4. The condenser C3 is shown on the diagram as a fixed condenser, whereas in the components it is referred to as a tuning condenser. Which is correct?

A.: The word "tuning" was put in inadvertently.

AY JAYEM (Kelburn): What is the difference between square law and linear detectors?

A.: A detector is linear when its output at audio frequency is directly proportional to the radio frequency input. Such detectors produce a small percentage of distortion with fully modulated signals in comparison with the larger percentage of distortion produced by other detectors. Anode bend or power detectors are linear only on a small proportion of their operating characteristics. Square law detectors are the ordinary detectors, that is, the audio frequency output voltage is proportional to the square of the r.f. input voltage. These detectors produce some distortion, especially if the detector is modulated at fairly high percentages.

"EXPERIMENTER" (Orari): We regret we cannot supply designs of receivers. We advise you to follow very carefully the series of articles that will start next week on the super heterodyne receiver, and note the set to which it leads up. This will probably do away with a large number of your troubles.

N.Z.D.X. (Auckland): I have a two-valve set. What is the best method of adding an audio frequency stage (three electrode)?

A.: We cannot tell you in a few words. You had better wait until the description of the "Ranger Three" comes out. It will be on the way shortly. The same applies to a radio valve. It is very difficult to outline constructional details such as this in the limited space we have available for Questions and Answers.

O. KAY (Blenheim): Is it possible to use the "Sparrow Hawk" adapter with an a.c. set?

A.: Yes; if you employ batteries for the "Sparrow Hawk" and use the circuit shown in Figure 2, shown on page 111 of the 1931 "Guide." Why not attempt building the super-heterodyne adapter also described in the "Guide"? It will really be more suitable for an a.c. set than the "Sparrow Hawk." The "Sparrow Hawk" would give easier tuning, but you would have to put up with batteries.

GREGG (Dunedin): I have had great results with the "Differential One." It is remarkable that such a small set can give one such world-wide reception. I have had good reception from England, Holland, France, Russia, Indio-China, Java, America, Australia, and some N.Z. amateurs. I am using two four-volt valves, with 45 volts "B" battery. As I wanted the set primarily for shortwave work I bought two .00015 variable condensers. However, hand capacity is a little bad. Can you tell me:

1. Which are the most suitable condensers to use with the Differential One coils?

A.: For the tuning double space .0001 tuning condenser. Reaction, .0002 or .00025 differential condensers.

2. Will I need to alter the coils?

A.: Not if you use these condensers.

3. When I tune in a station I have to sit very still to keep the set from squealing. If I touch the 'phone cord, headband, or 'phones the set squeals or else the signals fall away.

A.: This is a variety of hand capacity which shielding the set would stop.

4. I wound a choke of approximately 150 turns 30 d.s.c. wire and put it in the "B" plus lead at the phone terminal but it has not effected any noticeable improvement. On one of the bands oscillation is ploppy and it will not oscillate over the whole dial.

A.: To overcome ploppy oscillation the best plan is a potentiometer grid return such as is shown in the theoretical diagram of the "Kestrel Three."

5. What is the remedy for dead spots?

A.: The use of a midget condenser in the aerial or altering the number of turns on the primary coil, generally taking a turn or so off.

6. Would a PM4DX be more suitable than a PM3?

A.: Yes, PM4DX is a special detector.

7. Would it not be better with more plate voltage?

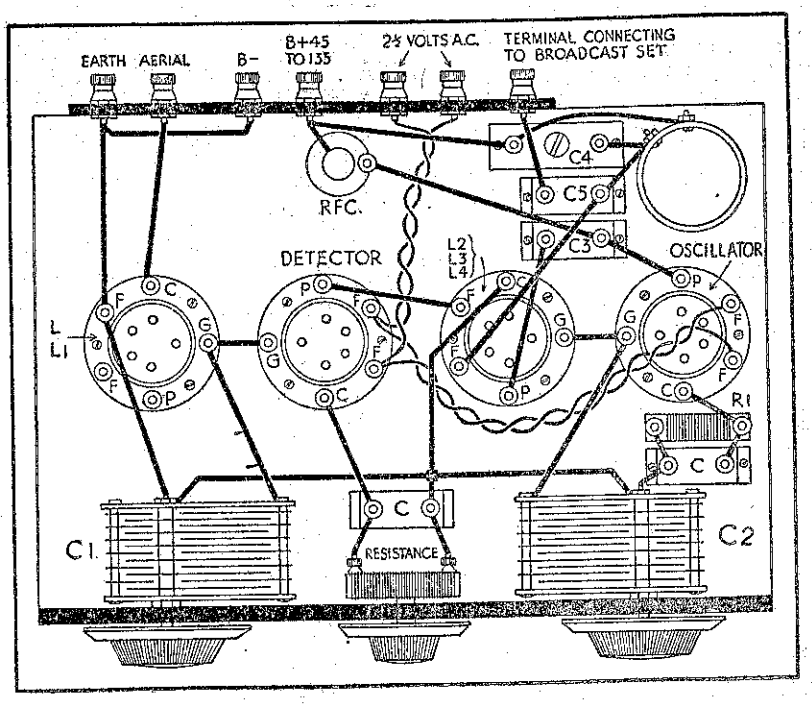
A.: In all probability not. So long as your set will oscillate, additional voltage would be of no advantage.

