on the advertised wavelength they are tuned, just as you tune your set to them.

(8) To the Aerial—and Beyond. The tuned waves are finally passed to the aerial of the broadcasting station, and flung out into space—to your own waiting aerial.

The numbers and letters, here and on the opposite page, are to show you the approximate link between this chart and your set. B and C are the transformer and valve which deal with the power on mains sets. They are omitted here for simplicity.



(9) The Waves reach your Aerial. The waves arrive, electric voice vibration riding on the carrier. They are very weak after their journey, so be sure that your aerial and earth are in good order, otherwise you will lose still more of their strength and drown them in noise.



The Waves reach the Set. By turning the tuning knob you tune your set to let them in. But remember that noise is bound to come in as well. Keep all connections clean and tight and so, keep out as much of it as possible.

The First Valve... amplifies everything that reaches it—noise, electric voice vibration, and carrier transport waves—because we do not get rid of the carrier before we have made the voice vibrations strong enough to travel on alone.

The Carrier is removed. The next valve does two jobs of work. The most important of these is the removal of the electric voice vibrations from the carrier—which is now no longer wanted, and so is conveniently "lost". The electric voice vibrations are then made bigger (amplified) and are passed on to the next valve.

(13) More Amplification. Though much stronger than when they arrived at your aerial, the electric voice vibrations have still to be amplified many times, and so they are passed from one valve to another and each one builds them up in turn.

The Speaker Speaks! Finally, the electric voice vibrations are made so strong that they make part of your loudspeaker vibrate when they reach it. This causes the air to vibrate—and you hear the air vibrations as sound.

