

The Value of Tone in Radio

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R. A. E. Elliston, of Reefton, writes very interestingly on the construction of a special horn to secure superior tone. The horn depicted, he says, was designed in conjunction

with a friend, and constructed by myself. It is made of No. 24 galvanised sheet iron, and is built in 12 segments. The length is 6ft. 3in., and the opening 3ft. 6in. wide, the small end fits in the neck of my loudspeaker, which is twenty inches long, making the overall lengths 7ft. 11in. It took three weeks to construct. The outside is painted and the inside has a coat of white lead one-eighth of an inch thick, and varnished, the diaphragm in the unit is 3in. wide.

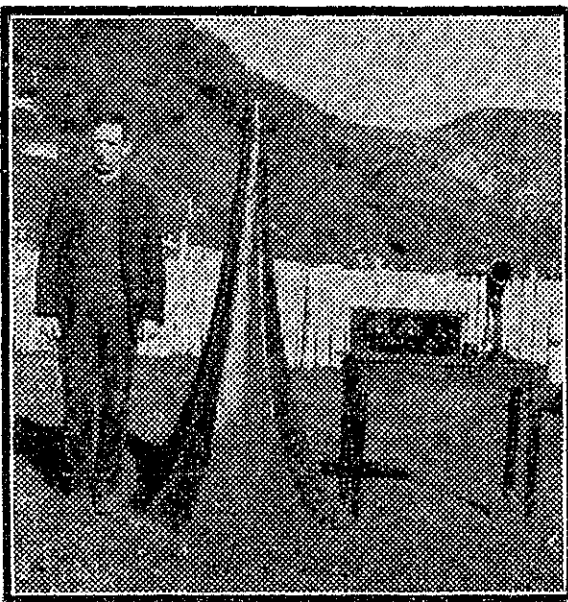
THE set I am using is a home-made three-valve duo reflex made for New Zealand conditions, using two PM5 and a UX112. Plate voltage, 120, derived from the town supply of 230 volts D.C., and reduced through a D.C. B eliminator. The circuit comprises tuned, straight, and reflexed, R.F. crystal detector, reflexed and straight audio. A tone filter is used between the set and the loudspeaker.

I use two aerials. One is 125ft. in length, of No. 16 copper, with flat top of 70ft.; the other is 512ft. long of 7-22 bare copper with flat top of 462ft. The iron pipe masts are 50ft. high, stand on glass bottles, and are insulated from stay wires.

AS there has been a good deal in magazines of late about the exponential horn and other large horn, it may interest readers to know what prompted me to make such a large horn. In the first place, I am an E flat bass player in a brass band, and have 20 years' experience in both concert and contest playing. I also played the yuba parts in an orchestra for some years, and of late years I have been a conductor. Playing in a band and orchestra calls for two different quanti-

Reefton Listener Describes Successful Home-made Horn

ties, and to a lesser extent qualities of tone. Having a good trainer, I went in for the cultivating, and a little later the study of tone. With the advent of radio I naturally turned to getting a good tone from my set and loudspeaker. The small horns did not satisfy me. To hear bands, orchestras, and choirs come out with a small, puny tone was not pleasing. So I set



about seeing what could be done with making a bigger horn, and using my band experience.

When the exponential principle came out I tried to get data, but none was procurable. In a friend's house I noticed a gramophone horn which gave a good tone, so I set about making a large horn on the same ratios, with the result you see.

TO hear this horn reproducing the tone from the Sydney Town Hall organ is a revelation—it is thrilling. Bands and choirs come out brilliant

and impressive. Cornet, clarionet, and flute solos come out rich and full. The 2YA orchestra comes out exceedingly well, the bass and cello in particular being deep and full. Symphony work and tone poems are beautiful. Soprano, contralto, and tenor solos all come out rich and full. Bass singers are splendid, and to hear Mr. Marshall sing through this big horn is immense. The chimes ring out naturally.

Care must be exercised that voices and instruments be kept in their proper proportions. A violin solo must not sound as if a big string bass was playing. Though this horn was not made on the exponential principle, it follows fairly closely when checked from measurements in the magazines. Its frequency cut-off is 80, equal to E below the bass stave. Notes can be got fairly good down to a frequency of 70.

I have had the horn in operation nearly 18 months. When I first made the horn there was a good deal of resonance due to the iron. I stopped this with a thicker coat of white lead, the result being a much greater clarity of tone. Many people, some highly qualified in music, have expressed their admiration for the beautiful clear tone given forth by the horn.

