M. (Miramar): On my crystal set I have to tune to 180 to get 2ZW faintly. 2YA comes in best on 45.

A.: You have far too many turns on the secondary coil. Take off ten to fifteen at least. 2YA should come in at about 10 on your dial and 2ZW would then be at about 135. Do not take plates from the condenser. Damage the coil—it is cheaper.

HOOK-UP (Matamata): We do not happen to have a copy of the "Radio News" to which you refer. If you must build circuits that you cannot complete from overseas magazines, we are afraid we cannot help you.

2. Is there any means by which I can match r.f. transformers and band pass filters, without using expensive apparatus?

A.: The construction of r.f. transformers was described very fully by "Cathode" some months ago in the "R.R." We would advise you to look up this article

DX15W (Shannon): You have certainly been unfortunate with your transformers. However, why don't you try a really good make, as that will, we think, be the only solution to your trouble? There appears to be nothing wrong with your hook-up, and it is only a matter of striking a reliable transformer. We think if you communicate with the New Zealand agents for the transformer of your shortwave set which burnt out and explain the position, they may do something for you. Tell them how long you have had the transformer.

DYNAMO (Waitomo Caves): The volume control on my set is very unsteady. As soon as it is turned up a little the set begins to oscillate.

A.: The set is not neutralised properly. What valves are you using? You should be using 201A or 221 in the first two stages, and then have the neutralising condenser adjusted to balance them up. You will then find that that trouble will disappear.

2. A frying, bubbling noise is very often apparent in my set.

A.: This may be due to the set not being neutralised, or it may possibly be a burnt-out transformer. To test the transformer primary, use the phones and cell method described in "Questions and Answers" last week.

3. When building the "Outspan Five" regeneration coil, would it matter if the tickler coil was on a different former and put in a different place?

A.: Decidedly yes. The tickler coil must be adjacent to the secondary coil if regeneration is to take place.

COILS (Owhango): In replacing the present r.f. valve in my receiver with a screen-grid, can the original coil be used?

A.: Not without being altered. Why not add an extra stage of screen-grid as described in this week's "Radio Record"? If you want to instal the screen grid without the extra stage follow the lines laid down in the constructional section this week and couple the screen-grid valve directly to the detector.

2. Can I retain the tickler coil or must it be replaced by a differential condenser?

A.: There is no necessity to replace it with a differential condenser. You need alter the radio section of your set only.

R.I.A. (Dunedin): The sub-panel is the same as the base. This consists of a sheet of aluminium, 18 inches by 12 inches, turned down 1 inch all round. A further sheet of aluminium 12 inches by 7 inches must be used to separate the radio stages as is shown in the sketch on page 29. Wood is not used in an electric set.

J.P. (Dunedin): I am making the "Outspan" with six valves and do not intend to use regeneration. How can the coils be matched to the condensers?

A.: The easiest way is to consult a table such as that appearing in the 1931 "Guide," and you can then get the coils for any gauge of wire and any former. If you start to work these things out by formula you will have a sheet of figures and will not get anywhere, unless it is muddled up. Once you have the size of the coils worked out, you fit them in your set and, when the set is operating, finally balance them up. This is done by tuning to a station at about the middle of the dial and slackening the condenser shaft. Then take the first radio condenser and move the variable plates slightly to see if the signals increase. If the signal can be improved, that coil is not matched to the others. Should the plates have to be pushed in slightly this coil has a lower inductance than the remaining coils. Leave it in this setting and go on to the next coil. Adjust this one and you will probably find that this condenser does not have to be so far and remove a few turns from the coil associated with it until the two condensers are at the same setting. Go right through the four stages until all the condensers line up nicely, then tighten the little screw holding them to the shaft and they are matched as near as possible. A .00035 condenser would require a coil of 87 turns if wound with 26 wire on a 2 inch former.

IN DOUBT (Lower Hutt): I want to use a power unit and battery charger as described in May of this year, into an "A" and "B" eliminator. Can I use the "A" supply suitably smoothed?

A.: Yes, you will need a smoothing choke comprising 300 turns of 18 d.c.c. wire on a core 1¼ inch. The gap should be 3/16th. This is choke "K" "Radio Record" standard, as published in the 1931 "Guide." An electrolytic condenser must be used across the winding.

2. Could the same rectifying valve and resistance lamp be used?

A.: Yes.

VITI (Manurewa): I am troubled with transmission hiss on an a.c. set employing the latest valves. Are the valves at fault?

A.: Transmission hiss is due usually to the valves themselves. The combination of valves you are using is one of the best and we would suggest that you get in contact with the agents who sold you the set. Probably the replacement of one or perhaps two valves would overcome the difficulty.

T.A. (Morrinsville): Do you know anyone who has logged more than 40 stations on a one-valve set?

A.: Ask the DX Editor. He will probably tell you that there is a man in Palmerston North who has logged Europe on a one-valver—or perhaps he won't.

2. During rain I am troubled by a loud sizzling noise in the phones.

A.: This may be due to a power leak, or possibly to your aerial finding a short circuit to earth. Examine your aerial installation very carefully. Make certain that trees are not coming into contact with it.

3. Would the addition of another valve improve the volume and assist in bringing in distant stations? If so, what would be the approximate cost?