8. Would it be advantageous to use a "B" battery with the one valve?

A.: No, it would be impossible. You would have to use anode bend detection, which would not give you the results that the grid leak detection does.

9. I have heard a broadcast from the local stations on the Differential One. Does this indicate a fault?

A.: No, you are really tuning them in on one of their harmonics. Note: We are pleased to hear of your good results and think that if you use the .0001 double spaced tuning condenser for tuning and .0002 or .00025 differential reaction, you will have vastly improved results. The squealing may possibly be eliminated by reducing the detector voltage until the set will just oscillate. Furthermore, the incorporation of the potentiometer grid return will no doubt be beneficial.



Layout of A.C. Superheterodyne.

RHO SIGMA (Ngaio): I have recently completed, according to the somewhat meagre specifications in the 1931 "Guide," the super het. shortwave adapter and it failed. I have had to guess at some of the components.

A.: we published last week a diagram with full explanations, and now publish a diagram of the layout. If you will follow the instructions given and get the components correct you will get your set to function all right.

2. The broadcast set to which the adapter has to be connected has two stages of tuned r.f. Is this sufficient?—Yes.

3. Must the return from L.5 be connected to any point of the set?—No.

4. Would increasing the number of turns on L4 cause the set to oscillate?

A.: If correctly constructed it should oscillate with the number of turns given, but increasing the number of turns would certainly help oscillation.

RIPPLE (Dunedin): I have constructed a Loftin Four with a band-pass filter and obtain plate and screen voltages direct from the power pack through resistances. Volume control is effected by varying the bias on the two r.f. valves.

1. Could you tell me the probable causes of the following:—(a) Instability. While stability seems satisfactory, when the volume is turned down a pronounced ripple appears. I have effected an improvement by by-passing the plate resister with a .2 mfd. condenser, but the ripple reappears when the volume is reduced to a comfortable degree.

A.: Are you drawing the screen voltages from the same source? If so, provide r.f. chokes in the lead to each. Furthermore, there should be chokes in the plate lead and these, if necessary, should be by-passed with midget condensers to earth. It is probable, too, that some of the ripple about which you complain is due to the method of controlling volume. The volume on the ordinary valve should not be controlled by varying the bias, but the screen voltage should be varied. Your plan is quite satisfactory for multi-mu valves, and if you were using these, probably you would find many of your troubles would disappear.

(b) The tone appears to be shrill and piercing on radio, but O.K. on the pick-up.

A.: We think this trouble is due to the same cause as that responsible for the before-mentioned trouble, and if you get to the bottom of that, following the lines we have suggested, the shrilliness will disappear.

CONDENSER (Marton): I am troubled with interference from power lines running about thirty yards from my aerial. Can I do anything to eliminate the noise?

A.: Keep your aerial as short as possible and higher than the interfering lines if possible. Make the flat top very short and shield the lead-in by using special armoured cable and earth the armoured portion. Try a separate earth, or rather a different earth from the one you are using, if possible in a different location. Arrange your aerial so that it is at right-angles to the nosy power line. Communicate with the District Radio Inspector and complain about the noise.

2. When I touch the fixed plates in a condenser the volume drops right away. The same occurs with two others, but hardly any difference is noticeable on touching the fourth.

A.: This is quite in order. It is due to the potential on some plates being higher than on the others.

SPARKS (Marlborough): Would it be possible to build a one-valve shortwave adapter for my commercial set?—Yes.

2. Could you suggest one?

A.: One of the super-heterodyne types such as described in the last "Guide" would be most satisfactory, although a battery adapter such as the "Sparrow Hawk" would also work quite well.

3. What would be the approximate cost of the a.c. adapter?

(Concluded on page 30.)