

FEEBLE RADIO CURRENT TO AVOID LEAKAGES SOME GOOD POINTS.

Even in a set which has been built of the best materials, which has been constructed by the best of radio engineers and which operates "perfectly" the percentage of the initial electrical impulse which has been utilised is very small. That is to say, the efficiency of a well-constructed and well-designed receiver is far from being 10 per cent. There are certain factors in energy losses which man has not been able to overcome. Some of these difficulties have been dealt with to a certain extent successfully.

Careful Insulation.

It is in the aerial and earth systems that the first losses of the received energy are sustained. The aerial should present a large surface of bare metal. Serious leaks are to be found in faulty insulators or insulators of poor quality. For all-round satisfaction employ the fluted or petticoated glazed porcelain insulators. These will generally be found to hold up in all weather and under severe physical strains. Bring your lead-in through a window pane. If this is not possible insulate it with a porcelain tube. An immense loss will result from jamming the lead-in under a window, not to speak of the danger incurred. Keep the wire away from the building a foot or more if possible to prevent absorption of the received waves.

The earth system has one main danger to be guarded against, providing that a good earth has already been established. Be careful to keep high resistance joints out of the circuit. This maxim holds for the aerial and the wiring of the whole set.

Sources of Losses.

Among those losses over which man has little control are those resulting from difference of electromotive force of two parts of a circuit. This has generally been known in the case of a wire-wound inductance as distributed capacity loss. It is on account of this loss the bank-wound coils are wound in a particular manner and not layer upon layer. Another source of trouble is poor insulation. This difficulty has been overcome to a very great extent, but in dealing with electrical impulses at radio-frequency the problem of insulation must be carefully regarded. In the true sense there is no substance that has yet been found which has perfect insulating qualities. An insulating material is one which offers a resistance high enough to retard to a great extent the flow of electricity. China and glass may both be called insulators. They differ only in degree of insulating properties. There is no well defined line between insulators and conductors, because each has to some extent the properties of the other. In a general way all metals are good conductors, and glass, porcelain and rubber constitute good insulators.

Avoid Resistance.

Aside from such uncontrollable (to some degree) energy losses, there are many ways in which energy is lost that are inexcusable. When constructing a set keep in mind that the initial impulse is very feeble, wire and arrange your set so as to offer as little resistance to it as possible. It is a known fact that electricity travels on the surface of its conductor. Never use a wire of small diameter for connection between instruments when a wire of fairly large diameter is available. No. 16 aerial wire is a good wire for wiring a set, although proper "bus" wire is better.

Bare Wires Best.

Because of absorption, another of radio's seemingly insurmountable difficulties, bare wire should be used wherever possible. Wire insulated, first with a single layer of cotton and then one of silk, is very efficient and very neat appearing in coils. In wiring the set, if a rather intricate job is encountered, and "bus" wire is not available, use heavy copper aerial wire and cover this with natural-coloured varnished cambric tubing or "spaghetti." Always use insulators in their natural colours if possible. Some of the dyes that are employed in colouring them have strong powers of absorption or conduction or both.

Advice On Wiring.

Every wire in which an electric current is flowing has about it a magnetic field. It is this property of an electric current that is taken advantage of in coils and transformers of all kinds. The field of a coil is much stronger than that about a single wire. This property, although most useful and essential in our receivers, constitutes a source of trouble alone. Never run high-frequency wires parallel to each other if they are within an inch and a half of one another. The field about one or two parallel conductors may set up a current in the wrong direction in the other. This last is called an induced current, for it is set up by the induction of another current. If the induced current "bucks" against the current already flowing in the wire it can readily be seen that trouble will result.

In circuits employing a tickler coil for regeneration, care must be taken in placing the coil in position so that its windings are in the same direction as those of the secondary. Otherwise the fields of the two coils will counteract and neutralise each other.

Induced Currents.

While we are speaking of induction it would be well to caution against crowding the parts of a receiver into too small a space. Amplifying transformers are surrounded by a strong

magnetic field, and for this reason should be as far removed from the tuning units as possible. Shielding these transformers with a metal case helps greatly to dampen this field, but does not prevent some of the strongest lines of force from breaking through. In some cases action in the radio valves is paralysed on account of some strong magnetic field in their proximity. Proof of this statement can easily be had by the experimenter. Set your outfit into operation and then place a large horseshoe magnet around your valve. Swing the magnet around in a circle in a horizontal plane and notice the effect produced on the signal strength.

Avoid Dust.

