



Fig. 5. Dry lubricants are trapped under the crest of an unplayable signal transient (10,000 $\times$ ).

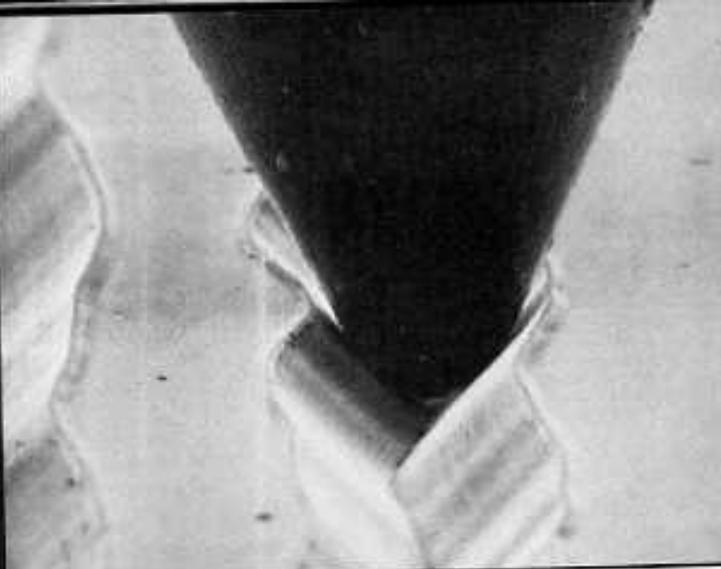


Fig. 6. Stereohedron stylus hugging the groove. Note groove "horns" typical of cheap records (1,000 $\times$ ).

## Record Wear

Of continuing concern to audiophiles is the oft-heard admonition never to play a record—or a part of one—two or more times in succession. The theory is that the vinyl (which is inevitably deformed to some degree by the stylus pressure) requires a "rest period" to recover from the trauma of play. It is supposed that without such a rest period, permanent injury is added to the temporary insult. To check this, I took a walk downstairs to our quality-control station, where new cartridges coming off the production line get their final checkout on a test disc. Cartridges are tested at a rate exceeding one hundred per hour, and a lot of records are used up in the process. I took a test record that had just been discarded after being played one hundred times in succession and compared it to a brand-new copy. Except for a slight rolloff at high frequencies and a barely noticeable degra-

dation of channel separation, the record was still okay. Under the SEM (Figure 10), the groove-wear patterns appeared absolutely identical to those found on records receiving normal use.

Not long ago we were life-testing an automatic-turntable shutoff mechanism. The tone arm was set to play the last band of the record, lift, then return to the beginning of the last band and play it again, and again, etc. The turntable went through 80,000 cycles of this to prove the reliability of the tone-arm lift mechanism—and then we suddenly realized that we had just played part of a record 80,000 times in succession! We rushed to listen to it and, to our amazement, it actually sounded better than some of our less-played records.

Looking at the groove under the SEM, we could see that the stylus had produced a "footprint" on the groove walls that conformed to the shape of the stylus tip, and it seemed that once a certain amount of wear had occurred,

no further damage to the groove took place. I estimate that the entire test was also equivalent to approximately 1,000 hours of playing time for the stylus, but there was hardly any wear visible on it although the tracking force was 1.5 grams. Note that there were no special precautions taken in running this test and no use of cleaning agents or groove lubricants. My conclusions from all this are that, with today's phono cartridges, record wear and sound quality are the same whether you play the disc repeatedly at one time or wait days between playings. Apparently, if you exercise reasonable care in regard to storage and hygiene, and if you are using a well-designed stylus assembly whose diamond tip is in good shape, your discs are not likely to be damaged by the playing process. Phonograph records, contrary to our fears, are unusually tough and durable; in general, they are the most "forgiving" sound-storage medium we know of. □

Fig. 9. Damaged groove surfaces and piled-up dirt globules in a wet-played groove (10,000 $\times$ ).

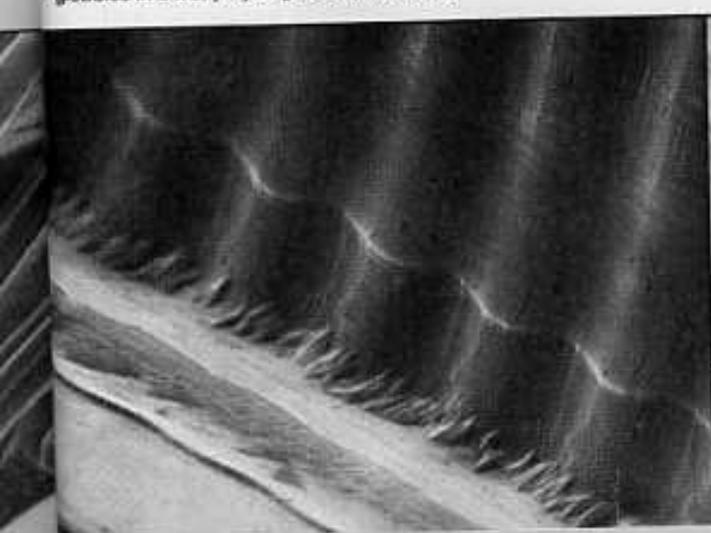


Fig. 10. Test record played one hundred times. Note 20 kHz modulation on right wall, none on left (10,000 $\times$ ).

