

FEB/MAR 1976

VOL. 1 NO. 3

\$1.50

# MODERN RECORDING

SERVING TODAY'S MUSIC / RECORDING-CONSCIOUS SOCIETY

A Session with  
Miles Davis

The Men Behind  
the "Wall of Sound"

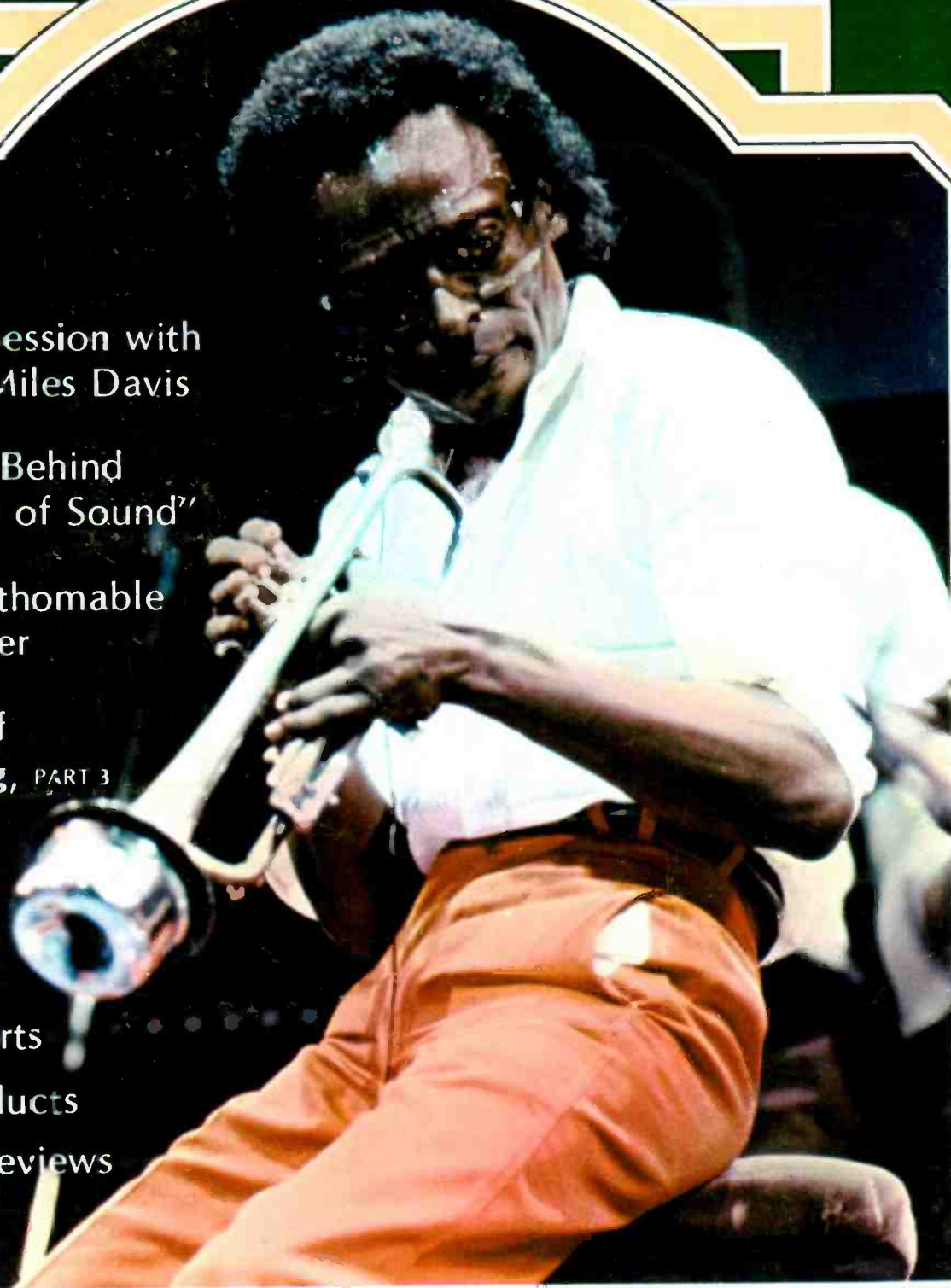
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Synthesizer

History of  
Recording, PART 3

Lab Reports

New Products

Record Reviews



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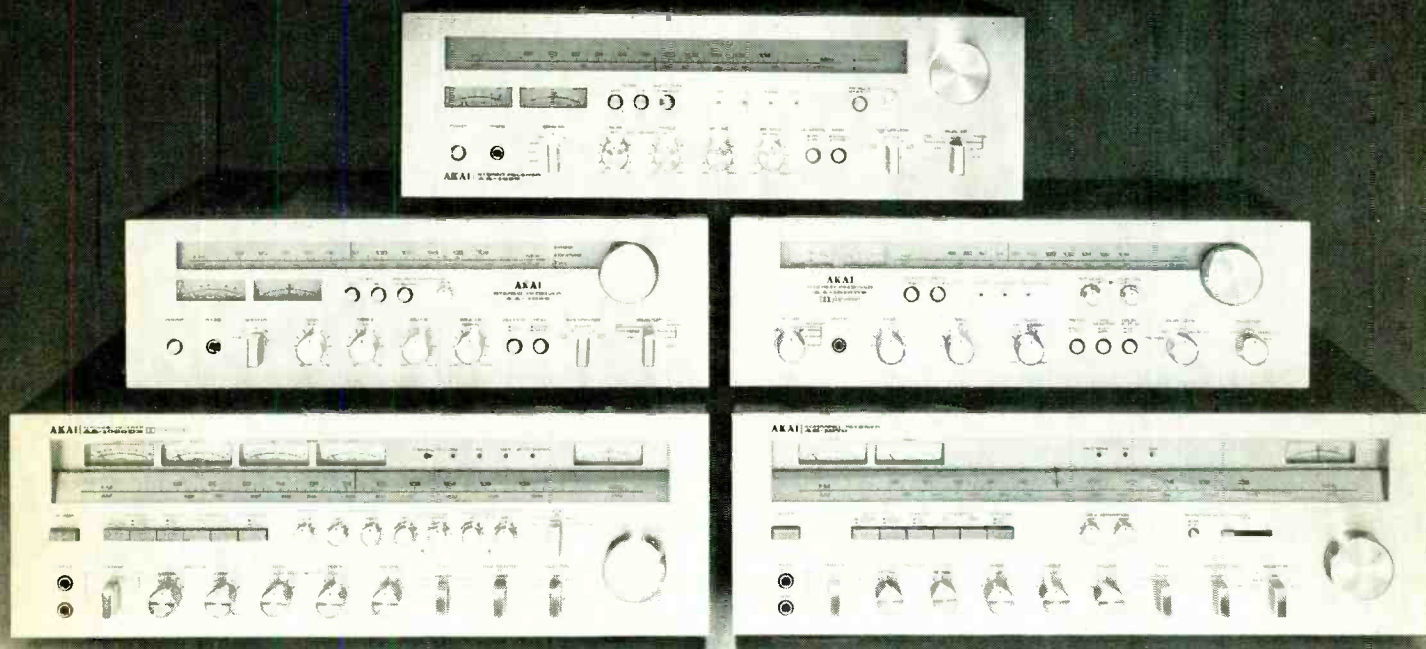
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# MODERN RECORDING

SERVING TODAY'S MUSIC/RECORDING-CONSCIOUS SOCIETY

FEB/MAR 1976

VOL. 1 NO. 3

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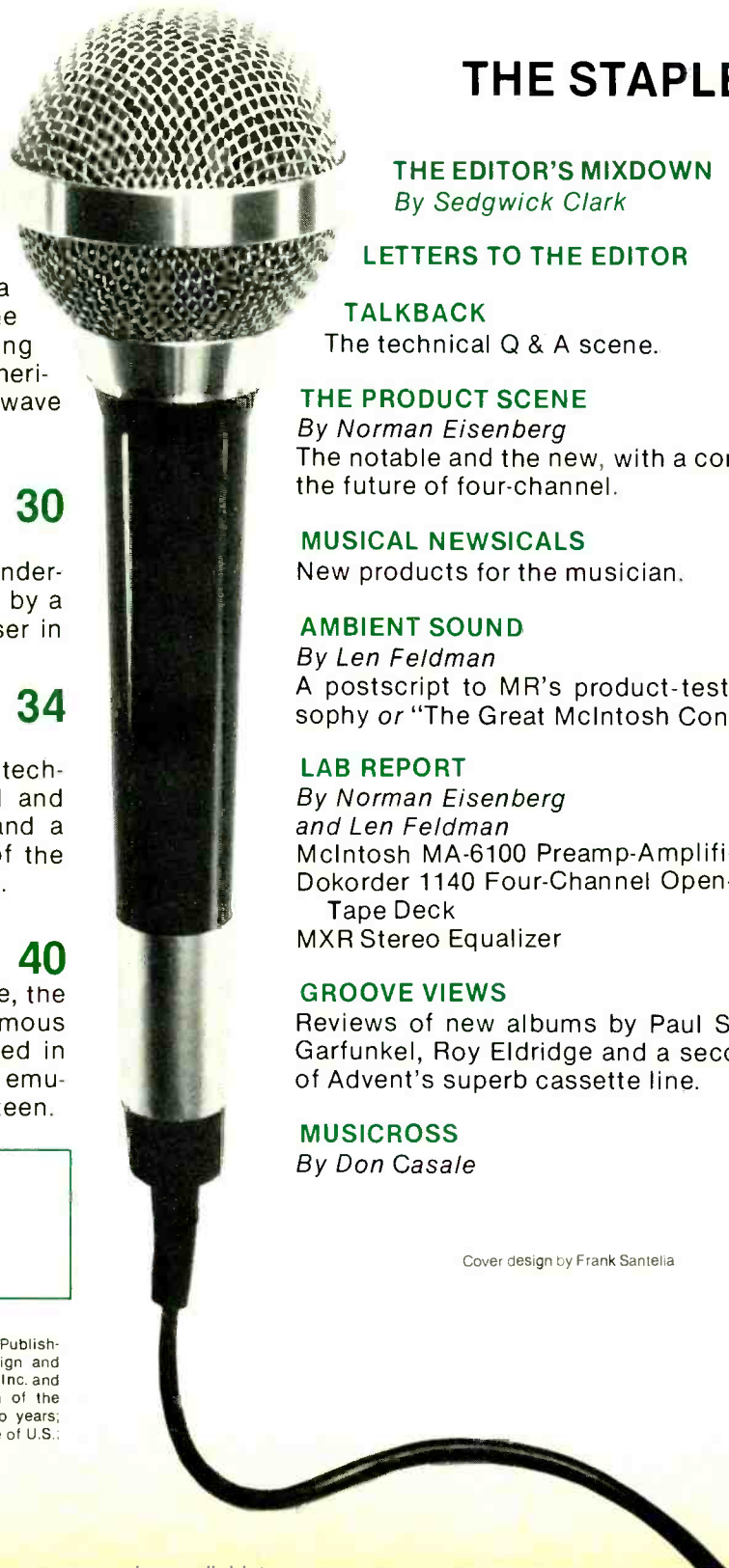
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Cover design by Frank Santelia

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# The Editor's Mixdown

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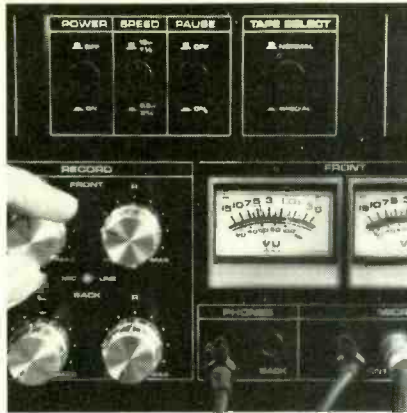
What should the *standard* procedure be for obtaining equipment for review? In keeping with our determination to publish a credible magazine, one of our more adventurous escapades occurred soon after we decided that it was time someone broke the seven-year ice on McIntosh equipment. You can read all about it in Len Feldman's "Ambient Sound" column on pages 50-1. Then turn the page and read the lab report itself on McIntosh's MA-6100 Preamp-Amplifier. "So what?" you say. "It's a rave review and only confirms the company's claims like any other review would." Not quite. For whatever reason, no other magazine that accepts advertising ever made the decision—regardless of McIntosh's feelings on the subject—to inform its readers of whether or not the vaunted company claims were still relevant.

McIntosh believes that any units acquired from the manufacturer could be specially tested at the plant and hyped up for the reviewer, thereby misleading the consumer; magazines should either borrow or buy factory-sealed units for testing directly from retail outlets—apart from any contact with the manufacturer. Len Feldman, on the other hand, not only prefers to receive the unit directly from the manufacturer, but also believes that the equipment *should* be checked out prior to mailing just to assure that it is not defective; *then*, upon receipt, specs will be confirmed (or otherwise) and the unit will be discussed as to its usefulness and performance; what is the purpose, asks Mr. Feldman, of reporting on a bum piece of equipment that doesn't represent what the unit can really do? Any consumer who buys an "occasional 'lemon'" has the opportunity to return it for a non-defective unit.

Although I understand Mr. Feldman's viewpoint, I cannot agree completely. Certainly it is a waste of everyone's time to print a review of a defective piece of equipment. But what about equipment with a high rate of return? Lab reports are essentially useless for reporting on the truly long-term reliability of such items. Therefore, it seems to me, magazines in the business of lab testing could try to secure equipment for review in as close to the manner of a consumer as possible. This way there would at least be a better chance to inform the consumer of a model's reliability.

Perhaps the fairest and most cooperative manner would be the way in which we acquired the third McIntosh MA-6100 for our review: we arranged directly through Mac to pick up a factory-sealed unit from one of their authorized dealers and returned it upon completion of our report. (And for all you cynics out there, Mac could not possibly have had the time to arrange a special unit; both the dealer and the unit were randomly chosen.) Granted, this isn't the easiest way. It would call for an entirely new way of thinking on the part of the manufacturer. Yet, it seems to me that any manufacturer who believed in his product would welcome such an approach because it could only increase the credibility of his product. This is only one possible suggestion. I'm sure there are many others from both readers and manufacturers. We welcome any comments on this matter.

S.C.



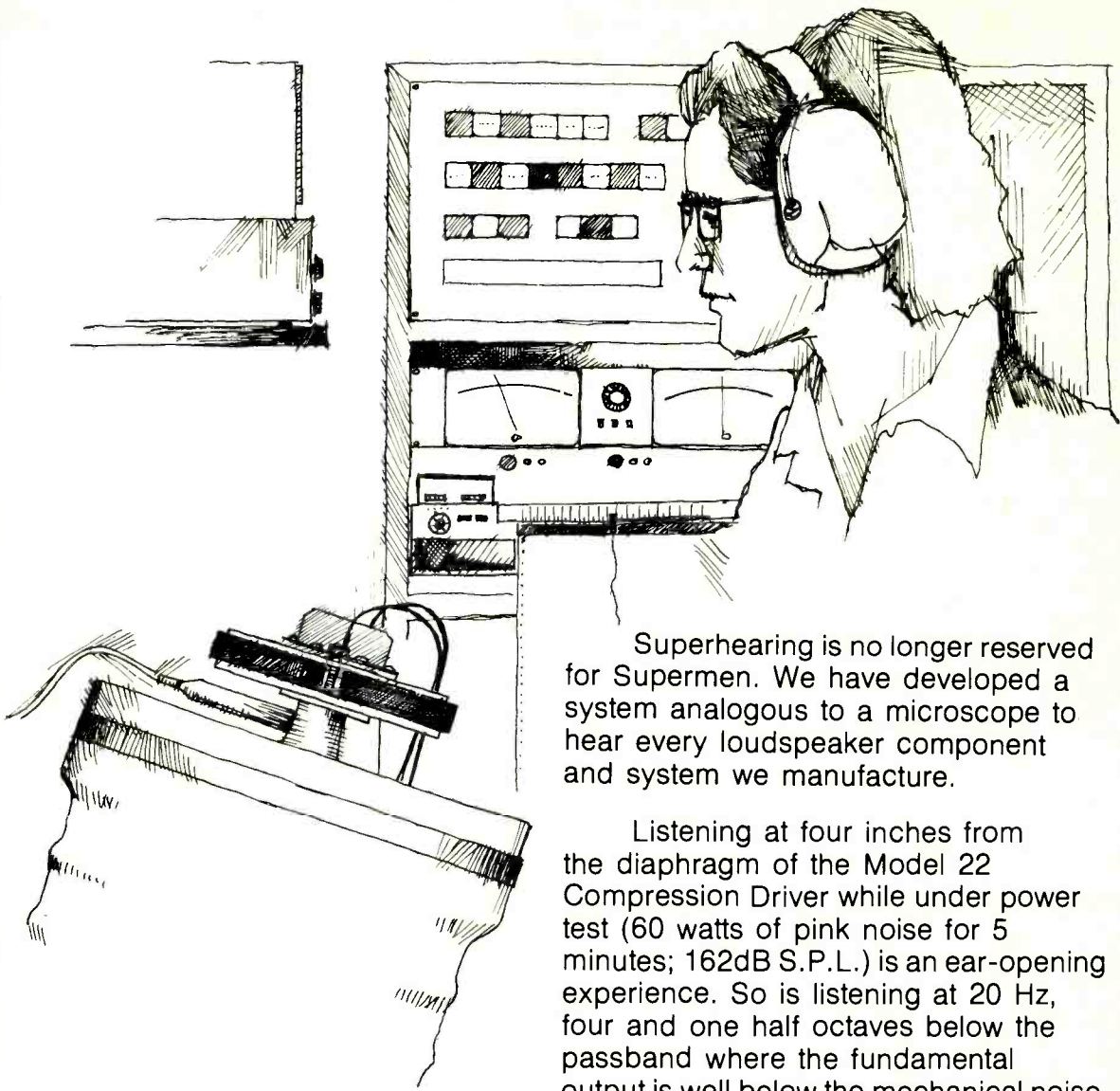
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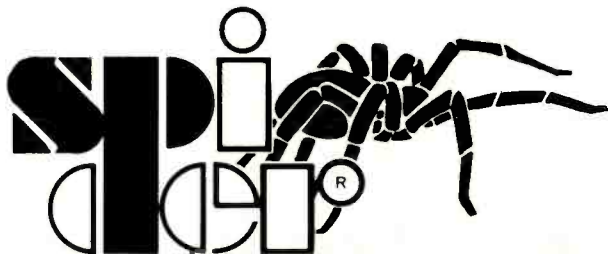
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# Letters to the Editor

## A Recording Experience

Congratulations on the second issue of your fine magazine.

I'd like to relate an experience that I had the other day that I feel may be of use to other recording engineers.

The nice thing about recording is the fact that it is one of the few technical fields that is essential to the creative process and is therefore doubly rewarding. As a recording engineer it is one's job to facilitate the flow of creative ideas onto the tape. Being in this somewhat God-like position can pose a problem if the engineer/producer cannot relate to the problems faced by the artist.

I am by no means a musician. However, the other day I had the opportunity to work out on a small versatile synthesizer. This fantastic little device is probably the ultimate in musical expression, and realizing this, I sat down with it in front of all my equipment with every expectation of turning out something interesting.

As you can guess, I did one pass with a few overdubs, and came away with a healthy respect for the technical obstacles that an unfeeling engineer can present to the artist. I also erased the whole mess! Still, it was worthwhile, and I recommend it to all engineers.

Incidentally, I'll be glad to personally answer any question anyone has if they include an SSAE.

—M.C. Rose,  
Chief Engineer,  
Pt. I of II Studios,  
No. Dartmouth, Mass.

## A Different Talkback Answer

In the second issue of *Modern Recording*, George Vondrasek asked why signal on a multi-track tape machine can't be transferred in sync to an adjoining track. The answer is that they can, but not on all machines. Whether you can or cannot transfer adjacencies in sync depends on the brand of machine and the construction of the record heads. Based on experience with two different brands of multi-track machines we have had at our studio, I have found

that with Ampex it's almost impossible and with MCI there is no problem. As a matter of fact, with our JH-10-16 not only can you transfer from track 6 to 5 or 7, but you can transfer IN SYNC both tracks 5 and 7 to track 6 and still have almost 10 dB of headroom before feedback.

—Bill Vermillion,  
Bee-Jay Studios,  
Orlando, Fla.

## Correction

For the sake of accuracy I would like to point out a misprint that occurred in the Dec/Jan issue of *Modern Recording* (Vol. 1, No. 2). In my article, "Building Your Own Recording Studio," a table entitled *Basstrap Construction* appeared on page 32. The last column heading in this table should have been labeled "1-inch Plywood"—not "1-inch Linoleum." Thank you.

—Jeff Cooper  
Hollywood, Cal.

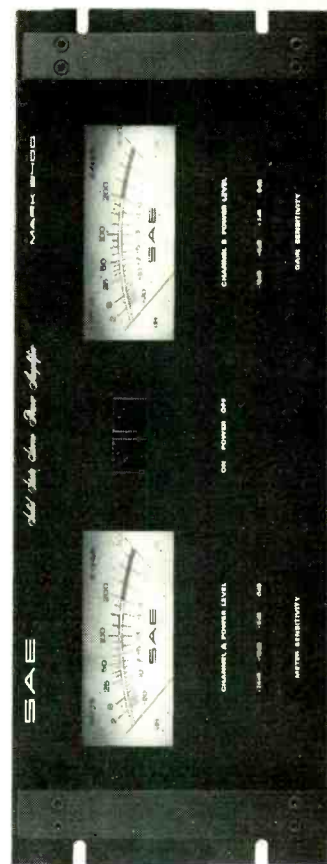
## Mobile Recording

I read a copy of your first issue of *Modern Recording* and enjoyed it very much. I think your magazine dealing with the recording industry is valuable as a source of information as well as interesting reading. I particularly liked the article on *Grand Funk* and the "live" aspects of recording, and the *Loggins and Messina* article about on-location recording.

While in Boulder, Colorado, recently, I heard a "Centennial Almanac" Composition which was written by Dave Grusin, (jazz pianist/composer and music writer for the film *Three Days of the Condor*), who performed along with the choir and orchestra of the University of Colorado. This production was recorded by Viking Studios, Ltd., a Denver-based studio, and the sound was amazingly clean, especially for a "live" recording. Because of my interest in recording techniques the Viking personnel wel-

Continued on p. 72

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# TALK BACK

*"Talkback" questions are answered by professional engineers, many of whose names you have probably seen listed on the credits of major pop albums. Their techniques are their own and might very well differ from another's. Thus, an answer in "Talkback" is certainly not necessarily the last word.*

*We welcome all questions on the subject of recording, although the large volume of questions received precludes our being able to answer them all. If you feel that we are skirting any issues, fire a letter off to the editor right away. "Talkback" is the Modern Recording reader's technical forum.*

## Engineering Career?

I, like many readers of MR, am interested in the engineering side of the music business. I have trained at the Eastman School of Music and at R.I.A., both of which offer excellent courses in professional recording. At present, I am working at Demo Recording Studio, which consists of consumer-type equipment (Sony TC-788 four-channel tape machine, MS-16 board, Soundcraftsman Graphic EQ and so on).

However, this is only scratching the surface when it comes to top-of-the-line professional equipment and experience. At present, I am not even remotely connected with a professional multi-track studio.

Therefore, I would like to know how and where I must go to receive the concrete experience I need to get into professional recording? How do I go about finding multi-track studios that may be interested in trainees to start off doing any odd jobs? Where are the new studios springing up and studios that are in the process of expanding and will be seeking the aid of addi-

tional personnel in the training stages of audio engineering?

—James R. Heldwein  
Buffalo, N.Y.

From what you say, it appears that you are already on your way to working at a larger, better-equipped facility. One has to start somewhere and there are many people who would like to be in your present position. An engineering career takes great patience and much pounding the beat in order to get involved in what you consider a good situation.

The only listing of studios available is the *Billboard International Director of Recording Studios*, available from *Billboard* magazine, 9000 Sunset Blvd., Los Angeles, Cal. 90069. It gives as good a picture of professional studios as is possible, short of searching through every telephone book in the United States and Canada. Pick a region and start calling and writing to each and every one. Good luck.

—Chas Farrell-Kimbrell,  
R.I.A.,  
New York, N.Y.

## Computerized Mixdown

Will the advent of computerized mixdowns take away much of the human aspect of mixing sessions, or will the job of the producer and mixing engineer stay essentially unchanged?

—Chano Sevilla,  
Bronx, N.Y.

A mixdown session requires three basic ingredients in addition to the completed multi-track master tape. The first is the producer's concept of how the finished song should sound, and the second is the engineer's knowledge of which control devices (faders,

EQ, limiters, etc.) must be used to convey the producer's concept. Naturally, there is an overlap between these two items, as the engineer will often give the producer ideas to add to a song's concept and the producer will often suggest the use of certain control devices to the engineer. It is the combined ideas of these two people which determine the *intended* sound of the final product, and it is in this area that human creativity takes place.

The *actual* sound of the final product is the result of the third ingredient in a mixdown session: the application of the engineer's knowledge through the setting of switches, knobs and faders on the audio control devices. The appropriate level, EQ, limiting, panning, echo, reverb, etc. devices are set for each track at the beginning of a song, and in a simple mix perhaps the positions of several faders will be varied during the course of the song. In a more complicated mix such as one which uses many special effects or one which requires that imperfections in the recording be corrected during mixdown, several or even all of the control settings will have to be varied in a precise way and in a precise sequence. If there are so many changes that the engineer cannot remember them all, or if more than two hands are required to manipulate the controls adequately, the producer, musicians or others in the control room may be called on to vary one or more controls at certain times. Unfortunately, this often results in such confusion that many attempts are necessary before each person completes his task accurately. Even more unfortunately, the producer and engineer become so involved in performing their mechanical tasks that they cannot determine if the others performed properly without hearing a playback of what was just

done. It is this aspect of mixdown sessions that computerized mixdown will change.

"Computerized mixdown" can be better understood if we substitute the phrase "computer-memory-assisted mixdown." A computer memory bank is used to assist the memories and physical dexterities of the engineer and producer. The computer makes no decisions about the sound or concept of the song. It merely accepts the decisions made by the producer and engineer about control settings or changes in settings, and repeats them *exactly* as the engineer did, while permitting the engineer to modify his previous control settings or concentrate on other settings required to produce the desired effect. Thus, the only human aspects lost through computerized mixdown are those which prevent the engineer and producer from achieving the desired mix—namely, limited memory and dexterity.

One caution is necessary, however. Because memory and dexterity have been freed from human limitations, further demands are made upon the judgment of the engineer and producer. With the capability of riding levels, EQ, etc. on each and every track of the multi-track master comes the potential of over-controlling and ruining a good recording, as well as the potential of achieving the "ultimate mix." Fortunately, the upcoming generation of computer mixdown systems will permit the control settings for many different mixes to be saved as insurance against losing a good mix made early in the session.

Robert E. Runstein,  
Author,

*Modern Recording Techniques*

## Punch-in and Faders

I have recently been faced with two questions: (1) What is punch-in? How necessary is it? (2) What are "faders' " functions?

—Chris Scapelliti  
Farmington, Mich.

Modern pop music recording is a process of creating an illusion. The sound the public hears on a final "mixed" record is often created from a series of closely-miked sounds, recorded separately and often at different times rather than all together, then corrected in level, equalized, limited, and

positioned across the "stereo" or "quadraphonic" stage between the speakers. In this manner the illusion that the musicians are coming across with tremendous clarity and "presence" is created—as if they were all standing in a straight line across the stereo field, not at all the way the human ear would hear them if they were all playing together in a room.

