

Sets in U.S.A.

ESTIMATE OF 12,000,000

AUDIENCE OF FORTY
MILLION

ESTIMATES of the radio trade now place the number of receiving sets in use in the United States at nearly 12,000,000, serving an audience of not less than 40,000,000 persons. Figures on the number of receiving sets privately owned have recently been compiled by a number of bodies at the request of the Federal Radio Commission, which is anxious to furnish Congress with dependable figures on the number of receiving sets in use in the United States.

Figures compiled by branches of the trade indicate that 7,500,000 standard receiving sets, capable of delivering loud speaker volume, are now in use in the country, in addition to a large number of crystals and one-tube receivers of obsolete type, which are still in wide use in rural districts.

Few persons, even in the radio industry, it is pointed out, realise the number of small crystal sets which have been put into circulation at premiums. One group of banking institutions is declared to have distributed 200,000 of these sets, combined with customers, saving banks. Other large quantities have been sold to customers through chain stores and mail order houses.

Among standard receivers at the present time, alternating current sets in cities constitute 90 per cent. of all the sales, it is estimated. One large manufacturer has disposed of approximately 200,000 such sets since December 1, 1927, and a second maker is following close behind with nearly the same output during the last six months.

Short-Wave Growth.

LISTENERS on the broadcast band are being augmented by the steady demand for short-wave facilities, mostly for international and commercial purposes. A group of radio engineers has been called in by the United States Federal Government Radio Commission for advice as to the assignment of short waves so that the maximum number of stations can be put on with the

least interference. At the hearing in Washington recently of short-wave applications it was revealed that there are applications pending for nearly 300 channels, while there are only about 55 to this country for assignment.

The Radio Corporation of America asked for 105 channels; the Postal Telegraph Company wants 34, the American Telephone and Telegraph Company four; the S.P. Radio Company three; and a group of newspapers 33 for press dispatches.

Some bitterness of feeling developed at the hearing when Joseph T. Pierson, of the American Publishers' Association, charged that the RCA was trying to prevent newspapers from getting channels. In order that the R.C.A. might get their business. He claimed the RCA was trying to obtain a monopoly in the communication field. He also opposed the request of the A. T. and T. for channels on the ground of an alleged agreement with the General Electric Company, which was in restraint of trade.

On the other hand, representatives of the RCA declared that because of the fact that there were not enough waves to go around they should be assigned to companies which serve the entire public.

Members of the commission have not yet formulated policies about the assignments, but it is believed that they will grant licenses as soon as they have the views of the engineers.

It is recognised that there is need for action by the authorities of this country because otherwise foreign countries may assign stations to the waves, which would give them a prior claim.

An indication of this is contained in the fact that there has been a 50 per cent. increase in foreign stations since March 20, while there has been only a 2 per cent. increase in stations in the United States.

An opinion is being expressed by members of the Radio Commission that the short-wave problem should be disposed of before the broadcasting reallocation is taken up.

Should the opinion prevail, it would mean that the new allocation might not be made until September 1, at the earliest.

WHEN a filter circuit is used in the output of a valve received it does not matter whether or not the loudspeaker is connected the right way round.

What Effect?

SHIELDED-GRID VALVE

INFLUENCE ON DESIGN

WHEN the 322 type valve was first introduced more than one engineer was heard to remark, "It's an interesting and unusual tube, but what for?—what practical application can be made of it?" This attitude (says a New York exchange) has been considerably altered, and it is interesting in the light of this to attempt to predict just what effect it will have on set design.

The biggest "objection" to the valve is that it is a recent product and that relatively little is known about its possibilities and limitations. It is largely this fact that has led some American manufacturers to postpone the introduction of receivers using it. There is very definitely a danger of the recurrence of the A. C. valve fiasco. The A. C. valve caught the public's fancy in America, with the result that the obsolescence factor was serious in the battery-operated set field.

There seems to be considerable justification for the belief, expressed by some American engineers, that the amount and type of publicity that the 322 type valve has received will result in a negative reaction to the sets that appear using it. Superlatives and hyperboles regarding it have been all too prevalent.

Manufacturers' Experiments.

A NUMBER of the leading American manufacturers have experimental models of receivers using the 322 valve. It is safe to assume that every laboratory worthy of the name has a number of experimental models of this type. There is a natural reluctance to placing these receivers in production until the trend of the consumer demand is better defined, however.

If even one large American manufacturer announces such a receiver the others will almost have to follow suit. Then, too, there is the possibility of pressure from the "kit" or set construction field, where such receivers are already appearing. Failure on the part of the large manufacturers to bring out a 322 valve receiver should result in better business for the kit manufacturers, since they can capitalise the publicity this equipment has received.