A common factor which lessens the efficiency of a set is dust. Dust causes leaks of high resistance all over the set. A heavy coat of dust will destroy the efficacy of an insulator. If dust is allowed to accumulate on the plates of a variable air condenser, the capacitance value of the latter will fluctuate and cause trouble. Dust must absolutely be kept off the grid leak.

Can you open up your set and disclose a shining and neatly-wired apparatus? Square corners in the wiring helps the general appearance. A neatly—and cleanly—wired set will be found to give greater satisfaction than one in which the wiring is a maze of twisted and coiled wires, going to and coming from only the constructor himself (perhaps) knows where. If ever you wire a set as an experiment, it will pay to use flexible insulated wire temporarily, and as soon as the set is found to function satisfactorily replace with permanent heavy wire.

A "SICK" SET

TO ASCERTAIN CAUSE.

When a receiving set does not operate to full efficiency or refuses to operate it is sometimes hard to put one's finger on the spot where the trouble lies. By using the following pointers it will be found that trouble-shooting in a set will be greatly simplified.

If a set refuses to bring the stations or just delivers signals that are audible one should first determine whether the aerial is in perfect condition. The loud-speaker or 'phones should be tested, then the batteries and the valves. If these are all perfect then start on the set proper.

Simple Tests.

Test all coils with a battery and a flashlight lamp to see if there is an open circuit in any of the windings. The condensers should then be tested for short circuits. A battery and lamp will do this also. If the lamp lights, the condenser under the test should not be used.

All connections from the instruments should be tested for contact and strength. As some soldering flux corrodes it is advisable to use rosin core solder for all connections; this eliminates the chance of corrosion. This information is given on the supposition that the set is wired correctly; this is really the first point to look over.

Locating the Trouble.

Another thing to remember is that if the detector valve delivers a signal and the amplifier will not, then one can be positive that the trouble lies in the amplifier. If the signals are heard in the first step of amplification and not in the second, then the trouble lies somewhere between the jack and the loudspeaker or 'phones on the last stage.

Jacks, valve socket contacts, run down batteries and poor connections are the four things that are the cause of most sets that are inoperative. Bearing these things in mind it should not be difficult for the listener to hunt trouble in his own set.

VOLTMETERS USEFUL

HINTS FOR BUILDERS.

When building a set now it is the desire of the fan to have as neat a looking outfit as it is possible for him to build. The more professional-looking the set the better pleased the constructor is with it.

There is one thing which adds to the appearance of any radio set, and that is the addition of a voltmeter. Some fans wish to use an ammeter, but this is not necessary. Besides adding to the general appearance of a set the voltmeter is a useful instrument on any tube receiver.

Valves Are Critical.

The reason for this is apparent when one knows that valves of to-day are critical to the voltage used to light the filament, and not to the amperage. For long life it is necessary that the valve be burnt at a voltage equal to the rating on the carton in which the tube came.

The amperage of the valve is taken care of in the tube itself. Besides the filament voltmeter there are no instruments that are of any great assistance in a set unless very fine work is to be done; in that case a plate milliammeter is an aid to fine adjustment.

To Select a Voltmeter.

In picking the voltmeter for a set the size and rating depend upon two things, the panel space, for size, and the number and type of tube for rating. In using storage battery valves such as the UX-201A or C-301A the rating of the voltmeter must be seven volts or slightly higher.

Using WD-11, 12; C-11, 12 the voltmeter should have a range of two volts. For the UX-199 or C-299 valves the range of the voltmeter should be four volts. Of course, it is possible to have the scale reading of the voltmeters used higher than that suggested above, but this is not advisable, because the higher scale the harder it is to obtain a fine reading on the low voltages.

The Children's Corner

By "ARIEL"

Dear Family—"Squealers" and "Surprizes" are arriving for the zoo by every mail. We hope to have our "Squealer" in his cage next week and he should be a fine fellow. I'm afraid the verses are not always quite as good as they might be. Try shorter ones, about four lines. I think many of you would find it easier to make just a simple little rhyme like that. This week we have some of Uncle Jack's songs, and also one of Uncle Sam's jingles. No doubt you all know the tunes perfectly well, but it is rather nice to have the words to refer to, isn't it? I am glad you find the competitions interesting—there are quite a number of young authors and authoresses coming to light, or say nothing of poets! Thank you all for your letters. I am always interested to hear all about you, and what you do at home and at school. I am glad, too, to have so many new "joiners" this week, and am looking for some good work from them!

Yours,
ARIEL.

The Words of Uncle Jack's Songs

FOR LISTENERS TO STATION 3YA.

THE TWILIGHT SONG.

