

NEW RECEIVING TUBE

GREAT FUTURE PREDICTED

TESTS UNDER WEIGH.

(By "Modulator.")

A new type of receiving tube has just been placed on the market which, if the prophets are correct, is destined to perform wonders in the field of radio frequency amplification.

This tube is called the VX 222 and differs from other usual types of tubes in so far as it has four electrodes. The usual grid filament and plate are present but in addition there is a double grid which entirely shields the plate. On account of this arrangement it is called a "shield grid" tube. It should be noted that the term to be used is not "shielded grid." It is shield grid on shielded plate.

The tube fits the conventional VX socket but the terminal connections to the grid in the 201A type connects to the shield grid in the 222 type. The control grid in the case of the new tube is brought out to a metal cap on the top of the glass bulb.

The main feature of the new tube is the low grid-plate capacity which renders it highly suitable for use as a radio frequency amplifier.

The 201A tube has a capacity of 10-15 micro-microfarads which, if oscillation is to be prevented, requires neutralisation.

The 222 tube, however, has a capacity of only 0.278 micro-microfarads, or about one five-hundredth of the capacity of the 201A.

When used as a radio frequency amplifier, a voltage gain of 200-250 has been obtained on the longer wave lengths, and 40-45 on broadcast wave-lengths, as against 8-10 with a 201A.

The filament voltage required is 3.3v at a current of 1.32 amperes. A negative bias is required on the control grid it is convenient to light the filament from a 6-volt supply through a rheostat and utilise the voltage drop over portion of the rheostat to obtain this necessary bias.

It is stated that one 222 tube used in a suitably designed circuit should give results as good as a superheterodyne using old type tubes.

In order to take full advantage of the properties of the new tube it is necessary for it to be well screened from outside influences. For this purpose metal cups can be obtained which slip entirely over the tube leaving only the metal cap at the top of the tube protruding.

One of these tubes was used as a short wave radio frequency amplifier on the recent occasion when WGV, Schenectady, rebroadcast the short wave transmission of 2FC, Sydney, and on short wave the new tube is said to bring in long distance stations like locals.

The writer is the proud possessor of one of these tubes—probably the first and only one in New Zealand—and is at present making up a stage of radio frequency amplification for use with his short wave timer. If results come up to expectations, we shall probably arrange for a further description of the apparatus.

THE CAUSE OF FADING

A REMARKABLE PHENOMENON.

The "radio roof," an ionised region in the upper atmosphere that causes radio concerts to wax and wane, is about 160 miles above the earth during daylight, and as night falls the level of the "roof" climbs as high as 400 miles, according to observations described recently at New York by H. A. Heising of the Bell Telephone Laboratories, who reported the findings at a meeting of the Institute of Radio Engineers.

He said measurements of waves between 57 and 111 metres in length revealed that the invisible ceiling rises at a rate of about six miles a minute and falls at the rate of twenty miles a minute. This unstable surface in the sky acts as a mirror and causes the ethereal signals to fade.

Get Ready for Maori Pageant on February 6

KEEN INTEREST BEING TAKEN IN MEMORABLE EVENING.

Advices received from many quarters indicate that keen anticipation is being directed towards the evenings of February 6 and 7, when the Maori Radio Pageant descriptive of the full life of the Maoris in New Zealand will be given in six phases. We hear on all sides of parties being arranged to listen at friends' houses, and we know of one enterprising country dealer who has hired a hall for the purpose of giving the greatest pleasure to the greatest number. The success which met the previous broadcast of Maori songs and voices—that from Otaki College—assures listeners of an evening of outstanding delight. There will be solid backing of history and literary knowledge on this evening which will, we assure listeners, be memorable indeed. The programme on February 6 will extend from 8 p.m. to 10.30 p.m., and on February 7 will be repeated, starting at 11 p.m. and continuing till 1.30 a.m. for the 'special benefit of overseas listeners. We understand there is a likelihood of some Australian stations rebroadcasting the programme, the start of which corresponds with 8.30 p.m. Sydney time. New Zealand residents in Australia will thus receive an unexpected contact with their homeland, while the Dominion as a whole will be brought prominently and interestingly before the Australian and Oceanic public.

Our issue of next week, February 3, will contain full details of the programme, and in addition special photographs and letterpress relative to the evening. The issue will be of a souvenir character, for which we anticipate an extra demand. Orders for extra copies that may be required should be placed early. Some of the photographs that will be used are especially historic and comprehensive.

