PHASE AND SOUND QUALITY

I write in response to the letter from Paul Furindle in the July issue. Mr Furindle described an experiment in which he listened to two tones nearly an octave apart and was unable to hear beats. He conducted the experiment to see if his ear could tell the difference as the phase relationship between two sinusoids changed. He reported a negative result except when gross intermodulation was deliberately caused "by introducing a diode across the loudspeaker terminals."

I was interested in, and concerned by his negative result, particularly as he tried it at "various levels and ratios of level."

In a paper in the *Journal of the Acoustical Society of America* in September 1954, entitled "Onset and growth of aural harmonics in the overloaded ear," M. Laurence and P. A. Yantis describe a very similar experiment. Their aim was to measure distortion in the ear by listening for beats between a harmonic born of aural distortion of a low frequency note. They found that the beats were detectable over a wide range of "levels and ratios of level" indicating that there is significant distortion in the ear detectable at sound pressure levels as low as 60dB.

These results seem to be very significant to the high fidelity enthusiast. What's the point in setting up a system that can go to 115dB s.p.l. without significant distortion if your little pinkies are going to muck it all up?

Another hint that aural distortion is significant was picked up by a local audio engineer who was given the task of eliminating some gross distortion in the sound system during the run of the rock opera "Hair" in Melbourne. He fixed the distortion, but arranged for the levels to be as before, only to find that some of the teenage audience found the comparatively distortionless signal to be "not loud enough." It appears that distortion in low level signals reminds us of the aural distortion we experience with louder ones, and makes us think the sound we hear is louder than it is.

The moral appears to be: Unless you have distortionless ears of the "Furindle type", listen to reproduced music at the same level that you would hear it in real life. Perhaps "loudness" controls should add distortion as well as bass and treble boost at low settings.

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