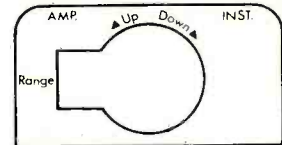
"Punching in" is a vital part of this process. It involves the insertion of additional program material into an already-recorded track on a tape. To punch in, one must be able to hear (1) what was recorded up to the moment the "punch" is made and (2) the new material added onto the track.

Let's say a vocalist is overdubbing his lead and does an excellent take up to the 17th bar of the song. He then makes a mistake. The producer has the option of recording another take on another track, if one is available, or of keeping the good part and inserting a new continuation from the 17th bar onward. Modern multi-track recorders allow one to listen to previously recorded material in "sync" (synchronization) with the other tracks, by playing off the record, rather than the playback head. If one listened to the other tracks off the playback head and then inserted a punch-in on one track, the timing would be off due to the distance between the record and play head on the machine.

At the moment the punch-in is made, the record button for that track is pressed, the recorder switches to record, and the output of the recorder to the console also switches to the "input" mode, so that the new material may be heard as it is being recorded. This allows the performer to hear his earlier take right up to the moment of punch-in, then to hear what he is presently adding. The whole switching operation occurs in a split second, allowing very "tight" punches. Modern machines also employ some sort of bias buffering or circuitry to prevent the sharp click transient of the bias amplifier turning on when the record mode is engaged.

Punching in on multi-track recording is one of the most useful and often necessary features of today's modern techniques. It allows the artist great freedom and the ability to experiment with the knowledge he can correct or change his interpretation at any time in the future, while retaining the best parts of each performance.

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(2) A fader is a continuously variable attenuator used to pass a signal from one source to another. It is a passive device, meaning that it cannot add level to a signal coming into or out of it. In simple terms, a fader is a volume control, and most faders are either rotary-type, which operate by turning the control in a circular direction, or straight-line, which move up and down in a straight line. Straight-line faders are preferred by most recording engineers as they are easier to operate in simultaneous groups and allow precise and delicate changes in volume. Straight-line units are slowly replacing rotary faders on many home stereo components, but they are most commonly found on recording consoles, at the input stage, to control the level of individual mics or line inputs.

The term "fader" may well have been derived from the "fade," in which a signal is gradually attenuated to infinity, or total silence, often at the end of the mix on pop music material.

—George Klabin,  
Freelance engineer,  
New York, N.Y.

### Miking Leslie Speakers

Could you please describe the best way to mic a Leslie speaker and what mics should be used in a "live" situation?

—Dan Wilson,  
Houston, Tex.

Due to the nature of the beast, Leslie units are usually a problem in and of themselves. My experience has always shown the primary problem to be a mechanical one of the device itself. Since most mechanical devices are less than perfect (Murphy's Law), they tend to generate a substantial amount of unwanted noise. No amount of adjustment or oil ever seems to correct the problem and the noise is ever-present at the mic, right along with the desired signal.

Secondly, we are faced with low frequency information produced by the rotation of the speakers. This frequency will vary with the setting on the speed control of the Leslie, but tends to be around 100 Hz. In the case of one unit I know, the rotational speed is from 60 to 350 rpm, giving us a generated frequency of 120 to 700 Hz. It is double the rotational speed because of two speakers on the shaft.

Thirdly, the physical motion of the

speakers creates some strong SPL in the areas we want to place our mics that could and *does* cause "puffs" and hence distortion from the transducer. Cabinet structure is of some help in reducing the intensity of these strong wavefronts, but a Leslie is frequently miked with the back panel removed, so the problem still exists.

You see that I feel the problem to be one of eliminating unwanted sound, as opposed to picking up the signal itself. With this in mind, I like to work back from the unit, utilizing a condenser such as a Neumann U87 or U86, and strike a good balance between the upper and lower speakers by mic placement and speaker amplitude adjustment. This takes a little doing, but will provide excellent results.

The maximum mic distance from the cabinet is also governed by the bleed problem from other sound sources (e.g., drums, screaming guitars, etc.). When separation of the mid-hi and low frequency information requires a two-mic set-up, I tend to stay away from condensers, because of their excellent low frequency response characteristics. My choice for close miking is usually a dynamic mic such as a Shure SM53 or Sennheiser 441-U. These are placed near the louvers on the side, for the top mic, and in the rear, which is usually open anyway, near the vertical center of the speakers. I also utilize low frequency roll-off if necessary, to further reduce puff and noise problems.

—Skip Frazee,  
Sound Techniques, Inc.,  
Dallas, Tex.

### Teac Track Capabilities

I recently purchased a Teac 3340S four-channel tape deck, and while my recording at home has been limited to record discs and pre-recorded tapes, I someday hope to do some "live" recording.

Meanwhile, I would like to know if it is possible for me to take a tape recording that I made on tracks 1 and 2 in the same direction and transpose or re-record track 2 onto track 3 on my Teac so that upon playback through my Marantz 4430 Quadradial receiver I would be hearing stereo on tracks 1 and 3.

I've been through my instruction manual, and it does not mention the possibility of simultaneously playing

track 2 and recording track 2 on track 3. I've done some experimenting, but still cannot accomplish this task. The only other alternative would be for me to acquire another tape recorder and by playing back tracks 1 and 2, patch into the second recorder in tracks 1 and 3—but only if my Teac is not capable of this feat.

—Eric Fussell  
Palmdale, Cal.

Yes, it is possible to move track 2 to track 3, but it will be out of sync with track 1.

The 3340S has the capability to record or playback on each individual channel simultaneously. This means you can play the *line out* on track 2 and connect this to *line in* on track 3.

Since the playback head is physically located in a different place than your record head, you will be out of sync or slightly behind on the relocated track. You could transfer in the simul-sync mode, but the playback response off of the record head will degrade track 2.

I suggest that you borrow a quality quarter-track machine, and transfer the cuts in question to this machine. Tracks 1 and 3 on the 3340S are compatible with left and right on a standard quarter-track tape recorder.

When you play this tape on your 3340S, the audio will appear on tracks 1 and 3.

—Theo Mayer,  
Teac Corp.,  
Montebello, Cal.

### Snaring a Snare

What effect would be produced by double-miking a snare drum (over and under) and why (if ever) would such a method be used?

—John Torvald,  
Birmingham, Ala.

You asked the question backwards. First you have to know why one would ever want to do such a crazy thing in the first place—or, for that matter, why one mics any drum in the four million different ways to mic a set of drums. In this case, the answer might be to get a fatter sound or perhaps to get more of a snare sound (snare the sound of a snare?)—I'm sorry I wrote that.

Anyway, let's say that the snare sounds too "dead" and there just

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CIRCLE 62 ON READER SERVICE CARD

aren't any highs to add through the EQ process. (You must have heard a snare that sounds as if it were made in a pillow factory.) So the only way to get that snare sound is to mic the snares from the bottom. But more often than not you get a thin sound from that perspective and tend to lose the attack. So you put a mic back on the top again to round out the sound.

You may have the opposite problem—that is, not a fat enough sound. By miking it from top and bottom you should get a more gutsy sound. The slight time difference it takes for the top head to make the bottom head resonate is enough to fill in a lot of holes and beef up the sound.

You can actually spend an hour or two miking a set of drums before you come up with the right combination of mics and techniques. Sometimes, the only thing that works is to throw out the drums and buy new ones. Then again, of course, the main problem could be that there is an idiot on the wrong end of the sticks . . . in which case nothing works.

Oh, by the way, if you mic a tom or any drum that is open on the bottom, you should put the bottom mic out of phase with the top mic or else backwash from the back of the head will cancel out what the top mic is picking up. If the drum has two skins, leave the mics in phase, as you are essentially miking two different instruments that are doing the same thing.

—Dave Moyssiadis,  
Frankford/Wayne Recording Labs,  
Philadelphia, Pa.

## Recording in the Wilds

Congratulations on MR Magazine! The story in the first issue on the mobile recording van (Loggins & Messina) hit close to home, as far as the idea is concerned.

I have been trying to put together a portable field recording system (back-packable), in order to tape various "wilderness sounds" for background effects in studio recordings.

*My problem is this:* Nobody has been able to give me a straight answer about selecting the right recorder for the job!

I was considering a Nagra III (used), but was told that the equipment specs are not reliable since they are not measured from a recorded tape. It is also a heavy-weight machine.

I was considering a Uher, but was told it had a poor track record mechanically. It is small, and a light-weight machine.

I was shown a machine called a Stellavox . . . which was way out of my price range!

I even tried out a couple of little Sony portables, but they didn't seem to be very rugged or have the specs I was after.

In any event, I still have nothing and still need to make the field recordings. I want to stay with a quarter-inch format.

What do you suggest or recommend in this situation????

—A.F. Bischoff  
San Jose, Cal.

You state that your problem is that nobody has been able to give you a straight answer about which recorder to use. Indeed, that is your problem, because only you can select the machine that satisfies your needs, not only in terms of performance, but in size, weight, features and format. What you need is a reputable dealer who can guide you as to which machine offers what. He can't tell you, though, whether you should use the recorder with the built-in limiter, or the one which is lighter, or the one which is 2 dB quieter. All recorders are a compromise of performance, features and price. You must determine which manufacturer had you in mind when the machine was designed.

For as many people that tell you that a specific machine has a bad track record, there are an equal number that swear by the same machine, just as some people like Chevys and some like Fords. The person who disliked the Uher might have gotten a "lemon," or perhaps the machine did not meet his specific needs, but that does not make it a bad recorder, and you should not necessarily rule it out based on his comments alone.

To get to your dilemma specifically, you do not state the weight and size that the machine must be, or how good the "specs" must be, or at what point your wallet actually dries up. If I were in your situation, I would use Nakamichi's 550 portable cassette recorder. Especially out in the field, cassettes take the hassle out of manipulating tapes; plus, the machine has left, center and right microphone inputs, as well as a built-in limiter. The performance is excellent, and Naka-

michi now offers monitor headphones, and electret condenser microphones to complete this portable recording system. The machine is not lightweight, but it and the system are certainly back-packable.

Whether the Nakamichi or any other recorder can meet your specific needs can only be determined by you.

—Michael "Tapes" Colchamiro,

—Michael "Tapes" Colchamiro,  
Freelance engineer,  
Roslyn, N.Y.

## Lab Test Terminology

I am an apprentice audiophile, so to speak, and find it a truly awkward position to be in. I read all the audio magazines but find myself getting hopelessly bogged down in terminology—especially when it comes to equipment profiles. Isn't there some way I can learn to translate all those tests and charts? As it is right now, I find I'm only second-guessing.

—Regina M. Mullen  
Bronx, N.Y.

Obviously, test reports are written for serious audiophiles who understand intermodulation distortion and who can discern the finer points of frequency response curves, and it will take more than a few words here to explain the meanings of all the terms you're likely to encounter in one. I've written full-length articles on the subject, and most audio handbooks devote a fair amount of space to definitions and explanations of terms.

But don't let that scare you off. You can get lots of information and two informed independent opinions from each *Modern Recording Lab Report*. Firstly, there's the name and model number of the product, then a photograph of it. Next follows a general description of the unit, covering its more important features, overall operation and any points of special interest. You don't need an engineering degree to determine what the machine does and how it does it.

Next come the actual test results, and here it certainly helps to know what a frequency response curve looks like and how distortion is measured. Get yourself a good audio primer, do some homework and you'll have no trouble with this section. Next comes separate comment from our two audio critics, a unique feature of *Modern Re-*

cording. Neither N.E. nor L.F. is shy about telling what they think of a particular piece of equipment, and why. You don't need an audio dictionary to comprehend most of the dialogue between them.

Finally comes the heavy technical stuff, the actual test measurements. Again, you have some homework to do, and books like Norman Crowhurst's *Basic Audio* (John F. Rider Publishing Co.) and *Hi-Fi for the Enthusiast* by M.L. Gayford (Tab Books) will help you do it.

—Robert Angus,  
Audio Editorial Board

### Syncing the 3340 and Reverb

(1) Is there an inexpensive device or electronic "invent" that can sync two or more Teac 3340's without using up tracks on the tape—thereby creating an 8-track, etc.?

(2) Also, what is the best type of reverb—plate, spring or electronic—and who manufactures these devices?

—Dennis Link,  
Vineland, N.J.

(1) Sorry, no. There are no inexpensive or expensive devices on the market that will sync a 3340S with another without using a track on the machine. Automated Processes Inc. (API) has a sync device that writes a time code on both machines, but this is not a practical answer to your question. You should explore the 8-track half-inch format machines. There are two companies offering this type of machine; I suggest you write to Teac's Tascam Series and Otari for information on these machines.

—Theo Mayer,  
Teac Corp.,  
Montebello, Cal.

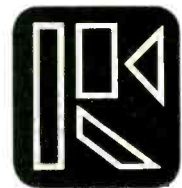
(2) How about none of the above? Or how about all of the above? Questions like this always put me off a little. What is the best camera? . . . microphone? . . . automobile? . . . food? It really depends, doesn't it? What are you trying to do? Do you have 4½ kilobucks or 50 for a chamber? Echo devices range in price from thousands to well under a hundred dollars. They range in weight from hundreds of pounds to a half-pound. They require 10 to 20 square feet of floor space to a few square inches.

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The Gimp™ preamp/mixer provides performer control over both voice and instrument channel gain and balance within easy arms' reach. It can be carried in your pocket, or on your belt, or mounted to the mike stand using clamps included. It has maximum gain of 30 dB and will drive up to 500 feet of line without noise pickup or high frequency loss. It gives excellent results with any mike or instrument pickup, even inexpensive ones. It lets you record multiple sound sources without using a mixing panel, and you can drive any amplifier or recorder with it. It is powered by a single transistor radio battery and weighs less than one pound. It is available from music and audio dealers, or you may order direct from manufacturer at \$69.95 plus \$1.25 for shipping. Or write for detailed product information.

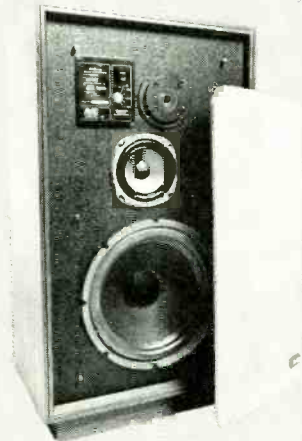
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## The Avid 103.

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CIRCLE 34 ON READER SERVICE CARD

You might expect a considerable difference between a \$50 spring and an almost \$5,000 plate system. You won't be disappointed. There are some springs in the kilo-bucks region that many say are comparable to the plates or even better.

EMT is the manufacturer of the two plate systems in general use. Almost everybody makes spring units, from the large elaborate AKG units down to the very simple and inexpensive springs often associated with organs,

guitar amps, etc. Of the two, the most common, most used and generally the standard of echo devices are the large EMT steel plates.

None of the devices is as natural as real reverb. Surely any reasonable recordist can find a place to put a speaker and a microphone which is rather reverberant. A back hall, large bathroom, entranceway, stairwell . . . any of these may be utilized to create a wider range of useful reverb sounds than any low-priced spring unit, and

sometimes than *any* unit. I recently listened to a tape brought in by a student which had a very subtle and appealing vocal track. It sounded like a group of singers with some very gentle equalized echo and perhaps just a hint of phasing which sounded as if it might have been generated by a digital delay. It turned out that the whole session had been done in his home, with two vocal overdubs having been recorded in a front hallway in two differing positions. There were only two singers. It sounded great, like a studio set with special mixdown effects.

Instead of worrying about how to get a fairly good imitation reverb box, why not do a little experimenting? Spaces and microphones are abundant and relatively inexpensive. Besides, everybody is using the plates and who says you can't create your own sound?

—Ed Rehm,  
The Ken Nordine Group,  
Chicago, Ill.

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### Custom Pressing 45's

Can you give me the approximate cost breakdown of having a demo tape pressed into 45's?

—John Kelly  
Salem, Mass.

The answer to this question has many variables—one of the biggest ones being money, the next being quality.

First, you must take your demo tape to a mastering lab, where the actual tape-to-disc transfer will be made. The end product is the master lacquer. Now the variables begin. You can go to a mastering lab that puts your tape on the playback equipment and does a straight transfer. Whatever is on your tape will go onto your disc (along with some added hiss, etc.; you're lucky if that's all that's added!). This is the cheap way, costing you between \$10 to \$15. Or you can go to a lab which specializes in only mastering, where they can doctor up your perfect mix with EQ, limiting, echo, etc., making it sound much better than it was, then transferring it to the master lacquer. This is the recommended way, if quality is most important. But it can cost between \$20 to \$30 per side. In addition, some labs charge you for the time it takes to get the right EQ. This can cost between \$30 to \$70 per hour, depending on the lab.

CIRCLE 47 ON READER SERVICE CARD



Once you have the master lacquer, you must then take it to a plating plant, where they make the metal parts from which your records will eventually be pressed.

There are two processes from which you can choose. The first is called the "one-step" process, and ranges in price between \$10 to \$20. But the resulting parts are good for only 1,000 records before you begin to lose quality. The second way is called the "three-step" process, in which the price ranges between \$20 to \$30 per side. From these metal parts you can press as many records as you wish.

These plates are at long last taken to your favorite pressing plant, which will then proceed to take whatever money you have left. Plants which use 90% to 100% vinyl make the best pressings. This could cost you about 13c to 20c per record, depending on the quantity pressed. The more records pressed, the cheaper per record the cost. A plant which uses a lesser grade of vinyl costs proportionally less, but the quality decreases accordingly in the form of surface noise.

You must also get labels printed for your records. The cost varies greatly depending upon how wild you go with colors, pictures, etc. Last, but not least, you can also figure in shipping, if needed. As you can see, it's all up to what you can afford, or should I say how much you *can't* afford.

—Stewart Jan Romain,  
Frankford/Wayne Mastering Labs,  
New York, N.Y.

### Acoustical Separators

With the advent of multi-track recording came close miking and the use of acoustic separators. Sole reliance on separators to control leakage may cause more problems than they solve. It is very possible that reflections from a panel, divider or whatever may severely degrade the frequency response of the instrument being recorded. My thoughts are: use separators if needed "with care." What are yours?

—Tim Zweig  
Minneapolis, Minn.

You are certainly correct in your assumption that separators or baffles affect the frequency response of the instrument being recorded. Almost invariably, these alteration effects are

experienced at specific frequencies whose wavelengths are multiples of the distance between the baffle and the microphone itself. These effects are especially pronounced when the baffle is reflective in nature (wood, glass, etc.).

To minimize the effect of baffles on the recording, I would suggest the following:

- (1) Locate instruments and microphones in a manner that reduces the need for excessive baffling *in the first place!*
- (2) Use cardioid or super-cardioid

microphones at close range when isolation is critical.

(3) Cover any baffle surfaces with an absorptive treatment of fiberglas or mineral wool.

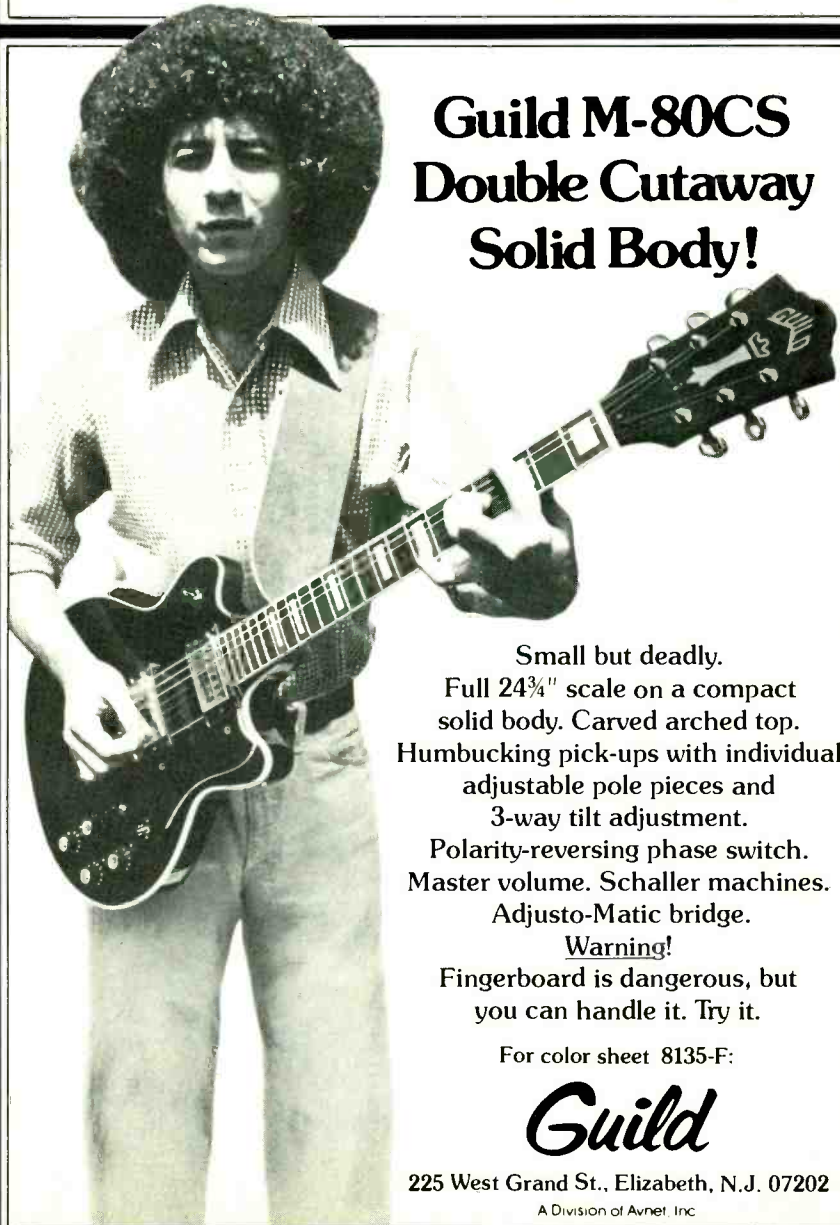
(4) Place adjacent baffles in such a way that they are not parallel.

(5) Locate all microphones off-center with respect to surrounding baffles and walls.

—Jeff Cooper,  
Acoustical Consultant,  
Hollywood, Cal.



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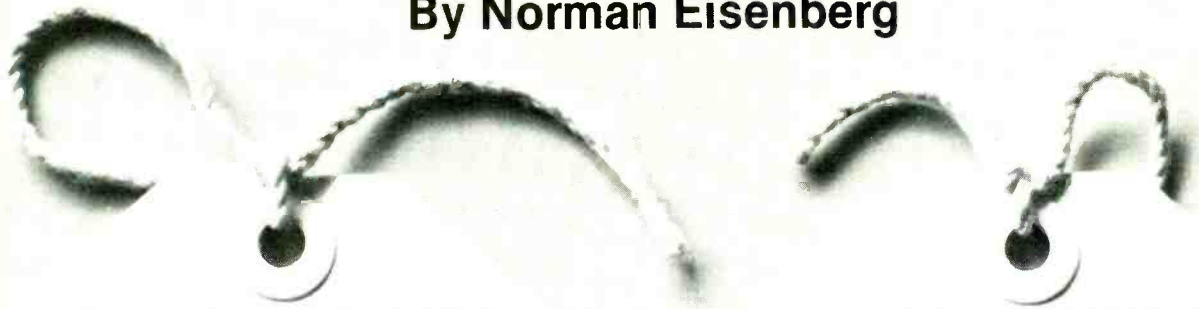
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# THE **PRODUCT** SCENE

By Norman Eisenberg



## VERSATILE NEW LIMITER

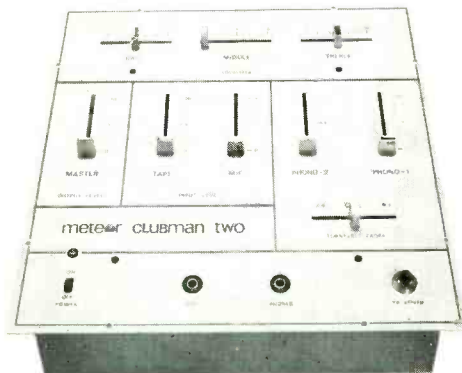
Inovonics, Inc. of Palo Alto, California has announced a new limiter, the model 201, said to fill any limiting or compression need. The unit—offered for recording, mastering, broadcast, film, sound reinforcement and other applications—features both average and peak limiting functions simultaneously and independently. Front-panel controls are provided and for all functions, including variable attack/release time and response action. The 201, which Inovonics states has a unique open-loop control approach, is priced at \$480 and has a “pancake” chassis design.



CIRCLE 1 ON READER SERVICE CARD

## COMPACT PREAMP-MIXER

The Clubman Two, from Meteor Light and Sound, is a mixer that provides full stereo output from a range of inputs that include phono, tape and microphone. Each input has its own slider/fader control.



The unit also has equalization, overall master volume control, pre-cue and talkover facilities. Meteor offers the Clubman II as a “control center of any disco system, mobile or permanent.” Advertised price is \$499.

CIRCLE 2 ON READER SERVICE CARD

## WORLD SMALLEST?



Uher of America, Inc. has introduced the model CR-210, said to be the world's smallest portable stereo cassette recorder. Among its features are automatic reverse, built-in condenser microphone, self-contained stereo power output stage, internal monitor speakers, automatic bias-switching for chromium-dioxide tape, and photo-sensitive electronic control of the transport mechanism. Its versatile power supply enables the CR-210 to be operated on internal batteries, external AC line or the 12-volt systems in vehicles. The unit measures a mere 7 inches wide by 7 inches deep by 2 inches high and is priced at \$605.95, including carrying case. It will record and play in either stereo or mono. With CrO<sub>2</sub> tape, response is listed as 20 to 16,000 Hz; signal-to-noise at 58 dB. Less than 0.12 percent wow and flutter (RMS) is claimed.

CIRCLE 3 ON READER SERVICE CARD

## OPEN-REEL SPLICING AIDS

From the 3M Company there's a handy little kit of pre-cut splicing and sensing tabs for use with open-reel tapes. Both kinds of tabs come in proper length on easily released “butterfly” liners. The adhesive is said to be new and stronger than in the past for added holding power without stretching, ooze or drying out. The tabs, for use on ¼-inch tape, come in compact folders that contain instructions for use. Cost is \$1.25 for either 36 splicing tabs or 18 sensing tabs.



CIRCLE 4 ON READER SERVICE CARD

## TWO FROM TAPCO

Tapco (the letters stand for Technical Audio Products Corp.)—a firm based in Edmonds, Washington—has announced two devices. The model 2200 is a graphic equalizer designed for recording, sound-reinforcement and hi-fi applications. The unit's two independent channels offer  $\pm 15$  dB equalization bands, output level meters, controls, balanced inputs and outputs (as well as single-ended inputs and outputs), and EQ in/out switching. With its built-in line drivers, the model 2200 also may be used as a booster for weak signals. Physical design permits rack-mounting, and the frequency range covered is stated as within  $\pm 1$  dB from 10 to 40,000 Hz. List price is \$289.



The firm's model 4400 is a reverberation system that provides two completely independent channels for recording, sound-reinforcement, and general hi-fi use. With a built-in graphic equalizer in each channel, the model 4400 permits the operator to duplicate room-reverb quality by way of adding a spatial dimension for more realism in recording. The heart of the 4400 is a delay system fed by a variable-gain input amplifier (monitored by a meter) and feeding through a mix control and a variable-gain output amplifier. The mixing control permits blending the "dry" signal with the delay signal. The model 4400 is operative within  $\pm 1$  dB over the range from 10 to 40,000 Hz. List price is \$389.

