

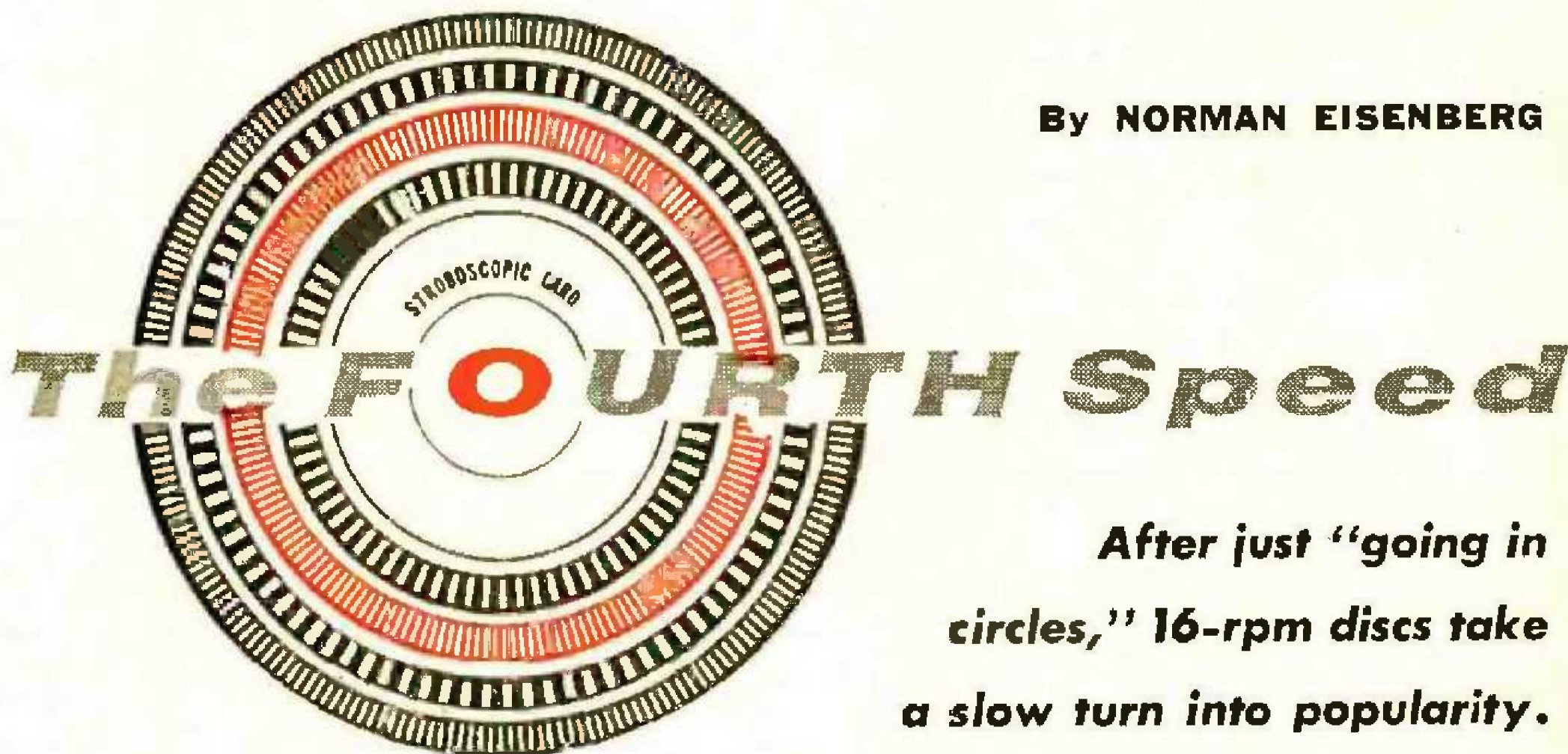
**W**HEN Chrysler announced, not so long ago, that its cars would be equipped with "highway hi-fi"—made possible by a new 16 $\frac{2}{3}$ -rpm record and player—audio enthusiasts drew their breaths in anticipation that this might have repercussions in hi-fi for the home.

What ensued, however, was not the expected sonic bonanza but a flabby fizz like a damped oscillation. POPULAR ELECTRONICS, poking among the available facts, discovered that the 16-rpm speed—though de-

auditions to find a "voice" for the Bible. The final choice was none other than Marvin Miller, known as the narrator of movie cartoon *Gerald McBoing-Boing* and other UPA features.

