

# Suggestions for preparation of master tape recordings for production of phonodiscs for publication

*For the ever-expanding audience and scientific need for published recordings of bird sounds, here's a useful guide for potential authors in this fascinating aspect of bird study.*

*John William Hardy*

**I**N RECENT YEARS PUBLICATION of scientific sound recordings has increased. The French Ornithological Society has issued a series of recordings of Ethiopian birds, the American Ornithologists' Union Ornithological Monographs has published two discs, each as supplements to Monographs Nos. 23 and 26, and other scientifically significant sound recordings have been issued by institutions and individuals. While sound archives such as the one at the Cornell Laboratory of Ornithology will continue to be important sources of materials for scientific study of sound, the published disc seems certain to become a valuable way to acquaint many biologists with a wide variety of animal sounds, and to provide food for scientific thought. Additionally sound specimens permit the detection or attraction of species in the wild [The latter technique is a scientifically useful one to biologists but should be used sparingly where possibility exists that it will disrupt nesting activities of birds. — Ed.]

Publishing on tape, even cassette, is still much more expensive than on disc. Moreover, discs properly cared for remain the best way to preserve sounds over time, and album jackets permit discs to be accompanied by detailed supplementary information in a way that would be difficult on a cassette label or box. When frequent playing of a disc is anticipated, the sounds can be transferred on tape with equipment available to most scientists either in a laboratory or at home.

Preparation of a master tape from which the disc is made is a process that requires time and thought, and most certainly is not a matter of merely splicing together a series of cuts from field recordings. In most cases, field recordings need to be preserved, are recorded on various types of tape, and are of variable quality, level, and length. To achieve some uniformity on a master tape that will allow cutting a master disc, the author of the tape needs to take some simple but important steps and remember a few facts.

*1. Quantity of material to be presented:* If no more than about 16 minutes of total playing time is necessary, the disc can be a 33 $\frac{1}{3}$  rpm, 7-inch, microgroove type, with 8 minutes/side. Ten to 14 minutes is best suited to a 10-inch disc. Fifteen to 25 minutes requires a 12-inch disc, the standard of the industry. On standards: one should try to avoid timing for a 10 inch-disc, as the recording industry is not now as geared to production of these as it was 20 years ago, and manufacturing costs are likely to run as high as those for 12-inch discs. It is possible, with care, to record more than 25 minutes on one side of a 12-inch disc, but peak levels must be carefully compressed. However, if amplitude variations similar to those of field recordings are desirably maintained and illustrate some important feature of the sounds, long recordings are not advised. However, if the subject sounds are of fairly low and uniform amplitude, it is quite possible for total time/side to reach 30 minutes. Here

we refer to monaural recordings, not stereo that must be prepared with much narrower tolerances, and in general allow no more than 25 minutes/side, maximum.

**2. Making a master tape:** First, re-record all sound specimens to be used on a high quality, low noise, high output, low print tape. The so-called "studio mastering quality" tape of many manufacturers is widely available in retail stores. Use 1 mil or 1.5 mil tensilized polyester tape. The reason for these instructions is simple: in re-recording one wishes to reduce loss of sound quality as much as possible. By copying recordings at 15 ips (inches per second) (19 cm/sec), especially if the recordings were originally made at 7.5 ips (9.5 cm/sec), the signal-to-noise ratio will, all other things being equal, be maintained, magnification of any distortion will be reduced, and overall sound quality will remain "bright." The low noise tape promotes retention of good signal-to-noise ratio as well. The high output tape permits recording at high levels (Vu meters peaking at over 0 dB) without as much chance of break up of sound when levels are high. And finally, recording at 15 ips spreads out the sound over a greater tape length. This permits the editing of pops, mechanical noise, and brief distortions so common in field recordings, without seriously affecting the cadence of the subject vocalizations.

**I**N THE RECOPYING PROCESS, it is possible to improve the overall sound quality somewhat by filtering, reequalization measures. Care must be taken when instituting such processes to not alter the audio character of the specimens themselves. The high-pitched voices of many songbirds are so displaced in frequency spectrum from any often-encountered kinds of outdoor sound that the filtering out of the lower frequencies can perform miraculous results. Example: songs of Seaside and Savannah Sparrows are in the 4 - 12 KHz range (as can be determined by making a sonogram). Thus using a graphic equalizer (a half-dozen brands are available in the commercial audio marketplace), the sounds at frequencies below 4 KHz can be attenuated as much as 12 or 15 dB. This can nearly eliminate the low rumble of highway traffic or even the blustery sounds of wind. Example: especially in tropical latitudes the air is often filled with the high-frequency continuous sounds of stridulating insects, often and mostly above 12

KHz. If it is determined that the subject sounds are in the 1-12 KHz range, a similar suppression of the high frequency sounds can make the listening experience much more enduring and informative. A word of caution it is possible to overemploy graphic equalizers, boosting the desired frequencies by 12-15 dB and attenuating the undesirable frequencies by a similar measure. At first this might seem desirable, but most equalizers are then revealed to have their own inherent (electronic) noise levels of the diffuse "white noise" type that gives an artificial, shallow quality to the resultingly-filtered sound. This can be very annoying to the listener.