CIRCLE 5 ON READER SERVICE CARD

## ESS OFFERS HEIL "AMT" HEADPHONES AND A NEW AMPLIFIER

The "air-motion transformer" type of sound reproducer—invented by Dr. Oskar Heil and featured in the line of speaker systems from ESS of Sacramento, California—serves as the diaphragm in a new headphone set from this manufacturer. The headphones connect to an amplifier's output via an adapter (supplied). Weight (less the 14-foot coiled cord) is 14 ounces. Earcups are padded, although the headset's "open-air" design does not isolate the wearer completely. Response is rated from 20 Hz to 20 kHz; distortion at 1 kHz is given as 0.3% for 90 dB/SPL. Impedance is 32 ohms. Sensitivity is 35 dB/SPL for 1 millivolt input; maximum input is 14,000 mV. Among the performance claims made for the headset that might be of special interest to MR readers is its ability to



"fully spotlight program mixdown characteristics."

ESS also is bringing out its own stereo basic amplifier to join the growing roster of super powerhouse amps. Known as the Series Eclipse 500, the new amp, listing for \$479, is rated for 250 watts minimum continuous power per channel (both channels driven into an 8-ohm load) with no more than 0.25% THD from 1/4-watt to full rated output. Two meters adorn the front panel and pushbuttons select their ranges. The amp also has speaker system A and/or B selector switches. In addition to a rear-panel power switch, the amplifier may be turned on and off from an external preamp or tuner.



CIRCLE 6 ON READER SERVICE CARD

## BURWEN OUTBOARD EQUALIZER



Described as a Frequency Extender-Equalizer, the Burwen model EQ3200 is said to combine the advantages of a graphic equalizer with a set of non-interacting tone controls. There are three basic groups of stereo (dual channel) controls. One group of five twin sliders handles low frequencies; another, the midrange; and the third group, the highs. The low-frequency group—called a range extender—consists of five pairs of peaking controls; the middle group—called the program equalizer—contains five pairs of sliders for tilting the frequency response. The high-frequency group also is called a “range extender” and contains five pairs of sliders for peaking control. Most of the high and low range extenders can provide up to  $\pm 10$  dB; the 16 Hz and 24 kHz sliders can provide up to  $\pm 15$  dB. The unit also has a sharp filter at 35 Hz (18 dB/octave) for reducing turntable rumble. List price is \$1,095.



CIRCLE 7 ON READER SERVICE CARD

## TWO HEIL SOUND MIXERS

Heil Sound (of Marissa, Illinois, and not to be confused with the Heil associated with ESS) has announced its “Six-Pac” portable sound-reinforcement mixer, listing for \$499. Designed for small P.A. systems as well as for recording work, keyboard and broadcast applications, the unit features six inputs with slide volume controls, attenuators for  $-10$  and  $-20$  dB, two outputs, eight studio-type in-line faders and selectable input pads. EQ is given as  $\pm 18$  dB at 80 Hz and at 5 kHz. Buss outputs are mixed so that several units may be stacked. An outboard power supply is said to assure minimum hum and noise. Separate main and monitor VU meters are provided, and output levels go up to 7 volts RMS into 600 ohms. A Heil sound system (known as the Troff—an amplifier-speaker setup including the Six-Pac) was used by The Who during their 1973 fall tour when they introduced “live” quadraphonic sound.

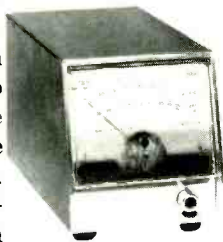


Heil Sound also announces the HM-1000, said to be the most professional mixer in its price class. A ten-input, two-way stereo device, it is loaded with features including balanced Lo-Z and unbalanced Hi-Z inputs, variable mic attenuator coupled to overload L.E.D.'s which monitor input distortion levels, stereo pan pots, echo-send control, monitor-send control, modular plug-in channels, stereo full-range outputs, stereo line inputs, monitor and echo masters, mono echo return jack, in/out switching jacks for insertion of equalizers, limiters or compressors, two 2-inch VU meters for monitoring stereo outputs, buss line inputs to monitor and echo lines, and a stereo two-way 800-Hz electronic crossover. Treble and bass controls provide 18 dB of boost or cut. The power supply is outboard in the interest of low noise. The HM-1000 is priced at \$1,250. Heil offers a variety of equipment for recording, broadcast and professional sound systems, including smaller mixers and high-powered four-channel sound systems.

CIRCLE 8 ON READER SERVICE CARD

## DBX OFFERS NEW METER

dbx, Inc., of Waltham, Mass., is offering its model 81 Extended Range dBm Meter as a means of measuring noise in professional audio systems "without elaborate laboratory instruments." The meter covers the dynamic range from -70 dBm to +10 dBm on a single scale. Percentage markings allow wide-range modulation monitoring, and the readout is given in true RMS values. Measuring 4 by 4 by 7¼ inches and weighing 3 pounds, the model 81 is battery-operated and costs \$200. The model 81W (\$225) has an extra jack that adds 40 dB to the scale, thereby covering the original range plus the range from -30 dBm to +50 dBm. The model 81T (\$235) is similar to the 81W except for a 6mW-500 ohm reference (0 dB = 1.732 V).



CIRCLE 9 ON READER SERVICE CARD

## ORBAN/PARASOUND EQUALIZER

Continuously variable control of center frequency, bandwidth, and amount of peak or dip highlight the model 621 Parametric Equalizer from Orban/Parasound which is announced as the first low-cost equalizer to provide "almost limitless freedom to 'tune' the sound until it's exactly right"—in contrast to discrete frequencies, stepped amounts of boost or cut, and pre-fixed bandwidth. Applications for the device include its use in recording studios, motion picture sound, broadcasting and sound reinforcement. Briefly, the unit has four peak boost/cut sections, each of which may be used in a number of ways including that of a sharp notch filter. Other front-panel controls and features include gain, input level and overload indicator. Available gain is up to +11.5 dB, and rated response (with EQ controls set flat) is within  $\pm 0.25$  dB from 20 Hz to 20 kHz. Distortion at all output levels is very low; residual is 0.03%. Equalization adjustment range runs from +16 to  $-\infty$  dB. Each channel requires a bipolar 15-volt supply. The single-channel version, model 621/R, is priced at \$439; a two-channel model, 621B/R, costs \$678.



CIRCLE 10 ON READER SERVICE CARD

## QUADRAPHONIC SOUND— FOUR CHANNELS GOING WHERE?

From the standpoint of widespread consumer acceptance, quadraphonic sound is not too far advanced over where it was three or four years ago. The reasons are not too hard to discover. To begin with, the number of conflicting and competing four-channel formats—while providing material for arguments among insiders and fascinating demonstrations at audio shows—has left the buying public slightly dazed and maybe more than slightly teed off at an industry that cannot seem to agree on what should be done, or how.

Several audio firms have tried to market products that accommodate several possible four-channel modes or formats, but the prevailing reaction by the consumer has been something like: "If they're trying to sell me three formats now, where will I be with my new expensive, complex rig if a fourth or fifth quad format turns up?" Besides, there also is a feeling that except in the most carefully designed (and costliest) equipment, the inclusion of several four-channel options implies some kind of compromise of one or all of them.

As for how a four-channel production "should sound," there seem to be as many opinions as there are recording studios. At one extreme is the "subtle ambient enhancement" school of thought which holds that the most relevant use of the rear channels is to lend some kind of "aural flavoring" or "seasoning" to the two main up-front channels. At the opposite extreme is the "ping-pong-ping 2-pong-2" approach that attempts to put completely different signals into the four channels and maybe some "motion" (via panning) between various combinations of channels.

So it would seem that not only is the consumer confused to a near standstill in buying four-channel sound, but that recording personnel also are at loose ends in terms of what kind of quad sound should be produced. The guidelines, as in the past, probably will become clearer eventually—but with consumer indifference to four-channel being what it is right now, it is understandable that the main thrust seems to be a rekindling of interest in good stereo as such. Which may explain, of course, why interest in four-channel tape decks remains part of the present product scene: these decks can be used to make "enriched" stereo recordings as well as straight four-channel tapes.



# MUSICAL

# NEWSICALS

**NEWS...** *Guitar Player* has been a standout musician's magazine for some time and its publishers are coming out with a new bi-monthly periodical: *Contemporary Keyboard* magazine. With an advisory board including Dave Brubeck, Chick Corea, Keith Emerson, Les McCann, Jimmy Smith and Roger Williams, and articles by the likes of Bob Moog, *Contemporary Keyboard* should have a lot to offer (*Contemporary Keyboard* magazine, Box 615, Saratoga, Cal.).

The late Ralph Gleason's book, *Celebrating the Duke and Louis, Bessie, Billie, Bird, Carmen, Miles, Dizzy and Other Heroes*, has just been published by Atlantic Monthly Press Books. As one of the most highly respected jazz critics in America, he was one of the first to champion rock 'n' roll.

Gleason's book is a collection of pieces he wrote over a 25-year period—articles originally published in the *San Francisco Chronicle*, liner notes for albums, essays and critiques for *Rolling Stone* (which he co-founded with Jann Wenner in 1967), and more.

**AMPS...** RolandCorp introduces the Revo Sound Systems for electronic keyboards. The three models of this solid-state speaker system simulate the "rotating sound" through electronic circuitry. They range up to 250 watts RMS and list for \$399.50 to \$995 (Beckman Instruments Inc., Los Angeles, Cal.).

Three new amps from Guild: Model 1 (\$209.50), for guitar or P.A., puts out 30 watts. It has a 12-inch speaker, reverb, tremolo and three instrument inputs; Model 2 (\$259.50) puts out 50 watts through twin 10-inch speakers; Model 3 (\$269.50), suitable for bass, guitar and organ, puts out 60 watts

peak through a 15-inch speaker (Guild Musical Instruments, Elizabeth, N.J.).

Kustom's new XX SRS power amp (\$799) produces 300 watts RMS. It is fan-cooled and has an auto transformer to drive either 4- or 8-ohm sound reinforcement systems (Kustom Electronics, Chanute, Kan.).

**GUITARS...** Gibson's Mark Series of flat-top guitars is on the market after two years of research and development. First, says the company, numerous guitarists were interviewed and voice-graphs were made of fine guitars; then, chemical physicist Michael Kasha (a long-time friend of Segovia) designed several prototypes which were built by master luthier Richard Schneider. The model that scored highest in "balance sensitivity, sustain, cutting power and tone" was strategically reinforced and tested for strength and durability. The regular line ranges from \$399 to \$799, with special models handmade by Schneider coming out soon at \$1,999.

Gibson also has two new electric solid-body guitars: the Marauder (\$349-\$399, depending on the finish), featuring a humbucking pick-up, plus two pick-ups with accentuated treble. The S-1 (\$399-\$479, depending on the finish) has three new hi-frequency humbucking pick-ups. It has a four-position toggle switch, a phase-selector switch and a by-pass switch which allows the rear pick-up to operate independently (Norlin Music, Lincolnwood, Ill.).

Ibanez has come out with the Jazzman line of acoustic/electric guitars. These three guitars, priced from \$450 to \$650, boasting maple body and spruce top, feature two humbucking pick-ups. Ibanez has also resurrected a

Golden Oldie: The Destroyer (\$395), a replica of the old Explorer with korina body and rosewood fingerboard. Also, available from Tama is the model 3571 Dreadnaught-style acoustic guitar for \$595 (Elger Co., Cornwell Hts., Pa.).

**OTHER INSTRUMENTS & ACCESSORIES...** The Lyricon, which looks like a B-flat clarinet and is fingered similarly to a flute or sax, is an electronic instrument which is played through a computer-like console. Timbre, volume, tone color and pitch changes are controlled by breath and embouchure action. It produces a wide variety of sounds over any conventional amp-speaker system and costs \$2,666 (Computone, Hanover, Mass.).

"The Beefer" (\$12.50) is a low-distortion (less than 1%) power booster that can improve an electric instrument signal-to-noise ratio by 8 dB. The "F.S. Clipper" (\$22) is a distortion system that gives low-distortion power boost, normal fuzz. Both units can plug directly into an electric guitar (Flex-Sound, Lancaster, Pa.).

"The Box" (\$49.95) is a solid-state wireless FM transmitter, carried on the musician's belt. It allows the musician freedom to roam 60 to 80 feet from his amp without the restrictions of a cord (Boxmaker Co., Huntington Sta., N.Y.).

The "Univox-Korg Synthepedal" (\$149.50) is the first variable V-C filter with completely adjustable Hi and Lo pass filters (Merson Musical Products, Westbury, N.Y.).

The tripod-mounted humbucker Models 220 and 220C are pick-ups for round-hole steel-string guitars. Both list for \$60 (Rowe-DeArmond Inc., Toledo, Ohio).



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This exclusive engagement will feature our complete product group plus the introduction of two new members.

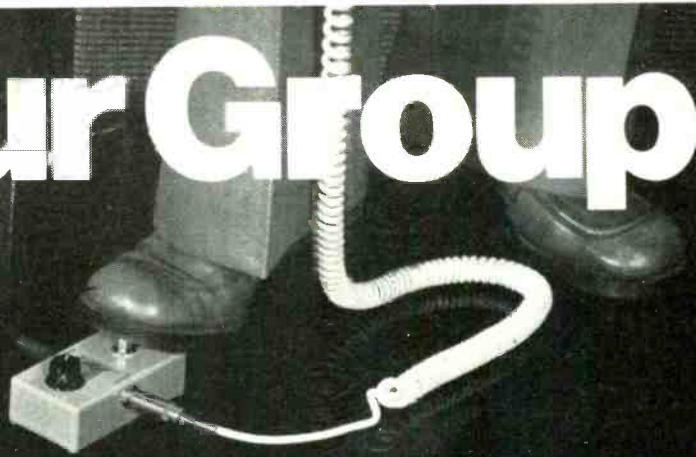


MXR Ten Band Graphic Equalizer



MXR Two Channel Equalizer

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# THE HISTORY OF RECORDING

By Robert Angus

## PART 3: The Telegraphone's Finest Hour

Romance and commercial interest are combined in the plans of the American Telegraphone Company, located in this city, which is manufacturing what is claimed to be one of the most perfect machines for recording and transmitting the sound of the human voice that has ever been invented. Contained in a box not more than 18 inches square, the telegraphone is a complete instrument for taking records of anything from a short conversation to an entire opera, holding them indelibly by steel impression, for transmission in the exact tones in which they were given. For business dictation of letters it is claimed that it will furnish a system perfectly reliable and money-saving. Connected to a telephone it is claimed for it that it will record every word of a telephone conversation, and in this way it has already been of use to Detective William J. Burns in some of his most famous cases.

—*Springfield (Mass.) Daily Republican*,  
Sept. 15, 1912

Thus began a breathless account of the magnetic recorder developed by Valdemar Poulsen some 13 years earlier, the American Telegraphone Company, whose 45-man plant at the corner of Dwight Street and Harrison Avenue was licensed to make it in the United States, and a tantalizing hint of one of the telegraphone's most exciting chapters.

As with so much of the telegraphone story, how the *Springfield Republican* story got into print in the first place is a mystery. For the company's factory had produced only a few dozen functioning recorders by September, 1912, mostly at the insistence of H.P.

O'Reilly and A.M. McCrillis, two Telegraphone stockholders who had set up sales offices for the company in a number of cities. Telegraphone president Charles Dexter Rood had been reticent about publicity on the machines and reluctant to release them—even to customers drummed up by McCrillis and Reilly. So reticent had Rood been about the telegraphone, in fact, that he had threatened publishers of scientific journals and textbooks with lawsuits should they publish anything about the machine, the Poulsen patents, or the principles involved in magnetic recording. The newspaper story thus would have appeared to have originated with the salesman rather than with Rood. And apparently it was one of them who supplied William J. Burns (founder of the detective agency which bears his name) with a recorder in hopes of getting a testimonial.

Burns had been in the headlines for much of the summer of 1912, thanks to a gangland slaying which had occurred some two months earlier in midtown New York. Although the gunning down of gambler Herman "Beansie" Rosenthal had all the earmarks of a simple murder of one hoodlum by others, district attorney Charles S. Whitman was convinced that there was more to it than that. Whitman, an intensely ambitious man, eventually rode the Rosenthal murder to the governor's chair in Albany—with the aid of private detective William J. Burns. And Burns cracked the case with the aid of a telegraphone.

### The Murder Story Unfolds

Here's how it happened. Monday, July 15, had been a typically hot, humid day in New York City. During the evening, it started to rain. At about 8 P.M., gambler Herman Rosenthal, proprietor of the Hesper Club on

West 45th Street, took a cab downtown to call on Whitman.

Beansie, it seems, had a partner in the Hesper Club—one Charles Becker, police lieutenant in charge of Special Squad Number One, a team responsible for ridding midtown Manhattan of gambling and prostitution. Becker had become a partner a few years before when he paid a call on Beansie and informed him that henceforth the Hesper Club wouldn't be bothered by police raids. Beansie wasn't too thrilled with the arrangement, but since it was a common one in the neighborhood, he put up with it. Soon, however, Becker was demanding a bigger slice of the action. When Beansie demurred, the police raided the club. Rosenthal stood firm. The next time the police came, they smashed the fur-



Herman "Beansie" Rosenthal  
"Gambler Talks"

nishings. Then Becker moved a patrolman into the Rosenthals' apartment on a 24-hour basis. Finally, the gambler gave in.

Becker, the police department, and the city administration which tolerated this kind of goings on were all Democrats, minions of Tammany Hall.



The district attorney, however, was a Republican elected on a program of reform. He'd heard that Rosenthal had a big mouth and had made overtures to him. But until the cops smashed up his club, Herman wouldn't talk.

### Beansie Sings

On the night of July 15, however, Herman was to sing like a bird for nearly three hours while Whitman took notes. Even Whitman hadn't suspected the depths of corruption and the payoffs revealed by the little gambler. Finally, he put Rosenthal in the cab at around 11 P.M., as newsboys in Times Square were already proclaiming that "Gambler Talks." Whitman thoughtfully had passed the word to reporters before Rosenthal left his office.

The headlines didn't bother Beansie. In fact, he strolled into the Cafe Metropole on 43rd Street carrying a paper and telling anybody who didn't already know that he was the man in the headline. The crowd at the Metropole included other gamblers, pimps, prostitutes and denizens of New York's underworld who gave him the deep freeze. Nobody spoke to him; old friends turned away when he started a conversation. Nevertheless, Rosenthal cooled off in this chilly atmosphere until 2 A.M., when somebody called him outside.

He stepped onto the sidewalk, momentarily blinded by the lights of a theatre marquee. "Over here, Beansie," a voice called from across the street. Rosenthal took a step off the curb, and four shots caught him in the chest. A fifth blew off the top of his head. By the time the crowd from the Metropole had gotten out the door far enough to see what was happening, a car was speeding eastward at the other end of the block.

Whitman, roughly awakened, took charge immediately. He demanded that any evidence turned up by the local precinct be turned over to him personally. As luck would have it, two young visitors to the city were walking along 43rd Street at the time of the crime. They heard the shots—like the sounds of a car backfiring—then an open car raced past them. One of the witnesses had the presence of mind to copy down the license number, which he turned over to the policeman on the beat. The cop took his name and address as well.

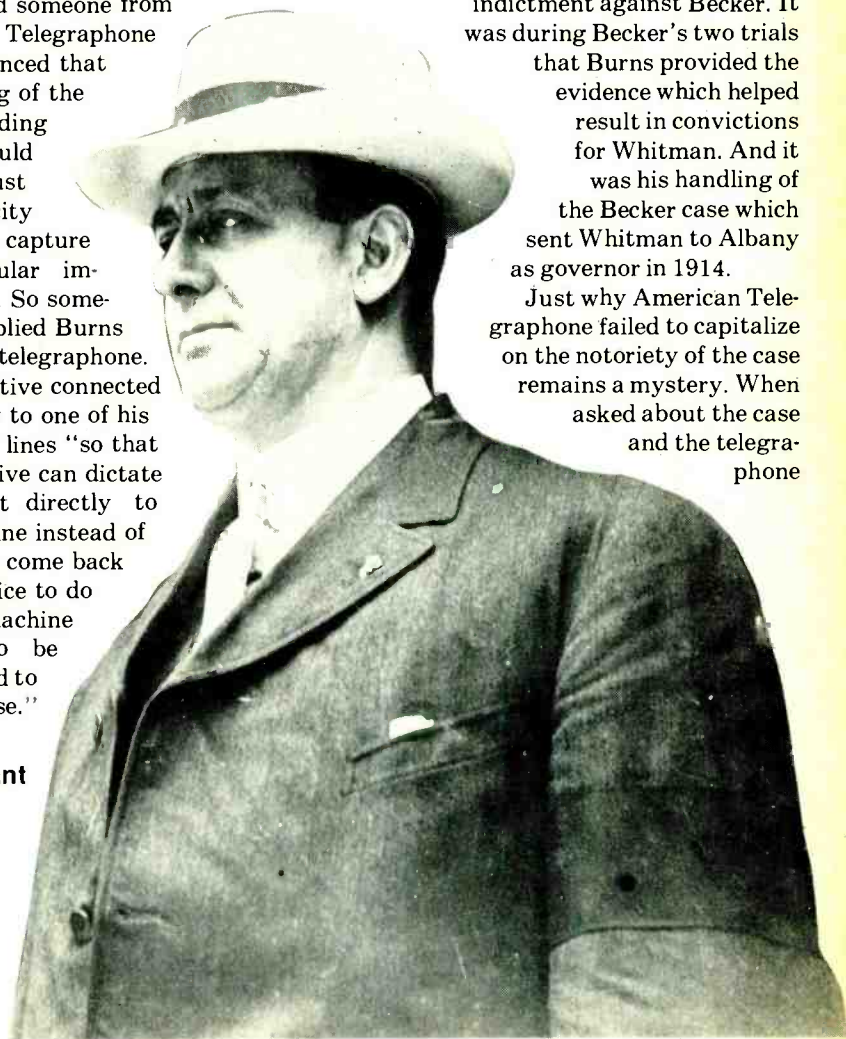
The next day, the newspapers re-

ported that the police had turned up no witnesses. One of the out-of-towners showed up at Whitman's office to say that his friend had copied down the license. The precinct commander then told Whitman that, yes, they had been given a license number, but they'd lost it. They'd also apparently lost the witness. He was nowhere to be found, and it was several days before the district attorney discovered that he was being held by the police.

Whitman quickly realized that if the Rosenthal killing were ever to be solved, he would have to do it himself, in spite of the police force. "Outside sources," dedicated to reform and reputed to include the financing of J.P. Morgan, raised funds for him to hire his own investigators and provide funds for his own staff. One of Whitman's first moves was to put William J. Burns on the case. Burns wasn't hampered by the restrictions under which the D.A.'s staff—and presumably the police—had to operate.

Rosenthal, Whitman and Burns were news—and someone from American Telegraphone was convinced that the linking of the new recording device would provide just the publicity needed to capture the popular imagination. So somebody supplied Burns with a telegraphone. The detective connected it directly to one of his telephone lines "so that an operative can dictate his report directly to the machine instead of having to come back to the office to do so. The machine seems to be well suited to his purpose."

Lieutenant  
Charles  
Becker



In addition, the Burns agency was making money available for underworld informants who had anything to say about the killing. Their voices, too, were recorded, and several anonymous callers later were identified by their voices on the wire.

### Detective Burns and the Telegraphone

The license plate jotted down by the eyewitness led eventually to Billiard Ball Jack Rose, a strongarm collector for Becker. Rose in turn implicated Big Jack Zelig, a killer from the Lower East Side, who brought along four friends, Gyp the Blood Horowitz, Dago Frank, Lefty Louis and Whitey Lewis, to do the job. According to them, Becker gave the orders for the killing, saying, "Kill him anywhere. Do it in front of a policeman and it'll be all right. I'll take care of everything."

Zelig's four gunmen were tried, convicted and electrocuted. But the evidence brought forth in their trial added to the public pressure for an indictment against Becker. It was during Becker's two trials that Burns provided the evidence which helped result in convictions for Whitman. And it was his handling of the Becker case which sent Whitman to Albany as governor in 1914.

Just why American Telegraphone failed to capitalize on the notoriety of the case remains a mystery. When asked about the case and the telegraphone



Becker jury going to lunch.

in 1974, a representative of William J. Burns International Security Services said he had no information on the incident, but confirmed the possibility of the story's truth.

### The Sayville and Tuckerton Telegraphones

Barely three years after the incident on 43rd Street, American Telegraphone was involved in another incident, in which publicity very definitely was not wanted. It seems that beginning in 1912, the Telefunken Company of Germany had been engaged in the erection of two shortwave stations in the United States, one at Tuckerton, N.J., ostensibly owned and operated by the Goldschmidt Wireless Telegraph Company; the other at Sayville, L.I., N.Y., ostensibly owned by Atlantic Communication Company, but sporting a giant sign proclaiming that it had been built by Telefunken. Both of these stations were linked with POZ, a shortwave station near Nauen, Germany, and were ostensibly designed to handle commercial messages across the Atlantic. They were, in fact, the first commercial transatlantic shortwave stations in the world.

Both stations utilized the most advanced radio equipment and construction techniques. In fact, their transmitter towers were the first in North America to use the ball-and-socket base now used for transmission towers throughout the world. And both had advanced message-sending equipment, including automatic transmission systems using perforated paper tape and telegraphones. The idea was that an operator could record a message at normal speed on tape or wire. Then the recording could be played over the air at high speed to another recorder

across the ocean. Later, an operator on the receiving end could replay the recording at normal speed to transcribe it. This method had two prime virtues: it was highly efficient of transmission time, in that twice or four times as many messages could be handled; and if anybody chanced to eavesdrop, he'd be unable to make sense of the messages being flashed past him. When Atlantic Communication's manager A.E. Seelig was asked just how efficient the automatic transmission system was, he replied, "It is of such construction that we can send more rapidly than any operator could receive."

But the orders for the Sayville and Tuckerton telegraphones came not from Atlantic Communication or Goldschmidt, or even from Telefunken. They were ordered by the German Imperial Navy, along with several units for use on naval ships, and were delivered in the summer of 1913. Actually, the German Navy was one of a few lucky customers ever to receive the telegraphones it requested.

Although he was a German national, Dr. Goldschmidt had worked for Westinghouse before going into business for himself. With the aid of financing from Germany, Dr. Goldschmidt built his station around the Goldschmidt Alternator, a device not unlike one developed by telegraphone inventor Valdemar Poulsen.

In those early days of radio, there was no provision that prevented foreigners from owning, building or buying radio stations in the United States—an oversight Congress hurriedly corrected, at the urging of Sen. Cabot Lodge.

In any case, by July 5, 1913, Goldschmidt was ready to communicate

experimentally with Nauen, and less than a year later, on June 18, 1914, the 820-foot tower at Tuckerton was beaming a message of goodwill from President Wilson to Kaiser Wilhelm.

At the same time, Telefunken was hard at work on a site beside the Long Island Railroad tracks in Sayville, Long Island. First there was a little white operations building, next a sign proclaiming "Telefunken," and finally a 500-foot tower. On January 27, there was an inaugural transmission featuring an exchange of messages between President Wilson and Kaiser Wilhelm. On the day it opened, the station still displayed its advertisement for Telefunken, despite the passage of the Communications Act of 1913. A reporter for the *New York Times* wanted to know how, in light of the new law, a foreign-owned station stayed on the air. A Telefunken spokesman at the company's Broadway office answered, "We have no interest in the station. It has been purchased by U.S. interests."

