

How Loud Is Loud?

IF THE ear were for sale in a high-fidelity shop, you'd be a fool to buy one. No two are alike, and all deteriorate with age. The ear's frequency response is nothing close to flat, and both its frequency and its perception of frequency change with differing levels.

Luckily, this all makes little difference. Since our brains are accustomed to the characteristics of our ears, they tend to compensate for these "defects," much as a preamplifier compensates for the RIAA recording curve—which is itself far from flat. If we could scrap our ears, and substitute a perfect hearing organ—perhaps a condenser microphone—the world would sound strange and shrill to us unless our minds retrained themselves.

The ear's response to changes in level is not linear but logarithmic. Two violins should sound twice as loud as one; they do not. Instead, it would take ten violins to sound twice as loud as one, and a hundred to sound twice as loud as ten. Hence volume ratios are measured by a logarithmic unit, the decibel.

"One decibel represents, under certain conditions, the order of minimum difference of sound intensity that can be perceived by the average person," according to Edgar Villchur's *Handbook of Sound Reproduction*. A difference of three decibels represents a doubling or halving of the volume of the sound—volume being an absolute quality. Ten decibels represent a doubling or halving of the loudness—the ear's perception of volume—and a tenfold change in volume.

The decibel unit was adopted as a measure of volume ratio because its logarithmic characteristics corresponded to those of the ear. But because it is logarithmic, it provides a convenient measure of changes in other quantities—such as antenna gain—where large ratios must be handled.

The dynamic range of a symphony orchestra, for example, is about 80 decibels. One could state this also by saying that the ratio between the loudest and softest audible sounds produced by the orchestra is one hundred million to one. The ear's total dynamic range, between the threshold of hearing and the threshold of pain, is 120 decibels or a trillion-to-one ratio (in this the ear is superior to virtually all audio equipment, which usually has a dynamic range under 100 decibels).

The decibel is commonly encountered in audio catalogues, as part of the specifications for such qualities as frequency response and signal-to-noise ratio.

For example, a frequency response of "20-20,000 cycles per second, plus or minus 0.5 db" means that nowhere within the 20-20,000 cycle range will the output vary by more than half a decibel from its reference level, assuming a constant input.

Signal-to-noise ratios must also be scrupulously examined. A figure of "hum and noise 80 db below 17 watts" is meaningful, a figure such as "signal-to-noise ratio, 80 db down" may not be. Most reliable manufacturers, however, use such reference levels as 100 per cent modulation (for a tuner or tape recorder), or full power output (for amplifiers), even if they do not indicate their reference. Signal-to-noise figures for preamplifiers with both high-gain (magnetic cartridge, tape head, microphone) and low-gain (tuner, auxiliary, etc.) inputs should be specified for both types of circuit, and those for tape recorders should specify whether the given figure is for playback only or for record and playback together.

The decibel is only a measure of ratios; from the standpoint of volume, "3 db more" is equivalent to saying "double." In some contexts, however, the decibel is used as an absolute unit, with reference to an understood volume level. For example, sound intensity tables, which may give the average level of "conversation at 3 feet" as "60 db" are implicitly using the threshold of hearing as a reference level.

The absolute amplitude of sound is measured in pressure, intensity (power per unit area), or power, the first two being of greater significance as far as perception is concerned.

But the ear being what it is, these units do not suffice to measure loudness, or the perception of sound intensity. For this we need yet another unit, the phon.

In 1933 Fletcher and Munson discovered that loudness and volume are far from identical. Specifically, if you had an audio system with perfectly flat response, and swept it through all the frequencies of the audio spectrum, with constant volume, the ear would not perceive the loudness as being constant. Instead, the loudness would rise to a maximum at about 3,500 cycles, then fall again as frequency increased further.

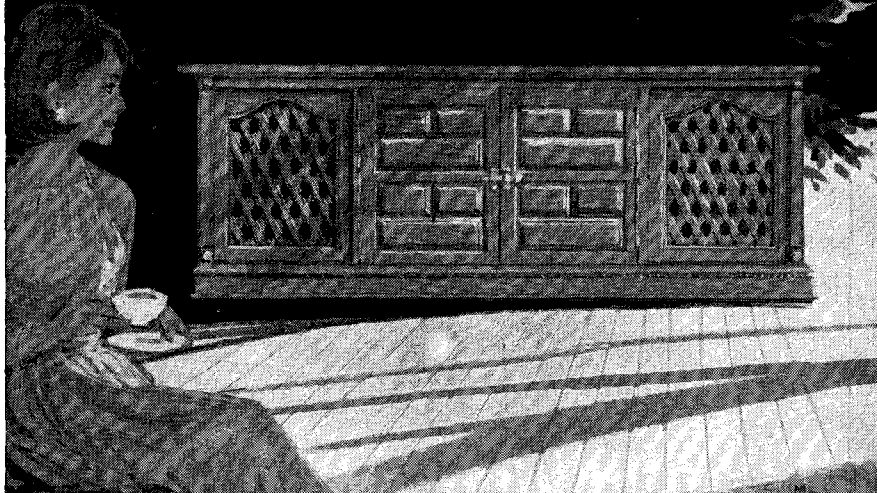
If the sound level had been 50 decibels above the hearing threshold at 1,000
(Continued on page 65)

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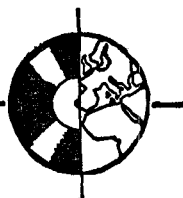
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THE OTHER SIDE



Festival Hall Reopened, Horowitz Reissued

LONDON.