The talking book idea is not new. As far as the phonograph is concerned, it is literally true that "in the beginning was the word." Thomas A. Edison, in the 1870's, dreamed of putting literature on records. "Mary Had a Little Lamb" was, in fact, the first recording ever made when Edison

By **NORMAN EISENBERG**



**After just "going in circles," 16-rpm discs take a slow turn into popularity.**

toured on the highways—never came to a dead stop for home audio.

*The facts are:* Aside from the dashboard version of 16 rpm, there is a growing library of these records available to the public. More and more record players are incorporating 16 rpm as a fourth speed. As "Talking Books," these discs are a boon to the blind—"The Lighthouse" of the New York Association for the Blind distributes them widely. Music, too, is now available on 16 rpm's. While admittedly not hi-fi, due to lack of high-frequency response, it sounds well as "mood music" and "background" in restaurants where mellowness is the keynote and trebled brilliance would only distract.

**Biblical Turn.** The Audio Book Company of St. Joseph, Mich., producer of these records—started the 16-rpm project way back in 1951. For a whole year they tried all kinds of slow speeds, as low as 4 $\frac{1}{2}$  rpm! In the fall of 1952, 16 rpm was picked as most practical because it would play on existing equipment.

The first "Talking Book" was a recording of the complete New Testament in the King James version, introduced in May, 1953, at department stores in California and New York. It took over a hundred

at last put his new invention to the test. The Library of Congress had, for years, offered recorded books for the use of the blind—but not in the convenient, lightweight, and inexpensive form of 16-rpm discs.

**Coming to the Point.** Recently, Audio Book introduced music on "compatible" 16-rpm records. "Compatible" means that the new 7" discs can be played on any phonograph having the fourth (16-rpm) speed;



"Highway Hi-Fi" was Chrysler's slogan for 16-rpm phonographs fitted under the dashboard. Actually, the "fi" was no higher than that of the car radio through which the music was reproduced.





Through the "talking book," classics of literature have joined those of music in the recorded medium.

no special stylus is needed. They can be played with a 1-mil (0.001") stylus, the same kind you use for regular microgrooves. Previously, music recorded at the fourth speed could be played only with a 1/2-mil (0.0005") stylus, as on the special equipment used in cars.

The new "compatible" 16 rpm's contain a full 40 minutes of playing time on each 7" disc and list for \$1.69 per record. When more than one record is included in an album of a longer work, the price per disc is lower. This relatively low cost, combined with a widening repertory, will probably earn for these records growing popularity.

To clinch matters, the company making the 16-rpm discs has developed a speed-reducing adapter which fits—like a 45-rpm spindle adapter—over any 33 1/3-rpm phonoplayer. Selling for \$1.95, this adapter not only accommodates the 1 1/2" center hole—it also converts 33-rpm to 16-rpm speed.

**Gradual Slow-Down.** Reducing the speed of phonographs to gain playing time has always been an accepted and legitimate interest of audio technicians. Edison's first recording of the nursery rhyme was made at about 100 rpm. The high speed was necessary because of the narrow diameter of Edison's cylinder.

After Emile Berliner's invention of the flat disc with spiral groove, the turntable speed was internationally standardized at 78 rpm. This standard was observed for nearly half a century and the first great library of recorded sound was created at that speed—at a maximum of 4 1/2 minutes playing time per side.

By 1948, searching for longer and uninterrupted play, Dr. Peter Goldmark of Columbia Records had developed the technique of cramming the full range of sound into narrower grooves. This new "microgroove" technique permitted discs to turn more slowly without losing high-frequency response. Columbia's LP's thus set the new standard at 33 1/3 rpm.

RCA Victor, concerned over having been "scooped," refused Columbia's generous invitation to jump aboard the LP bandwagon. Some years later they did so anyway—but not before they had involved the public

in a "speed war" in which they pitted their own new 45-rpm doughnuts against Columbia's LP's. After years of bewilderment and industrial "warfare" (at the record buyer's expense), RCA's management then agreed to a policy of "coexistence" by which all record speeds were allowed to survive—each serving the particular needs for which it is best suited.