Pursuing the subject, the reporter found that the new owner was the Atlantic Communication Company of 90 West Street. Atlantic's manager, A.E. Debec, said that his firm was made up of American stockholders who had purchased the Sayville plant "with some German capital." Atlantic's president was Herman Metz, then just finishing his first term in Congress after a career that included the making of a small fortune as importer and manufacturer of dyestuffs and drugs. Most of his business contacts were in Germany, and he represented such German interests as I.G. Farben, BASF and Agfa in the United States. The two latter firms were later to become active in the manufacture of recording tape.

### Two Related Events

Under Metz, Atlantic Communication began taking commercial messages for transmission to Europe, and relaying messages from the Continent. Then on August 3, two apparently unrelated events occurred. The German Lloyd liner *Kronprinz Wilhelm* left her berth in the North River for a seemingly normal run to Bremerhaven. However, she had been provisioned for a long stay at sea and was loaded with coal up to the level of her deck. On the main deck was a huge crate of what appeared to be electrical equipment. Nobody thought much about it until

some ten days later the *Kronprinz Wilhelm* seemed to have disappeared from the face of the earth. She had not been reported sighted by other liners on the transatlantic run, and she certainly hadn't arrived in Bremerhaven. Yet the Lloyd line seemed unconcerned.

The second event was Germany's invasion of France. England immediately moved to support France and cut the extension of the transatlantic cable from England to Germany, leaving Tuckerton and Sayville as the only direct links between the U.S. and northern Europe. The predictions of Senator Lodge less than a year before seemed to be coming true and Washington had the excuse it was looking for. Censors—two Navy wireless operators—moved into Tuckerton on August 7.

Meanwhile, Germany had found transmission from Sayville's 500-foot tower unreliable, particularly in periods of high sunspot activity. The answer was a mid-Atlantic relay station that picked up the Sayville station and relayed it to Nauen. When the story was told to the newspapers, the *Times* man asked if the *Kronprinz Wilhelm* were being used for this purpose. "You've guessed it," replied an Atlantic Communication official.

The next step was to examine the financial structure of Atlantic Communication a bit more closely. Since Atlantic appeared to be an American-owned company, it had received a license to operate. The investigators found, however, that while Metz was the president, Dr. Karl George Frank, a German national, was the secretary-treasurer and actual head of the firm. Metz, it developed, was the only American to own stock in the company, and his holdings were only enough to qualify him as a corporate officer. The balance of the stock was held in Germany by arms of the Telefunken combine. In charge at the transmitter was a German naval officer, Captain Zenneck.

Toward the end of August, Secretary of the Navy Josephus Daniels discovered that Tuckerton was operating without a license. So he ordered it seized and closed. On September 10, the station reopened, manned by U.S. Navy personnel. Whether the Navy seized Tuckerton's telegraphophone along with the other equipment or whether it was taken out by the German operators nobody ever knew, because the

Navy clamped a lid of secrecy on the entire operation.

### A High-pitched Buzz

Almost coincidental with the closing of Tuckerton, ham radio operators along the East Coast were detecting a high-pitched buzz that went on the air every night at exactly 11 P.M. when Sayville began its transmissions to Germany. One particularly poetic ham described it as "a musical note like the buzzing of a titanic bumble bee which

sped through space." Nobody seemed to know what it was, but hams agreed it came from Sayville.

On the morning of May 7, 1915, Americans awoke to find that German U-boats had sunk the Cunard liner *Lusitania* off the Irish coast, taking with her a large number of American passengers. Within hours, reports were circulating that German newspapers had known in advance that the *Lusitania* would be sunk, and where. The Berne correspondent of the

## When you're buying a mixer, read the small print first.

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CIRCLE 54 ON READER SERVICE CARD

London *Morning Post* wrote that they had received the news by wireless from New York in advance of the sinking and had their stories already written. In New York, Carl Schurz Jr., spokesman for German interests, told the *New York World* that the Germans had been alerted by wireless to the presence on the *Lusitania* of war supplies for Britain when the ship left New York on May 1.

Because Germany was at war with Britain, he said, the U-boats had only been protecting themselves in sinking the ship.

If the reports were right, there was only one way the U-boats could have gotten the word—from Sayville. The next day, such anti-German newspapers as the *Providence Journal*, *Brooklyn Daily Eagle*, *New York World* and *New York Times* were calling for the closing of Sayville—or at least much stricter control over its activities.

Meanwhile the mysterious sounds continued to be heard. After establishing contact with Nauen, the operator would begin sending so fast that the message became unintelligible. But not all transmissions fell into this category. Between 11 P.M. and 5 A.M. Sayville sent a full schedule of commercial messages at normal speed. The *Providence Journal* stationed a crack telegrapher at its experimental radio station at Point Judith, R.I., with instructions to transcribe every word sent out by Sayville.

By the end of June, Navy Secretary Daniels ordered three lieutenants into Sayville as censors with instructions to hold up every message they couldn't understand. The censors did stop a number of what appeared to be commercial messages using code words or referring to British or German ships, but reported nothing else wrong. Almost immediately, rumors began circulating that the German operators simply waited until the censor on duty went out for a smoke or coffee break before sending the coded messages. Lt. Clark, one of the censors, denied it.

On July 1, the *Providence Journal* lowered the boom by publishing the first in a series of what it said were Sayville transmissions. Specifically,

the *Journal* charged that Nauen had been requesting more repeats of messages lately, allegedly due to faulty reception. But when the repeats came there often were rows of numbers that had nothing to do with any previous transmission. Prices from the New York Stock Exchange and Cotton Exchange bore no relation to actual transactions. The cotton orders, the

newspaper claimed, were concealed reports of European troop movements.

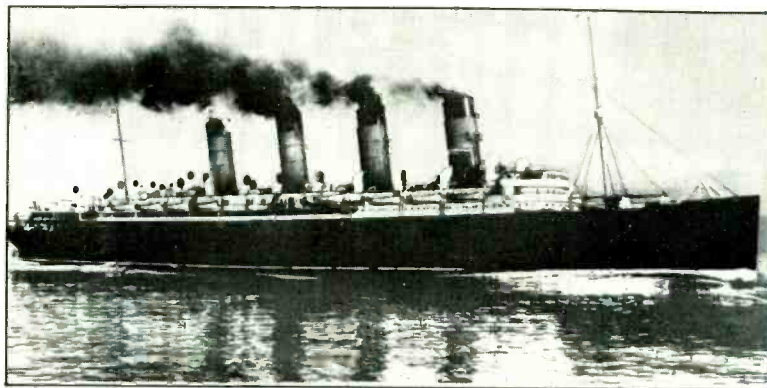
## Bumble Bee Code Deciphered

But the Providence newspaper wasn't the only one listening in on Sayville. In Westfield, N.J., lived Charles E. Apgar, a ham radio operator and something of an electronics experimenter. He had developed a device he called an Ampliphone which permitted him to record signals off the air onto an Edison dictating machine. On the night of June 7 he had made his first cylinder of the mysterious bumble bee sounds. He was unable to make any sense from the transmissions, though, until

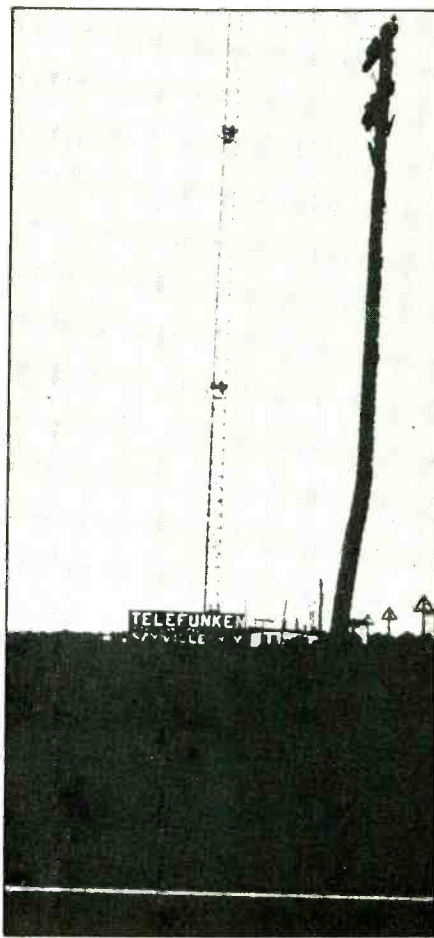
one night the Edison machine began to slow down as he was playing a cylinder. Apgar listened intently as the bee drone resolved itself into dots and dashes. Taking a pencil, he wrote down what he heard, then got a German-English dictionary.

What he found sent him hurrying the next morning to the offices of L.R. Krumm, the chief radio inspector of the Bureau of Navigation's New York office. Apgar showed him the messages and played a few of the cylinders. Krumm was not a man to be alarmed easily, but he hurriedly sent for William J. Flynn, head of the U.S. Secret Service. Together the three men listened to the cylinders as Apgar tried to slow down his machine. Although none of them knew it at the time, they were listening to a Telephonograph used as its inventor had envisioned—to provide more efficient use of the airwaves by cramming four messages into the time it normally took to send one; and to confound eavesdroppers by presenting them with a meaningless hum.

It wasn't until after the war that anyone disclosed what Apgar had recorded. Even then, nobody was providing complete texts. As an example, however, a spokesman cited what appeared to be a commercial message reporting that a cargo of sugar had been shipped on a particular vessel and bills of lading were going forward by hand. Another message announced the birth of a baby, the date and the fact that



The *Lusitania* leaves New York harbor on her final voyage.



The infamous Telefunken transmitting tower on Sayville, L.I.

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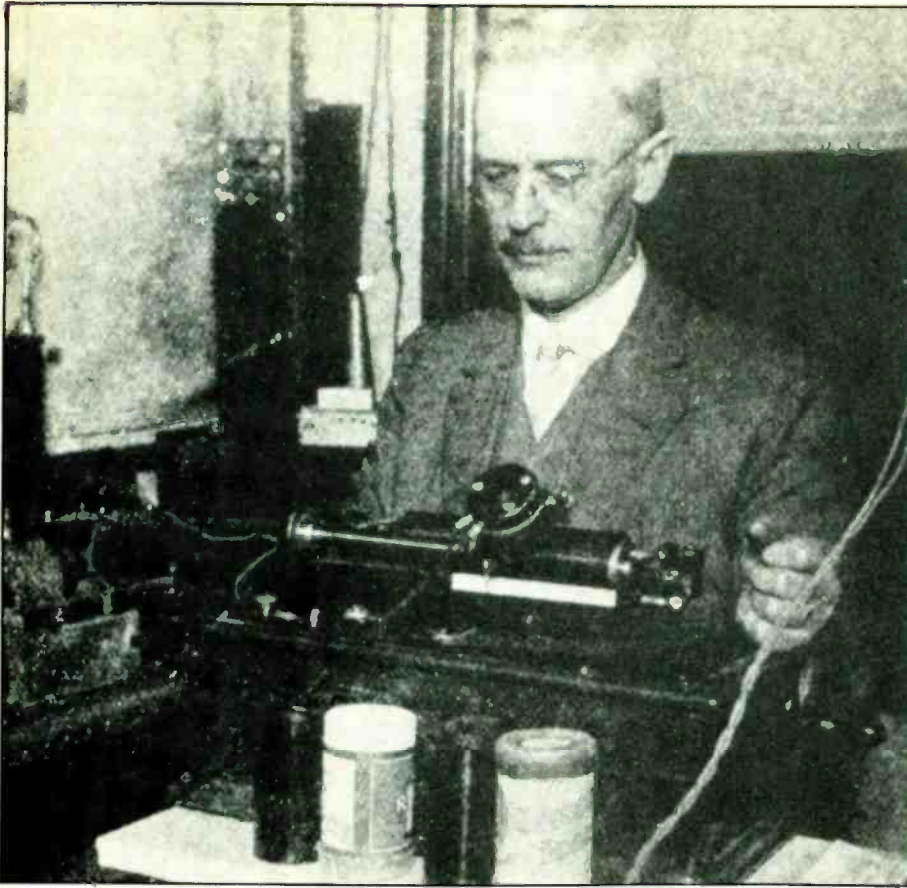
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**Charles E. Apgar, the ham radio operator who decoded the mysterious bumble bee sounds.**

the child had been christened Mercedes. The Secret Service determined that there was no sugar aboard the ship mentioned. But the ship did have a passenger named Mercedes and when it docked in Liverpool, she was met by two men. British police arrested all three and confiscated the documents ("bills of lading") the lady was carrying.

On July 6, Captain W.H.G. Bullard showed up at Sayville with orders from Secretary Daniels to seize the station. Nobody was more surprised than the three Naval officers who had been on duty there. The Germans weren't caught napping, however. A Brooklyn *Eagle* reporter who had camped in a field across the railroad tracks the day before reported that cartons and crates were trucked out after dark on the night of the 5th. Some were described as too large and too heavy to contain papers or files. The Navy men said they hadn't noticed anything unusual during their entire tour of duty that day.

Bullard's first act was to clamp the same lid of secrecy on Sayville that he had imposed on Tuckerton. What be-

came of the telegraphones at both stations remains a mystery to this day, although some of the records from both stations can now be seen in the National Archives in Washington, D.C.

Altogether, the Imperial German Navy ordered half a dozen telegraphones, including the Sayville and Tuckerton units. One of the others found its way aboard the U-boat *Deutschland*, where it was photographed during a goodwill visit by the ship to Baltimore in 1915. What became of the others is even more shrouded in mystery.

#### **Was Rood a Collaborator?**

When he saw the picture, Dr. William D. Tracy, a Telephonograph stockholder living in New York, fired off a letter to Rood demanding to know how the Germans had gotten the telegraphones when salesman McCrillis couldn't. Rood replied that he didn't know anything about any sales to the German government. But a Congressional investigation showed that two years prior to Dr. Tracy's inquiry, Rood had expedited the order himself, marking them "for the

German Government." The order itself had come by way of Denmark.

Three years later, with the United States already in World War I, Rood was to turn down yet another potential customer. This one was the U.S. Signal Corps, which requested a demonstration of the telegraphone, to determine whether it was suitable for recording messages in the field. Rood replied that the company still was experimenting with the machine and discouraged any order. He suggested that such a use would be in the nature of an experiment, even though the Secret Service and the Navy knew that the Germans had been using their telegraphones in just this way for four years.

The Signal Corps wouldn't take no for an answer. Finally, in September, the company delivered the first four machines. During the construction period, Rood asked to be advised as to the proposed use of the equipment. It was alleged later that he actively sought intelligence data which conceivably would be recorded on the machines. His inquiries, a Senate committee was to be told, included details on where the machines were to be placed, whether it would be in France or elsewhere, and under whose personal supervision they would be operated. Later testimony indicated that Rood had been given secret information on the movements of the U.S.S. *President Lincoln* prior to its torpedoing on May 31, 1918.

When the four machines finally were delivered "in some kind of condition," according to a witness, they failed to work. "Nobody has ever been able to trace the cause. I have tried to find out," attorney George E. Sullivan told the Congressional investigators.

To top it off, American Telephonograph's most satisfied customer, DuPont, decided to trade in its machines for the "new model" promised in 1918 by Rood. During the final year of the war, DuPont sent all 20 of its machines back. The ones it received in exchange "were defective in materials and workmanship." After struggling with them for nearly two years, DuPont junked the lot and turned to the more reliable dictaphone.



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**Between the Wars — 1920 - 40.**

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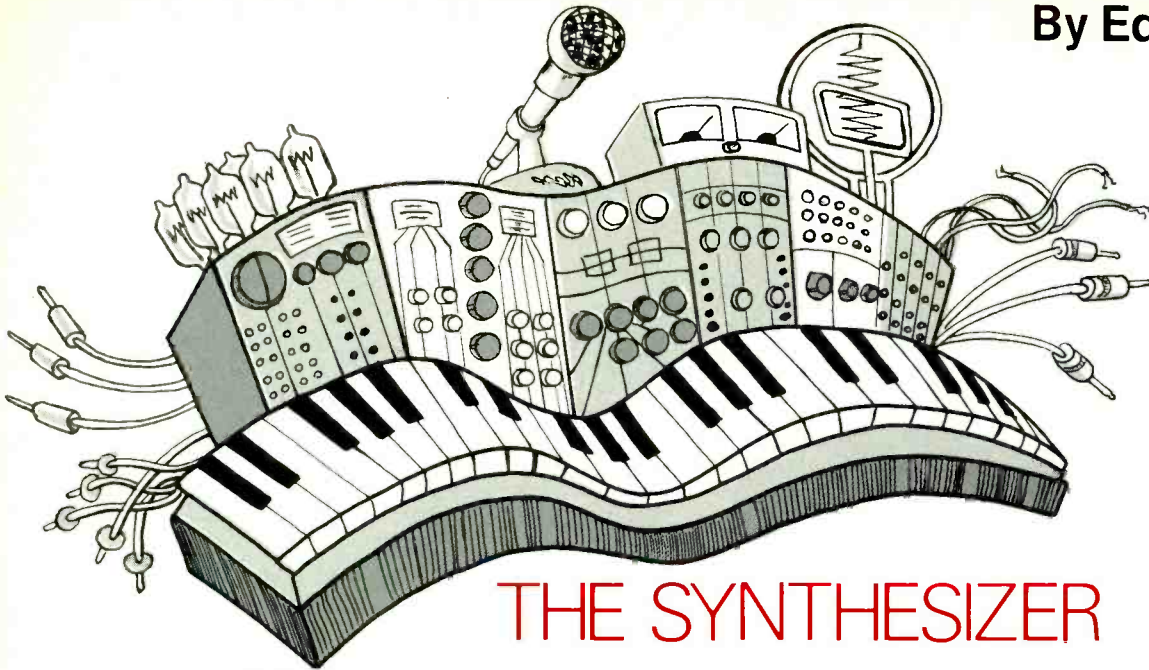
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# THE SYNTHESIZER

## AN UNFATHOMABLE SOUND GENERATOR

The first synthesizer was the Moog, built around 1964 by Dr. Robert Moog following years of development. There had been synthesizers before, but those had at least one major defect. Either they were too large, too cumbersome, too expensive or all of the above. What Moog did was to perfect the concept of small modular components and arrange them into a unit that was both relatively inexpensive and infinitely controllable from a musical standpoint.


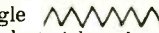
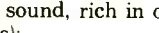
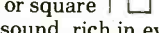
For example, in order to create a series of pitches into a melody, one had to first record those pitches from an oscillator, cut each piece of tape the desired length (15 ips—remember?) and edit the composition into a final piece.

Needless to say, this was time-consuming and the results were “not ideal.” On the new Moog, one had a keyboard that could not only control pitches but could also control anything that had to do with the sound of that note, timbre, duration-attack, filtration (sweeping with its own envelope if desired), etc. More about technique later. The era of voltage control had begun and that alone changed the course of music history.

### Synthesizer Technicalities

The classic Moog—that is, the first basic design—is a poem of sublime simplicity. The sound oscillators are arranged to create four wave forms: sine, triangle, pulse or square and saw-

tooth. These have a pitch range both lower and higher than we are capable of hearing. Usually three oscillators are controlled by one oscillator controller which is referred to as a “bank” of oscillators. By having this arrangement, one can create extremely rich-sounding notes that can phase each other with comb filters, beat overtone series and create “difference tones” (i.e., when two pure notes are played, a third is created), and that’s just in one bank with only the pure tones at work.

(1) Sine		—the purest of all fundamental sounds;
(2) triangle		—mellow sounding but richer than the sine (has a hollow sound, rich in odd-numbered overtones);
(3) pulse or square		—a brighter sound, rich in even-numbered overtones;
(4) sawtooth		—the brightest sound source, all overtones present.

Not only can these wave forms be used to create pitches, but they can also be used in their lower frequencies to modulate pitches, filtration and envelope. By the sheer physical shape of the wave form, one might have a pretty good idea of what effect it would have on the sound being modulated. Sine and triangle are rather smooth in their modulating effect, while the pulse and sawtooth are sharp and defined. The sine modulating pitch

and a varying of the intensity of modulation via a potentiometer is used to create a vibrato which, when handled correctly, gives a most human, “played” quality rather than a harsh, cold, electronic tone.

Some other examples of wave-form modulation are octave jumps made by one note being modulated with a pulse wave with the bandwidth equal on both top and bottom.



By one note being modulated on the octave 200 times a second, one creates the effect of an overly rich, powerfully brassy tone, approaching the sound of a trombone or trumpet.

The next area of importance in control of our basic wave form is pitch in a tempered scale. This is achieved by a keyboard using voltage control, set up to give even increments of 12 notes to a scale. The keyboard is in fact many little “off” and “on” switches that raise the voltage for higher pitches and decrease it for lower. Many synthesizers can play only one note at a time, because only one voltage (usually the lower one) can be digested at one time by the synthesizer.

The next step in control of a wave form is the shape and character of the note. A note must have a beginning and an end. This factor gives the note character. On all synthesizers, one refers to this process as envelope control. The attack of a note is important



in creating the synthesized effect. An instant attack and short decay is plucked-sounding as on a harpsichord, plucked string, etc. A smooth attack on soft note reminds one of a bowed or smoothly blown note such as a violin or flute. By the logical and systematic approach to envelope control one can create extremely realistic-sounding musical sonorities.

The last basic area that greatly affects the quality of a sound is filtration, both bank filters and voltage-controlled filters. The former is used when a fixed, non-moving control of frequencies is desired. By shaving away the fundamental frequencies and rolling off the middle, one obtains a nasal sound quite close to the oboe or double reed family of instruments. The latter is used most often by synthesizer players, as it is the most dramatic-sounding method of filtering. By sweeping the sound with a low-pass filter, one achieves that familiar "bo-o-ieee-ong" sound. Depending on the pitch of a given note, one can get very powerful bass lines or shining, soaring string lines by using the envelope control and filtration systems.

### Exploration in Sound

I hope that by now the basic qualities of synthesizer sound production are a bit more understandable. It is important to stress that if the previous principles are clear, any synthesizer can be approached and basically understood. For example, a popular synthesizer now on the market is the Arp String Ensemble. This unit achieves a controlled "beating" using a series of sawtooth wave forms. It also modulates the pitches against each other with a sine wave modulation. The resulting sound approaches the basic qualities of real strings playing a simple line.

However, it must hastily be added that under *no* circumstances could the string ensemble replace the majesty of a powerful, accomplished string section. Personally, I don't ever intend the string ensemble to replace strings, but rather use the unit as a sound source capable of producing a reasonably interesting sound. Of all the users of synthesizers from Stevie Wonder to Walter Carlos, I don't know of a one that is out to replace an instrument with a synthesized one. Rather, the goal is exploration in a realm of completely new tonal colors and exploitation of this wonderfully rich medium.

The fact that a synthesized bass sound is utilized rather than a bass player simply says that there are other sounds "down there" worth hearing—not that a synthesizer is replacing "live" players of basses! To approach the synthesizer as an orchestra is naive. It makes much more sense to use conventional instruments in their historical, "live" environment and leave the synthesizers as a new horizon capable of steps beyond.

### Some Various Models

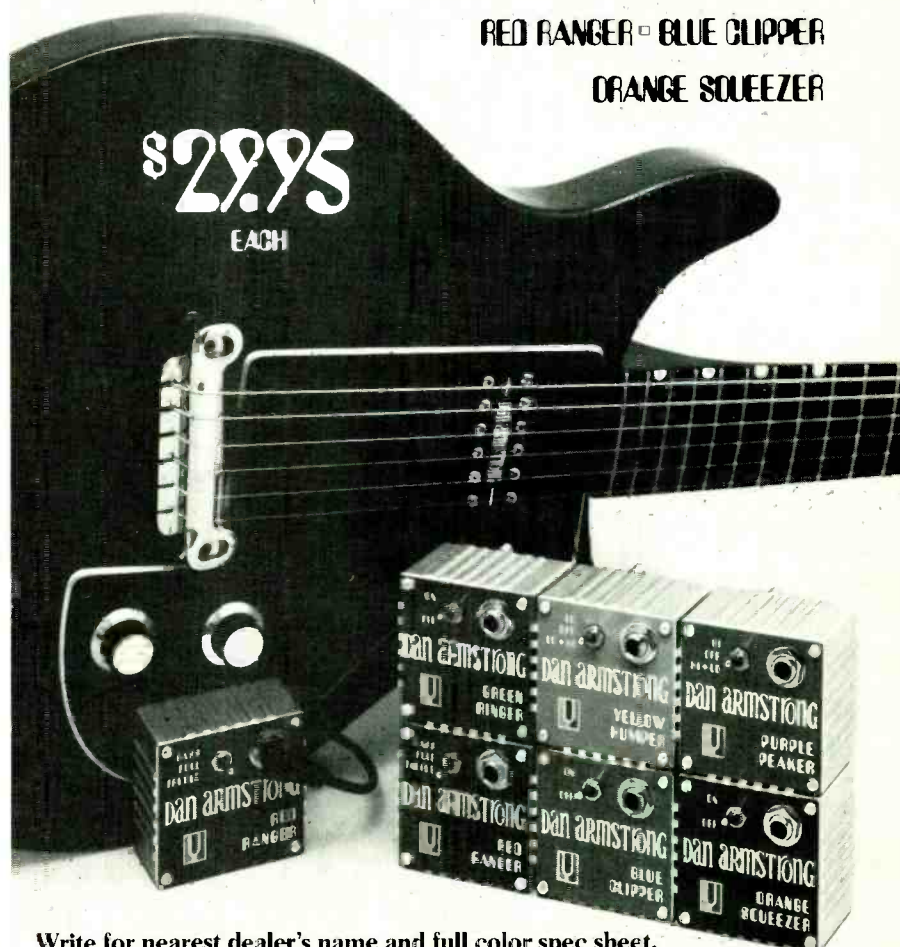
The basic synthesizers on the market today can cost from a low of \$1,200 to custom units spiraling into the \$20,000 to \$30,000 range. In my opinion, the best units are made by Moog (the Mini on up to the series I, II and III) and Arp (the Odyssey, the 2600 and larger series instruments). There are many other makes of synthesizers but, excluding one or two, all are tone sound generators rather than synthe-

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sizers in the true sense of the word. However, all of the other instruments have one thing in common: they are all based on the technology first developed by the early Moog. Armed with knowledge of the basics, one can sift through the lesser-quality instruments and wind up with one that is worthy of his time and money.

It would be simple if the synthesizer itself were all that were needed, but it isn't. One needs a way of hearing the sounds—amp, pre-amp and speakers.

ing down a lot and each successive bounce heard that old "hiss" rising steadily. In our present studio, we use full dbx Noise Reduction and record with a fully saturated signal. In using any noise reduction on synthesizers, the engineer must be ultra-sensitive to the clipping effect brought on by the noise-reduction unit, seeing the synthesized signal as a noise. I had experienced this clipping with my first dbx and, as a result, I began to overcompensate with the synthesizer envelope

abling the "live" performance player instant changes of sound (Keith Emerson has done much along these lines). Although quad development has apparently slowed down in record production—apparently from the lack of a unified thrust on the part of the manufacturers—it is surging ahead amongst synthesizer performers, for here the four independent sound sources are a natural playground for the fertile mind of both the performers and developers. There is sure to be more growth along the lines of spacial contiguity (where the sound occurs in a given space) in "live" quad performance.

