
LETTERS

The *ARSC Journal* encourages signed, typed, comment on current issues and matters of general interest to association members. Letters beyond 250 words may be edited to fit space. Letters can be sent to the editorial office.

To the Editor:

It is a moot point whether artists or record producers should deign even to note the existence of critics let alone allow that they have read their writings. There was certainly nothing moot about it for Goethe: "Let the dogs bark, it shows that we are on horseback."

However, throwing caution to the wind, may a few "points of information" be made concerning Professor Bond's review (*ARSC Journal*, February 1989, pp. 126 & 7).

Accidents excepted, shells are certainly not "destroyed in the production of one good positive for dubbing."

The phrase, "direct pressing from original master recorded by EMI Records Ltd.," was designed by EMI Records Ltd. and Symposium Records to make clear that records bearing this inscription are absolutely not transfers (dubbings) produced electrically or mechanically or acoustically but pressings from stampers directly derived from the original by electroplating.

Catalogue numbers are omitted from this series deliberately because (i) many records have over the years and continents had several catalogue numbers even simultaneously at first issue, (ii) for many people the matrix number is of more interest, (iii) generally the less cluttered a label is the better it looks and (iv) for production purposes the smaller the number of numbers the better.

On grounds of historical and musical value a number of records have been prepared for this series from metals which are in less than perfect condition. It was felt that collectors would not wish otherwise. For example [some] of the D'Indy metals are marked by quite ugly corrosion spots and these do sound. The Grieg metal on the other hand was in remarkably good condition, its weird appearance corresponding with other metals and pressings frequently found from that era (Sarasate, Demouget, Pugno etc.). The swish on the Joachim side may well have developed in storage as it is not on original

pressings. The Hubay pressing seems to me to be astonishingly good. Certainly, I have neither seen nor had reported to me any copy with "small depressions as if it had been sprayed."

Please permit me to repudiate utterly the statement, "clearly virgin vinyl was not used." These pressings are produced on machines which immediately before and afterwards produce top class LPs. There is no question whatsoever of a change in stock.

To be repudiated also is the phrase "nor was the pressing done with care." Great care is taken at each stage. However, there are very considerable engineering problems in producing 78s, which, strangely, are much harder to press properly than LPs. I accept that we have still not conquered every problem; but, if one may borrow the slogan of a well known manufacturer of motor cars, we have "a policy of constant improvement."

Great care is also taken over centering. However (a) there is a limit to the accuracy possible with normal production plants and (b) many records just do not have truly mathematically perfect spirals. Why, I am not sure. Maybe the original feed screws did not operate with perfect linearity or maybe waxes or metals acquired slight distortions after cutting. Lastly, a point not mentioned in the review: to play these records properly, it is of the utmost importance that correct stylus sizes are used. A difference of one thousandth of radius can produce a change of as much as six or eight decibels in signal to noise ratio (e.g., try the Tolstoy records with 0.0025 and then with 0.0015 inch radius). *Eliot B. Levin, Symposium Records, East Barnet, Hertfordshire, England.*

To the Editor:

Steve Smolian's article on preserving recording tape (*ARSC Journal*, Vol. 19, no. 2/3, pp. 37-53) comprehensively describes problems and solutions for analog tape, but I was puzzled by his statement that "the present digital system, when considered from an archival standpoint, is limited by the 44.1 [thousand per second] sampling rate through the loss of hall resonance and other quiet noises during conversion."

Sampling rate determines the upper-frequency limit of recording, but it is sample resolution which determines the dynamic range. Dynamic range increases 6 dB (doubling of amplitude resolution) per digital bit (doubling of the number of resolved steps) and so 16-bit samples give more than 90 dB--beyond the limits of any analog medium, unless heavy compression such as dBX or Dolby SX has been used. In this case, the compressed signal may be transferred unaltered to the digital medium and reexpanded upon playback.

I am sure that Mr. Smolian has heard the "loss of hall resonance and other quiet noises" which he describes. I have heard it too. It can theoretically occur when peak-to-peak signal amplitude falls below the digital converter's step size (-96 dB), preceded at slightly higher levels by gross distortion due to failure of the small number of resolved steps to track the audio waveform accurately. However, very few input signals to audio recorders have a noise level this low. In any case, properly-designed digital recorders deliberately add very low-level randomizing noise ("dither"), eliminating low-level signal loss and distortion. In practice, the cause of low-level signal loss is something else entirely: noise-reduction processing used in commercial rereleases of older recordings.

Mr. Smolian and I apparently share a distaste for such manipulation: unfortunately, today's noise-reduction techniques are less discriminating than the human ear.

He is correct that archival copies should retain frequency ranges which make them uncomfortable to listen to, so they may benefit from future noise-reduction techniques. This applies to digital as well as analog archival copies. Reference copies may be filtered to relieve the discomfort. Due to rapidly decreasing signal amplitude at high frequencies, a non-varying filter cutoff frequency can usually be found which will render noise and distortion tolerable without audibly impairing the signal quality, and without causing variations in ambiance.

Mr. Smolian has another--entirely justified--concern, about the recording medium used for digital storage. As he states, video tape and DAT are not trustworthy archival media. This is understandable: they are, after all, consumer media designed for low cost, not for high reliability and long life. Even professional digital media can suffer signal loss, as Mr. Smolian correctly indicates.

But the answer to these problems is not to copy to a new generation of analog tape every twenty years. Analog copying introduces distortion as well as noise. Two or three generations of analog copying can ruin the archival quality of even an early recording whose noise masks tape hiss. Most early recordings, both acoustical and electrical, have pronounced resonant peaks within the recorded frequency range. When, some time in the future, an engineer prepares a listening copy from a late-generation tape of an early recording, equalization to flatten the response can increase 1% of distortion products to 10% or more, since the filtering attenuates the frequencies where the signal was strongest. I have run into this phenomenon time and time again in my own restoration work. The increased distortion is often highly objectionable when compared with playback of the original recording through the same filters.

The ultimate solution to archiving problems is, as Mr. Smolian indicates, a "non-alterable, non-deteriorating medium." All physical media deteriorate chemically and have a particular structure which adds noise with each new generation of copying. These are unchangeable physical facts. Therefore, the only medium meeting Mr. Smolian's requirements is digital storage, which allows copies to be made with absolutely no deterioration in signal quality beyond that from the original transfer. This follows from the fact that digital signals are numbers, which can be compared, checked and corrected. Given sufficiently good error-correcting codes and recopying at a high enough rate to keep ahead of the physical deterioration or destruction of media, recordings can be preserved unaltered for billions of years.

Audio preservationists need to develop standards for digital media, encoding and archiving practice, but ironically, events may lead us in this direction even without our leading them. Many types of computer media have far higher reliability than is needed for audio, and may be used for audio storage. Even the much-maligned digital compact disc marks an important, though unintentional, leap in preservation of those recordings which it holds. In the future, if several copies of a compact disc pressing can be obtained to allow a digital comparison, it will be possible to restore an error-free signal even if no one copy will play through.

In this connection, I have written a paper discussing some possibilities of digital audio preservation and restoration. It is enclosed, and I hope that the *ARSC Journal* can see fit to publish it. *John S. Allen, Waltham, MA.* 