Variable margin control, a recent electronic advance which allows each groove on the record only as much radial space as it needs—but no more, permitted closer "squeezing" of the soft passages without limiting the fullness of the loud ones. The space saving paid off in longer playing time per-unit-diameter and made it possible to get up to 10 minutes of music on a single side of a 45-rpm disc. In terms of cost per minute of music, this made the 45-rpm record comparable with the 33-rpm LP. Yet, in terms of hi-fi and musical possibilities, the 33-rpm disc is still the favored choice because its inherently longer playing time permits major works to be transcribed on a single disc without interruption.

On one point at least—that of playing time—the 33-rpm record is now rivaled by the 16-rpm record, which provides comparable playing time at half the size (and cost) of a 12" record. The 7" 16-rpm record runs at least 20 minutes per side. For this reason it is sometimes advertised as "ultra-microgroove," but this term is misleading because it implies grooves narrower than the 1-mil used on regular LP's. As stated before, only the 16 rpm's made for Chrysler cars used grooves narrower than 1 mil; the newer "compatible" 16 rpm's can be played with a standard 1-mil stylus.

**Time vs. Fidelity.** While the 16-rpm record certainly makes good the claim of "longer long play," it cannot aspire to "higher hi-fi"—at least not at the present state of the recording art. Many people have the mistaken idea that long play in itself means hi-fi. The truth is: all other things being equal, the greater the speed of a record, the greater the recordable frequency range—just as with tapes. In the case of tapes, narrow-gap magnet heads



and tapes with homogeneous oxide layers can provide wide range at the relatively slow speed of 7.5 ips. So it is with discs—the groove dimensions as well as the surface properties of the vinylite material permit wide range *despite* slower speeds—not *because* of them.

In the case of 16 rpm's, the question arises as to what extent this slowest of slow speeds (actually twice as slow as 33 rpm) impairs the sound. Most listeners agree that a new 16-rpm disc sounds somewhat better than a 78-rpm shellac recording but by no means as good as a top-quality 33-rpm or a 45-rpm disc. On this point, we are fortunate in having a remarkably objective statement direct from the people producing these records. A spokesman for Audio Book says: "At the present time 16-rpm records are not acceptable for hi-fi reproduction and the upper frequency limit is in the vicinity of 9000 cps." He adds, however: "There is no question but that improvements will be made. In the foreseeable future, a hi-fi record at 16 rpm will be a reality."

**Slow-Turning Tide?** Another hurdle that 16-rpm records must clear is playback equipment. How will such records sound on conventional phono players? At a speed as slow as 16 rpm, the average record player—although adequate for 33 rpm—runs the risk of increased flutter and wow. Small defects in motor or drive system, which may go unnoticed at 33 rpm, could become magnified at 16 rpm into marring noise.

Turntable manufacturers have thus found a new problem-child in their lap. For their new models, they have had to make good mechanisms better and include provisions for the fourth speed with no appreciable price rise. A phono player that features the fourth speed now needs a fourth transmission wheel added to a mechanism that previously had only three. As you select the fourth speed, the appropriate wheel snaps into position to engage the idler wheel which spins the turntable.

It sounds simple, but new product design is involved, as well as premature obsolescence of existing models. And they're still not sure of how well these units will handle 16 rpm.

Yet uncertainty never deters an industry which evidently regards any question mark as a prod to go ahead, seek new ways,



**Hi-fi turntables** featuring the fourth speed include (reading from top to bottom): the Fairchild Model 412-4, built to precision standards, with a hysteresis motor whose speed is controlled by a continuously variable frequency electronic oscillator; the Bogen B50 and the Metzner "Starlight," both featuring continuously variable speed adjustments over a mechanical transmission. The Garrard Model T "Mark II" turntable and the Collaro RC-456 automatic changer shown below are among the first low-priced equipment to feature 16 rpm.