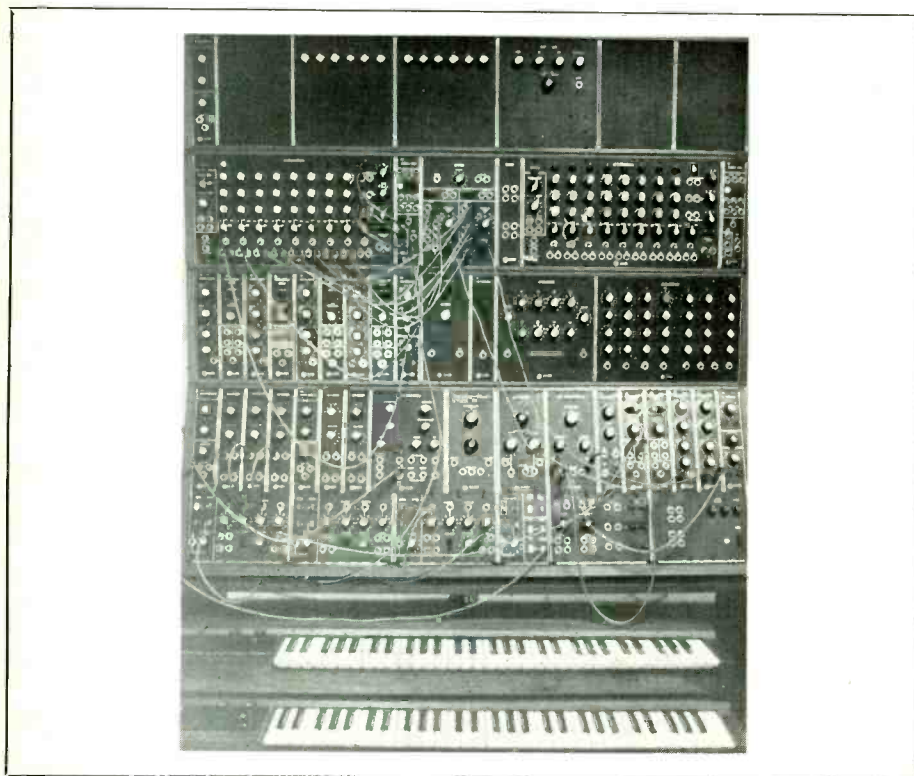
For any engineer, there isn't a better lesson in acoustics than a basic course in synthesizer appreciation. It not only stimulates thinking in terms of frequencies and the psycho-acoustic effects, but also gives the ardent student a lesson in overtone series, difference tone control, phantom placement, phasing problems—and the list can go on and on. I feel that the problems of recording exist *a priori* to be understood, and when they occur in relation to a synthesizer, the remedy is often more clean-cut, apparent and predictable than with conventional equipment.

Musicians contemplating the purchase and subsequent use of a synthesizer are strongly urged to have a firm background in keyboard playing, music theory, harmony and some understanding of orchestration. Although the synthesizer is a remarkable instrument and an unfathomable sound generator, ultimately the person using it must be prepared to make the essential choices and then perform them to remain competitive. The player should also be the programmer because when he is not, the sounds are even more sterile than otherwise.

In this age of eight tracks being recorded on half-inch tape with acceptable signal-to-noise ratios and noise reduction being made available to an increasingly large number of people through modest pricing, there is little doubt that an age of intense growth and expanding sound appreciation through the use of synthesized sounds is rapidly approaching.



Edd Kalehoff is a partner with Ray Bardani in Producers' Recording Studio, a 16-track studio specializing in record production and related projects, located in New York City. Housed there is Edd's Moog Synthesizer, one of the largest in the world.



**The Moog Synthesizer installation at Producers' Recording Studio. From the keyboards up: polyphonic controller; keyboard controller; first tier, housing oscillators, mixers, voltage controlled filter bank, two envelope controllers, two voltage control amplifiers, dual trigger delay, envelope follower and trunk lines; second tier, housing quad envelope voltage control, amplifier section, white noise source, fixed filter bank and four channel mixer with EQ; third tier, housing two sequencer controllers, two switching modules and an interface; fourth tier, housing polyphonic oscillator bank. (Unit is patched for a 24-note sequence.)**

On top of that, one then needs multi-track tape recording equipment. As mentioned previously, only one note at a time can be played on most units, and without lots of empty tracks, the "horizons" appear excessively limited.

In my years of development, I started with two 2-track Ampexes of studio quality which grew to 4-track and 2-track, then 8, 4 and 2, and, finally, 16, 4, 2 and mono. Needless to say, I received a first-hand education of signal-to-noise ratios, as I was mix-

controls. I am used to what happens now with noise reduction, but on certain occasions when the sound is overly delicate, I omit noise reduction on that track altogether.

The most exciting developments taking place in the synthesizer world are those involving "live" performance. New generation instruments are including polyphonic keyboards (many notes can be played at one time) and mini-computers which allow the pre-programming of sounds, thus en-

A Yamaha sound mixer is shown in a dark setting, likely the back of a stage truck. The mixer is a large, professional-grade console with numerous knobs, sliders, and buttons. It is illuminated by a red light, possibly from a stage light. In the background, a license plate with the number '489' is visible. The overall atmosphere is dark and focused on the equipment.

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In the midst of massive album budgets with vast numbers of studio hours booked and lavish mood-setting studio environments, it is refreshing to hear Miles Davis' longtime ("14 or 16 years—I don't count") Columbia Records producer Teo Macero say, "With Miles the studio mood is like the mood in an editing room, everybody working lights up. Sometimes some colored lights because I feel like putting them on, depending on my mood. He really doesn't care. He comes in and he's strictly business. All business."

Understanding the techniques and patterns of a session with Miles Davis requires the individual to differentiate between this form of jazz and the other

Bill Evans, Chick Corea, Herbie Hancock, John Lewis; (drums and percussion) Airto Moreira, Philly Joe Jones, Tony Williams, William Cobham, Mtume, Roy Haynes, Lenny White; (bass) Paul Chambers, Ron Carter, Dave Holland, Percy Heath.

The groups have changed often, not necessarily because of any animosity as much as the needs of the side men to find their own groove, or Miles Davis' desire to push beyond the present bands' limitations or wants.

Miles Davis, who at age 49 or 50 (*he* doesn't count) says that it is time to retire from touring, has brought incredible creativity to recording. He creates so much "live" on stage that it has pushed his studio associates to great lengths in order to grow with him. Davis can be a difficult man to talk with unless you know exactly what you want to discuss. He refuses to talk of the weather, last night's dinner or

musician orchestras can be recorded in it with equal ease. It is a carry-over from past times, yet one never gets the feeling of age—simply that of knowledge and professionalism.

There are no rehearsals, jams or practices in the studio for a Miles Davis recording date. All pre-production is done at home with Davis rehearsing two or three band members at a time. There are no charts (he hates the word) but instead there are "head" arrangements known only to Miles. He specifies *exactly* what he wants from each musician, be it a single note, one or two bars, a single chord to be played at predetermined intervals—or to just sit and absorb for three hours. More than a leader in the studio, he is a general. Democracy—a luxury in these situations—does not exist.

In keeping with the strict business

## a session with

# MILES DAVIS

forms of recorded music. In other words, this music requires different techniques and attitudes which, because it has withstood the test of time, must be given proper attention. It has a history, as do the people who operate within its framework.

Miles Davis began recording in the 1940's and his techniques in the studio have changed along with equipment development; but his attitudes toward the art of recording have not. His artistry and influence have spawned some of the finest musicians—many of whom have since formed outstanding groups on their own—in jazz forms from A to Z, bop to jazz-rock. Some of those men include: (reeds) John Coltrane, Sonny Rollins, Wayne Shorter, Julian "Cannonball" Adderly, Bennie Maupin; (keyboards) Wynton Kelly,

the color of your new car. Someone prepared to talk intelligently about music on a professional scale fares much better. Involvement in his art is total.

Described by many people in jazz circles as an artistic giant and a musical brain, the man is also said to be hostile, arrogant and uncompromising. "Junk" is a term that some musicians have applied to his music since *In a Silent Way*. Listeners unable or unwilling to follow his direction since that period label the music too *avant-garde* or, worse, too cerebral. He is probably all these things to all these people. It is unimportant.

CBS Studio B is a large and flexible facility: high ceilings, hardwood floors, rugs, large isolation booth and sound-absorbing curtains from ceiling to floor at approximately the half-way point from controlroom glass to rear of the studio. It can be both comfortable and overwhelming. Unlike most studios, either rock groups or 100-

approach to recording, a Miles Davis date has no hangers-on, no admirers or visitors. No musicians drop by to sit in on a tune; they would simply be a disturbance, and the music hardly lends itself to easy jamming.

Dates are booked according to studio availability, not according to whims. If Miles wants to record, Teo Macero will call him about studio time. Sessions will start at 10 A.M., 4 P.M., midnight, anytime, and Miles will always be there ten minutes early. Apart from the musicians, there will most likely be producer Teo Macero, engineer Stanley Tonkel and tape-machine operator Peter Dauria.

In Studio B, Miles arranges his musicians in a semi-circle on the hardwood floor, ten to twelve feet in front of the control-room glass. The drum-

mer has his back to the glass facing Miles, who requires eye contact with his engineer and producer. All the Yamaha amplifiers are placed behind the musicians, who, from the most recent albums, *Get Up with It* and the long-overdue "live"-in-Japan album, *Agharta*, consist of: Reggie Lucas (guitar) Mtume (congas and percussion) Michael Henderson (bass) Peter Cosey (guitar and percussion) Al Foster (drums) Sonny Fortune (sax and flute). Miles also requires a monitor speaker to send the music back to him in the studio while he is recording.

Engineer Stanley Tonkel manages to cope with the problems of leakage by using up to 26 microphones close-in on both the acoustic instruments and the large guitar and keyboard amplifiers. For instance, percussionist Mtume's three congas are each miked with an Electro-Voice RE-20 close-up—separate mics for each conga, even though three separate tracks aren't used. The center mic is split, creating a true left-center-right effect while only recording



## By H. G. La Torre

on two tracks. Lately, Mtume has begun incorporating a Rhythm Master or Rhythm Ace (which most people use as a glorified metronome) into the "live" dates and recording dates. His use of the piece as a percussion instrument is unique: he sets up a complex pattern first and then throws the instrument into play as he needs it. Then, he will play around the particular pattern set by the Rhythm Master.

The bass guitar is ordinarily recorded by direct pick-up. But if the luxury of two tracks can be afforded, the amplifiers are miked *and* the direct pick-up is used. Then both the direct and acoustic pick-up are combined in the final mix. The guitarists are very



different from one another in their studio approaches to equipment. Reggie Lucas uses a basic amplifier, incorporating numerous foot pedals.

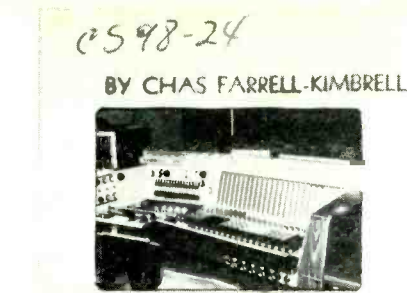
On the other hand, Pete Cosey likes to feed all his amplifier effects through an old Leslie speaker. Because he is also an excellent percussionist, Cosey's corner in the left section of the circle looks a mess—a jungle of instruments on a table, plus all the amplifiers and speakers. The Leslies are miked top and bottom, just as if an organ were being played through the speakers. In order to get a bright, high-end sound, the top rotor is miked with a Neumann U-67 (with the pad) or a Sony C-500. Sometimes an older Sony model will be used because they have much less gain than the 67's and allow for fairly "tight" miking. The bottom section will use an RE-20. The percussion instruments are picked up by two mics—again, in "tight," usually RE-15's.

It is rare that any of the electronic instruments, other than the bass guitar, will be taken directly. The best of both philosophies (acoustic and direct)



is used in order to be able to use either or blend both when possible. Even with this unorthodox instrument setup, engineer Tonkel is never worried about leakage: "By knowing your microphones you can get a minimum of leakage, or you might even want the leakage. You'll want to control it, of course—that's the most important thing in recording, having control—and take advantage of the leakage to get a real good room sound. If something is going to leak, you want it to leak into the channel on which it's eventually going to end up."

Miles Davis' trumpet is always miked acoustically with a Neumann U-67 or U-87, whether "live" or in the studio. The aim is always to capture the bright, airy sound for which he is famous. When his trumpet is equipped with a pick-up, his amplifier is miked



BY CHAS FARRELL-KIMBRELL

as well in order to gain a proper blend. That blend has caused many top artists to call and ask questions. During the mixing of *Get Up with It*, Roberta Flack called and asked why, whether she spent twice as much time and energy in the studio or half as much, she hadn't been able to get the sound Miles gets. The answer is always the same: "It's in the studio. We don't leave anything for later. Everything is done right the first time." The team of Tonkel, Macero and Davis don't believe in the phrase, "We'll fix it when we mix it."

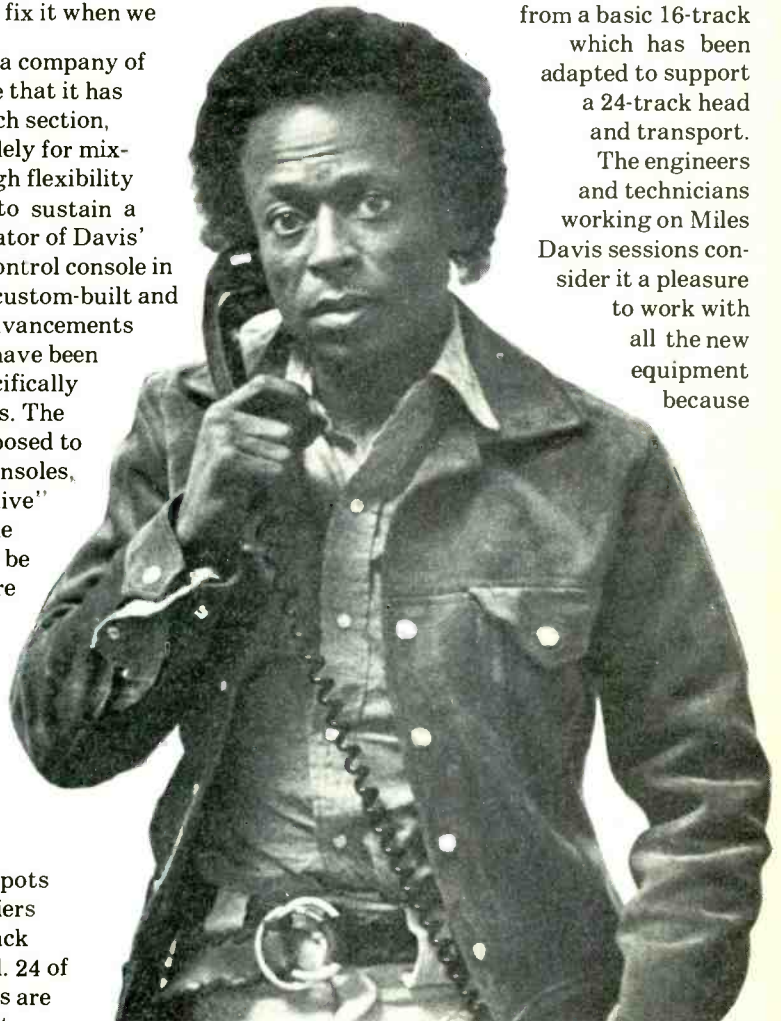
Columbia is a company of such great size that it has its own research section, rooms used solely for mixing, and enough flexibility to enable it to sustain a musical innovator of Davis' stature. The control console in Studio B was custom-built and much of the advancements in the studio have been developed specifically for Miles Davis. The console, as opposed to most studio consoles, is geared for "live" recording in the studio and can be made even more functional by bringing in additional outboard equipment. The board contains no electronics; it has passive equalizers and pots with all amplifiers stored in the rack directly behind. 24 of the 30 positions are directly in front of the engineer.

The remaining six positions were added at a later date and are to the right. These, because of lack of space, are not equipped with equalizers and have rotary pots instead of faders. The equalizers on the original 24 positions are, according to Tonkel, "good for 'live' studio recording where you don't want extremely severe equalization. In other situations, like a re-mix, we bring in outboard equalizers."

There are six echo chambers available in each studio. In "B" there are two "live" chambers (rooms) and four EMT's.

The machines, which come and go from one studio to another, are basically all Ampex: a 16-track, 2-track and a mono machine. Some Scully 2-tracks and mono machines are also used. There is a new 24-track with remote locator, a system which allows you to run back the tape to a specific spot, stop and then start again. Marvelous cueing can be done with it. Also in-

cluded is a granddaddy of 24-track machines, made from a basic 16-track which has been adapted to support a 24-track head and transport. The engineers and technicians working on Miles Davis sessions consider it a pleasure to work with all the new equipment because



it helps to do a job better, faster and more efficiently. But overall, they believe that it's still a matter of recording the way they did years ago during monaural recording. Full symphony orchestras were recorded with one or two microphones. Unless you had a choral group, the use of three mics was considered an extravagance. You had to do an acoustic recording—which meant placing a mic in such a way as to capture the balance of the orchestra in the room in which you were recording. This is the type of background and thinking that helps to create those Miles Davis albums that listeners find satisfying and other artists find enviable.

A Miles Davis session is usually three hours long; sometimes two three-hour sessions are booked. From this comparatively short amount of time can come one album or even a four-

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most USE



Stanley Tonkel

BY CHAS FARRELL-KIMBRELL

sided album. He is one of the most productive musicians in music today, especially when one listens to the complex material and sees the unorthodox (by today's "modern" standards, that is) manner in which it is recorded.

In conversation, Davis makes it clear that he dislikes the manner in which the allocation of recording budgets is handled. Not that *he* should be getting more or less time and money but rather that most name artists get too much of both. He speaks of Herbie Hancock calling him to say that he had just spent \$65,000 on his latest album; the sum is incomprehensible to Davis. "What would anybody do in a studio that costs or is worth \$65,000? I know it ain't the music on the album. That sure isn't worth \$65,000." Miles and producer Macero both feel the studio is a place to do business and that most musicians misuse the studio. Most use it as practice hall which it is not—especially at the price.

The question of overdubbing on *Get*

DEC 1983



*Up with It* or even *Agharta* is not seriously considered because so little overdubbing is done on any Davis album. Teo Macero explains: "A lot of groups depend too heavily on overdubbing. In some cases it's fine, if you can control it. But, the idea of bringing in a rhythm section first and then some lead instruments, then a vocal, and finally strings and /or horns is crazy. How can you possibly get anything but a sterile performance? It's best to deal with music as a whole. We record everything at the same time, strings and all. Sometimes Miles might put another horn line on for extra texture. Putting something together piece by piece is not always the answer. You see, it's the feeling of the thing. Let's say you're overdubbing a vocal: what's important is the feeling. A singer has to respond to the track. The intonation and phrasing can be all wrong. However, if the vocalist gives you a great performance and he or she is responding to the track(s), then I'd say 'fine.' As long as there is something 'live.' Where you don't have that, where there's no interplay or fighting back and forth, that's trouble. Strings are different: sometimes you can throw them on after and they can do balloons; or horns, even, they can play sort of a cool lick behind it all. But some groups can work only by heavily overdubbing and once you get used to

it, it's the only way. Some manage to do it very well."

The mixing process can sometimes afford the producer and re-mix engineer a chance to be as creative as the artist. With this in mind, there have been numerous inventions and techniques drawn up for Miles's music. Columbia has what is known in-house as an "electronic switcher," which allows the selective switching of instruments from position to position in the stereo field. It is a technique used for some of the drum tracks on the last few albums. The final effect sounds as if two or three drummers, rather than

0598-12 must use!



John Guerriere

BY CHAS FARRELL-KIMBRELL

one, were employed on the tune. Also, an invention described as an "instant playback" was developed by Macero and the research department which allows entire passages or single instruments to be played back at 30- to 40-second intervals. This gives you the freedom to repeat passages anywhere on the tape. Therefore, a musician can play along with himself in time or contrapuntally answer himself. The playback system is closely associated with the delay systems in use today.

Believing that Miles's music cannot be destroyed ("It's a monster"), Macero and re-mix engineer John Guerriere have done some very interesting things in the mixing room. For the classic *In a Silent Way*, which received great critical acclaim, there was originally well over two hours of material. Because the budget called for a one-record set, it was impossible to release an album containing everything on tape. After cutting down the material, Teo found himself with 45 minutes on each side—still too much for one album. He asked Miles to come in and work things out. When Miles finished cutting, he was left with 7½ minutes per side. Miles was satisfied with that. However, you do *not* release an album with a total playing time of

Teo Macero + Miles



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15 minutes. So, with Miles as creator and Teo and the engineer as editors, they repeated sections of music until there were some 17 minutes on each side. Teo relates: "It was not done to deliberately deceive anyone. It was an attempt to develop the very best pieces that were recorded. Considering the favorable responses we got on the record, certainly no one felt cheated. It was a gas doing that album—a totally new approach."

On "Rated-X," a track on *Get Up with It*, Miles plays the Yamaha electronic organ, an instrument he has brought to his recordings after using the system on stage. What one hears is an intense room-filling organ passage which seems to control the entire band as if it were an on/off switch. The band drops out of entire sections without hint of stopping. The effect is as though the band has continued to play—but the listener can no longer hear it. The organ was not recorded that way originally, however. This exciting process was done as follows: first the original 16-track machine was stopped and the organ piece was put on a loop. Then the organ was recorded on a separate track, at which point the 16-track was turned on again and the program mixed down. Next the organ track was put on another machine, a 2-track. Altogether, three machines were now involved: the 16-track, the loop and the 2-track master. (No one said this would be easy!) Finally, a fourth machine was brought in where the engineer would key out the program on cue. The result was dramatic. The listener hears the band and organ, and suddenly just the organ, and then everyone together again.

Looking at album credits and personnel credits on any of Miles Davis' albums may be confusing. He does not, as mentioned before, bring in guest artists. So while one may see two or even three almost totally different bands listed on an album, the answer is not what it seems.

Since winning the battle against Columbia—which wanted Miles to do only tunes people could recognize or get to know in a short time (the period coincides loosely with the release of *Bitches Brew*)—Miles has been playing what John Guerriere describes as, "music that's continuous, it flows. It has no beginning and definitely no end. It has periods of time: Chapter 1, Chapter 2, etc." In other words, Miles does not come into a studio with a cer-

tain number of selections written for a specific album. Each album contains not only music written for a new release, but tunes which are interchangeable. Furthermore, listening to past selections will make recent ones clearer in direction.

Room 411 of the CBS building is where most of Miles Davis' albums are mixed. John Guerriere and Teo Macero have a stack of 2-track masters containing material taped during Miles' recording dates. Each time he records, the tapes are reviewed, and if two tunes recorded a year ago fit nicely with three from a week ago, they will be included on a new release. There is never a fear of certain pieces being outdated because they are not written to be contemporary. The editing process differs from that of most sessions: splicing the good notes from a fifth take into the basically good body of a second take never occurs because there are only first or occasionally second takes. Editing, therefore, is a matter of splicing entire tunes end to end. Thus, many artists who, in reality, have not played with Miles for two or three years may appear on one album.

Because the machines start rolling from the time Miles walks in and says "All right," there are many tapes filled

with material waiting to be mixed and released. Often two 16-track machines will be on cue; as one begins reeling off, the second is turned on. No material has ever been discarded. Parts of the latest album, *Agharta* (recorded "live" in Osaka, Japan), took a year and a half to be released. Many company people did not find the material strong (commercial?) enough to release before. Consequently, Teo and Miles had been holding on, waiting for the right time. The first issued copies have already prompted numerous reviewers to call with favorable remarks. One even called from Sweden to say that *Agharta* puts all of Miles's previous albums into perspective, which causes Teo to remark: "All we are trying to do is make people listen, understand and recognize. That's why we are so meticulous with these recordings. The person buying an album should be able to go home, put it on and say, 'Wow! This is great!' But first they have to understand. Some people *still* don't understand Duke Ellington and now, hell, it's too late. With Miles, we can't wait for that. Forget about the personal stuff. You can only judge an artist and his art for what it is, not for what you think it should be."





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# THE MEN BEHIND THE WALL OF SOUND

## An Exclusive Interview with Larry Levine, the man who actually recorded the "wall of sound"

Although many readers may not have been into buying records in the early and middle '60's, the Phil Spector "Wall of Sound" success story starts long before the Beatles' *Let It Be*, George Harrison's *My Sweet Lord* or John Lennon's *Plastic Ono Band*. It begins with names like The Crystals, Bob B. Soxx and the Blue Jeans, Darlene Love, The Ronettes and the Righteous Brothers. □ Phil Spector recorded the Beatles in '69 and even recorded John Lennon, Cher and Dion as recently as this year. However, his initial relationship with the Beatles grew out of a mutual artistic admiration existing between the Beatles as artists and Spector as producer *extraordinaire*. □ Brian Wilson, founder and creative force behind the early Beach Boys, often referred to Spector as his mentor. Today's new superstar, Bruce Springsteen, outwardly admits attempting to re-create or capture "The Spector Sound." And a never-ending list of aspiring artists and producers clamor for an audience with the creator of the "Wall of Sound," but instead remain satisfied to simply fantasize about how those incredible, classic records were actually created. □ What was the "Wall of Sound?" How was it created? Is Spector really a genius or was he merely successful at a particular moment in time? Does genius ever die? When MR decided to do an article on the "Wall of Sound," we were warned that *if* we could reach Spector, we really shouldn't believe anything he had to say anyway. When we contacted him, he demanded final approval of the interview. But, not wanting to just do another publicity article on Phil Spector, we decided to locate and talk with the man who actually *recorded* the "Wall of Sound"—not the publicity seekers who float around as Phil Spector "authorities," but the only man who lived in the studio with Phil through those glorified years, 1962-67. □ Larry Levine began as an assistant engineer at Gold Star Recording Studios in Los Angeles in 1952 at 24 years of age, earning \$35 a week ("I left a \$75-a-week job!"). Stan Ross was the owner and chief engineer in those days of recording direct-to-disc. In 1956, tape recording became "the thing" and Larry went from set-up man to operator of the board—what there was of it. □ After Gold Star, Larry designed and built A & M Studios, where he remained as chief engineer and general manager through September 1975 when he chose to retire as an engineer. When queried, he jokingly admitted that he could be convinced to come back and engineer Bruce Springsteen's next album. . . .

**Modern Recording:** What was your first hit record as a full-fledged engineer?

**Larry Levine:** I think it was Eddie Cochran's "Summertime Blues." Then I cut Tony Fisher's "The Big Hurt" in 1958.

**MR:** "The Big Hurt?" I remember that record! It was really a strange-sounding record in its day. Didn't it have a phasing effect in it?

**LL:** Well, yeah! But it didn't originally start out that way. It was recorded 3-track and mixed. Wayne Shanklin, the producer, loved the mix but didn't think that Tony's voice was out far enough. He wanted me to run a simultaneous copy—run the two copies together—in order for her voice to be doubled and more out front. I told him it wouldn't work, that the machines wouldn't hold in sync. It didn't, but he loved it. The phasing was very effective on the "gliss" that was being

played by the strings. So then I recorded each 8-bar signature, allowing the machine that was running faster to start a little later—and then, in catching up and passing, the phasing would happen. I did this with each section of the song and then edited the pieces together. It was an accident . . . that worked!

**MR:** Were there any other hits prior to your long working relationship with Phil Spector?

**LL:** Yeah, a record by Robin something or other, but I can't remember the title. It was a big record, but I can't recall it at the moment.

**MR:** When did you first meet Phil Spector?

**LL:** Oh, I don't remember, I guess in 1961 or maybe '62. He was working with Stan. He loved Stan. Stan was a consummate engineer who did all in his power to satisfy a client. Stan was able to work with almost anyone. I

couldn't. If I didn't like an artist's performance or the song, I couldn't hide it. When I first met Phil I didn't like him. I thought he was a show-off. I found his personality grating—most people still do. Stan cut Phil's first hit record, "To Know Him, Is to Love Him," I think. And so he was working with Stan.