A.: It would certainly improve the volume to be had from your set, and does assist in bringing in the distant stations. The cost would be something like £2.

DISGUSTED (Whangarei): I have built the "Kestrel Three" and cannot get it out of oscillation. I cannot reconcile your sketch of the coil and the sketch in the book.

A.: Had you examined them a little more closely you would have seen that they were both the same, with the exception that the artist, in drawing up the picture of the r.f. coil, has shown the tuning condenser upside down. That, however, is only a very small detail. You will see that the top of the coil goes to earth, and to the moving plates of the tuning condenser. The bottom of the r.f., that is, the grid pin, is connected to the fixed plates of the tuning condenser (or the .0001 condenser, which is its equivalent), to the grid of the valve, and to one of the sets of plates of the midget condenser. If you will make sure that your connections are right, you will get the set out of oscillation all right, but you must have the high potential end at the bottom of the coil. We made that point very strongly in the article. For the sake of clearness in making our diagrams, we took the grid direct to the fixed plates instead of through the .0001 mfd. condenser. Of the two sketches you have submitted for the connection of chokes, the first one is right, as is shown in the book. There is no question about which we intend; it is shown clearly in all three illustrations. Very many have this set working, and no one yet has complained that the text and the drawings fail to agree. All your trouble is possibly because you have the high potential end at the top of the coil. If this is not so, then your best plan is to put a cocoa tin over the coil, and, if necessary, over the valve itself.

BALDY (Auckland): I recently purchased a five-valve set, complete with 6-volt "A" accumulator and 90 volts "B." Should I be able to get the Australian and foreign stations? I am using 221's in all stages.—Yes.

2. My aerial is 36 feet high, but doubles back upon itself.—Your aerial should be quite satisfactory, although we notice that at one point it is only 20ft. from the ground. This is a bit too low. Cannot you get it a little higher.

3. Would it be possible to convert the set into the "Outspan Five"? If so, what would be the cost? And where could I obtain the necessary particulars for the "Outspan"?

A.: The "Outspan" was described very fully in the "Radio Record" a little while back. A few copies are still available. It should not cost you very much to convert your set, probably only the cost of the new coils and the screen grid valves, a matter, say of £2 or £3.

KYE (Naseby): My six-valve commercial set has developed a decided whistle.

A.: Whistles can be caused by many reasons. Possibly it is due to the valves ageing or the set requiring re-neutralisation. If you do not know how to go about this yourself, it would be wise to get a friend who knows something about the set to do it for you. The job is really simple, and was described in last week's questions and answers. It is, however, a case of locating the neutralising condensers, which are usually near the panel. Another reason for squealing can be a run-down "C" battery, a defective "A" or "C" battery, or both, and long leads to the "B" battery. A microphonic valve can also cause a certain amount of whistling.

2. Is it better to have an aerial running north-south, or east-west?

A.: The direction of an aerial has very little to do with its efficiency, providing it is of the normal "L" or "T" type.

SPARKS (Carterton).—I should like to know the number of turns for a broadcast coil to be wound on a Colvern coil former? I am using a .0005 for tuning.

A.: Use 26 gauge d.s.c. wire and on the secondary wind 65 turns. On the primary 20 turns, and on the tickler, if you are using a .00025 condenser, 30 turns. The tickler can be wound with a finer gauge wire, say, 28, 30, or 32.

2. The two audio valves have the same plate and grid voltage. Should this be so?

A.: No; the second last valve should not be biased. It is quite in order, however, to use the same plate voltage on this valve as on the last. If the voltage is high, that is, over 90, a small bias of 1½ volts should be applied. You need not worry about trying to put a lower plate voltage on the PM1. We have tested the set you speak of and have it perfectly satisfactory. Of the other makes you mention, some of the sets are made in America and others in Australia.

GLENCAIRN (Auckland): How is it I can get Christchurch and Sydney better than Wellington?

A.: It may be either your locality or a peak in your set. Some sets are more sensitive to certain frequencies than to others. This would account for the reception of some stations more strongly than others which are nearer and more powerful.

2. What is the best method of padding a transformer which hums?

A.: Padding should not be necessary. If a transformer hums it is an indication that either the insulation between the laminations is bad, or that the bolts need tightening. If you have to pad it use stalloy and jam in strips between the frame and laminations.

W.E.A. (Dunedin): I have a six-valve commercial set with a "B" eliminator, and I can receive certain local "B" class stations on three points of the dial. The set is obviously not oscillating, as I can put my finger on the aerial terminal and there is not a click.

A.: It is not always possible to tell by this means if your set is mildly oscillating (it would not disturb your neighbours). It is possible that the strong carrier wave of the local station is causing beat notes which are interfering with your set. Other than this, it may possibly be reflected frequencies.

DX14W (Pahiatua) writes to say that he has found in the two sets he has had that PM6 makes an admirable r.f. valve. In reply we would say that, although it is an output valve, it sometimes goes well in another portion of the set, i.e., as detector. If used without bias, it will place a fairly big drain upon the battery. It cannot burn out any transformers in the radio stages because there are none there to burn out. He states that he has constructed the

(Concluded on page 29.)