BILLING ELECTRONS

"The times at which multiple reflections occurred, indicating that the layer was parallel with the earth's surface, were always times during which the level was rising," said Mr. Heising. "It would appear as though a great mass of electrons are tossed about into the atmosphere rather quickly, and that as a result the level drops with accompanying turbulence. Immediately thereafter repulsion by the negative charge on the earth causes the entire mass to rise and the unevenness to vanish. After the mass of electrons has moved upward for a few minutes the disposition approaches uniformity in a horizontal direction, and we get the phenomenon of reflection."

THE "RADIO ROOF."

It was found that during the day the strength of the sixty-seven-metre signal depends, to some extent, upon the height of the "radio roof," as it affects both the angle at which the radiation must leave the vertical aerial and the actual length of the path traversed by the waves. Increased height of the "roof" lengthens the path and increases the angle at which the waves leave the aerial. This reduces the signal strength.

"The short-wave lengths—longer than fifty metres—usually have fairly uniform transmission during hours of darkness," said Mr. Heising. "They do not show the falling-off in strength after midnight that is generally experienced with still shorter waves."

One effect of the earth's magnetic field is to reduce enormously the absorption that occurs on waves from 200 to 10,000 metres. It has been found that the influence of the magnetic field on absorption of waves under 100 metres is small. Mr. Heising said the locations of regions of the atmosphere where absorption of radio waves occur can be deduced reasonably well from knowledge of the atmosphere's structure.

RADIO PICTURES

BROADCASTING COMMENCES.

Radio station WOR at Kearny, New Jersey, U.S.A., is preparing to broadcast pictures to radio set owners soon after the first of the year, John Poppele, its chief engineer, said in New York early last month.

"We have been approached by representatives of Austin G. Cooley, inventor of the radio-picture transmitter and receiving equipment, for the use of our station for development work," said Mr. Poppele. "We have consented to be of what service we can because we are intensely interested in the progress of television and photo-radio. The pictures will be radiated in the mornings up to 11 o'clock, so that the experiments will not conflict with WOR's regular programmes. We have both a 5-kilowatt and a 500-watt transmitter, and we may use the latter because it sends a good signal strength throughout the metropolitan area. The pictures will be sent on WOR's wave of 423 metres or 710 kilocycles.

TESTS IN PROGRESS.

"It will be no trick to connect the picture devices with the regular broadcast transmitter. Mr. Cooley has also developed a receiver. We hope to begin the tests shortly after the first of January."

Latest reports from Great Britain regarding the experiments being conducted there in developing an Empire broadcasting service indicate that the British Broadcasting Corporation is still very lukewarm in its endeavours to provide regular programmes for Dominion listeners. In spite of the success which was achieved in the initial stages of the tests from the short-wave station 5SW on 23 metres, the wave-length of this station will shortly be altered to 40 metres.

The Lawn Tennis Broadcast

One of the most successful sporting broadcasts made by any station in New Zealand for some time past was that given by 2YA in connection with the international lawn tennis match at Miramar between France and New Zealand. The attendance of the public to see these stars in action was very large, and severely taxed the accommodation provided. In addition to those on the ground, a very large circle of listeners enjoyed the thrills of the play by means of the broadcast description, and were thus able to visualise the thrills of the play. It is undoubted that, not only will the visit of the French stars benefit this sport throughout New Zealand, but that the broadcast description in itself, will contribute very definitely to that outcome. No more conclusive argument could be given of the help that broadcasting can give a sport than this experience. No comparison can be made between the merit of seeing the tennis match and of hearing a description of it, but where one is unable to see a match, interest necessarily follows a description, and further, those who have enjoyed the description will certainly make every effort to see subsequent exhibitions of high-class games.

The description was very capably done by Mr. C. F. Williams, being better on the second day than on the first when the announcer endeavoured to conquer the noise of the crowd by speaking more loudly into the microphone. A feature of microphone success is that the voice must be kept down all the time—an even, steady emphasis giving best results.

GAS FOR H.T. SUPPLY

EXPERIMENTS IN PROGRESS.

The chief trouble of most valve users is the high-tension, or B, battery. Nowadays, with valves that are heated with an absurdly small current, the old, heavy and objectionable accumulator has almost disappeared, and with it the constant nuisance of recharging. Instead we have a two, four or six-volt accumulator of very small dimensions that will light the valves for perhaps a month. But the high-tension battery is still, for many people, a big problem.