**MR:** Did anything happen at that first meeting?

**LL:** No. Soon after that Phil left for New York to work for Leiber and Stoller. Then he started Philles Records with Lester Sill. Phil & Les: "Philles." I guess that was in '62. They had a few hits right off the bat: "There's No Other Like My Baby" and "Uptown" by The Crystals. I think he was recording at Mirasound in New York.

**MR:** When did you see him again?

**LL:** He flew in to L.A. with a guitar/voice demo of Gene Pitney's song, "He's a Rebel." It had already been re-

corded by Vicki Carr for Liberty. He flew in to "cover it." While we were mastering our finished copy at United Recording here in L.A., Liberty was mixing Vicki's version in the next room. Well, anyway, Stan was on vacation and Phil had to work with me if he wanted to meet his deadline. You knew it was a hit from the demo.

**MR:** Was that the beginning of the Spector, Nitzsche, Levine label credits we began to see on all Philles Records?

**LL:** I guess so. Although the band, the rhythm section we came to use time and time again, was not fully together at this point. You see, Phil was really scared because it was the first time he worked with any of us—me, Jack or any of the musicians. He was pleased, because two weeks later he came back to work on a song he had been thinking about for over a year.

**MR:** Which was that?

**LL:** "Zip-a-dee Doo Da."

**MR:** What do you remember most about that session?

**LL:** Well, I think it was the first time we used two pianos; Leon Russell was on one. I remember listening over and over for hours on end with all the meters "pegging." Finally, I turned everything off and said, "I can't do it, it's too hot." I started bringing everything in one at a time, all except the lead guitar. Phil screamed, "That's it, record it!" I said, "There's no lead." He yelled, "Record it." There was no lead guitar. What you hear on the record is the lead's leakage in the room.

**MR:** What was that fuzz-like bass sound?

**LL:** That wasn't fuzz. It was a Dan-electro wire-wound bass guitar. That record was take 1. After three hours. If you listen on the mix you'll see that the voice enters low and is brought up. That's the way we left it. One take, one mix.

**MR:** Was Nitzsche very instrumental in that and all of Spector's arrangements?

**LL:** Jack was Phil's pencil.

**MR:** What was the studio like?

**LL:** Pretty much the same as it is today—small! Well, today it's 16-track. Those days with Phil it was only 3-track.

**MR:** What? Do you mean all these

records were cut 3-track?

**LL:** All except the Righteous Brothers and Ike & Tina—we must have been 4-track by then.

**MR:** When you say small, how small could it have been? Listening to those records, I would have guessed it was like an auditorium.

**LL:** Yeah, so did Carole King and Gerry Goffin. They wrote "You've Lost That Lovin' Feelin'" and when they flew in for the session they were anxious to see the famous Gold Star



Room where all Phil's hits were cut. They were shocked. It's 22' by 30'.

**MR:** What about the control room?

**LL:** It was small too. Only 15' by 10', I guess. The sound came back at you from almost everywhere. It was all pegboard. There was no acoustical design to the room. We had Altec 604D's and Phil listened back at incredibly loud levels. Maybe at about 120 dB—we never measured it. It was the greatest, most exciting room to work in, though.

**MR:** What kind of console, tape machines, equalizers, etc. did you have?

**LL:** We had an Ampex mono 350, 2-track was 351, I don't remember what Ampex model the 3-track was. The board was a United Audio board built by Bill Putman. It was strictly a 3-track board, with 12 inputs—all of them were on rotary pots.

**MR:** Equalizers were all outboard then?

**LL:** Well, if you could call them equalizers. We hardly ever used them.

They were at the bottom of the console. They could be for minus 3 or 6 on the low end and 5 or 10 kHz on the high end.

**MR:** When did you update the console?

**LL:** We didn't. Not during this entire period.

**MR:** Did Spector have a standard recording procedure?

**LL:** Yes, absolutely. It never changed once he had his band together. The band was made up of three guitars (Tom Tedesco, Bill Pitman and Irv Rubins; then Barney Kessel later on), two basses (Ray Pohlman and Jimmy Bond), drums (Hal Blaine), two pianos (Al De Lory and Leon Russell or Dan Randi and Nino Tempo), a horn section of five or six, two bones, two saxes, two trumpets, usually, and anyone who was available as percussionists (Sonny Bono, Cher, Jack Nitzsche, Frank Kay, Brian Wilson, to name a few).

What he'd do was to start with the guitars. They might play for an hour, two or four bars, over and over. He'd listen, then change it. They'd play, he'd listen and change it until he was satisfied with the rhythm figures they were playing. Then he would add the pianos and repeat the process until the pianos would actually meld with the guitars. This was the "Wall of Sound."

Phil's whole concept was to have nothing really stand out and say, "Look at me." It was the movement of the whole. The horns and strings were used usually for "padding." The whole sound had to meld as a wall. A lot of people thought it was echo, but it wasn't.

**MR:** Did he describe it as a "wall?"

**LL:** No. It was coined that much later.

**MR:** Was he conscious of it as such, even though he never called it that?

**LL:** Phil is, or was—I don't know where his head's at today—the ultimate producer. He knew what was going on in the studio and in the control room at all times. He never asked me to do something that he didn't already know could be done.

**MR:** Did he have any musical or technical knowledge?

**LL:** No. It was all "ear" and "feel"

—although I'm sure he had it to the degree that he knew what would or wouldn't work, what would destroy it, and so on. So, anyway, after the guitar and pianos were melded, then it was the bass's turn to fit inside—all as a total sound! This was standard operating procedure, always.

**MR:** So then after the guitars, pianos, basses, then came the drums?

**LL:** No, the drums came last! The horns and percussion came before. Because of this procedure I don't ever remember putting anything on tape before 2½ hours into the session. I have a theory on that. I think Phil needs the musicians to get tired enough so that they weren't creating.

**MR:** Do you think he was trying to make the musicians so tired that they became an instrument that he was playing?

**LL:** Yeah, I guess. I'm sure he wasn't conscious of it. But he really didn't want them to have a personality, a style of playing, because it might detract from the sound *he* wanted.

**MR:** Now, what about that fantastic Spector drum sound?

**LL:** That's funny. Phil was never that pleased with the drum sound. He would have liked the drum sound to always be the same. Something he could count on when the drums came on. But it never was. There was so much leakage in the room—with a small room and a 12-foot ceiling and all those people. Sometimes 18 to 23 in that room all going at the same time—percussion, horns, full rhythm section. There was no way to prevent leakage.

**MR:** How did you deal with the leakage?

**LL:** Well, you were leaking into the rhythm guitar mic with the drums, you brought up the drums so that it didn't sound like all drum leakage. When you turned one thing up, you generally had to turn something else up along with it, because you change the sound of that "other" thing when you turn "this thing" up. Therefore, leakage itself became an instrument. That's why when people thought that it was echo that created the sound, it wasn't entirely true. We used echo, of course, but the sound was created by the leakage in the room itself.

**MR:** With today's sophisticated equalizing, you can block out or bring out certain sounds by selecting various frequencies. What did you do, however, to prevent the leakage from actually altering the sound of any one

instrument?

**LL:** It was a lot of work: re-positioning, feeding more signal to different instruments, playing with the guitar and bass amp settings, rearranging the locations of the mics and the players in the studio, mixing and re-mixing until it was right.

**MR:** The sound, then, was studio-created rather than control room-created. All equalization came from the amps and the room itself. Can you recall what microphones you used, how many, and any of the techniques you employed?

**LL:** Miking was very basic. We used



**Larry Levine and the Glorified Years, 1962-67.**

two mics on the drums (one on the kick drum and one overhead), a mic for each guitar and bass, a mic for each piano, one mic for the entire percussion crew and, I think, we used two mics for the horns. Remember, we only had 12 mic inputs on the board. We used mostly ribbon mics (RCA 44's and 77's) on the vocals and horns, and Electro-Voice 667's on the rhythm instruments.

**MR:** With only three tracks to work with, which instruments or groupings of instruments were assigned to which tracks?

**LL:** Everything went on one track.

**MR:** Everything? Weren't the percussion, horns and strings put on a separate track?

**LL:** The strings and vocals were. But everything else, including horns

and percussion, was cut "live" onto one track of the 3-track. That's why there was so much leakage. That's the way Phil wanted it. He didn't want to work multi-track. He felt that "the sound I have today I want tomorrow." The only way it could be that way was if it's *all* on one track. Either it happened for us or it didn't. It was a *total* sound.

**MR:** With everything on one track and two tracks left for voices and strings, how did you go about doubling the voices?

**LL:** We rarely doubled the voices, but sometimes we did double the strings. You see, because the Ampex sel-sync, in those days, had no top end at all, I didn't want to "ping-pong" or "bounce" tracks. So we'd go from the 3-track (which, had the entire band on one track and the first set of strings on another) to a 2-track. I'd transfer the band to one track, and the strings, while I was doubling them, to the second track. Then I would transfer the "doubled" strings from the 2-track back to the 3-track. This way I've still got the original band on one track of the three and a doubled set of strings on another. If I wanted to double the voices it would be the same thing.

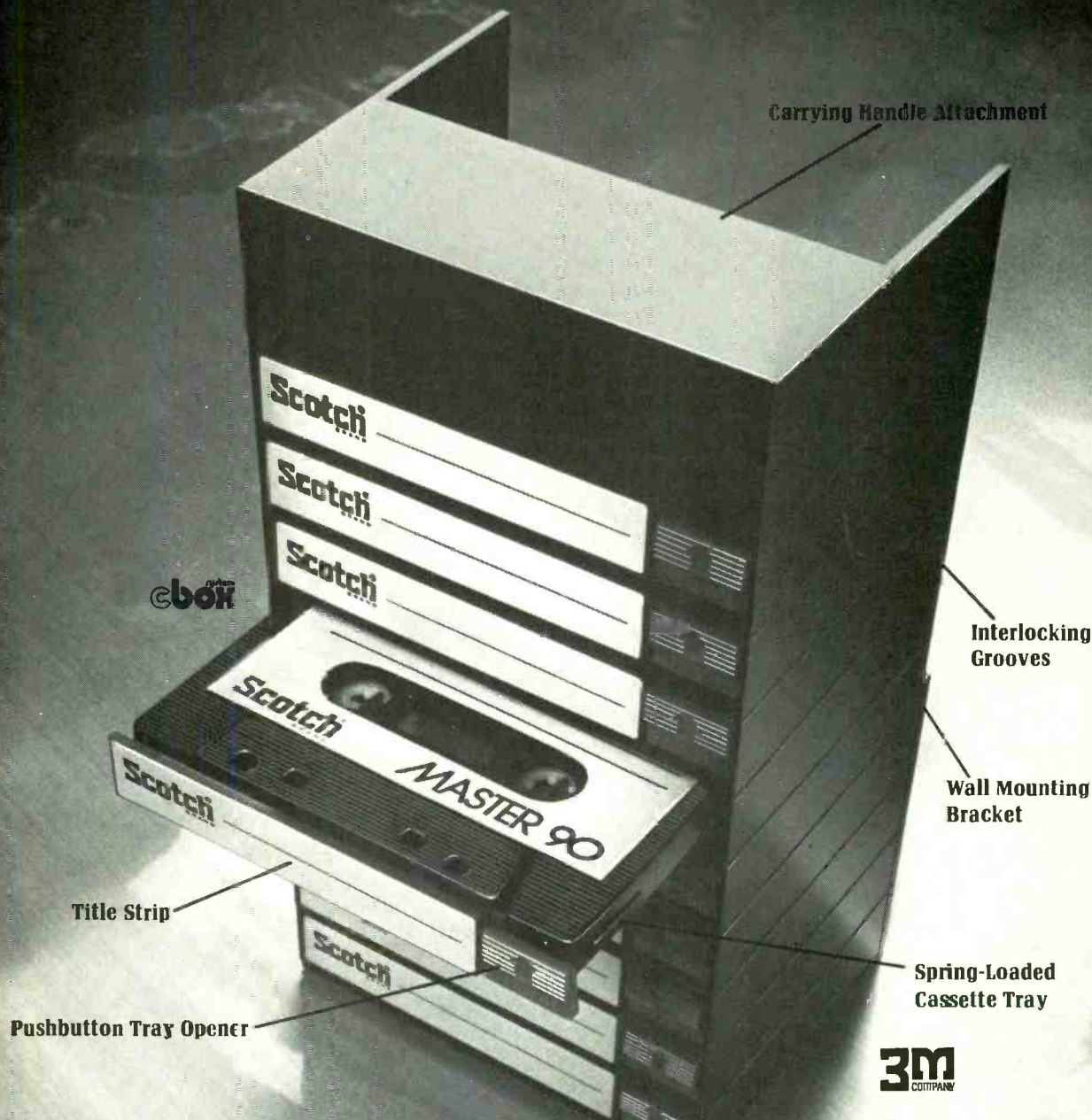
**MR:** What about echo?

**LL:** Well, we had two "live" chambers at Gold Star that were extremely bottom-heavy, so we couldn't put echo on the overall track. It would rumble forever. So we had to add it while we were recording. We did have selective echo, and what I liked about it was that it was a "splitter." When you turned the echo up it would send more sound to the echo and less to the direct. So as you'd increase the echo, you'd decrease the direct. The sound was great. You see, the concept of echo in those days was that echo was supposed to give you a feeling of "distance." Therefore, bringing the echo up would automatically pull the direct sound back. Today, as you know, the direct sound remains and the echo is added. In order to get that "distance" you have to decrease the direct and increase the echo. Anyway, on most of Spector's sessions we echoed the guitars, sometimes the pianos and strings. On a few sessions, like "Be My Baby," we put echo on the drums.

**MR:** Didn't you receive a Grammy for your recording techniques on one of Spector's records?

**LL:** No. I received a Grammy nomination for special effects on

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"Walking in the Rain" by The Ronettes. I felt so stupid. All I did was add a little rain. However, the next year I did get one for "A Taste of Honey" by Herb Alpert.

MR: During the span of success from 1962 until his retirement in 1967 did you and Spector become close friends out of the studio?

LL: No, I wouldn't say so. I'm not sure anyone can.

MR: But I'm sure as time went on you must have communicated your own ideas and concepts while in that studio all those hours.

LL: From "Be My Baby" on, Phil began heavily relying on me as a sounding board. But I've never kidded myself as to what an engineer does. An engineer can destroy a hit, but he can't make one. It's brought in to him. There are too many records made in garages with no real "sound concept" that were hits because of the material and the artist.

MR: So, then, how and what was your relationship with Spector in the studio?

LL: Phil was one of the best producers to work with. The worst is the kind who doesn't know what he wants and can't communicate at all. The next is the kind who doesn't know how to communicate what he wants, but when he hears it he can recognize it. The best producer to work with is the kind who knows what he wants to hear and can communicate it and recognize it. That's Phil. He knew what he wanted and he knew how to get there. He was in total control. All you had to do was sit there and concentrate. All creativity came from Phil on those records. I really feel that I was in the same position as Jack Nitzsche in that area. Phil felt comfortable with Jack. He could tell Jack and Jack would put in writing whatever changes Phil wanted. But Phil was the creative force—nobody else. The same was with me. He felt comfortable. But Phil was the creative force, the creator—not me, not Jack, not the musicians, not the artists. Phil created every one of those records.

MR: How were his dealings with his artists?

LL: Abominable. The artist meant nothing to him. The artist was just a tool. He thought nothing of having them sit in the studio for hours while he listened back to a take. He'd listen and listen without ever telling them to take a break. I was embarrassed for

them just sitting there as if they were contributing nothing.

MR: Do you think he was intentionally being rude—you know, psychologically brow-beating them in the same way he physically dispirited the musicians?

LL: Yes, I think he was rude. But they were his records, not theirs. And he would sometimes sit there and listen to the same eight bars of vocal for hours and never say a word.

MR: Rude or not, in two years he managed to create such hits as "Da Doo Ron Ron," "Then He Kissed Me" and "He's a Rebel" by The Crystals; "Be My Baby" and "Walking in the Rain" by The Ronettes; "Zip-a-dee Doo Dah" and "Why Do Lovers Break Each Other's Hearts?" by Bob B. Soxx and the Blue Jeans, and at least two or three hit records by Darlene Love.

LL: Yes, but remember now that Darlene recorded as herself and as The Crystals. Sometimes it wasn't until after the record was finished that Phil decided whether it was coming out as The Crystals or as Darlene Love, solo. And what's funny is that she was

never a member of The Crystals.

MR: When did Spector begin working with the Righteous Brothers [Bob Hatfield and Bill Medley]?

LL: I think it was 1965. We were still at Gold Star but now we were 4-track.

MR: Was "You've Lost that Lovin' Feelin'" the first record he cut with them?

LL: Yes. That record was so left field when compared to what was happening. It was longer than any pop record of its time, too—3:38, I think. That was unusually long for a single. But, boy, you could tell from the outset that it was going to be a giant record.

MR: When you did that record, stereo was very much the thing. Were you still only doing mono mixes?

LL: Yes, the rhythm track was still alone in mono on one track. That was his original concept and so it stayed even while we were 4-track. We had the lead vocals on one track, the background vocals on another, the entire band on one and the strings on another.

MR: Do you recall doing anything in particular in the mixing of "Lovin'



Larry Levine, reunited with his old console, stored in the back room of A & M Studios.



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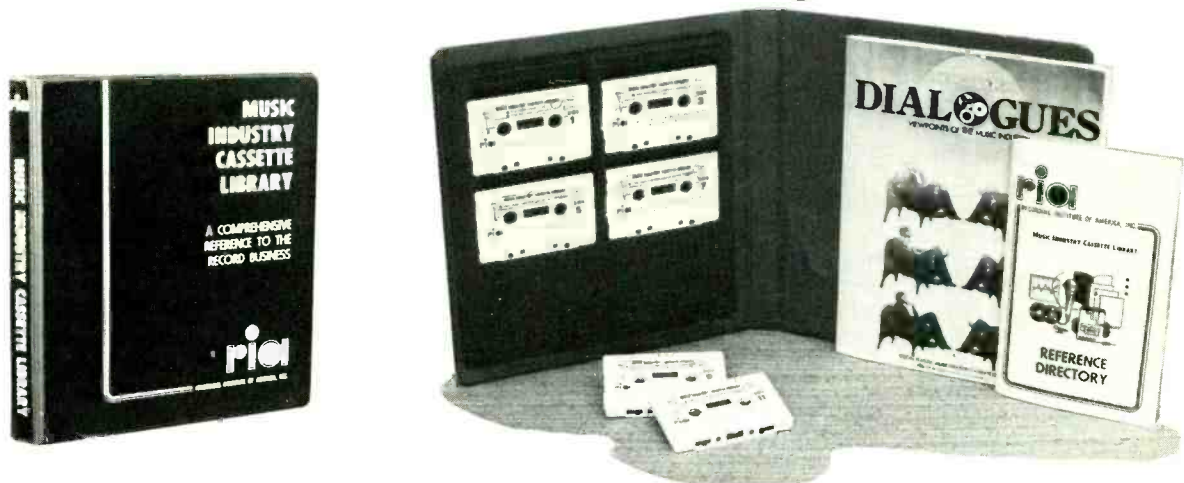
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Feelin'?" Did he want to add anything while you were mixing to the quarter-inch master?

LL: I don't think so. But on "Da Doo Ron Ron" we added a bass drum figure. It's on the final mono master, but not the 3-track. It wasn't normal procedure to put things on during the mix.

MR: What happened with "Hung on You," their second record? It was flooded with strings and the voices were almost inaudible. It also came off as a "sound-alike" of "Lovin' Feelin'."

LL: We had difficulty getting Phil, Bob and Bill together, timewise. At the session they weren't singing in tune and Phil wasn't really excited about the record because it wasn't creative, and he knew it. I ended up doing the *Lovin' Feelin'* album with Bob and Bill. Phil came in to approve the mixes. It wasn't a great album.

MR: Well, what...

LL: Oh, wait! Before I forget: one of the greatest things about working with a producer like Phil is that in the mixdown, we'd run it down real quick, he would tell me what he felt about it, and then he'd leave the room. *I would mix.* I would mix until I was happy

with it, including the things that Phil wanted in it. When I felt I had it I'd call him in. He would listen to it, tell me what he thought it needed, and then leave the room again. I would mix it over with those changes included. Then he'd come in again. That's the way we did it. I think it's a great way to do it. I'm mixing for *me*, without another pair of ears sitting next to me—and he's able to remain objective. He's not worn out by the mix.

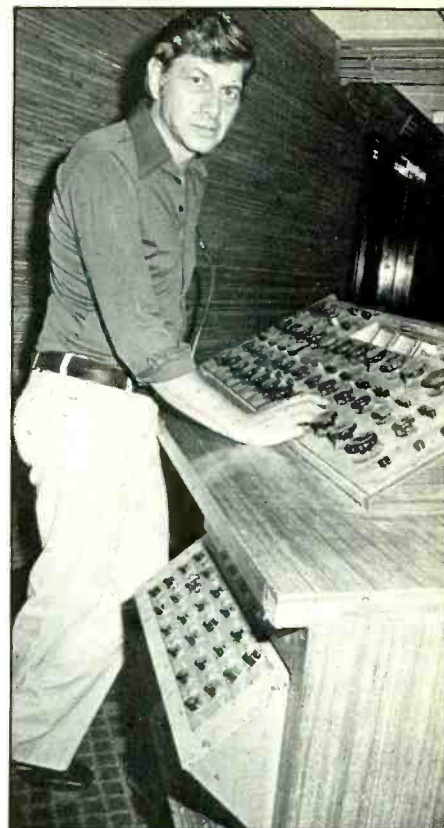
MR: So he wasn't much of a knob twister?

LL: No, he never touched the controls. The only knob he hit was the overall master volume.

MR: Were any of those records cut in one day, top to bottom?

LL: No, we'd do the basic tracks, then leave, then come back in another day to do the vocals, then leave, then come back in to do the vocals again, then leave, then come back in to do strings, then leave... and so on. The only exceptions I can remember are "He's a Rebel" and "Zip-a-Dee Doo Dah." It got worse as we got deeper and deeper.

MR: What do you mean? Did he often leave satisfied and come back



A view of the outboard EQ unit beneath the old 3-track console.

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dissatisfied?

LL: Well, Phil at this time is "Phil Spector, Boy Genius." Now there's an image that everybody has of Phil.

MR: Does he try to live up to that image?

LL: Absolutely. It kills him and he eventually retires—in '67, I think.

MR: What caused the retirement?

LL: A lot of people wanted to see Phil fail. His personality was obnoxious to a lot of people. Well, anyway, we recorded a record called "River Deep, Mountain High" with Ike and Tina Turner. The trades panned it. After 26 successive chart records. That was the last record to come out on Philles Records and the last record we cut at Gold Star together. It became number one in England, where his fame continued.

MR: Could it be that at that point, after four years of the Spector "Wall of Sound," the records began to sound the same?

LL: I don't disagree with that concept. Maybe it didn't deserve to be a hit. But I feel the trades were after him. I don't think that it was Phil's best record, myself. I think "Lovin' Feelin'" was the peak. "Hung on You" and "River Deep" were "Lovin' Feelin'" copies. But Phil was trying to go somewhere he couldn't go. As I said, at this point in time he's very caught up in his own image.

MR: Did he begin acting like a star, because he felt it was a role that was expected of him?

LL: Phil was not a star to the people with him, only to those outside. He was appearing on talkshows and there was an image that he himself was building up in his own mind. Now that's not unique to Phil. I have yet to see any super-successful artist that hasn't created himself right out of the business. If you're creative, there are only just so many places you can go, only just so many new creations you can create. The frustration of trying to reach somewhere from where you are has to sooner or later put you away from it. It happened to the Beatles, Herb Alpert and others. They go from this point to another, and then another, and you're spending more time trying to get there, where there's "something new." Trying to get it to go somewhere it hasn't been. And soon you run out of places to go. Every creative artist in the world, sooner or later, runs out of places to go.

MR: What you're saying, then, is

that Spector's retirement was inevitable?

LL: You see, those weren't Ronettes records, or Crystals records, those were *Phil Spector* records. Phil was the artist, creator and star of those records. So he had to create new, and more meaningful and more meaningful until finally he ran out of room.

MR: I'm sure that the trade was awaiting his demise for a long time. Predicting that he would fail. Yet time and time again he managed to come up with unique, innovative-sounding records. Do you think he just got tired of proving himself?

LL: I think part of what happened was that he wasn't hungry for success anymore. I think that's part of his problem now.

MR: It's strange that you say that because it's a fact that since he's come out of retirement he has yet to impress us with anything fresh and innovative. His producing, since his return to the industry, appears to be at best "just good." In no way are they classic landmarks of today's record production. He has not shown us anything new or even unique, including his work with the Beatles. He hasn't added any new dimension to any of his productions. He isn't *creating* records anymore, he seems to be just producing. Why, then, all the continued talk about Phil Spector? Is he really a genius or was he just creative during a certain period of American pop music?

LL: I worked with Phil again on his first couple of records after his return to the business. I was at A & M studios. We cut "Black Pearl" with the Checkmates Ltd. It was a pretty big hit. But it wasn't the same. We were recording 8-track, with different musicians in a different room which had a totally different sound to it. We were different, I guess. We weren't caught up in the momentum or the need to keep it going somewhere. We used to make emotional records. We had great material. Phil needed to have his hand in writing those songs. They had an impact. The songs were emotional and Phil's production enlarged those emotions. You see, there's a time for everything and the time for Phil was then—maybe it's not now. My feeling is that Phil is just not hungry anymore. If Phil were hungry, he'd do it. Without a doubt, he'd do it all over again. He'd come up with it and take it someplace it hasn't been before.



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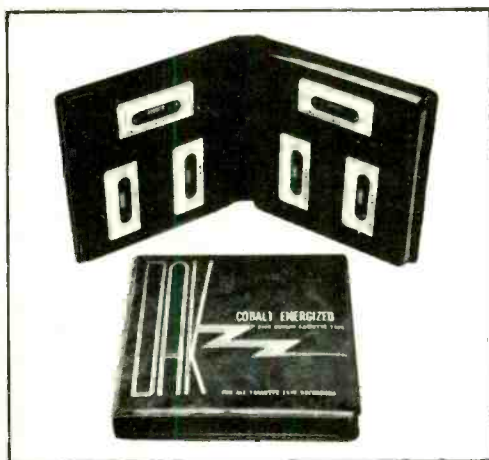
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# Ambient Sound

BY LEN FELDMAN

## Postscript to Our Product Testing Philosophy . . .

In the very first issue of *Modern Recording*, I went into some detail regarding MR's approach to product reviews and test reports. I discussed the importance of lab measurements versus listening tests, and the format that Norman Eisenberg and I would use in trying to fairly report the merits (or demerits) of a variety of audio products. I did *not* detail how we would "sample" products for testing. A recent series of episodes took place in our labs which points up some of the problems and conflicts inherent in attempting to test electronic equipment, and I'd like to share the experience with you.

Basically, we obtain equipment in one of two ways. Either we ask a manufacturer to send us a representative sample of the unit to be tested, or we obtain one on temporary loan from a dealer. In rare cases, if we cannot obtain a sample by either of these approaches we will go out and purchase the required unit in hopes that we might sell it at a minimum loss after our tests are completed. Personally, I prefer getting a unit directly from the manufacturer, and the story I'm about to tell will show why.