Sing a song at twilight, when the lights are low;
And the flick'ring shadows softly come and go,
Whisper-wills a-sing, robin's in his nest,
May our song at twilight lull you to rest—
Lull you to sweet rest.

BED TIME.

The evening is coming, the sun sinks to rest,
The crows are all flying straight home to the nest.
"Caw, caw," says the crow, as he flies overhead,
"It's time little people were going to bed."

The flowers are closing, the daisy's asleep,
The primrose is buried in slumber so deep;
Closed for the night are the roses so red,
It's time little people were going to bed.

Good night, little people, good night and good night;
Sweet dreams to your eyelids 'till dawning of light;
The evening has come, there's no more to be said;
It's time little people were going to bed.

GOOD NIGHT AND GOOD MORNING.

A fair little girl sat under a tree,
Sewing as long as her eyes could see;
Then smoothed her work and folded it right,
And said, "Dear work, good night, good night."

A number of rocks came over her head,
Crying "Caw, caw," on their way to bed;
She said as she watched their curious flight,
"Little black things, Good Night, Good Night."

MY GRANDFATHER'S CLOCK.

My Grandfather's Clock was too tall for the shelf,
So it stood ninety years on the floor;
It was taller by half than the old man himself,
Though it weighed not a pennyweight more.
It was bought on the morn of the day that he was born,
And was always his treasure and pride,
But it stopped short, never to go again,
When the old man died.

Chorus:

Ninety's years without slumbering, tick, tick, tick, tick,
His life-second numbering, tick, tick, tick, tick,
It stopped short, never to go again,
When the old man died.

In watching its pendulum swing to and fro,
Many hours had he spent, while a boy,
And in childhood and manhood, the clock seemed to know,
And to share both his grief and his joy.
For it struck twenty-four when he entered the door,
With a blooming and beautiful bride,
But it stopped short, never to go again,
When the old man died.

COMPETITIONS

1. The Best Story; closing date, October 12. Prize, a book.
2. The Best Poem; closing date, October 19. Prize, a book.
3. Our Wireless Zoo. Animal No. 6, the "Surprise"; closing date, October 19. Prize, 5s.

ANSWERS TO PUZZLES

A WORD SQUARE.

1. L 2. 3. 4. 5.
1. S A G E S
2. A D A G E
3. G A U G E
4. E G G E D
5. S E E D Y

QUEER THINGS.

The Excursion.

To complete the little story I gave you last week, fill in the following words in this order: Noon, eve, Bob, Hannah, pop, peep, ewe, dad, tit, Aba, sees, eye, pup, peep, bib, pap, tot, Bob, pip, eye, nun, redder, redder, Tut, did, madam, deed, refer, level, eke, poop, gig, Oho, revival.

MORE MISSING WORDS

All the missing words contain the same letters, but differently arranged. Can you find them this week?

THE FISHERMAN.

A man of — had caught a —
And it was windy weather,
"Give me my —," he cried, "to fix,
My fish and — together.

FOUND ON A PENNY.

Take a penny and, looking at the King's head, try to find how many different objects are to be seen there. To begin with, can you see a well known animal? The answer is, hare (hair).

Now find these:—
A place of worship, part of a bottle, part of a hill, a personal pronoun, part of a trunk, part of a whip, a protection against thieves, a river crossing, a badge of royalty, a receptacle for corn.
Answers next week.

LIMERICKS

A thrifty young fellow of Shoreham,
Made brown paper trousers and wore—
ham,
He looked nice and neat
Till he bent in the street,
To pick up a pin, then he torchman.
As a beauty, I am not a star,
There are others more handsome by far,
But my face, I don't mind it,
For I am behind it;
It's the people in front, get the jar.
—Both sent by Nancy McNie.

There was an old man of Dunoon,
Who always ate soup with a spoon,
When they said, "Is it slow?"
He answered, "Oh, no,
I find it a positive boon."

There once was a farmer of York,
Who made all his fortune in pork;
He bought for his daughter,
A tutor who taught her
To balance green peas on her fork.

There was a young lady of Mutter,
Who smeared herself over with butter;
She looked very well,
But they say that the smell
Was too utterly, utterly utter!

There was a young lady of Weedle
When in church she sat down on a
needle
It was luckily threaded
And not far embedded,
And quickly pulled out by the beadle.

