

Technical Bulletin

HAMMOND ORGAN

"music's most glorious voice"

June 17, 1966

TO ALL MAINTENANCE ENGINEERS - FOR IMMEDIATE ACTION

NO. MODELS

SUBJECT: UNEVEN NOTES, OR ROOM PATTERN

38 ALL

Approximately 10 to 11 years ago, we presented to the technicians, at that time, various bulletins concerning the phenomenon known as "room pattern".

It seems at this time that some selected excerpts from these bulletins might be in order to enhance the background of the technician, salesman, or dealer, who occasionally faces a customer that tells them such and such a note sounds weaker than another.

While there is much that can be said as relates to this phenomenon, we believe that what follows will suffice for general knowledge and for conveyance to such a customer who feels there is something amiss with his instrument.

It is a well-known acoustical phenomenon that audibility of some frequencies is emphasized over others in a given enclosure. The range of frequencies effected depends upon the size and type of the reflecting surfaces within the room, such as walls and ceilings. Thus, if a musical instrument - such as an organ - is played in an enclosure of almost any size, some frequencies will sound louder in one portion of the listening area than in another, and conversely, some frequencies will sound weak. This can be effectively demonstrated by playing the organ in a small room with a microphone and then listening to signals picked up by the microphone in another room. Variations in loudness will be startling, especially when single frequencies - such as the Hammond Organ can provide, by means of drawbars - are sounded.

This phenomenon of acoustics is known as "room pattern". Sound waves leaving the speakers do not all reach the listener's ear at the same time, and at the same instance no cancellation of frequency takes place; hence, the sound is loud. An instant later, certain waves arrive late, having been reflected from different surfaces than the first ones. As a result, partial cancellation will take place; the degree of cancellation depending upon the phase relationship of the waves. At the instance of cutoff the sound may seem to build up for an instant, then cancellation is diminished as a result of the cutting off of some of the waves ahead of the others.

If a tone cabinet is used, such as with certain models of the Hammond Organ, a change in the position of the cabinet will find that the pattern will be changed also. It is not always necessary to move the tone cabinet to an entirely new location to notice the change, however, in many instances we would suggest it - at least for purposes of comparison.

Should you be confronted with an instrument, wherein the owner seems to believe that certain frequencies are weak, as related to others, a check can be made as to whether it is "room pattern", or a function of some mechanical or electrical portion of the instrument.

It is only necessary to compare output voltages of that frequency which seem to be weak with the frequency above and below the one in question. For this measurement, an AC Output Meter may be connected to a speaker voice coil terminal at the power amplifier. To sound the note by itself, pull out the appropriate single drawbar. Depress the present key associated with it, and then depress the appropriate playing key. It is well to point out at this juncture, that a variation in voltages of 25 per cent will hardly be noticeable as a change in power. With this data you can make certain that electrical signal strength is not responsible for the difference.