

Weather report and station notices.

Selection—The Band, "Lucia di Lammermoor" (Donizetti).
 Tenor—Mr. D. L. Irwin, (a) "The Fairy Tree" (O'Brien); (b) "Song of the Palatium Bearers" (Shaw); (c) "Isle of My Heart."
 March—The Band, "The Vanished Army" (Alford).
 Horn solo—Bandsman H. Parsonage, "My Love's Grey Eyes" (McGeogh).
 Cornet solo—Bandsman T. Goodall, "Two Eyes of Grey" (McGeogh).
 Mixed chorus—Glasgow Orpheus Choir, (a) "Cradle Song" (Gibbs); (b) "The Campbells are Coming" (arr. Mansfield) (H.M.V. B3109).
 Overture—The Band, "Le Diademe" (Hermes).
 God save the King.

3YA, CHRISTCHURCH (980 KILOCYCLES)—SUNDAY, NOVEMBER 1.

- 3.0 : Relay of Christchurch Cathedral Jubilee Celebration—Young People's Service. Preacher, His Grace Archbishop Julius. Organist and Musical Director, Dr. J. C. Bradshaw.
 5.30: Children's song service by children of Anglican Sunday schools.
 6.15: Chimes.
 6.30: Selected recordings.
 7.0 : Relay of Jubilee Celebration Evensong from Christchurch Cathedral. Preacher, His Grace Archbishop Averill. Organist and Musical Director, Dr. J. C. Bradshaw.
 8.15 (approx.): Relay from Oamaru of Programme by Oamaru Municipal Band.
 10.0 : God save the King.

4YA, DUNEDIN (650 KILOCYCLES)—SUNDAY, NOVEMBER 1.

- 3.0 : Selected recordings.
 5.30: Children's song service, conducted by Big Brother Bill.
 6.15: Instrumental recordings.
 6.30: Relay of evening service from Church of Christ, St. Andrew Street. Preacher: Pastor W. D. More. Choirmaster: Mr. W. H. Mackenzie.
 7.45: Selected recordings.
 8.15: Relay from Oamaru of Concert by Oamaru Municipal Band and assisting artists. Conductor: Mr. Pheloung. Accompanists: Miss Vera Slater, A.T.C.L.
 Hymn—"Fierce Raged The Tempest" (Dykes).
 Descriptive item—Band, "Sunday Parade" (Hawkins).
 Musical Monologue—Mr. J. McLean, "Troubles."
 Violin solo—Mr. W. J. Hill, "Valse Triste" (Sibelius).
 Vocal—Miss Mary Pratt, "Sun Above Me" (Pergolesi).
 Selection—Savage Club Orchestra.
 Vocal—Mr. A. Shrimpton, "Invictus" (Bruno Huhn).
 Piano solo—Miss Vera Slater, (a) "In a Woodland Glen" (Barratt); (b) "Hungarian Dance" (Brahms).
 Vocal—Miss Mary Pratt, "Ring, Bells, Ring" (Maud Craske Day).
 Selection—The Band, "Nabucco" (Verdi).
 Vocal—Mr. A. Shrimpton, with violin obligato by Mr. W. J. Hill, "Fiddle and I."
 March—The Band, "Gladiator's Farewell."
 10.0 : God save the King.

2XB, NEW PLYMOUTH (1230 KILOCYCLES)—SUNDAY, NOVEMBER 1.

- 6.0 to 6.45: Children's Sunday Service.
 8.15 to 10.0 p.m.: Concert programme.

Questions and Answers

(Continued from page 15.)

A low impedance low-mu valve can be expected to have high plate current and accommodate a large grid swing. Under these circumstances the variations in a plate current will be considerably greater than with a corresponding valve of high impedance (excepting, of course, the pentode).

2. Can the extent to which a valve can be safely overloaded under constant working conditions be determined by its maximum anode dissipation, and can a valve be overloaded to a greater extent in a transmitter than in a receiver?

A.: A valve should in no case be seriously overloaded, in whatever circumstances it is used. The conditions ruling in a transmitter are, however, entirely different from the case of a receiver. In the receiver practically the whole of the power supplied is dissipated at the plate, so that the input is determined by the permissible plate dissipation. With a properly adjusted transmitter, however, a substantial percentage of the input is dissipated in the aerial as radiation or in a succeeding grid circuit as excitation for an amplifier. Thus, roughly speaking,

the dissipation is limited to the difference between input and output. It is entirely possible to run the input on a valve rated, say, 20 watts anode dissipation as high as 50 watts without the slightest danger of overloading.

3. How is anode dissipation and percentage of modulation calculated (at the transmitting end)?

A.: Anode dissipation can be approximately measured by feeding the output of the oscillator into a dummy aerial, the losses in which can be measured. The difference between such losses and the input will then be an approximate guide to the dissipation. Percentage of modulation is not readily measured with the equipment available to the average amateur. The most practical instrument for this purpose is an adapted vacuum tube peak voltmeter, but a description of the construction and operation of such an instrument is beyond the scope of these pages. A study of Q.S.T. files for 1929 will provide all necessary information on the point. The purpose of a Heising modulator is simply, by drawing more or less current corresponding to audio variations, to decrease or increase the voltage applied to the plate of the oscillator, and consequently its output. Hence the possibility of over-

loading the oscillator does not enter into the question.

4. In a Hartley circuit with Heising modulation would it be any advantage to have a higher voltage on one valve than on the other?

A.: To secure a high percentage of modulation (higher than 60 per cent.), it is necessary to apply a higher voltage to the modulator than the oscillator, this being usually accomplished by a resistance inserted in series with the oscillator. There is no novelty in this idea.