One of the best solutions so far is the rectifying device which takes electricity from the house lighting mains, rectifies and transforms it, and then passes it to the receiver for application to the anodes of the valves. This instrument (battery eliminator) consumes very little electricity indeed, and is in many ways a successful solution of the problem, but unfortunately there are still people who have no electricity supply in their homes and cannot, therefore, make use of the device. Experiments are now being conducted with an instrument that may enable listeners to obtain adequate B battery supply from gas. The principle on which the device works is thermo-electric. Two electrodes of dissimilar metal are placed in a gas flame, and a potential difference is created from which a current of electricity is obtained suitable for heating the valve filaments.

A Melbourne amateur transmitter writes in the Melbourne "Listener In": "There are rumours travelling round amongst the hams that the average short wave receiver does not respond to signals as well on 20 metres as it does higher up, and from my results and experiments on from 5 to 10 metres I can quite believe it.

"For those who are trouble hunting down there I would suggest that the best thing to do is to start off with moving coil reaction and a home-made tuning condenser. This condenser need only consist of two plates of standard size, one fixed and the other soldered to a piece of quarter-inch diam brass rod. This rod can then be mounted in bakelite bearings, and a pictorial connection be taken direct from the rod to the filament lead from the grid coil. "By doing this the losses from metal end plates and bad connections between plates will be eliminated, while there can be no losses in a reaction condenser if one is not used. This only leaves the grid condenser and leak to be dealt with, and the trial of several of each will soon show which is the best. The coils will be found to give the greatest signal strength when about two and a half inches in diameter.

ADVICE ON CRYSTALS

GALENA POPULAR.

If you go into a wireless shop and ask bravely for a crystal for your receiver, the assistant will immediately ask you what kind you require, says a writer in "Modern Wireless." If you say, "What kind do you keep?" he will reel off a list of names as long as your arm. Some of these names you will recognise as those of mineral substances with which you are already acquainted, such as silicon, galena, copper pyrites, iron pyrites, etc. You will find, however, that many of them have such names as hertzite, lionite, permatite, electronite, markonite, and what-not. If you are not experienced in using crystals you can do worse than choose one of the crystals with a fancy name, for they are practically all specially treated galena, itself, a very good rectifying substance. The special crystals are greatly superior to ordinary galena in one very important point—the number of sensitive spots to be found on their surface.

Sensitive Spots.

If you take an ordinary cubical crystal of galena you will find that it is very bright and shiny and smooth. On the smooth surface you will be able to find two or three exceedingly sensitive places, but they will take a good deal of finding. The specially treated crystals, on the contrary, are sensitive on practically every part of their surface. If you examine such a crystal under the microscope, using a low power, you will see that the surface, consists of a very large number of tiny crystals, and as each of these tiny crystals has one or two sensitive spots on its surface, you can easily see why the whole substance must have a very large number of sensitive places.

The Whisker.

There is a great deal in the proper choice of the cat-whisker. By the way, I wonder who was responsible for the peculiar term? I don't see why the fine wire we use for making contact with the surface of a crystal should be called a cat-whisker any more than a pig's bristle or a dog's hair. However, there it is. The name is stuck fast in wireless literature and cannot be removed even by force. This cat-whisker must be of metal, and it is advisable that the wire of which it is made should be as fine as possible. The end of the wire which touches the crystal surface must be kept quite bright, as such metals as copper and brass oxidise or have some other film deposited upon their surface from atmospheric action. If we are to retain our crystal detector at its maximum sensitiveness, we must occasionally keep this surface bright by clipping off the ends of the wire.

Try Gold Wire.

If you take my advice you will buy a gold wire cat-whisker. These are very cheap, as the gold is only 9-carat, and being fine very little of the material is used. This cat-whisker costs about 4d. to 6d., and has the great advantage of keeping bright at its point for very long periods, if not indefinitely. A thick cat-whisker will often miss the most sensitive points on the surface of the crystal, while a thin one will ferret out many which otherwise you would not notice. Thick whiskers can be improved by sharpening the point with a file.

To hundreds of thousands of listeners the name "loudspeaker" is so familiar that it arouses little interest. Yet, when a new instrument is made a name must be found for it. The late Alfred Graham, inventor of the prototype of the loudspeaker, first called it the "Loudspeaking Telephone," and later, in 1893, changed to "Loud Talking Apparatus." In 1894, Mr. Graham made the acquaintance of Professor McKendrick, of Glasgow University, who became associated with him in several subsequent experiments. Professor McKendrick, in his lectures, invariably referred to the instruments designed by Mr. Graham (who, by the way, originated the firm which produces the Amplion Loudspeaker) as "Electrical" or "Telephonic" Loudspeakers, and thus to a Scotsman belongs the credit for coining the almost universally used expression "loudspeaker," though in America the term "table talker" is sometimes used.

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