As many readers may know, the McIntosh Company has, for many years, refused to "lend" equipment to publications for review purposes. That is one of the main reasons why MR, believing that the consumer should have the right to know, wanted to test a piece of Mac equipment. Mac's reasons are many—some of which I cannot argue with, others of which I feel are not justified. For one thing, the people at McIntosh feel that if a manufacturer supplies equipment directly to a magazine for review, the manufacturer has an opportunity to "tweak up" the sample (or even possibly modify it or improve it) for better results. On this point, I can only speak from experience dating back some six years, during which time I have probably tested several hundred components sent to me directly from manufacturers. I cannot remember a single instance in which a manufacturer "phonied up" a circuit so that the unit would yield better measurements. Of course, I cannot deny that many manufacturers probably "double-check" such samples before sending them to me, but, frankly, I see nothing wrong with a manufacturer making doubly sure that a unit he sends

for review performs in accordance with specs and is not the occasional "lemon" that any manufacturer of complex electronic gear is liable to turn out once in a while. In fact, I wish more manufacturers *would* double-check the units they send for evaluation. If I receive a faulty unit from a manufacturer (and, indeed, I *have* in the past received several defective pieces of equipment) that I know to be defective (not poorly designed—just defective), I don't have the same warranty privilege of having it fixed up by a local service agency. I will have wasted the better part of a day (it's usually the *last* measurement that shows up the fault—hardly ever the first; a variant of Murphy's law, you know) only to have to start all over again with a request for a second unit from the manufacturer. I see no point in printing a report *based upon a defective unit* that does not represent what the model can do!

McIntosh's other argument against supplying equipment to "reviewers" for test purposes is that they have no way of knowing whether the particular tester or reviewer has the necessary test equipment or knowledge with which to properly evaluate that equipment. I certainly can't argue with that one—though I believe that a simple bit of investigation on the part of McIntosh (or any other company that may feel the same way) could insure that samples are sent only to *qualified* reviewers possessing reasonably up-to-date test equipment.

Be all that as it may, MR decided that we wanted to do a report on a piece of McIntosh equipment for this issue. Knowing that McIntosh would not supply one, MR decided to borrow a unit from one of their authorized dealers for that purpose. We did just that, and that's how we obtained our first MA-6100 Integrated Amplifier for testing. We were all prepared for an exciting "first" at our lab. Preamp section tests went smoothly enough, with all published specs met or exceeded by far. Construction was excellent, as the famed McIntosh reputation had led us to believe. Then, we came to the power output measurements and—sure enough—we realized at once that the unit was defective. Output sinewaves were being clipped severely *on one side only* before rated power was attained. What to do? We couldn't go back to the manufacturer—they hadn't supplied the unit in the first place. We asked the dealer if this were, indeed, a unit

from a factory-sealed carton and were told, at first, that it was. (It had not been sent to us in a McIntosh carton which, at once, raised our suspicions.)

I agonized over this situation for some time, along with the editors and publisher, and I finally decided to confer with the manufacturer as to what might be the trouble. A bit of telephone diagnosis led both McIntosh and myself to the conclusion that something must have happened in one "side" of the power supply and that, indeed, the unit was not functioning correctly. The very next day, a representative of McIntosh was in my laboratory with a second unit for comparison. We did a little trouble-shooting and found that one diode of a four-diode rectifier bridge circuit was *open* and that the required negative 41 volts DC supply was therefore running at about 37.5 volts (causing the one-sided clipping). McIntosh volunteered to take the defective unit back up to their plant, repair it and ship it back to the dealer. Since I was responsible for the unit, I felt I had to call the dealer once more to tell him what we had found. It was only then that the dealer admitted that this particular unit had been sent to a local authorized McIntosh service station earlier for a power supply repair. Seems a diode had *shorted* and the service agency had replaced the diode and sent it back to the dealer. What the service outfit did *not* discover was that when the first diode had shorted, it had "opened" a second diode. No listening test in the world could have disclosed the fact that the "repaired" unit still had another open diode, for the difference between 64.5 watts and rated 70 watts is just over *one third of one dB* (0.355 dB to be exact). Nor would a user have been able to tell that the unit had not been fully repaired, for at all but maximum power output, all other specifications were met and exceeded.

I relate this story in full for several reasons. First, to illustrate the dangers of testing "sample" units whose origins are not known. How much better it would have been for all of us (readers, manufacturer and your obedient product reviewer) if we could have started

with a "known entity," produced and tested under controlled conditions. Secondly, what would it have proven to readers if we had simply "put on the blinders" and reported that the McIntosh MA-6100 doesn't make rated power output? All but that "odd-ball" or improperly repaired unit of the three we tested, *did* meet specs—and then some.

All of which brings us back to the tabulations which you will find in our test report of the McIntosh MA-6100. You will note that we ended up reporting on *two* units. The first is the unit which the people from Mac brought to my lab when the problem with the borrowed unit arose. We could have stopped there, but we felt that if we did so, without telling the full story here, we would be doing our readers (and McIntosh) an injustice. On the other hand, if we simply told what happened, and then reported that the second unit more than lived up to expectations, we would be doing exactly what McIntosh feels is improper in equipment reporting. The only solution, therefore, was to find another dealer who would supply us with yet a third unit, and that is exactly what we did. A comparison of the results obtained from the second (Mac-supplied) and third (off the dealer's shelf, this time in a sealed carton) proves, we think, what I said earlier. It is obvious that McIntosh didn't *have* to do anything special to the unit that they hastily brought down to my lab. The third unit delivered virtually the *same* power as the unit brought down by McIntosh personnel.

Perhaps now, McIntosh—and any other companies who are reluctant to have their products reviewed by audio-involved publications—will take another look at the whole problem of test reports. Perhaps readers will be less prone to "climb on our backs" for testing products supplied by manufacturers. And perhaps, as a result of this unnerving experience (the episode ran for three days, and the phone bills are yet to be received), the lives of magazine reviewers (myself included) will be made just a little easier in the future.



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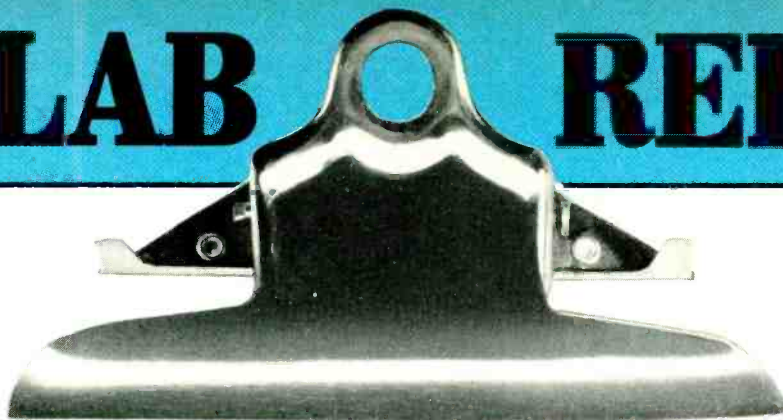
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## McIntosh MA-6100 Preamp-Amplifier

**General Description:** The McIntosh MA-6100 is a stereo preamp/power amp combined on one chassis, or, as custom terms such a unit, an "integrated amplifier." Its features and controls are intended not only to appeal to the serious audiophile but to the advanced hobbyist too, including the owner more than casually interested in tape-recording.

It is possible to connect, all at once, to the MA-6100 two turntables, two tape recorders, two tuners, and any auxiliary (line-level) source. In addition to the normally expected inputs for tape (line-level) there is a stereo input for connection directly from a tape head—a feature once offered on de luxe preamps but not to be found on units of recent vintage. Provision also is made for "interrupting the circuit" between the pre-amp and power amp section via stereo preamp-out and power amp-in jacks, which permits the insertion of special accessory units such as speaker equalizers or other signal-shaping devices. It also permits the use of either section by itself for special applications.

Two sets of stereo speakers (nominally designated as "main" and "remote") may be hooked up and turned off or on from the front panel, where there also is a headphone jack. The headphone signal is not affected by the speaker selector switches. An unusual and useful feature in connection with the speaker options is a switch that selects the load impedance depending on what combination of speakers is being used—the switch is found at the rear and has two positions, one

for 8 to 16 ohms and the other for 4 ohms. There are four AC convenience outlets for powering other equipment; of these one is always "hot" and three are controlled by the unit's main power switch.

Nothing seems to have been overlooked in the way of front-panel controls. Bass and treble controls are dual-concentric types that permit separate adjustment on each channel. The channel balance control shares a dual-concentric arrangement with the loudness compensation control which itself also has a "presence" position. Power off/on is combined with the master volume control.

The input selector has six positions to correspond to the input sources connected at the rear. The mode selector offers an unusually broad range of possibilities: left input to left and right outputs; right input to left and right outputs; reverse stereo; normal stereo; mono (left plus right); left plus right to left output only; left plus right to right output only. While the average home listener probably will find little or no need for such versatility, the advanced hobbyist or semi-pro will appreciate the options they represent for special purposes, not to mention their serving as a built-in trouble-shooting tool to help isolate problems to source, amp or speakers.

In addition to these knob-controls is a series of push-buttons. Two control the tape-monitor function for the two recorders that may be connected at the rear. Two more facilitate tape-copying in an easy and ingenious

way: the T1-to-T2 button connects the output jacks from tape recorder no. 1 to the input jacks of tape recorder no. 2 without affecting the program being monitored over the speakers. In this position, a copy of the program being played on tape recorder no. 1 can be made on tape recorder no. 2. To monitor this copy, you simply press the Tape 1 monitor switch.

The T2-to-T1 button does the same thing the other way round, permitting a copy of the material on tape recorder no. 2 to be made directly on tape recorder no. 1. This time, to monitor the copy, you would press the Tape 2 monitor button.

In addition, there are two more buttons for low and high frequency filters, and yet another for phase reversal—this last is another feature once found on many control panels and for some years not offered on most amplifiers or preamps. Needless to say, the phase switch not only is useful in initially setting up stereo speakers but it can provide a check on the proper phasing of stereo program material. It also comes in handy when adding a rear-channel amplifier and speakers to an existing stereo set-up to convert to quadrasonic sound. Proper phasing of all four speakers is germane to the full quadrasonic effect generally; in matrix decoding, it is especially important that all four channels remain in phase.

The speaker selector buttons and the stereo headphone jack complete the picture at the front. The panel itself is neat enough to fit into any home decor and is "business-like" enough to fit into the more workaday environment of a studio. Somehow, "Mac" stylists have managed to design a look that may well appeal to both types of user, and this opinion dovetails with the unit's general feel as a product.

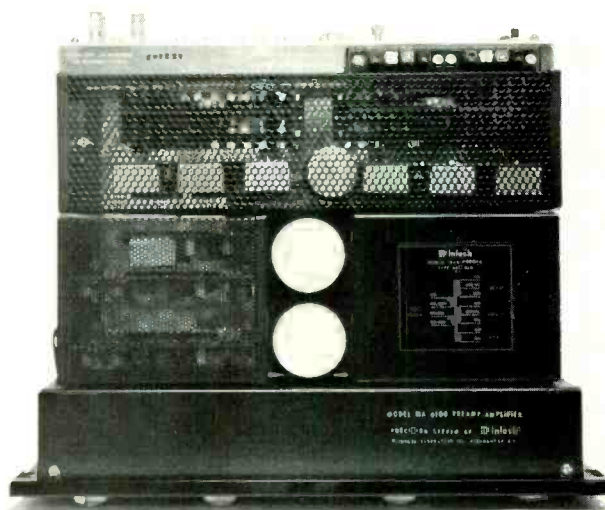
**Test Results:** Because of McIntosh's reputation, and because this company offers a money-back guarantee that its products will meet or exceed published performance specs, MR raised its critical eyebrow when the first sample of this amplifier, which had been obtained off a dealer's shelf, fell somewhat short of making 70 watts in one output channel. The details of this are explained elsewhere in this issue (see L.F.'s "Ambient Sound" column on p. 50), but briefly, investigation revealed that the unit we had started to test was a used model that had been less-than-expertly repaired prior to our getting it for testing. We accordingly discontinued tests of this unit and got hold of two new units, both "factory-carton fresh," and the test results reported here are based on those two units.

To state the story briefly, the second and third samples did indeed exceed published specifications, went through our test swimmingly, and most assuredly document that the MA-6100 is a superb amplifier in every respect. As for the less-than-perfect sample that

was on the dealer's shelf, we must conclude it was a freak accident (and not a serious one at that since the fraction of a decibel less output on one channel probably would never have bothered anyone just listening to the amplifier), but one which McIntosh, in any event, has been apprised of and which they presumably will guard against happening in the future.

As to the new, normally functioning samples, both produced better than 85 watts per channel (McIntosh claims 70). Power bandwidth extended from 14 Hz to 35,500 Hz in one, from 13 Hz to 35,000 Hz in the other (McIntosh claims 20 to 20,000 Hz). For McIntosh's claim of 0.2% harmonic distortion, we measured in either sample the extremely low level of 0.03% harmonic distortion.

And that's the way it went through all our tests of both the power amp section and the preamp section which, by the way, has very accurate RIAA equalization and excellent overload signal characteristics combined with a very low noise level—exactly what you look for in a preamp. Control and filter characteristics all were fine and well-suited to their intended use; signal sensitivities and output levels were well within the normal range for easy mating with other equipment of contemporary design. All controls and switches performed with professional smoothness to lend the unit a



McIntosh MA-6100: Top view.

"quality feel" which was substantiated by our lab tests and further borne out when we opened the beast and studied the extra-careful layout of quality parts that make up its innards and circuitry. All told, MR's view of the MA-6100 is that it is a superb integrated amplifier that should interest a wide range of users.

**General Info:** Front panel is 16 inches by 5 $\frac{7}{16}$  inches. The chassis itself is 15 inches wide and 13 inches deep (including Panloc buttons for optional panel mounting) and connectors at the rear apron. Front-panel knobs require clearance of 1 $\frac{1}{2}$  inches in front of mounting panel. Unit weighs 34 pounds net (46 pounds in shipping carton). Owner's manual is excellent, with detailed explanations and good illustrations. Price: \$699.

**Individual Comment by L.F.:** The full story of my adventure with the MA-6100 preamp-amplifier will be found in my "Ambient Sound" column on page 50. In terms of panel controls, the Mac unit gives a user the kind of input and output flexibility which has long since been abandoned by other manufacturers. Consider, for example, the flexible mode switch which lets you feed just about any mono or stereo combination of channels to the pair of outputs. Or the cleverly incorporated compensation control (tandemly mounted to the balance control to maintain an uncluttered look) which incorporates *both* a loudness compensation switch and a fixed mid-frequency presence emphasis that is neither too exaggerated nor insufficiently effective. It's been a long while since we saw a "tape head" input on an integrated amplifier (or on a preamplifier, for that matter) and we doubt whether even a small percentage of purchasers would ever have a need for this low-level input, but the flexible tape copy arrangement and the dual tape monitor circuits will find favor with serious tape recordists.

Action of the bass, treble and loudness controls, shown in the accompanying 'scope photos recorded directly using a slow-sweeping audio generator and a spectrum analyzer are just what you would expect and correspond almost exactly with McIntosh's own published curves, as they appear in the owner's manual. High and low cut filters have 12 dB per octave slopes, and the "presence boost" at midrange frequencies peaks center frequencies by just under 5 dB when this feature is switched in.

Readers may be curious to know why the MA-6100 is rated at 60 watts per channel under 4-ohm load conditions and at 70 watts per channel when operating into 8-ohm loads. Normally, one would expect higher power output into 4-ohm loads. In the case of this unit, a special rear panel switch has been added, which limits output when placed in the 4-ohm position in order to meet early interpretations of the FTC Audio Amplifier Power rule. That interpretation required that the amplifier be able to sustain one hour's operation at one-third of full power output without overheating or cycling of thermal protection circuits. Since this change was made, the FTC has re-interpreted the rule to permit repeated thermal cycling while making this test, so long as a full hour of "on" time was accumulated. Of course, under musical listening conditions the test is academic and, in fact, with the switch set to the "8- or 16-ohm" position, the amplifier would deliver

much more than its rated power when loaded with 4-ohm loads.

In addition to listening tests conducted at levels which produced peaks at or near full power output, we had occasion to run the amplifier at *full* power output under steady signal conditions for extended periods of time. This test puts a severe strain on the power transformer, and few consumer-type amplifiers could take such a beating for a very long period. The McIntosh MA-6100 stood up to this test nobly, with transformer temperatures such that we could comfortably rest our fingers on the surface of the transformer.

As for the listening tests themselves, we used three different types of loudspeakers for musical listening, including a pair that normally require an input of about 60 watts to produce reasonably loud sound levels. The amplifier contributed no audible distortion during these tests. Sound quality was strictly a function of the speakers used—as it should be.

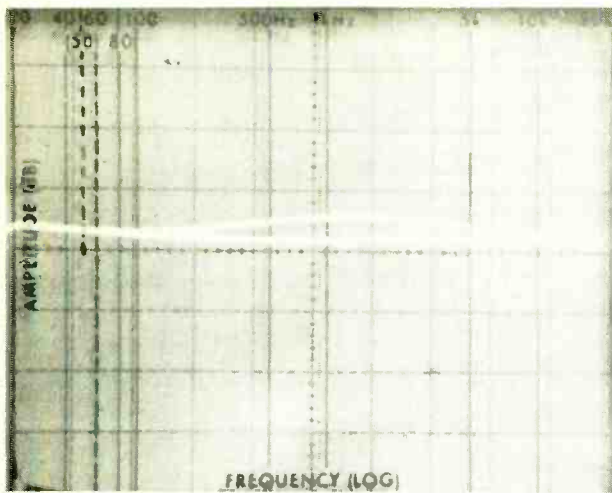
Dead shorts maintained across the output terminals while operating the amplifier at high power output levels triggered the protection circuits (which McIntosh calls a Sentry Monitoring Circuit) almost instantaneously, and return to normal operation of the system took place equally rapidly when the offending short was removed.

One gets the feeling that the McIntosh MA-6100 was built to last a very long time. During the course of our investigations, we had occasion to examine the insides of the amplifier and were impressed with the company's conservatism in choice of components, many of which are of much more than necessary quality. It is difficult to equate power output with respect to selling price for this unit, for certainly there are integrated amplifiers around which produce as much power for less cost. McIntosh stresses long-term reliability for all of their products, along with a dedication to service and customer satisfaction that cannot be adequately judged in the short time we had to live with these units. The large and devoted group of audiophiles who own Mac equipment suggests that many people are willing to pay a premium for this reliability and service.

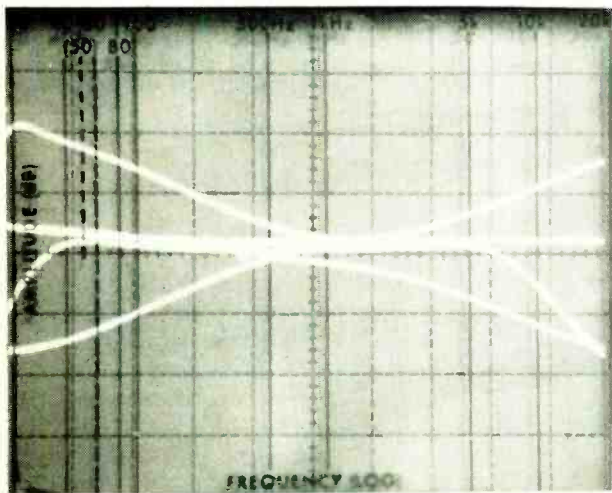
**Individual Comment by N.E.:** This was a more-than-usually interesting test project for me since it resulted in two things, both of which I deem positive and constructive: (1) it proved out a piece of equipment from a company about which there has been considerable speculation, and (2) it resulted in the first published test report in years on a piece of McIntosh equipment in any magazine in this field that accepts advertising. It is well known that for years McIntosh has maintained an aloofness regarding editorial coverage of its products which not only precluded their making test samples available but which also extended to their not sending information, even when requested by editors.

I am sure that the idea of simply going to a dealer and getting a McIntosh unit has occurred to more





McIntosh MA-6100: Response when set to "flat" (lower curve) and "pres" (upper curve) positions.



McIntosh MA-6100: Tone control range and low and high filter response.



McIntosh MA-6100: Loudness control characteristic at various volume control settings.

than one editor, but apparently this idea never has been translated into action. We, at *Modern Recording*, can thus take credit for an editorial first and for something of a scoop.

That in itself might be enough to be happy about. But what our little adventure also produced was some information that should be of value both to the reader/consumer and to the manufacturer—and that is the fact that it is entirely possible for a unit to have been serviced in a less-than-perfectly competent way and then returned to the dealer who sent it out for repair, presumably for sale to a customer. To be sure, the dealer had no way of knowing about the faulty repair job and it is certainly true that the nature of the flaw was such that in normal use of the amplifier it probably would never show up. But it was the kind of flaw that would show up in careful lab tests such as ours. And I suppose it could be argued that even a minor discrepancy would be objectionable to the kind of buyer who is willing to pay a premium price for equipment that is reputed to be built with more than average care and precision.

To guard against this sort of thing happening in the future, it would seem that McIntosh might more rigorously monitor its in-field servicing set-up. And a word to whomever it was who replaced that shorted diode and sent it back to the dealer: whenever you find a bum circuit part, especially in high-grade equipment, you always suspect and check out neighboring circuit parts which may have caused the defect or which may have been damaged as a side effect of the defect.

End of sermon. Now everyone can be happy and enjoy Mac equipment.

McINTOSH MA-6100 INTEGRATED AMPLIFIER: Vital Statistics

PERFORMANCE CHARACTERISTICS	LAB MEASUREMENT	
	Sample A	Sample B
Power output per channel, 8 ohms, 1 kHz	85.7 watts	85.9 watts
20 Hz	76 watts	76 watts
20 kHz	81 watts	80.7 watts
Power output per channel, 4 ohms, 1 kHz	80 watts	81.3 watts
20 Hz	66 watts	68 watts
20 kHz	72 watts	72 watts
Power band for rated 70-watts output	14 Hz to 35.5 kHz	13 Hz to 35 kHz
Harmonic distortion for rated output, 1 kHz	0.03%	0.03%
IM distortion for rated output	0.12%	0.10%
Harmonic distortion at 1-watt output, 1 kHz	0.05%	0.04%
IM distortion at 1-watt output	0.05%	0.04%
Damping factor, 8 ohms	58	56
Frequency response, 20 Hz-20 kHz, high-level input	±0.3 dB	±0.25 dB
Signal-to-noise, ref. full output	92 dB	92 dB
Frequency response, RIAA equalization	±1 dB	±1 dB
Max. input before overload, preamp	135 mV	137 mV
Signal-to-noise ratio, preamp, ref. full output at 10 mV input	79 dB	79 dB
at 2 mV input	65 dB	65 dB
Input sensitivity, phono 1	2 mV	2.1 mV
phono 2	2 mV	2 mV
high-level inputs	280 mV	290 mV
tape inputs	280 mV	290 mV
Output level, tape	280 mV	290 mV
headphone jack	0.84 V, 8 ohms	0.8 V, 8 ohms

CIRCLE 11 ON READER SERVICE CARD



## Dokorder 1140 Four-Channel Open-Reel Tape Deck

**General Description:** The Dokorder model 1140 tape recorder is a quarter-track model capable of recording and playback in four-channel as well as in stereo and mono. Multi-channel and overdub recording in perfect synchronization is possible with the built-in multi-sync (similar in nature to the sel-sync feature found on competing models). "Punch-in" recording (effectively, editing and re-recording a portion of a track without splicing it) also is possible. The model 1140 has absolutely fast-buttoning (except when in record mode) from any wind to any other without the need to press the stop button. It also features completely adjustable bias, independently on each of four tracks, which is facilitated by a built-in pink-noise generator that provides the test signal; correct bias for a given channel may be read directly off its respective VU meter. The 1140 also permits "ping-pong" recording whereby several mixed-down tracks have been put onto a given track which is transferred onto another track to free the first track for re-use. Regular editing is facilitated by the ability to "rock the reels" electronically, and the so-called "wastebasket" method may be employed whereby large chunks of material you don't want to save may be spilled directly into a container—the tape need not be threaded onto the take-up reel. The 1140 also has a "double memory" feature which utilizes two tape counters—one forward and the other in reverse—and permits rapidly locating a desired passage on a tape as well as repeating the tape. A special socket permits running the deck via a remote control accessory (the RC-11 attachment).

As supplied, the model 1140 has the twin-section

look made famous by Dokorder in its lower-end machines, whereby the meter and electronic control panel sits vertically above the transport itself which rests horizontally. Of course, those who prefer can dismantle this arrangement and regroup the two sections in any way they choose; the transport will operate, of course, in the vertical position. The 1140 uses two erase heads, a record head, and a playback head. It accepts reels up to and including the professional NAB size (10½ inches in diameter), and it operates at two speeds—15 ips and 7½ ips.

The upper (electronics) section is dominated by the four meters, one per channel and calibrated from -20 to +5. These are average-level reading meters; peak indicators are in the form of small red lamps near their respective record level controls. The meters light up as per the mode of operation chosen: the first two for stereo, all four in four-channel. The mode selector is in a row of controls at the left and directly below the meters. Also in this section are the mic/line selectors for each track and their four level controls. To the right are four monitor buttons to choose tape or source; below them is an equalizer switch ("normal" or "special"), and the switch that turns on the built-in test generator. Finally there are the output level controls, one per channel, arranged in dual-concentric pairs for tracks 1 and 3 (stereo) and for tracks 2 and 4.

On the left side of the electronic unit are headphone output jacks for front and rear channels. The right side contains the four mic inputs. At the rear are standard jacks for line in and line out plus multi-connector

sockets that link the electronics here with the transport section below.

The tape reels rest on sturdy platforms or small "turntables" that are fitted with spring-loaded, rotatable reel holders and accept the NAB-size hub adapters. The tape path goes past a compliance arm and roller assembly, through the head cover, the drive capstan and pinch-roller, a tape-tension arm, and onto the take-up reel. Above the head housing are the four buttons for automatic multi-sync, one per channel. To the left of the head cover are the two memory counters, each a four-digit type with its own reset button. Just to the right of these are the four adjustable bias controls, normally protected by a removable plastic cover. At the extreme right is the three-position memory program switch ("auto stop," "off" and "repeat").

The lower section of the transport deck contains the following controls: power off/on; reel-size selector; tape-speed selector; fixed- or variable-bias selector; cue; pause; record-channel selectors (one per channel with its own indicator lamp); and the main movement controls for record, fast rewind, stop, normal forward and fast forward. The socket for connecting a cable from the remote control device is on the bottom "apron" of the transport.

There is one additional "control" that is quite critical and that's a locking screw under the transport which, if it is not loosened, will keep you from being able to run the machine.

Mic inputs are 600 ohms; line inputs are 100K ohms; line outputs are suited for 10K ohms or higher; headphone output impedance is 8 ohms. The Dokorder 1140 uses three motors—one is a hysteresis-synchronous type for capstan drive; the other two are 6-pole induction motors.

The Dokorder 1140 is supplied with wooden panels framing the electronics section and the transport; the latter is supported on small "feet." Included also are an empty 10½-inch reel; two 10½-inch reel adapters; two 10½-inch reel adjusting discs; signal cables; owner's instruction booklet. Optional extras include the remote-control unit, a rack console for floor-standing installation; a rack adapter for completely vertical installation; a dust cover; a cleaning kit; various

empty reels; a stereo headset. The owner's "reference book," is generally good but on the lean side.