From a technical viewpoint the valve has very good possibilities, even though they fall quite a bit short of what the first articles on the subject led one to believe. The possibilities are best brought out by considering what was considered good performance in the radio-frequency stages only a year ago. A well-designed, neutralised stage usually gave a voltage amplification of about 7 at 550 k.c. and 14 or so at 1500 k.c. The selectivity per stage while satisfactory at 550 k.c., was frequently very poor at 1500 k.c. At the latter frequency the band passed was frequently 2.5 or 3 times that at 550 k.c.

Careful Shielding.

CAREFUL shielding was necessary to permit a stable high gain amplifier, and this shielding complicated the use of the balancing circuit with its associated leads. The problem of stability was in itself serious enough so that the introduction of a new valve permitting the same gain without a neutralizing circuit would have been very welcome.

Even those who are pessimistic about the 322 admit that an average amplification of about 20 a stage may be secured. Unfortunately, as in the case of the usual balanced stage, the gain is about twice as high at 1500 k.c. as it is at 550 k.c. This is due to the higher equivalent dynamic resistance of the tuned circuit to this frequency. Any lossier method which tends to overcome this, such as a grid-losser, results in very ununiform selectivity at the various frequencies.

Even 20 a stage is twice that obtained from good radio-frequency circuits last year. And the stabilisation problem is not acute at this gain a stage when the over-all gain is not unusually high.

To effectively use this added gain better selectivity is necessary. But this should not be serious, since the trend is toward the use of band selector circuits, in which a higher order of selectivity is possible without discrimination against the higher modulation frequencies.

Direct Filament Current.

ONE electrical objection to the valve for use in A.C. sets is that it requires direct current for the filament. This difficulty has been overcome both by the introduction of suitable rectifiers capable of supplying the necessary current and by the development of heater type 322 valves. Some of the independent manufacturers already have announced such valves.

Another objection to the valve arises from its physical construction. It is a difficult valve to manufacture uniformly on a large scale. This trouble was also found in making valves of the heater type, however, but this problem is said to have been solved.

On the whole, then, it seems that the 322 type of valve, or its A.C. filament type equivalent will have a marked effect on the design of radio-frequency circuits henceforth. Its use should result in more gain a stage, with less difficulty due to stabilisation when moderate over-all gain is used. Its use should not make present A.C. type receivers obsolete by any means.

Australia's Dilemma

TOO MANY STATIONS

MANY MORE APPLICANTS

THE New Zealand Government very wisely, in the interests of listeners themselves, has been extremely chary about granting licenses for new broadcast stations in the Dominion. The wisdom of this attitude will be made apparent by the difficulties already arisen in Australia owing to the congestion of the ether in some of the leading cities.

A Melbourne writer says:—

Overcrowded Now.

The reported statement of the Commonwealth Postmaster-General that there are 49 applicants for Class B broadcasting licenses may mean something not to be welcomed by listeners. The prospect of even six extra stations will not be cheerful news to many listeners who now have difficulty in cutting out the stations they do not want. Owing to the fact that many receivers in use are not very selective, listeners frequently complain that while listening to 3LO they are unable to cut out a station or stations transmitting at the same time, and there are only four stations now transmitting simultaneously in Melbourne.

Selectivity Problems.

In Sydney the conditions will be worse. There are now four stations in addition to the main stations. So bad were the difficulties of satisfactory reception there about two years ago that thousands of listeners cancelled their licenses as they were unable to get the programmes for which they were paying. The solution of the selectivity problems is a reasonable and scientific allotment of the wavelengths to the stations. If the wavelengths are too close to one another the result will be the chaos now causing so much trouble in America. There are so many stations licensed in cities like New York and Chicago, that the wavelengths are literally on top of each other, and only the most selective receivers can tune in to a particular station.

New Allotment of Wavelengths Wanted

There are only a certain number of wavelengths available for distribution, and the claims of stations in all States must be considered. Therefore, when considering what is needed by Sydney or Melbourne we must not overlook the conditions in other capital cities. And in addition the difference between wave lengths in stations in the one State must be on a safe basis. In Melbourne at present the four stations are on wavelengths respectively 484 metres, 371 metres, 319 metres, and 255 metres. If additional stations are to be started the difficulties will be of a more serious nature.

The only safe way in which to consider the distance between each station in the ether is by their respective frequencies. Thus the stations mentioned above have frequencies (in kilocycles) of 1333, 940, 800, and 610 respectively. In America and in Europe the difference for stations in the one city is only 50 kilocycles. Such a narrow band of "no man's land" of the ether would be unsuitable for Australian stations. The receivers in use, or the receivers and their aerials, would not be able to selectively pick out one station to the exclusion of the others, and that is what the listener wants.