HER NEIGHBOUR'S VOICE

When entertaining the children recently, Uncle Sam of 3YA gave an exhibition of his powers of mimicry. And this is what one of his nephews told him happened in his home:—

"It might interest you to know that our Mrs. Cat appreciated your efforts on Saturday night. She was asleep on a couch in another room, but the instant the 'cat fight' started, she darted in and over to the set. She sat down and stared intently at the loudspeaker. There is no doubt that she was keenly interested. The Tunney-Dempsey fight had no more intent listener. But when the dog barked, her ears went back, and she made a discreet disappearance."—
L. A. D., Linwood.

UNCLE SAM'S DITTY

GIVEN FROM 3YA.

There's a radio station in the town—
in the town,
And there old Uncle sits him down—
sits him down;
And tells his tales with rapture free,
A-thinking all the time of you and me,
Fare you well, for we must leave you,
Do not let this parting grieve you,
But remember that the best of friends
must part—must part.
Adieu, adieu, adieu, adieu, adieu, adieu,
We can no longer stay with you—stay
with you.
We'll close down now till we meet you
all again,
And hope you'll all keep merry and
bright till then.

QUESTIONS AND ANSWERS

No one quite tells me what I want to
know;
They answer me—and that's the end
of that.
For if I ask, "What makes a flower
grow?"
Their answer wouldn't satisfy the cat!
If I say, "Daddy, why should snow be
white
And fall in crystals, no one like the
other?"
He mumbles gruffly, while he strikes a
light,
"I'm busy, Tommy. Run and ask your
mother!"
But mother, when I ask why cuckoos
cuck,
Just stares at me and says, "God
made them so,"
And gives me such a wise and solemn
look,
Which means, of course, she really
doesn't know.
And Nannie's way is diff'rent altogether,
For if I ask why winter days get
colder,
She gives a grunt and says, "Oh, it's
just the weather;
You'll understand all that when you
grow older!"
—Algernon Blackwood.

COFFEE-POT FACE

Coffee-pot face both long and thin,
Pelican neck and leathery skin;
Frumptery nose that points straight down,
Forehead crumpled with crease and
frown!
Lips pursed up in ugly pout,
Eyes that sulkily shift about.
O coffee-pot face is in disgrace!
Coffee-pot, coffee-pot, coffee-pot face.
It's a teapot face that is my delight,
Chubby and jolly, merry and bright!
Apple-pie round and cheerfully red,
And smiles that tickle and ripple and
spread!
Lips that wrinkle and entrance,
Eyes that twinkle, laugh and dance.
A teapot face chock-full of glee,
A teapot face is the face for me!

LETTERS

Dear Ariel,—I have been wishing very much to join your page, and am sending in a story. We get the "Record" every week, and I always find your page very interesting. I wanted to ask you when Uncle Ernest is going to be on the air, and which nights. The painting competitions look very pleasing; but I have no paints. I am very sorry that I am unable to write you a longer letter, but I shall have to hurry off to school. We have to drive 4½ miles.—Peggy Farquhar, Rakaia.

(Uncle Ernest is on the air every Friday at 6 p.m. I am so pleased to have you join Our Corner.—Ariel.)

Dear Ariel,—Thank you very much for the beautiful book you sent me. I enjoyed reading it very much. I should like to go in for your story competition, which is mentioned in the children's column of the "Radio Record." I am very fond of writing stories, and reading. My little sister, Beryl, is very surprised at you thinking she was a boy. She is the one on top of the ladder, on the left-hand side, and on the right is her twin brother, —With love from your little friend, Catherine Sale, Mangaohoe.

(I'm afraid I couldn't have looked very carefully at Beryl. It is quite easy to see that she is a little girl. How lucky she is to have a twin brother! Yes, do try for the story competition.—Ariel.)

Dear Ariel,—As I dislike poetry I have written a story about a radish for the competition, and I am hoping it is not too long. I am looking forward to your secret, which is going to improve our corner, and I have an idea what it is. I am glad I am not you, writing letters to boys and girls. I did not realise how many receiving sets there are in New Zealand. Here is a description of a circle. It is a round straight line with a hole in the centre.—George Best, New Plymouth.

Dear Ariel,—I am writing to ask if I may join your corner, for my brother gets the "Radio Record" every week, and I always dive into the children's page. I am fourteen years old, and this is my second year at the High School, but I do not suppose I am too old to join your corner. My father says I am too big to listen to bedtime stories, but I notice that every Wednesday and Saturday he is listening-in, so I told him that he is the one that is too big! As I cannot draw, I am entering for the poem. I have a good few pets, three cats, one dog and two bantams, named Romeo and Juliet. I also have some kind friends on top of the roof.—Eileen Hurrell, Beckenham.
(Of course you are not too old to join Our Corner. I am delighted to have you. Your bantams must be a very romantic pair, with such names!—Ariel.)

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