

PRECISION! THAT MEANS VALUE

A striking example of the marvellous precision used in achieving the supreme performance of all "Gulbransen" models is shown in the final testing of the efficiency of each set, which must measure to within four-millionths of a volt of the master laboratory model. All the other equipment used is made and tested with the same care.

HEAR THE NEW GULBRANSEN PRECISION-BUILT RADIO

and be convinced of its undoubted superiority, whether you require a Combination Radio and Gramophone or a straight radio model.



Combination Radio and Gramophone model £85

Highboy Straight Radio £55

The "9950" Model £42/10/-

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THE
GULBRANSEN
Factory Representatives:
H. W. CLARKE
LIMITED

182 Wakefield Street,
WELLINGTON.

The principle of obtaining grid-bias for any valve is to connect the particular grid to a point on the filament wiring that is more negative by the required amount. If objectionable hum is encountered by this method, provide additional smoothing, or bias with a dry battery. Some mains are difficult to smooth and may require a choke in both positive and negative leads. If there is only one choke, it is always in the "live" or unearthed lead.

Particulars given in this article are for a voltage of 230, but will cover the range from 220 to 240 volts if a corresponding adjustment is made in the resistance in circuit.

In special cases where a voltage-divider is used across the mains, the total resistance should be not less than 20,000 ohms, that is, considerably higher than is used in the average A.C. eliminator.

Needless to say, insulation must be good throughout the receiver, and a fuse of thin copper wire, say, 38 gauge, must be placed in each lead from the mains, along with a well-insulated double-pole switch, which will be found handy when making adjustments. No live connections must be allowed outside the panel, so that when the receiver is working, enclosed in its cabinet, there is no liability of a shock being experienced by the operator.

Whether shown in the diagrams or not, connection to loudspeaker or 'phones should be either through an output transformer or a choke-filter, in which latter a condenser is placed in both leads. When the latter method is used, it must be remembered that the condensers are in series, so that their values are halved, so double the usual capacity must be used for each. At least 500 volts test, and not less than 2 mfd. each. If low notes are missed, increase the capacity to 4 mfd.

At this point we shall have to leave the discussion till next week.

Building Eliminators

BEWARE of the crudely built home made eliminator. A Melbourne writer says:—"A well-designed battery eliminator, properly used, is a perfectly safe part of the receiving gear. One can rely absolutely upon the products of well-known firms. The type of eliminator to avoid is that put together by someone with little or no knowledge of electricity or of the precautions required when the lighting mains are used for supplying current to the wireless set. The writer has seen in recent months several eliminators which, to say the least, were positively dangerous. Most of them were turned out by ambitious youngsters in their spare time with a view to earning a little extra money. Plain brass terminals, paper dielectric condensers intended only for comparatively low voltages, leads of the commonest and most poorly insulated and most inadequately shielded.

HAVE you renewed your subscription to the—

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BOX 1082, WELLINGTON.

The Beverage Aerial

Some Definite Information

RE "Switch's" query regarding the Beverage aerial, E.M.W. (Christchurch) writes: The following is taken from the Christchurch "Star" several years ago:—

"Avoiding technicalities as far as possible, let us start with the actual transmitting station. This sends out a series of waves in all directions. These waves have been measured from crest to crest and the length ascertained and described in metres (one metre equalling, roughly, 39 inches).

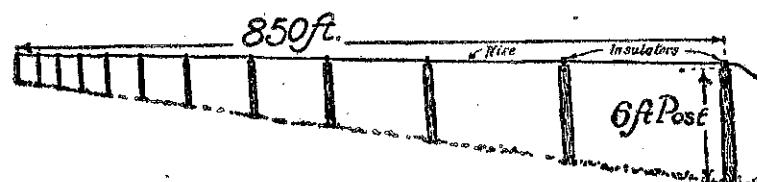
"It might be more accurate to say that it is the distance from the lowest trough of one wave to the lowest in the succeeding wave, that is measured—hence 3YA on 306 metres means that the distance from the crest to the crest of the following wave is

bay are preferred the aerial should be run out directly north-west from the house. If Americans are preferred the direction would be almost north-east."

I have never tried this aerial, but for anyone with plenty of space at their disposal I think it would be well worth trying.

ANOTHER description has been taken from an old publication and forwarded to us by a Wellington correspondent:

"The Beverage Wire"—This modification of the single wire antenna, proposed by Mr. H. H. Beverage and described in United States Patent No. 1,381,089, has for its principal object the reduction of interference from static and other stations by means



306 metres, or, approximately, 331½ yards. Now, if you construct an aerial 332 yards in length, every portion of one complete wave from 3YA will fall once on that aerial and you will obtain every particle of energy it is possible for that wave to give you.

"The length will be slightly greater than the length of the wave of the station farthest up the wavelength scale possible of reception by your receiver. In other words: If your set covers stations broadcasting on anything between 200 and 600 metres and you wish to hear a station at the top of the scale (say 550 metres) your Beverage will have to be 551 metres (roughly 597 yards). That length will also take care of the stations whose wavelengths are less than 550 metres.

"The height is not at all important. It must, of course, be off the ground. The wire could be laid along the tops of posts forming a fence (in a straight line) so long as the wire was insulated from contact with the post. Any old wire seems to be good enough.

"One enthusiast uses 14 or 16 s.w.g. galvanised iron ordinary fencing wire, strained by a fencing strainer. The aerial (a) must be all in one piece; (b) must be in a straight line; and (c) must be earthed (through a resistance of 750 ohms) at the far end. As a resistance of this value is not easily obtainable, two 400-ohm potentiometers in series would do. By moving the sliding arm of the second potentiometer you will obtain a total resistance approximating 750 ohms.

"Then the lead-in must be insulated on its way to the set, exactly as in the case of the normal aerial. Finally, as the Beverage is acutely directional it must be located so as to point in the direction from which signals are principally desired. If Indian and other stations between the listener and Bom-

of its sharply directional characteristic. It consists of a single horizontal wire of equal length to the wavelength to be received (or an integral multiple thereof).

"One end of this is grounded through a resistance approximately equal to the 'surge impedance' of the line (200 to 600 ohms for a line about 10 feet high, No. 16 s.w.g. wire, at radio frequencies), and the other end is connected through an inductance to the ground in the usual way. The receiving apparatus may be coupled to this inductance.

"The system has theoretically a well-defined directional characteristic, and receives best from a direction toward the end grounded through the resistance. The inductance to be used may be of the order of 100 micro-henries for the 200-metre system. The chief merit of this antenna resides in its directional properties and the immunity it provides from static disturbances; a theoretical examination shows that as an antenna it has no special virtue, at least over ground of average conductivity.

"But the directional property may be frequently of great use; an example of this was furnished by the recent trans-Atlantic tests conducted by the American Radio Relay League, in which the antenna was employed with some absolute success in receiving the signals.

"A very complete and understandable discussion of this antenna has lately appeared, and the reader is urged to consult this article: "The Wave Antenna for 200-Meter Reception," by H. H. Beverage, QST p. 7. November, 1922.

"The surge impedance of a line of these dimensions is approximately 550 ohms. The latitude 200-600 ohms is prescribed to allow variation."