market this great new sound by offering recorded open-reel tapes with the four channels in-line making one pass over the heads and operating at the standard 7½ ips speed. Two of the channels would be carrying the principal stereo information, which would be directed to the left and right speakers of the normal stereo installation. The other two channels would contain the "ambience" . . . the reverberant sounds of the recording hall which would be directed to left and right speakers in the rear of the listening room *behind the auditor.* Tape machines which could play these Vanguard quadraphonic recordings were few in number and very expensive. But they did exist. The tapes were available. It was a start. The era of quadraphonic sound had begun.

Now it is late 1973, and to paraphrase a famous ad, "Quadraphonics . . . you've come a long way, baby!" If you are a regular reader of the Schwann Record and Tape Guide you will have read the excellent "Introduction to Quadraphonics" in the January 1972 issue, and the equally valuable "Quadraphonics To Date", in the October 1972 issue. Thus by now you are aware of the basics of quadraphonic sound, the various tape and disc formats of this medium, and the essential differences between matrixed and discrete quadraphonic sound. Considering the complexity of the subject, it is also quite probable that some confusion about various aspects of four-channel sound is bound to exist. More specifically, there are no doubt quite a few people who question the validity of the entire quadraphonic concept. And more people still who accept the concept, but who are fearful of becoming involved in the purchase of four-channel equipment and recordings which may rapidly become obsolete if the industry adopts as standard, a quadraphonic system different from what they had chosen.

Perhaps we can clear up a few of these matters if we re-evaluate the various quadraphonic systems.

The oldest (beginning with the Vanguard tapes) and still incontrovertibly the best, are the open reel four-channel tapes. With four independent channels on standard quarter-inch magnetic tape, there is no question about the "discreteness" (separation) of the sound delivered to each loudspeaker. In view of the great wear factor (longevity) of tape and the basic discrete nature of the format, obsolescence is not a consideration. Naturally, all the normal performance parameters of tape are available such as wide frequency response and wide dynamic range. Four channel playback machines have been markedly reduced in cost, with some units as low as $300. The recorded tapes are still somewhat of a problem, because of their limited number. In addition to Vanguard, Enoch Light's Project Three label has issued some fine quadraphonic tapes. Although London Decca is still uncommitted to any of the matrix or the CD-4 discrete disc systems, they nonetheless have been recording in quadraphonic sound, and through their association with Ampex Stereo Tapes, a number of their "Phase Four" productions have been issued on open reel four-channel tapes. Ampex Stereo Tapes have begun to issue some of their own quad tapes, as well as issuing some of Dick Schory's quad product from his "Ovation" label. Vanguard recently issued a new batch of quad tapes, this time in a really deluxe, "Rolls-Royce" category, in which both front and rear channels use Dolby Type B noise reduction to eliminate tape hiss. You need two outboard-type Dolby B playback units to decode these tapes, but make no mistake . . . this is the ultimate quadraphonic listening experience. Now that the Dolby B circuit is available in integrated circuit "chips", perhaps it won't be too long before we have a relatively inexpensive quad playback unit. In summation; you can't go wrong with open reel quad tapes, even though the music choice still is limited.

The next tape format to consider is that of the four-channel/eight track cartridge. It should be noted that this is one of the least expensive ways to get into quad sound, and it is discrete quad sound to boot. There is also quite a large selection of music in all categories, from most of the major companies. It is a bit amusing to note that Columbia records which espouses their SQ matrix system for discs, is not averse to issuing discrete quad cartridges. In fact, to give full credit to Columbia, they have just issued the first Dolby B quad cartridges, something that was badly needed, as one of the drawbacks of the quad cartridge format is quite a bit of tape hiss. Ampex Stereo Tapes is about to issue Dolbyized cartridges as is EMI in England. As to playback equipment to cope with these Dolby quad cartridges, the situation is much the same as for open reel tape. Wollensak is readying a cartridge unit with built-in Dolby B circuitry and it may be decided to double it for quad playback. Summation; there are wow and flutter problems inherent in the 8 track cartridge format, along with reduced frequency response and tape hiss, but the quad is discrete, the increasing use of the Dolby System should alleviate the noise, and in a car the quad sounds great.

Quadraphonic sound on cassettes is not yet a reality for several reasons. In the approach taken by Phillips and recently by JVC, they want to put four channels of sound running in one direction, and another four channels running in the other direction, all on the tiny 1/7th inch width of the cassette tape, and all in the so-called interests of compatibility. The track widths are so incredibly small that even with Dolby B noise reduction the tape hiss would be intolerable. Also the problems of high speed duplicating of quad cassettes in this format would be formidable, with the slightest amount of misalignment in the