Crystal sets of the average type in use now would be of very little use, and many valve sets near one of the more powerful stations would be of very little use.

It is apparent, therefore, that the Postmaster-General will need to be careful before authorising many more stations, and that a very thorough redistribution of the wavelengths will be necessary if even a few of the applicants receive licenses in Melbourne and Sydney.

It should, however, result in more extensive investigation into its performance, with the assurance of its complete acceptance in the near future.

By-Pass Condenser Necessary.

DUE to the fact that the shield-grid of the new 222 type valve is connected directly to the 45-volt tap of the "B" battery, it has commonly been assumed that it played a negligible part in causing instability and other troubles which arise from the use of a common "B" battery. Actually this shield-grid has a mu or amplification constant with respect to the plate of between forty and fifty. This means that any variation in its voltage produces a change in the plate current forty or fifty times as great as the same change in plate voltage would produce. For this reason it is important to see that any common impedance through the "B" battery is eliminated. This should be done by connecting a by-pass condenser from the shield-plate terminal of the socket to the negative filament terminal. The fact that the circuit is not unstable does not indicate that coupling is not taking place, since any disturbance in the "B" circuit of one particular valve will cause a variation in the shield of that valve which will produce "negative" regeneration or tend to reduce the amplification.

Every Third Home

VICTORIA'S PROUD POSITION

LICENSES TOTAL 136,481

A MELBOURNE radio writer says:—

The upward trend of the curve of listeners' licenses in Victoria, Australia, has had a check. The continued increase of licenses which has marked out Victoria so strikingly since 3LO Melbourne commenced its service in 1924 was so far in excess of figures in other States that it was not surprising that some sign of stabilisation should eventually come into evidence.

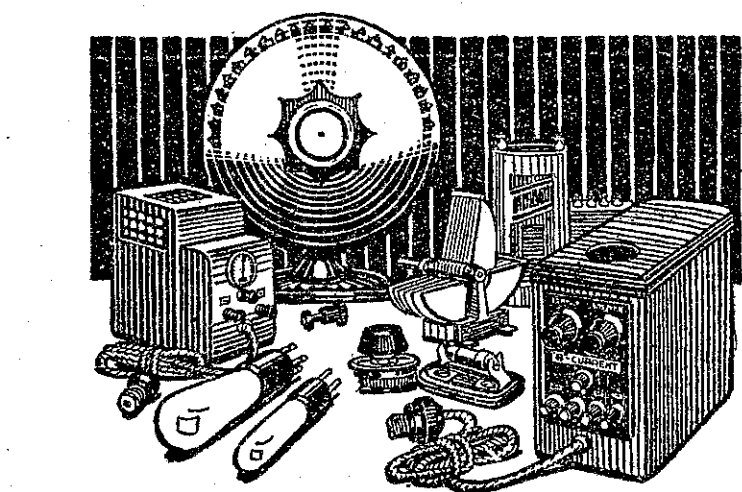
"Some critics, apparently but meagrely informed of the history of broadcasting in Australia, seem to see, in a temporary decline of the advancing license totals, a slackening of listeners' interest in the services. They even go so far as to say that the license figures are tantamount to an expression of dissatisfaction by listeners."

"Such criticism," says the Melbourne writer, "is far from being an explanation of the fact that license figures were two hundred less in May than in April. If the total were only a small number then the 200 might be worth regarding seriously, but when we remember that the grand total for Victoria is 136,481 and for the rest of the Commonwealth 263,340, there is not much ground for feeling pessimistic."

"THE number of licenses cannot go on increasing indefinitely. There must come a time when all the prospective listeners have their licenses. One cannot expect that every single household will have a wireless set, at all events, for some time to come, but when every second or third house has one we must in reason say that the maximum is being reached. And that is what has occurred in Victoria. The official figures given out some time ago showed that there was a license held by every third household."

"One must conclude, therefore, that the phenomenal totals for licenses in Victoria, in comparison with totals in other States of the Commonwealth and in other countries, must sooner or later show a decline. One fact alone should convince readers of this conclusion, the official figures always show the net totals after deductions have been made for the people who have not completed their payments or have given up listening-in. There are often good reasons for abstaining from listening, such as when a listener leaves the State or suffers some setback financially. It was mentioned at the Royal Commission last year by witnesses that a large number of listeners drop out in this way and the absence of their licenses from the total does not in any reflect any criticism of or dissatisfaction with the services. It was simply unavoidable."

"The figures for May show an unusually large number of such deductions and consequently the net total is about two hundred less than in April. But there were actually 3018 new listeners licensed during May. That is definite proof that the services are still attracting new patrons."



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