DURING the past half-century this capital city has gradually relinquished her erstwhile status as the hub of world affairs. But as a center for the arts London is now far maturer and better endowed than in the halcyon days of empire. Our present musical season did in fact reach its climax just as the bells tolled and the guns fired a last salute to Britain's most illustrious citizen, for the previous night Covent Garden had launched one of the finest new productions ever seen there, and on February 1 the Royal Festival Hall was restored to us, after having been closed since last summer for an extensive overhaul and considerable structural additions.

In fact, it is only now, almost fourteen years after it was first put in use, that the Festival Hall can be said to be complete as originally intended, although it will be some time yet before the two neighboring smaller halls (not to mention the National Theatre and the new opera house for Sadler's Wells) are in commission. In the RFH proper, most of the changes are best described as peripheral, being concerned with backstage accommodation, enlarged foyers, and improved restaurants. The auditorium as such looks much as it did, although the platform has been altered and made more adaptable (it can be raised to different levels as required for concerts, ballet, or other uses), and the experiments designed to improve its acoustics—which began already last summer—are to continue yet a while. Whether the hundred odd Helmholtz resonators, which have been placed in the ceiling in order to increase the hall's "LF response" by lengthening

the reverberation period of middle and lower frequencies, will actually rid the auditorium of its oft-criticized "dryness" is still far from clear; after the first few concerts opinions ranged from "no change" to "it sounds as though someone had turned up the bass control."

Perhaps it was Colin Davis's decision to use four bassoons on the opening night that led to the latter judgment; one certainly sensed a greater downward spread in the London Symphony's sound during the *Meistersinger* Prelude, which prefaced Serkin's rather tense account of Brahms's B-flat Concerto, and in the excerpts from Berlioz's *Romeo and Juliet*. Two nights later, when the New Philharmonia gave an all-Brahms program under Klemperer, any suspicion of artificial boosting had disappeared, possibly because of the veteran conductor's subtler balancing of textures and—dare one suggest?—because of his wise refusal to follow modern practice in the matter of orchestral geography.

Anyway, it is good to be back on the South Bank once more, even though one is sorry to learn that Ernest Bean, who has since 1952 managed the hall with seemingly effortless efficiency and a puckish humor, is due to retire next year. No doubt these past few months have been immensely arduous for him and he has had a long tenure, but all of us Festival Hall regulars—performers, listeners, and even critics (whose fallibility Bean loves to expose in the monthly RFH programs by quoting diametrically opposed reports of one performance side by side)—are bound to miss a man whose warmth and enthusiasm made one feel thoroughly at home in this rather impersonal edifice.

On records, this is proving a somewhat erratic, disorganized month, with the Decca and Philips groups badly behind schedule and only EMI and DGG releases arriving punctually. Not that EMI's list is anything more than a patchwork of odds and ends: HMV leads off with a "highlights" disc from the Gobbi-Christoff-de los Angeles mono set of *Simon Boccanegra* and *On Wings of Song*—a recital of popular songs and ballads by Joan Hammond, accompanied by Ivor Newton. Far more interesting are two reissues of piano music in the "Great Performances" series: a Beethoven collection—Variations, Opp. 34 and 35, a Minuet, and three Rondos—from Artur Schnabel (performances originally issued as part of the Beethoven Sonata Society)—and a mixed recital by Vladimir Horowitz. The latter contains breathtaking performances of works by Bach, Scarlatti, Beethoven, Chopin, Debussy, and Poulenc, all recorded in London between November 1932 and March 1936, at a time when the young Russian had taken Europe by storm with his dazzling technique and musical sensibility.

On Columbia we have a collection of Rossini overtures, played with elegance and dash by the Philharmonia under Giulini; clear and finely controlled, yet slightly impersonal performances by Richter-Haaser of three Beethoven Sonatas (Op. 2, No. 3; Op. 54; Op. 81a); and an exceedingly welcome and attractive disc by the Paris Conservatoire Orchestra under Cluytens devoted to music by Albert Roussel. Apart from the almost inevitable *Spider's Banquet*, this finely recorded collection offers the Sinfonietta for Strings and the Second Suite from *Bacchus* and *Ariadne*—splendid music by a widely underrated composer, played with skill and affection.

Back on HMV we find a thoroughly enjoyable recital of British folk songs—some unaccompanied, some with guitar—sung with warm and unobtrusive artistry by John Langstaff, a gifted American baritone who has done sterling work in musical education over here during recent years. On the same label the Pro Arte Orchestra, conducted by Gilbert Vinter, provides a lighthearted tour of the world (actually the Northern Hemisphere) with characteristic pieces from Britain, France, Scandinavia, Austria, Germany, Russia, the U.S., etc.

Other Decca issues due this month include *Don Pasquale* (featuring Sciutti, Oncina, Corena and Krause, conducted by Kertesz), a Suisse Romande-Ansermet Prokofiev No. 5, a Chopin recital by Vladimir Ashkenazy, scenes from *Siegfried*, and a joint recital by Sandra Warfield and James McCracken entitled *Duets of Love and Passion* (wow!).

—THOMAS HEINITZ.

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