



## TECHNICAL TALK

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# Loudspeakers, Then and Now

**H**ave you ever had the experience of listening to a loudspeaker, perhaps at a dealer's showroom or an audio show, or even in someone's home, and being so impressed with the sound that its memory remained with you for years? I have had a number of such auditory experiences that remain vivid after more than forty years.

This subject comes to mind because of a letter from a reader who has a pair of speakers that I had given a highly favorable review almost thirty years ago. At the time, the Rectilinear III (long gone from the audio scene) impressed me in an A/B comparison as being a virtual match in most respects for one of home audio's classics, the Quad Electrostatic, except in the low-bass region, where the Rectilinear clearly surpassed the Quad. Of course, that statement, while perfectly true, is akin to saying that a Ferrari is much faster than a Rolls-Royce. True, but hardly relevant to the intended uses of two very dissimilar products.

My correspondent is the recipient of considerable ribbing by his audiophile friends about his pair of Rectilinear III's, now worth about \$35 each, he tells me. He asks whether my standards have evolved through the years, and he deliberately gives no hint of how *he* currently feels about his speakers.

Of course, my testing and listening standards have evolved in parallel with the strides that have been made (and are still being made) in loudspeaker design and measurement technology, and with my subsequent exposure to many hundreds of different speakers. Nothing remains constant except the basic laws of nature (assuming *they* are truly fixed).

Essentially, what I said in my December 1967 review of the Rectilinear III was that, in my opinion, none of the other speakers to which I had compared it could match its overall listening performance. This specifically included the Quad Electrostatic, whose sound was unique and unforgettable, although unfortunately its reliability fell short of matching its superb listening quality. The high-voltage power supply on my Quad (singular, in those pre-stereo times) failed after a couple of years, and the replacement was not much better.

Nowadays it is easy to accept that loudspeakers are "forever." Barring misuse or gross physical damage, speakers (at least those for the home audio market) tend to last indefinitely. My unfortunate experience with the early Quad Electrostatic would be unlikely to occur today. Other than the old Quad, the only loudspeakers (and there have been only a handful) to suffer mortal injury while in my possession were victims of my own carelessness. Used properly, any good speaker should last for many years. On the other hand, testing (or listening to) a small speaker that's powered by an amplifier capable of delivering hundreds of watts is a recipe for disaster!

The reader also questions a statement I made in the review of the Rectilinear III to the effect that I had "never heard better sound reproduction in my home, from

any speaker of any size or price." Well, that was literally true, although I would hardly risk such a sweeping statement nowadays! The operative words were "in my home." Unquestionably, there were better speakers made in that time, but I had never heard them *in my home*, and as I've said time and time again, the listening environment can have an enormous impact on the sound of any speaker.

My correspondent's letter closes with a rather sweeping question: What has been the nature of progress in the field of sound reproduction? Although I cannot give a simple answer to that question, I will be glad to offer some of my views on the subject.

Thirty or forty years ago, speaker design was considerably cruder than it is today. A lot of it was done through largely empirical methods, "by guess and by gosh," particularly when the designer had little formal training in acoustics. The result could range from terrible to surprisingly good, the latter being more likely if the designer was musically trained.

A major advance came in the work of Neville Thiele and Richard Small, published in the *Journal of the Audio Engineering Society* in the early 1970's, which provided the basis for the truly scientific design of low-frequency drivers, or woofers. Most of today's high-quality speakers were developed through the use of the Thiele-Small parameters. As a result, modern home audio speakers can be made to deliver almost any type of bass performance chosen by the designer, subject to economic and aesthetic limitations.

I had the Rectilinear III for several years in the late 1960's and early '70's, and it was an excellent-sounding speaker in every respect. To be sure, nothing sounds quite like a full-range electrostatic, but in most respects the Rectilinear was a worthy rival.

Actually, in my 1967 review I said that none of the (unnamed) speakers to which I compared the Rectilinear could match it in *all* the principal characteristics (frequency range, smoothness, distortion, efficiency, dispersion, and transient response), although some outperformed it in one or more of those areas.

Would I make such a statement in a 1996 review? Only if I believed it was true, which was also the criterion applied in the Rectilinear review. The point is moot, in any case, for several reasons. For one thing, I rarely have more than a couple of speakers available for listening at

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the same time (and they don't necessarily have comparable acoustic properties). For another, today's speakers are considerably improved over their predecessors of the 1960's, to the point where it would be foolhardy to claim that any one of them is "better" than every other! I'll admit to being curious about how the old Rectilinear III would fare in a comparison to some of the speakers I've tested in recent years, but we will never know.

Today's technology makes it possible to design a speaker with almost any desired acoustical or electrical properties. A great deal of this lies in the realm of art, rather than pure science. Nevertheless, there are so many other factors to consider, including appearance, size, and price, that I doubt that loudspeaker sound performance will ever be defined as precisely as that of electronic components, at least in their subjective qualities. And keep in mind that a *major* part of a speaker's performance — the listening room — is beyond the control of its designer, and often of the user as well. □