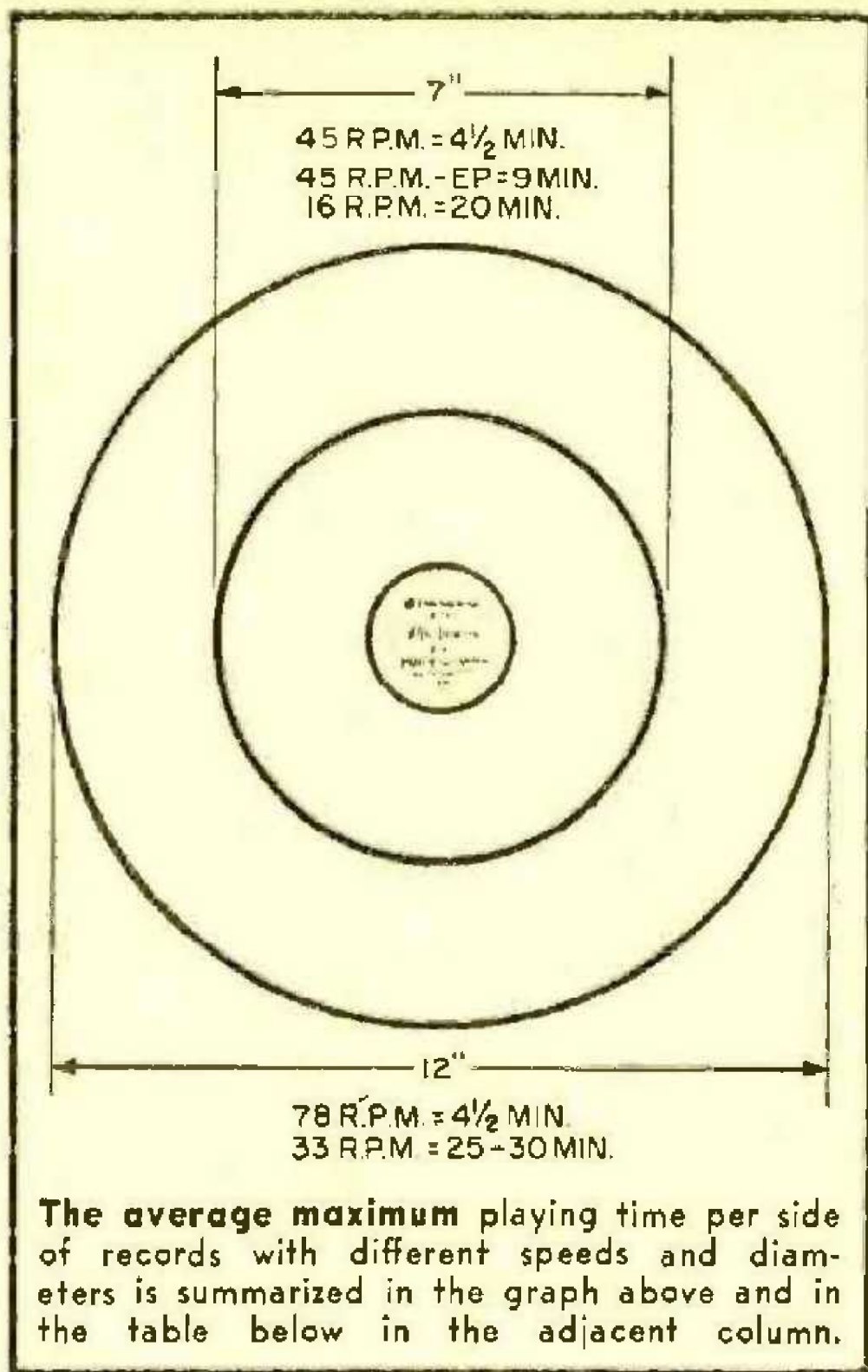




**Adapter for 16 rpm** fits over the spindle of any standard turntable. Made by Audio Book Company, this effective device costs only \$1.95. The low price is expected to hasten the widespread acceptance of the new phonograph speeds.

make new things, and generally succeed. Many "package" phono systems (including those decidedly low-fi) feature the fourth speed. Some hi-fi component firms also include it in new equipment. The Garrard Mark II manual player and RC-121 changer incorporate it. Similarly, it appears in the Collaro RC-456 changer, Bogen's B50 and B20 manual players, the Metzner "Starlight" professional-type turntable, and the brilliantly

Playing Speed (rpm)	Average Playing Time (minutes)		
	12"	10"	7"
78	4½	3	2
45	—	—	4½
45 EP	—	—	9
33	25	15	10
16	40	30	20



engineered new Fairchild Model No. 412-4.

With components in this class, it is safe to assume that wow and flutter at 16 rpm are pretty well licked. It also means that, for better or worse, 16 rpm is here to stay. The growing catalog of recorded material and new playback equipment in all price ranges proclaim that the tide may yet turn to 16 rpm and roll into the arena with quite a splash.