If the author plans, as is highly desirable, to have a human voice provide basic information to introduce each cut on the finished tape and record, it is desirable in the copying process to use a 2-track, 2-channel stereo tape deck as the copying machine. Then, the subject sounds can be transferred to channel 1 on the master tape. This will leave channel 2 blank, to be used for the recording of the human voice narrations. At this point the program of sounds should be arranged and each segment timed. A script should be prepared, typed and timed. Remember, the total time/side must be considered. Next, a recording of the script should be made, directly onto track 2 of a tape of the same type used in copying the sound specimens. Often the author or a scientist knowledgeable about the material to be presented is *not* an experienced narrator. Try to obtain the services of someone whose voice will be clear, well modulated, and who can pronounce any technical terms correctly, while speaking in a pleasant conversational manner. This may seem to be a minor point, but a good narrator can make the repeated use of the disc in research and especially in demonstration a pleasure rather than a task. At this point, the author ideally has two tapes, one of the sequenced animal sounds on track 1 only, and another of the narration on track 2 only.

Next the master tape sound specimens and voice cuts can be spliced together in proper sequence. Begin with a plastic or paper leader of 8-10 ft length. Splice in the introductory track (usually a narration cut), then the next specimen and so forth. If one wishes to leave gaps on the disc, separating each sequence or group of sounds, he must splice in a 30-to-45

inch length of leader so that when the master disc is cut, the engineer knows where to create the gap. Remember, each gap takes up valuable space, so no more should be installed than are absolutely necessary. However, the usefulness of the disc may be greatly increased if a listener can cue the tone-arm of the record player to a specific cut. The last tape on a side should be followed by an 8-10 ft segment of leader.

**A**T THIS POINT THE RECOMMENDATION of separating the specimen segments from the voice cuts on separate tracks of the tape becomes of special significance. Review the finished tape. If the voice track contains mistakes, they might be corrected without further splicing, as long as the narration to be substituted is the same length (plus or minus a few seconds) as the narration segment to be eliminated. On a 2-track, 2-channel stereo recorder that has the capability of having either track and channel record-activated independently in either direction, place track and channel 1 in the play (safe) mode, and track and channel 2 in the record mode. Now either erase first and record or record over the defective portion while listening to the subject sounds with earphones. Some recorders, but not most current models, may introduce a *pop* sound as the record function is activated. If so, and no other recorder is available, the defective voice segment may be snipped out with scissors and replaced with the corrected segment. This is, of course, the only procedure if the substituted segment is of different length than the segment to be removed, by more than a few seconds.

With the track separation suggested, it is possible to erase the entire voice track without marring the specimen track (1), and replace it with a new voice track without splicing, given the facility and experience of the narrator.

**3. After the tape is prepared:** For use of the engineer and later for publication on the record jacket, provide a program with timings of each cut, plus an indication of the total time with intercut leaders of each side. This knowledge will allow the engineer cutting the master disc to employ the variable pitch of the lathe, widening the grooves for loud passages and narrowing them for soft passages, thus taking maximum advantage of the space available with respect to the time needed. Also prepare disc-label copy—the information about the program that goes directly on the center disc label of the record. And finally, note on the tape boxes the brand and type of tape used, the 2-track nature of the tape, and the speed. In preparing a master monaural disc, the engineer will simply channel both tracks of the tape into a single integrated output signal to the cutting head of the lathe. Upon playback, then, the sound will emerge from a single speaker or identically from both speakers of a stereophonic playback system.

**P**ROCEDURES FROM THIS POINT ONWARD are beyond the scope of this account. The publisher can receive the tape just described with its supplementary information and normally proceed to publish with only minimal correspondence with the author.

From my experience as sound recording editor of the American Ornithologists' Union Ornithological Monographs, I am of the opinion that providing anything much short of the finished tape above described places an undue burden on the publisher and is comparable to sending in field notes or a rough draft of a manuscript (not unprecedented) requesting the editor to prepare it for publication.

—Florida State Museum, Museum Road,  
University of Florida, Gainesville, FL 32611

