

Joel Tall Oct. 17, 1962

Lives there a man who has not shot a roll of film - every frame perfectly exposed! - and then wondered, after examining the out-of-focus, off-color prints, what on earth had gone wrong? The analogy to tape recording is obvious. While you're recording you say to yourself "This is going to be GREAT -A MASTERPIECE". When you listen to it afterwards it all sounds pretty dull. There is no brilliance, no presence and the lows sound tubby and shallow. What went wrong?

There is no single answer to that question. Just as shooting good photos requires taking infinite pains with small details, so does recording sound so that it sounds alive. Not one link in the long chain of events that takes place during a recording session can be neglected without jeopardizing the result. It is only after years of experience with completely familiar equipment that a recordingist can rapidly survey acoustical conditions, make a fast check of his equipment and go ahead to record a perfect tape. He falls into the same category as the veteran cameraman who can shoot perfect takes even though his light meter has been swallowed^w by Lassie. His judgment of light, tempered by long experience, is probably more accurate than that of the meter.

Nobody I know has ever learned anything from someone else's experience. Maybe you are different. I hope so, because I am going to tell you how you may learn rather quickly how to do better work. The first thing to do is to standardize as much as possible, so that there remain fewer unknown quantities in the great number of details you must pay attention to. (In a subsequent article I shall discuss acoustics of the studio and listening room, the two greatest "unknowns" in the recording chain). Eliminate, one by one, any deviation from flat response of any component in the recording chain. Start with your ears; give them at least a rough check by listening through high quality phones to the output of an audio oscillator, keeping the oscillator's

output steady while noting your hearing response. Find out if you don't hear well at any frequency or band of frequencies. If your hearing is not normal, and you don't know it, you may overequalize the tape. This will satisfy you but will offend the hearing of anyone with normal hearing.

Check backwards, in this way, from your ears back through output amplifiers and the whole complex of your equipment. It is only after everything in this chain proves to be approximately flat that you can begin to think about recording acoustics and listening room acoustics. Do not allow a single non-standard factor to creep into your system once you have set your standards. Don't change tape-either brand, type or thickness-once you have had the recorder bias set for best response on a good standard make of tape. Don't change bias settings without good reason - you could be wrong just that time! (The question of bias is a complicated one and will be discussed all by itself sometime soon). There could be a lot of other "don'ts", but we can compress them into one big one: Don't gamble with unknown factors; standardize so that you have to wrestle with only one unknown - the acoustics of the recording surround. That's enough for anyone to contend with, ~~expert~~ expert or not.

To help you to standardize your recording outfit, it might be a good idea to spend what time you can spare studying one of the many good books that have been written about tape recording. One of the best, even though it is slightly technical, is "Magnetic Tape Recording" by H.G.M. Spratt (The Macmillan Company). Of course, I think my own book, "Techniques of Magnetic Recording" is good in its own way, but I hesitate to ask you to read it unless you want to know all!

Very often people phone me to ask "My son wants a tape recorder-what do you suggest that he buy?" All I can suggest is that you look over the specifications carefully, paying most attention to the measure-

ment of total flutter. Sometimes the specs purposely give you only half of the total flutter. That's the measurement that separates the men from the boys in tape recorders. Some cheap tape recorders have low flutter - others are too high for good recording. Note that flutter practically doubles when tape speed is cut in half. If you have a choice of speeds - and lots of money - always record at the highest available speed. And don't fall into the error of thinking that you ever get something for nothing. There's no such thing! All things considered a thicker tape is better all-around than a thinner one (less print-through) and a full-track is always better than half - or quarter-track. You can compensate somewhat for what is lost - but you never get something for nothing.

There are ways, however, to improve your recordings without going to the extreme of recording on 35 mm. magnetic film, for which method marvellous results have been claimed by a record manufacturer. You can invest in a good low impedance microphone (I like dynamics - and large ones, at that), hook it up to your tape recorder through an input transformer of good quality, and then learn how to use it to best advantage. It is truly surprising what a great difference a high-grade mike makes when used with even a low-priced (but low-flutter) tape recorder. Hum level is reduced, presence is increased and extraneous noises (picked up by high impedance mike cables) are reduced.

Another way to improve your recording at low cost is to purchase a good bulk eraser (or, as the movie men call it, a degausser), disabling or by-passing the erase head in your machine (if possible) and recording only with bulk-erased tape. If you use this method correctly - we'll cover it in detail in a later article - you can gain about 8 db in the signal to noise ratio. That gain of 8 db, in practical terms, means that you can get closer to the dynamic range of live sound. A poor erase circuit in a recorder will often add distortion, as well as noise,

because it may leave a slight dc component on the tape. It is difficult to build a really efficient erase circuit into a low-cost machine. Current flow in the erase head sufficient to completely demagnetize the tape tends to overheat the head and the recording tape, a condition under which good recording cannot take place. Therefore most low-cost machines do not erase the tape sufficiently to insure good recording. Of course, you could erase the tape several times over on your machine, let the machine and the tape cool off, and then record. I used to do that in 1948, but I'd hate to have to do it now.

One final tip: Keep the recorder and the tape as cool as possible. Heat from the motors transmitted through the top plate, adds to the temperature of the heads and the tape and causes several different kinds of trouble. When head temperature increases the magnetic gaps may become distorted from their true shape and specifications, causing distortion. The hotter the tape gets the less it will record. Find some way of keeping your recorder cool - don't pack it in ice, however, unless you're working in the midday heat of the Sahara, but, if necessary, mount a small exhaust blower where it will not transmit any vibrations to the deck, or reduce the recorder cabinet to just a frame to get cooling air to circulate around the motors and the head-structure. Heat is the enemy of good recording. Any Questions?