



LEFT: The new Town Hall at Lower Hutt—as the performer sees it

DESIGN FOR MUSIC

AS you sit and listen to an orchestra or a choir, you may not realise that many things have happened to make for your enjoyment. The conductor has taken a group of individual artists and trained them to play as an orchestra or sing as a choir. They have spent many hours rehearsing the music you are now listening to. The concert hall in which you are seated, the stage upon which the orchestra plays or the choir sings have also been designed. The designer in his turn has taken a number of building materials, each with their own individuality and function, and has co-ordinated them into a design so that they not only provide the physical shelter for both audience and orchestra, but also play a very important part in the production of the music you hear.

Music is an abstract art; unlike sculpture or architecture it has no physical dimensions. It is not composed of material things, but is rather the result of material things being set in vibration, as with the drawing of a bow across the strings of a violin, the blowing against the reed of a clarinet, or the beating of the skin on a drum. These vibrations, controlled by the musician, in turn set the air particles in the concert hall in vibration progressively outwards from the sound source. It is these vibrations falling upon our ear which are in turn translated into music.

But what of the material things forming the physical shelter and enclosing the air, the walls, floor and ceiling which form our concert hall? These materials, along with the carpet in the aisles, the seats we sit upon, our bodies and the manner in which they are clothed, all play an important part in the quality of the music we

hear. Each material used in the lining of the concert hall must be carefully selected with a full appreciation of the part it has to play and the location in which it is to be used. It must be selected not only for its aesthetic and structural qualities, but also for its acoustical value. Some must be selected to reflect sound and give reinforcement to the original music, others by their surface and design to give diffusion, whilst others again are selected to give partial reflection and absorption, and still others are selected to absorb as much sound as possible.

Concurrent with the selection of these materials, direct and reflected paths for the sound must be planned in relation to the audience to be seated, the size of the orchestra, and the volume of the hall. This reflection, diffusion, and absorption of the sound must be studied so as to give the best possible results. The relation of the volume of the hall to the number of audience to be seated and the size of the orchestra to perform is most important. A quartet or a small orchestra of ten players can readily be staged in a large auditorium, but conversely a large symphony orchestra or a civic band cannot hope to play successfully in a small auditorium.

The designer of a concert hall, unlike a musician, does not deal in notes or a musical scale, but deals in a range of frequencies of sound, or the number of times each particular note or sound vibrates in a second. On the piano keyboard, the musician reads from low A on the left to high C on the right, whereas the designer of a concert hall

translates these notes and the intervening notes between on the keyboard into frequencies of sound. He works from a frequency of approximately 26 cycles or vibrations of sound per second for low A, right through the keyboard to a frequency of 4096 cycles per second for the high C on the piano, and into a frequency range two octaves above this note of C. In the selection of linings and building materials for a concert hall, this musical scale of the musician translated into the frequency scale of the designer plays a very important part. You will now know, when next you are seated in a concert hall and look around you, that all these materials forming the various surfaces of the hall play a part in the production of the music. If the musical performance is good, then you can rest assured that careful consideration has been given to their selection and planning.

Quite a lot of research has yet to be done to determine the exact acoustical properties of many building and furnishing materials, and the several types of seating, both fixed and removable, used in our concert halls. Sometimes a designer must exercise his every skill and ingenuity in assessing the acoustical value of some materials and forms of seating, unless, of course, he has all the facilities of a major Building Research Station at his disposal, as was available for the designing of the Festival Hall in London. No doubt some day such research will be carried out, definite material standards established, and concert hall seats designed which have a constant sound absorption factor, whether they be empty, or occupied by the audience. When this is achieved, the task of those who design for music, and that of the conductor and his orchestra or choir who create music will be very much easier.

In New Zealand, owing to the size of our population, it is reasonable to assume that for some considerable time to come our concert halls must of necessity be designed as general purpose auditoriums catering for the many cultural and recreational requirements of our communities. Such a general purpose auditorium presents many design problems, and the greatest care must be taken in planning, as a considerable measure of compromise must enter into



WHEN the National Orchestra gave the inaugural concert in Lower Hutt's new Town Hall on April 6, the acoustics were as warmly commended as the Orchestra's performance. R. GILLESPIE MELDRUM (right), who was invited by the City Council and the architects to design the stage setting, here describes the problems facing the acoustics expert and how he seeks to overcome them.

