THE RADIO RECORD

Published Weekly

REGISTERED G.P.O., WELLINGTON, N.Z., AS A NEWSPAPER.

Price 3d.

Vol. II., No. 1. WELLINGTON, FRIDAY, JULY 20, 1928.

? WHAT TONES CAN YOUR SET REPRODUCE ?

Special Test for the Benefit of Listeners from 2YA

ALL sounds are composed of vibrations. Some sounds are beyond the capacity of human ears to detect. Some folk can hear better than others—their detector apparatus is superior. It is just the same with radio valves and speakers—particularly with speakers. Some will reproduce only up to a certain number of vibrations which means that sounds exceeding those vibrations are not reproduced and the listener hears nothing at those points. He may thus be losing the finer qualities of the music being broadcast.

THE quality of your set and its capacity to reproduce various vibrations can be tested on Tuesday evening, July 24, through a special transmission from 2YA. Every listener concerned with quality music should make a special point of benefiting by this test.

ON Tuesday evening next a transmission test by 2YA will claim the attention of all listeners, for the test will relate to the efficiency of receiving sets, particularly having reference to the quality of earphones and loudspeakers.

It is to the interest of all listeners that they should know whether the quality of the music they receive is comparable with the quality of the music as it is transmitted from the station.

This can be tested in a scientific manner, for scientific principles underlie all music. The pitch of a note depends upon the vibration rate, and it is not every mechanical apparatus such as an earphone or loudspeaker which can faithfully reproduce those vibrations. Where the reproducer fails on such occasion the full beauty of the music is lost.

IT is recognised that music depends for its interest on two fundamental characteristics—quality of tone, and rhythmical character in its widest sense. It thus follows that if a loudspeaker is incapable of conveying quality to the listener, he is thrown back upon rhythm which is the most elementary characteristic of music, as depicted in the beating of drums by savage tribes. This is probably one of the reasons why many listeners feel dissatisfied with musical programmes, and particularly why there is such a demand for rhythmical music such as jazz. This demand for rhythm does not indicate that the listener has not the capacity to appreciate beauty of tone, but that possibly he never hears it from his loudspeaker.

SCIENTIFIC PRINCIPLE OF MUSIC.

IT is in order that listeners may have an opportunity of judging for themselves as to whether their loudspeakers are capable of responding to the vibrations which are necessary in order to obtain a true tone, that the Broadcasting Company proposes to put over a series of tests. These tests will consist of the transmission of various vibration frequencies ranging from the lowest fundamental to the highest harmonic.

The Director of Music of the Radio Broadcasting Company, Mr. W. J. Bellingham, will be present when the tests are being carried out. The changes in vibrations will be made during the transmission of a lecture by Mr. Bellingham on the nature and purpose of the tests. He will announce when each change in frequency is made. These transmissions of different vibration frequencies will each last ten seconds, and it is important that listeners should remember that while there will be a difference in the vibration frequencies of each transmission, they will all have the same volume and should all be received with the same volume. If the listener hears nothing, he will realise that his set is incapable of accepting this particular frequency, and he will therefore be able to draw his own conclusions as to the ability of his loudspeaker to receive the music which is being transmitted.

THE scientific principle on which it is all based is particularly interesting. The pitch of a note depends upon its rate of vibration. Middle C at concert pitch has a vibration rate of approximately 27, and the highest note approximately 4320 vibrations. These vibrations represent the vibration rates of the fundamental note.

It is readily realised that the same notes on different instruments have different qualities, but it is not generally known that this quality depends on the fact that a note when it is sounded contains in itself other notes which, though not appearing as different notes, actually make the note appear to have a different quality. It is probably very difficult for the layman to understand that what he has always thought to be one note is really a combination of notes.

ONE GUINEA PRIZE

This frequency test is of outstanding importance in enabling listeners to check up the capacity of their sets. A coupon recording the different frequencies which will be given appears on page 15. On the occasion of the test on July 24, listeners should check reception from 2YA on this chart (page 15) and note the results.

To encourage close observation, we will award A PRIZE OF ONE GUINEA to that listener who sends in the most carefully compiled and complete coupon, and the most informative recital of the lessons learnt through the test as to the capacity of his or her speaker.

Address entries to Editor, Radio Record, P.O. Box 1032, Wellington. Closing date August 1. Award will be made as early as possible.

THEORY OF HARMONICS.

THIS combination of notes is called harmonics. The table illustrating the harmonics which are heard simultaneously with the sounding of middle C on the piano, clarinet, flute (softly blown) and cornet, together with their frequencies will be found on the leader page—p. 4.

IF we take as an example a note two octaves above middle C with a vibration rate of 1080, the seventh harmonic on this will have 1080 multiplied by 7 (7560) vibrations. It can readily be understood, therefore, that in order to obtain the actual timbre or quality of a note it is essential that the receiving instrument must be capable of receiving the highest possible vibrations, otherwise, if these high vibrations are eliminated, every instrument will have more or less the same characteristics, and it will not be very easy to determine the different instruments playing in an orchestra. Again, on the other hand, with respect to low notes, if a loudspeaker has not the capacity to respond to the lowest vibration, it may respond faintly to the other harmonics which are contained in this low note. That is to say, it is quite conceivable that on a speaker which would not accept the fundamental of a double bass, the harmonics of its notes might come through, but at an octave or possibly two octaves higher. The obvious result of this would be that a double bass could sound very much like the pizzicato on a second violin, and it would therefore be impossible for such a loudspeaker to show any balance.

WHAT THE TEST WILL PROVE.

WITH speakers, therefore, which will not accept the lowest vibrations, it is impossible to obtain correct balance, and with speakers which will not accept the highest vibrations it is impossible to obtain other than a dull, characterless quality.

The number, order and relative intensity of these harmonics varies in different instruments and governs the quality of the instrument. The peculiar quality of the clarinet is obtained from the fact, as shown in the preceding table, that it sounds only harmonics of odd ratios. The cornet, on the other hand, gains its quality from the fact that it sounds very high, piercing harmonics, and the flute from

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