5. What is the principle of the Telefunken modulation?

A.: Telefunken modulation, by operating on the input to the oscillator has the advantage of requiring a less ambitious modulating system. This type of modulation appears to be rather hard on the valves employed, and is considered less satisfactory than the Heising or constant current system.

6. How is double tuning of the i.f. stages of a super-heterodyne carried out, and does it cut out getting one station in two places (not necessarily on the same set of coils), i.e., at (1) the sum and (2) the difference of the frequency of the station and that of the local oscillator?

A.: Simply by turning both primary and secondary of the intermediate transformers, coupling being by mutual induction. The "double tuning" effect of a superhet, employing a low frequency is not affected. Both primary and secondary are tuned to the same frequency.

7. What does the load impedance of (a) the oscillator, (b) the modulator depend on in a Hartley with Heising modulation, and about what do these figures generally amount to?

A.: The load impedance of the oscillator is determined by the tuned circuit and either (a) the aerial radiation resistance or (b) the input impedance of a succeeding amplifier—in parallel; the latter factors being also affected by the degree of coupling to the plate coil of the oscillator. Owing to the wide variations in the conditions likely to be encountered, it is not possible to estimate the probable load impedance. The load impedance of the modulator comprises the feed choke and the plate resistance of the oscillator in parallel. Generally speaking, it will be fairly low, a few hundred ohms, being a probable quantity.

8. How would (a) a pentode, (b) a screen grid valve go as (1) oscillator, (2) modulator?

A.: There is no particular advantage in using either pentode or a screen-grid valve as an oscillator; either makes a good amplifier in a master-oscillator outfit, and the pentode makes quite a satisfactory modulator for a low power outfit.

9. There are several instruments for measuring r.f. current. Are there any to measure r.f. voltage?

A.: A vacuum tube voltmeter is the instrument you require. This is simply a plate-bend detector (or, for less accuracy, but greater sensitivity, a grid detector), the input being between grid and filament; measurements are taken with a low reading milliammeter in the plate circuit. The instrument requires to be calibrated from a source of known a.c. voltage.

[These questions, although interesting, are quite beyond the scope of "Questions and Answers." To make matters worse, "Third Grid" sends down nine questions, and asks us to spread them over three weeks. He certainly interprets the words "free service" in a very liberal manner. We are not particularly anxious that other radio enthusiasts should interpret the terms in the same meaning. We wish to help the average chap to get a little better reception, not to delve into the intricacies of radio for the benefit of those who have a sufficient knowledge to hunt these things up for themselves, and certainly we cannot entertain splitting queries up into several weeks. If you have more than three questions to ask, don't seek to dodge the issue, pay your shilling—but these are "Specialist" questions.—Tech. Ed.]

KEEM (Wanganui): My aerial consists of two poles about 40 feet high with 90 feet between, including the lead-in. Would I obtain greater signal strength if I erected one pole 80 feet high?

A.: While it is impossible to give any definite ruling on the matter, we are inclined to believe that you would. Theoretically the best aerial you can have is a vertical one.

SMITHY (Wellington): Look for the description of the super six next week. It is an adaptation of the circuit to which you refer.

W.B. (Pio Pio): Could you suggest an improvement in my valves? I use an American set with 615 as detector, A609 in all the other stages, except the last, where I use B805. The set has not the punch that it had formerly, though all the batteries are A1, and I find I get much better reception with a B605 in the first r.f. stage.

A.: Providing your valves are not too old, they should work in your circuit quite well. For most circuits of your type the American class 221 valve is best, at least in the two radio stages. The use of other valves generally means that the set has to be re-neutralised.

ODSOX (Pio Pio): Your circuit is quite orthodox, and should be satisfactory. Seeing that it employs a pre-selector circuit, you should, to a large extent, overcome the selectivity trouble, but of course this will mean a certain loss in volume. Is it worth it? Why not build a three-valve set of the "Kestrel Three" type, which would give you better selectivity than the two-valve type, and certainly a greater pick-up. It would not be necessary, with the circuit you contemplate making, to use a midget condenser in the aerial.

ALL-WAVE (Shannon): I intend building the Electric Radiogram Five. Will the 100-watt power pack described in the "Radio Guide" be suitable?—Quite.

2. Will the r.f. choke described in the "Radio Record," January 30, be suitable?—Yes.

3. What should be the d.c. resistance for the r.f.c. in the electric Radiogram?

A.: Not in excess of 300 ohms.

V.R.H. (Auckland): I am building the "Kestrel Three." Is a screen-grid valve advisable?

A.: We can thoroughly recommend a screen-grid valve. If you want to use a screen-grid valve of the same make as you are now using, use a 642, but you must use a 50 ohms. resistance in the filament circuit, for it is a four-volts valve.

2. I have only 110 volts "B." Will this be sufficient?

A.: It will be quite satisfactory. You should get good results from the "Kestrel Three" with this voltage.

R.D. (Banks Peninsula): Is a four-valve Browning Drake superior to the Hammarland Roberts of the same number of valves?—No.

2. Would it be possible to add a second stage of radio frequency to either of these sets, and how would this be accomplished?

A.: The five-valve Browning Drake was fully described in the "Radio Record" and 1930 "Guide." In last week's issue we explained how to add an s.g. valve to the H.R. Four.

SHORT SUP. (Baklutia): I am constructing the battery version of a super het. shortwave adapter. In my set "A+" and "B—" are joined together, and for volume control a potentiometer is used across the "A" battery, the sliding arm being earthed. Could you give me the number of turns for valve base coils using 201A valve and .00015 condensers?

A.: A diagram which should prove successful as a battery s.w. adapter is given herewith. The potentiometer used in your broadcast set as a volume control should be set to the position of maximum sensitivity, but just short of the oscillation point if the receiver is capable of being