NEGATIVE QUALITY AND CONTRAST

Ideally, the image of a variable area sound track should have a sharply defined boundary, with no transition through varying shades of gray, from the opaque track to the clear film base. To approximate such a condition as closely as possible, the manufacturer recommends to develop the negative material to a high gamma of at least 3.0 or more.\textsuperscript{1,2,3} And more often than not, this recommendation is religiously observed with little attention to other information revealed by the sensitometric curve. A large majority of the people involved with sound on film will certainly be satisfied with the negative developing, if a gamma figure within a tolerance from 3.0 to 3.2 or even 3.4 can be read from the HXD curve. In some instances the gradient of the so-called straight portion is even slightly tilted on the graph paper by the person analyzing the sensitometric data, so as to come up with the requested gamma figure. This practice can easily be followed when working with high-contrast stock which has often only three density steps with equal incremental increase between the toe and shoulder breaks. Is this really accurate enough to assure a consistent negative quality over any period of time?

Surely not, because the author has seen 35-mm variable-area negatives on Eastman 5375 with a perfectly acceptable maximum gradient slope, yet even the widest range of print densities did not produce one single acceptable print! In fact, the cross-modulation analysis resulted in such unusual readings that the plotting of the familiar cusp-curves was not at all possible. This may have been a rare exception, but it indicated clearly to the author how meaningless a gamma figure can be.

Depending on the composition of a developer, processing time may vary to some degree between different formulas without appreciably altering the contrast gradient of the film, but there may be a decided difference in the film speed thus obtainable. Data sheets for sound recording films suggest a certain range of track densities for good overall performance, causing some people to think that all one has to aim for is this suggested density, with little attention to the exposure and processing conditions under which it was achieved. Was it a low exposure and a long developing time—or was it the other way round?

Lewin\textsuperscript{4} when investigating the effect of developing time on the quality of a negative track came to the important conclusion that the changes in negative quality are much greater than might be expected from any variation in the actual gamma. In practical work, developing time is frequently adjusted to arrive at a specified track density to compensate for exposure variations. Now then, if the effect of developing time is such a marked one, perhaps it would be advantageous to adjust exposure so as to suit a once established processing time which yielded a negative of good quality. Yet, in doing this, we are most likely adjusting for chemistry changes, which means in other words, that even though the chemical reaction time is now kept to a fixed value, there must be some changes in film speed and the resulting gamma. Thus, we are back at the start, trapped in a vicious circle in this search for an accurate and reliable procedure to assure a more consistent negative quality.

Data collected by the author from cross-modulation tests performed over a period of several months indicated great fluctuations in the optimum negative density for a cross-modulation product of better than minus 30 dB based on an

\textit{J. W. Dorner is with ReVox International in Regensdorf, Switzerland. He was formerly with Film House Ltd., of Downview, Ontario, in Canada.}