May I in all good faith draw the attention of readers who may be making big horns to a few points about them. Some may make horns out of boards from packing cases, or whatever is handy. It is best to have the material of uniform density, soft and hard wood together won't produce good results; also, holes in the horn that a pin will pass through make the tone flat and dead. Bandsmen will realise this.

"The effect of the horn is to reinforce the vibrations which enter it, due to the resonance properties of the body of air enclosed by the horn. The quantity and quality of resonance depends mainly upon the volume of the enclosed air, and somewhat upon its shape. But if the walls are rough or flexible they may absorb or rapidly dissipate the energy of vibrations of the air at certain frequencies, and thus by subtraction have an influence on tone quality. The horn of itself cannot originate any component tone, and hence cannot add anything to the composition of the sound. The horn is an air resonator, and not a sound board. . . .

A long horn seems to respond nearly as well to high tones as does a short one, while the response to low tones is much greater. . . . The flare of the horn has a great influence upon the response, heaps it up near the fundamental." The above excerpts are taken from Lecture V in the book entitled "The Science of Musical Sounds," by Dr. D. C. Miller, of the Case School of Applied Science. The musician or reader who wishes to step into the realm of science, in order to understand how his loudspeaker "goes," would do well to read the chapters "Influence of Horn and Diaphragm on Sound Waves" and "Tone Qualities of Musical Instruments" in the above-named book.

I much appreciate the "Radio Record," and in particular the "Mailbag" column. I am satisfied with the programmes. What does not appeal to me I pass by for the other man to whom it does appeal. I must make special mention of the 2YA orchestra. It is a splendid combination, and in an isolated town like this it gives the writer great pleasure these winter evenings to sit back in the armchair by the fire listening to this combination of artists rendering the works of the great masters.

All Ready for the Tasman Flight?

RADIO is again, in the near future, to demonstrate its value in the conquest of sea and air. As the time draws near for the projected flight across the Tasman Sea by Kingsford Smith and his crew in "The Southern Cross," the interest of listeners centres on the part radio is to play. Radio "beacons" in Europe and America act as lighthouses in directing the course of air-pilots, who are also able to receive radio reports as to weather conditions ahead of them. Radio may be truly termed the handmaiden of aviation.

THE projected flight across Tasman Sea promises to sweep New Zealand with unprecedented enthusiasm in broadcast listening. For the first time the four high-power broadcast stations are in all probability to be on the air

Keen Interest in Kingsford Smith's Attempt—All Stations on the Air

throughout the night. The Radio Broadcasting Company of New Zealand, with characteristic enterprise, proposes to report the flight from Australia to New Zealand from start to finish. The short-wave morse messages from the "Southern Cross" are to be picked up by the various New Zealand stations, and read out in plain English so that all listeners will be able to understand the messages without knowledge of morse. No doubt occasionally the actual transmission from the "Southern Cross" will be put on the air to enable listeners to hear how the actual morse from the airplane sounds. Through this enterprise all

listeners in New Zealand will be able to hear the progress of the great adventure from start to finish. Those who operate receiving sets capable of bringing in the Sydney stations will have much to listen to at the aerodrome from which the flight is to commence. There will be much to describe, and, possibly, Kingsford Smith and his comrades will speak an au revoir message to Australia and New Zealand. The hop-off is to commence late at night.

THE chances of the flight being successfully accomplished appear greatly in favour of the airmen. The "Southern Cross" has three engines, an enormous fuel supply, first-class radio

sending and receiving equipment, and the pilots, Captain Kingsford Smith and Flight-Lieutenant Ulm, have proved themselves, in their flight across the Pacific, masters of the air. They have lately accomplished a 2000 miles' trial jaunt from Melbourne to Perth, in a non-stop flight, about 600 miles further than their proposed flight from Sydney to New Zealand.

New Zealanders have a special interest in the projected trans-Tasman flight in view of the fact that the important duties of wireless operator for the "hop" have been entrusted to Mr. T. H. McWilliams, a New Zealander. The navigator will be Mr. Litchfield.

LISTENERS throughout New Zealand will find it worth while to have their radio broadcast receiving equipment in first-class condition for the big event. This will be the greatest broadcast happening in the radio annals of New Zealand up to that date.