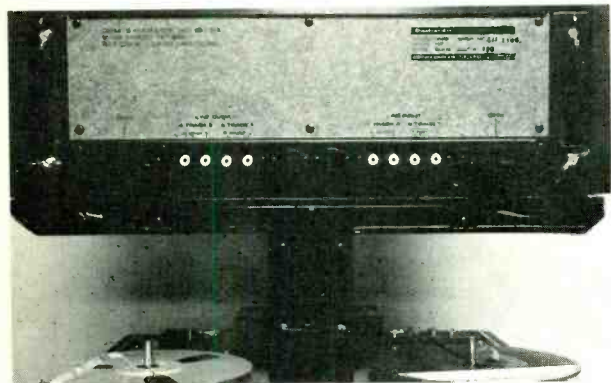
**Test Results:** In MR's view, the Dokorder 1140 comes as close to a truly professional recorder with multi-channel capability as any seen to date. This opinion is based on an evaluation of its many features and, of course, its audio performance which is tops. There wasn't one published specification which was not surpassed in MR's test of the unit. Maxell UD-35 tape was used, with the EQ switch set to "special" position (as per the instructions), and by taking advantage of the built-in generator to trim the bias for the particular reel we used. Just to check on this method, we recorded a high frequency (12 kHz) and adjusted bias with an external meter and oscilloscope. We did get a slightly improved reading this way, but the difference between this method and the built-in method provided on the deck was negligible; the Dokorder's own generator will do nicely for those who don't own, or are not inclined to using, extra test gear.

In terms of response (at either speed), distortion, signal-to-noise, wow and flutter, and so on, the Dokorder 1140 is excellent.

At 15 ips, response—using the tape mentioned—ran within  $\pm 3$  dB from 27 Hz to 28,000 Hz. Total harmonic distortion (THD) was 1.2% for zero VU level; rising only to 1.3% for +3 VU, and to 3% at +6 VU. Wow and flutter came to 0.02%.

At 7½ ips, response—with the same tape—came to within  $\pm 3$  dB from 17 Hz to 24 kHz. THD was 1.1% for zero VU; 1.2% for +3 VU; and again came to 3% at +6 VU. Wow and flutter at this speed measured 0.04%.

Just as these measurements impressed us very favorably, so were we taken with the smooth response of the 1140's controls and the action of its transport. By combining the cueing feature (which moves the tape close enough to the playback head to permit hearing what's on it during fast wind) with the facility for electronically rocking the reels (alternately depressing the two fast wind buttons), one can achieve rapid and accurate editing and precise cueing. The track sync, and the "punch-in" editing features also worked



Dokorder 1140: Line inputs and outputs connect at rear of electronic section.



Dokorder 1140: Mic inputs are located on side surface of electronic section. (Phone jacks for front and rear channels are on opposite side.)

smoothly. The 1140 lacks a built-in mixing facility which at first glance seems surprising inasmuch as it is often found on other multi-channel decks including some priced lower. However, Dokorder makes a point of not offering it here, claiming that its omission favors lower-noise circuitry, and that, anyway, mixing is the function of a mixer rather than of the recorder.

**General Info:** Transport and electronic section each come with wooden sides fastened and both units joined via support. Overall dimensions: 20½ inches high; 17 inches wide; 16½ inches deep. Individual dimensions: electronic section is 17 inches wide; 5⅞ inches high; 6⅞ inches deep plus 2 inches more for clearance of connectors and knobs. Transport is 17 inches wide; 9¾ inches high (on feet); 16½ inches deep. Note: use of 10½-inch diameter reels adds 2¼ inches to each side and ⅞ inch to rear. Weight is 66 lbs. Advertised price: \$1,199.95.

**Individual Comment by N.E.:** The Dokorder seemed to make a dubbing of an earlier-recorded cassette tape that was "brighter" than the original; analysis showed, however, that the very upper end was perhaps getting a little more signal than it needed. A re-check of the bias adjust corrected this and the result was a copy that no one present could distinguish from the original. This copy then was redubbed on the other machine (a cassette deck) and, as expected, there was some difference. This may seem like a lot of trouble to take to demonstrate the excellence of the Dokorder, but we felt it was worth it. The 1140 lacks input mixing but it does have that separate-track variable bias adjust. And its fast-buttoning is foolproof. You can go from any speed in either direction to the other, or to normal forward (except when you're in record). One thing that first annoyed and then amused me: my sample arrived not with the detailed owner's "reference book" but with a hastily printed "interim manual." No mention was made in this manual of the locking screw under the transport, and a friend and I tried in vain to get the unit to work. We were about ready to give up and chalk up a defective sample, when sheer curiosity got us to lift the monster and look at its underside where we spotted the shaft of the locking device. We removed it and the unit was ready to roll. I note in the regular manual that mention is made of this, but it should be printed in red letters and/or in large type.

**Individual Comment by L.F.:** The fine line between professional studio open-reel decks and high-end home decks has, in my opinion, been made a bit finer with the introduction of this impressive machine. Of course, the electrical specifications and measurements speak for themselves, but there have been (and are) other home-use decks which deliver extended frequency response, low distortion and good signal-to-noise ratios. In fact, most high-priced decks intended for home use compare favorably with studio machines in these respects. What has previously distinguished true professional machines from the home variety are operating features that are particularly important to

the professional recordist working in a studio. Many of these features appear on the 1140. Multi-sync (some firms call it sel-sync) is one—and perhaps the most important one, since it enables sequential laying down of tracks in perfect synchronism with previously recorded tracks by temporarily converting record head to playback head. Individual track recording, individual selection of source or tape monitoring and peak indicators are others, but these too have been found on other home machines.

What is totally new, to the best of my knowledge, is the built-in pink-noise generator and the associated front panel bias adjustment controls (a separate control for each channel). This, to me, really makes a difference. No matter what tape a manufacturer recommends for use with his machine, variations occur from batch to batch and no self-respecting recordist would start his professional day without adjusting bias for the tape batch he or she plans to use that day. Until now, that's only been possible on true studio multi-track machines. Now the Dokorder 1140 offers this refinement for home or semi-professional users.

I also liked the absolutely foolproof transport-motion functions, and the "electronic rocking" of the reels—as well as the "punch-in" editing feature.

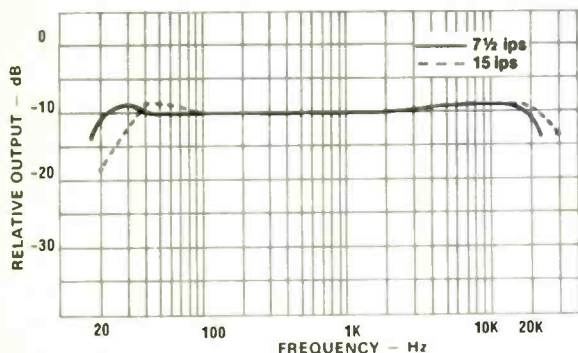
Attempting to please the semi-professional as well as the hobbyist means including features that will appeal to one group and not the other. For the professional or semi-professional, the "double memory" re-wind feature is superfluous. For the music listener it does offer an easy way for repeating a favorite reel of tape endlessly until the feature is defeated. The fact that the 1140 is equipped with a remote control socket (to fit their RC-11 remote attachment) will appeal, once more, to the professional who will be sitting at a mixing console and will want to operate the transport remotely. Though we have not seen the remote accessory itself, there are enough socket contacts to suggest that every transport function can be duplicated from the remote position when the attachment is used and, presumably, one could even get in and out of the record mode using the add-on device.

Speaking of mixing, we were rather surprised to find that the deck has no provisions for mic and line mixing. Again, the emphasis seems to be on professional use. While much less expensive machines (both two-channel and four-channel) offer this feature, the serious recordist will probably end up using some sort of mixer board with this deck—even if it is one of the small six-in, two-out types that emulate the large consoles found in studios but are really intended for high-impedance, unbalanced inputs and outputs. In that event, all mixing would be done at the small console and there would be no need for line/mic mixing on the deck itself. Just the same, not every one owns a mixer.

Speaking of impedance, while the mic inputs are 600-ohms in impedance (albeit unbalanced), the high level line inputs are 100K in impedance and the line outputs are 10K ohms in impedance and could therefore not be expected to feed balanced 600-ohm associated equipment. Outboard matching transformers would have to

be used for any 600-ohm applications other than mic inputs—a requirement that is not likely to appeal to the true professional recordist.

While I like the dual-plane arrangement and the two section packaging of the machine (visibility of all controls and access to all of them is much improved over the one-piece deck), it should be noted that rack-panel



**Dokorder 1140: Record/playback frequency response, using Maxell UD-35 tape (reference record level = -10 dB)**

adaptors are available and the two major sections of the deck (electronics and transport) could be taken apart quite easily and mounted one above the other, vertically. The transport operates equally well in both planes (as we proved to our own satisfaction by up-ending the machine in its present packaging just to see if it would work).

DOKORDER 1140 TAPE RECORDER: Vital Statistics	
PERFORMANCE CHARACTERISTICS (using Maxell UD-35; EQ and bias set as per owner's instructions)	LAB MEASUREMENT
Record/playback frequency response	
15 ips, -10 VU	±3 dB, 27 Hz to 28 kHz
7 1/2 ips, -10 VU	±3 dB, 17 Hz to 24 kHz
Harmonic distortion	
15 ips, +6 VU	3.0%
15 ips, +3 VU	1.3%
15 ips, 0 VU	1.2%
7 1/2 ips, +6 VU	3.0%
7 1/2 ips, +3 VU	1.2%
7 1/2 ips, 0 VU	1.1%
Best S/N ratio (ref. 3% THD point)	63 dB
Input sensitivity, mic line	0.20 mV
	75.0 mV
Output level, line (re: 0 VU input)	0.775 V
Headphone output	2.2 mW/8 ohms
Rewind time, 1,800-ft. reel	88 seconds
Flutter & wow (weighted), 15 ips	0.02%
	7 1/2 ips
	0.04%

CIRCLE 12 ON READER SERVICE CARD



## MXR Stereo Equalizer

**General Description:** The MXR stereo equalizer is a two-channel frequency equalizer that offers ten bands of discrete adjustment on each channel. Nominal center frequencies are: 31, 62, 125, 250, 500, 1K, 2K, 4K, 8K and 16K. Each of these octave bands may be cut or boosted independently by up to 12 decibels by using slide controls. In addition each channel has its own overall level slider. The unit has an internal power supply and is designed to run off normal "household" current (115 volts, 60 Hz AC). It has no power switch of its own and so must be turned on or off by

having its line cord connected into a controlled AC receptacle on some other major piece of equipment such as an amplifier or receiver.

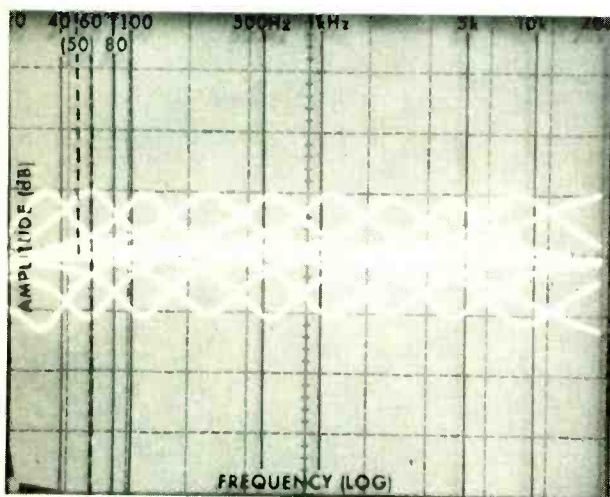
Its main intended use is to provide precise compensation for aural tone quality discrepancies that may be caused by room acoustics, speaker inadequacies, or program source quality. As such, it is designed basically to be inserted in a playback system at the "tape monitor" signal level. When the tape monitor facilities of a typical hi-fi receiver or integrated amplifier are so used, an alternate set of tape jacks at the

rear of the MXR device may be used to provide the normal tape functions thus preempted. The MXR equalizer also may be patched into a system between a separate preamp and power amplifier. A switch at the rear permits the user to bypass the device. There also is a tape switch ("normal" and "monitor"). There are stereo line in and out phono jacks, and stereo tape monitor and record jacks.

Input impedance is 47K ohms, and the unit is designed to work into output loads of 600 ohms or higher. Although the instructions do not mention it, the MXR also—in addition to serving as a versatile "tone trimmer" in a playback system—also could be used to shape signals being fed into a tape recorder, but with its wide control range and hefty gain, due caution is called for to avoid tape overload and distortion in this application. An alternate "professional" model also has been announced by the manufacturer; this version has phone-jack balanced bridging inputs, and low-impedance outputs. It lacks the tape-monitor facilities or bypass capabilities.

The MXR equalizer is quite petite—about the size of a cigar box, very neatly styled, and handsomely packaged in black and brushed aluminum, with wooden sides. Its input and output characteristics make it compatible with any normal hi-fi equipment.

**Test Results:** Lab measurements and listening tests confirmed the usefulness and reliability of the MXR equalizer which, despite its small size, can do a very creditable job of tailoring sonic output to a far greater degree, quantitatively and qualitatively, than conventional tone controls can possibly do. MR found that its center frequencies were well calibrated, and that the range of adjustments was very much as specified. This was verified by taking 'scope photos of a series of successive response curves for the extreme



**MXR Stereo Equalizer: Composite response range.**

settings of each slider; the curves were stored on the face of the 'scope for the composite photo shown here.

Distortion measured on the device was low enough not to add unwanted coloration to the signal being processed through it, and the unit's overload capability is great enough so that, when connected to the tape monitor circuits of a receiver or amplifier, it is not likely to be overloaded even by program material having extraordinarily great dynamic range. Maximum output level was even a shade better than claimed (MR measured +17 dBm into 600 ohms; MXR claims 15 dBm); into an open circuit MR measured +23 dBm as compared to MXR's claim of +22 dBm. Overall frequency response at zero dBm was measured as within  $\pm 1$  dB from 17 Hz to 35 kHz.

MR is, in short, very happy about the MXR equalizer. It does what its makers claim for it and then some—and in a format and at a price that are quite attractive for this type of device.

**General Info:** Unit is 9¼ inches wide; 7 inches deep; 2½ inches high (including mounting feet). Weight is 4½ lbs.; price is \$199.95. Use of the device is simple enough for an experienced audio person, but the manufacturer could use the services of a good writer to prepare a decently detailed instruction booklet.

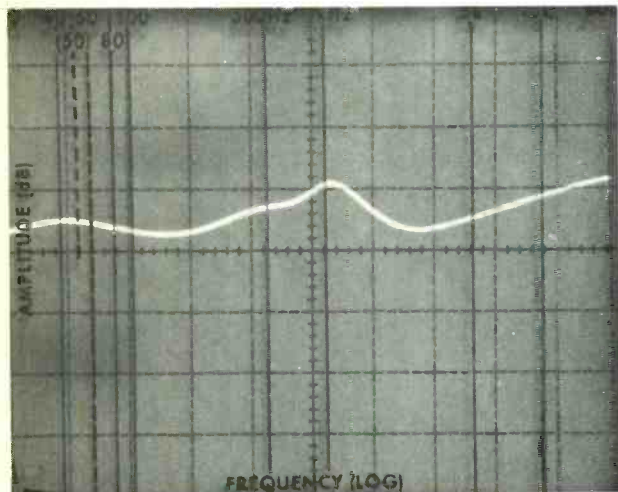
**Individual Comment by N.E.:** My first experience with a multi-band equalizer was some years ago when I was party to a "room-tuning" with the Altec Acousta-Voicette which has no less than 24 active filters per channel and which—when you add the cost of the technician's time—can run to a price of about \$1,000. Here, for one-fifth that amount, is a device that obviously is not as sophisticated as the Altec but which still can do a job of audibly improving the sound of a playback system—bringing up a soloist, or taming a nasty room resonance, correcting for channel imbalance when stereo speakers have to be placed in asymmetrical acoustic environments in a given room, and so on. Any doubt as to what the MXR device contributes during playback is readily resolved by flipping the "in/out" switch at the rear, which makes me think it should have been placed on the front panel—not only as a convenience to the owner but to facilitate its demonstration to skeptics.

**Individual Comment by L.F.:** I agree with N.E. that the "in/out" switch might have been more conveniently positioned on the front panel. By the same token, why not the source/monitor switch also? I also wonder why MXR failed to include a power off/on switch on the unit. It is true that most users will connect the device to a switched AC receptacle on their receiver or amplifier, but it is also true that many sound enthusiasts—especially those into serious recording—by now might have used up all such receptacles for

other audio devices. So the owner of the MXR should have the option of plugging the unit directly into its own AC outlet and turning it on.

Aside from these minor carpings, I was very favorably impressed with the unit. It is, of course, one of several similar devices that are fast becoming popular in sophisticated hi-fi set-ups thanks to their ability to

provide far superior tone adjustment than conventional treble and bass controls. For most home and recording applications, it seems to me that ten bands are just right, and I was able to shape response curves to my liking under a variety of acoustic and equipment circumstances. The unit is small enough to fit just about anywhere, and these days—with all the out-board devices we tend to patch into our sound systems—that advantage should not be overlooked.



MXR Stereo Equalizer: Complex response (arbitrary) we were able to "tailor."

MXR STEREO EQUALIZER: Vital Statistics	
PERFORMANCE CHARACTERISTICS	LAB MEASUREMENT
Dynamic range	110 dB
Gain (Unity, $\pm 1$ dB, controls centered)	+0.3 dB at 1 kHz
Control range	$\pm 12$ dB
Output impedance	600 ohms or greater
Maximum output level, into 600 ohms	+17 dBm
into open circuit	+23 dBm
Input impedance	47K ohms
Equivalent noise input	-95 dBm
Frequency response	$\pm 1$ dB, 17 Hz to 35 kHz
THD at 0 dBm	0.007% at 1 kHz
	0.01% at 20 Hz
	0.25% at 20 kHz
IM at 0 dBm	.045%
Center frequencies (31, 62, 125, 250, 500, 1K, 2K, 4K, 8K, 16K)	Accurate; see graph

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STEVEN R. MASTERS  
IRA MAYER  
GIL PODOLINSKY  
HOWARD ROLLER  
BOB WEIL

## POPULAR

**THE CHIEFTAINS: 5** [Paddy Moloney, producer; John Wood, engineer; recorded at Sound Techniques, London.] Island Records Ltd. ILPS-9334.

Performance: **Unique**  
Recording: **Natural**

Just for starters, let me say that your record collection is not complete without at least one record by the Chieftains. The Chieftains are seven Irish musicians who play traditional Irish music. The combinations of color through the blending of fiddles and harps (Irish, to be sure), tin whistles, flutes, oboes, concertina, native instruments such as uilleann pipes, timpan (cousin of the dulcimer), bodhran and bones offer a unique sound.

This, the Chieftains' first U.S. release, is preceded by four albums on Garech Browne and Claddagh Records, dating as far back as 1964. It is worth crediting Island Records for introducing the Chieftains to this country. If you'll recall, it was Island which first made us aware of reggae music. The straightforward approach to the tunes by the Chieftains, and the hands-off technique of the producer and engineer result in a recording of traditional music where time seems to stand still.

G.P.

**BUDDY EMMONS: *Buddy Emmons*.** [Michael Melford, producer; Jack Logan and Steve Logan, engineers; recorded

at Music City, Nashville, Tenn. and Intermedia Sound, Boston, Mass.] Flying Fish #007.

Performance: **Professional**  
Recording: **Natural**

**TUT TAYLOR: *The Old Post Office*.** Flying Fish #008.

Performance: **Top quality**  
Recording: **Straight ahead**

Two fine albums have been issued by a little-known but classy label known as Flying Fish Records. Both albums are in the country/bluegrass style and both are excellent. Each has country musicians of the highest caliber involved in the projects.

The first and most interesting is a solo album by Buddy Emmons, the "living-legend" pedal steel guitarist. Emmons has helped to build the famous Sho-Bud steel guitar and has now designed his own Emmons pedal steel guitar. A master of the instrument, he is capable of playing any form of music flawlessly.

The album, *Buddy Emmons*, is a collection of country and popular standards: "Remington Ride," "Wabash Cannonball," "Orange Blossom Special," "Nothing Was Delivered," "Rose in Spanish Harlem." An added attraction is a silky, smooth rendition of a classical piece "Canon in D Major" by Johann Pachelbel. All is done so tastefully that the album brings a smile to your face.

A further plus: unlike many similar albums, the specific instrument featured is not spotlighted to the exclu-

sion of all others. Care seems to have been taken with the entire production, but with a virtuoso such as Mr. Emmons it was probably very easy.

The second album, Tut Taylor's *The Old Post Office*, features Tut on dobro and banjo, Norman Blake on vocals, guitar and mandolin, and Butch Robins on the new "Tennessee" Top-Tension banjo. The music is mostly easy-going blue grass style which is rapidly regaining popularity. The vocals are uninspiring but the general musicianship and good feeling is of top quality.

If you are unable to find either album at local record shops, write to: Flying Fish Records, 3320 N. Halstead, Chicago, Ill. H.G.L.

**THE GRATEFUL DEAD: *Blues For Allah*.** [The Grateful Dead, producers; Dan Healy, engineer; recorded at Ace's (Bob Weir's home studio), Marin.] Grateful Dead Records GD LA494-G.

Performance: **Good, but not great**  
Recording: **Excellent at last!**

For proper perspective, it should be pointed out that I am a confirmed Dead-Head. Although my immediate reaction to *Blues For Allah* is mixed, the album is undoubtedly a landmark for The Grateful Dead. The group has certainly recorded albums with better material (*Workingman's Dead* and *American Beauty*) and hotter chops (*Live Dead* and *Europe '72*), but the immediacy of their concerts has been captured at last within the context of a well-produced studio recording.



There is plenty of improvisation (the Dead's trademark), the vocals are up-front, the drum sound is full and real, the bass is tight, and the guitar tones are rich and varied. Previous recordings have been lacking in one or more of those areas, which is surprising in view of the advances the band has made in the field of "live" sound reinforcement.

*Blues For Allah* opens with a classic Dead medley starting with "Help on the Way." This jazz-flavored cut features Jerry Garcia's typically understated vocal set in a fine weave of bass and electric guitar. The music flows through the improvised, instrumental transition, "Slipknot," and on into the album's highlight, "Franklin's Tower (Roll Away the Dew)." The syncopated Reggae rhythm provided by bassist Phil Lesh, the underrated rhythm guitarist Bob Weir, and drummers Mickey Mart and Bill Kreutzmann is a perfect backdrop for Garcia's guitar. His distinctive "be-bop" accenting within melodic non-stop guitar lines (a la Betts or early Bloomfield) makes him the most unmistakable guitarist in rock; he never plays anything the same way. Musically and



**JERRY GARCIA**  
Makes Dead magic.

spiritually, The Grateful Dead is one of the tightest knit, most spontaneously creative groups around—but it is Jerry Garcia that makes them magic.

*Blues For Allah* is a good record with definite flashes of brilliance, but it is nowhere near the ultimate Grateful Dead album. Their production technique is up to the caliber of the group's best performances at last. Now, with more consistent material and a little more room for Garcia to solo, we may get that album yet. B.W.

**GRUPO FOLKLORICO Y EXPERIMENTAL NUEVAYORQUINO: *Concepts in Unity*.** [Rene Lopez and Andy Kaufman, producers; John Laico, Con Puluse and Lou Waxman, engineers; recorded at CBS Studios, New York.] Salsoul Records SAL 2-400.

Performance: **Enlightening**  
Recording: **Bright and natural**

It is upsetting to think that, after so many groups and single artists in almost every musical field have made a name for themselves (not to mention a few dollars) using forms that were originally of Latin music origins, an album like this with its Folkways series-type format should even be necessary.

*Concepts in Unity* is a diverse, seemingly well-thought-out double album containing some extremely good Latin music and some of the best but unpublished Latin musicians in the field. The nucleus of the group is made up of personnel from El Conjunto Libre and the *conjunto* of trumpeter Alfredo "Chocolate" Armenteros. The musicians present many styles of music such as the "plena" that, in the shadow of the "salsa" boom, have been ignored for too long.

The harmonica-playing of Francisco "Tan" Martinez and the lyrics are a highlight of the album on *Adelaida (Si Me Pego En El Pool)* which serves to showcase the flexibility and humor of the music and musicians presented on the album.

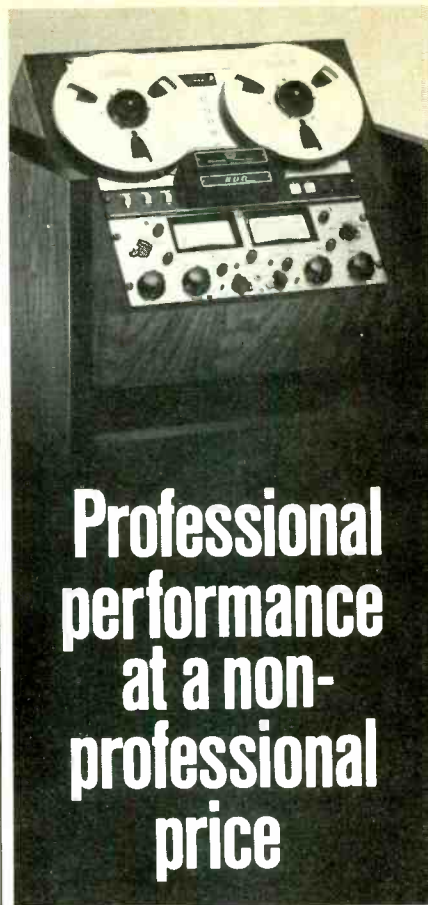
The recording, with the possible exception of some of the voices, appears to have been done "live" in the studio (i.e., no overdubbing), judging from the "open" sound quality. You hear more of the bright, natural room ambience than with console mechanics—which for this type of music is essential.

It would serve many musicians and listeners previously unfamiliar with Latin forms to look to this album as an introduction to the scene. H.G.L.

**GEORGE HARRISON: *Extra Texture*.** [George Harrison, producer; Norman Kinney, engineer; recorded at A & M Studios, Los Angeles.] Apple SW 3420.

Performance: **Formidable**  
Recording: **Excellent**

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# Simon and Garfunkel's New Solo Albums —“a mere misstep” and “somnambulant sweetness”

by Paulette Weiss

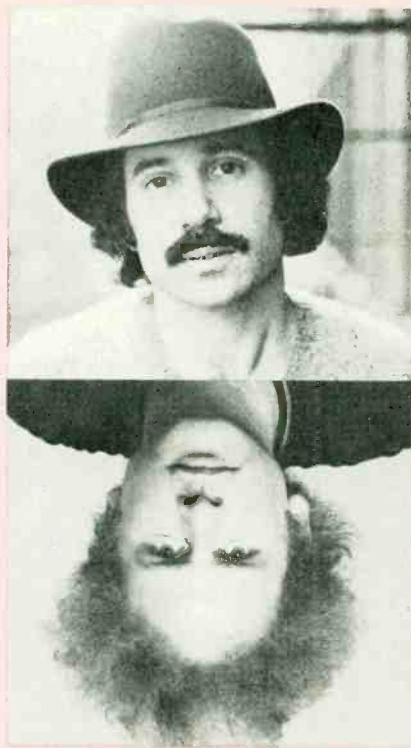
“Everyone’s got to grow up some-time,” preach the wise old cliché merchants, but I still pout and kick my cats when disappointed. After listening to the new Paul Simon and Art Garfunkel albums, I punted the two bewildered tabbies thirty yards apiece before regaining my composure.

Of the two, Garfunkel’s *Breakaway* is the least disappointing simply because my expectations were low to begin with. Even more than in his previous *Angel Clare*, song after song exhibits a somnambulant sweetness whose ultimate effect is boredom. Garfunkel’s pure choirboy voice skims the surface of a lyric like a casual gull over the sea, ignoring nuance, incapable of (or unwilling to risk) interpretation. Chief examples of this are his zombie-esque treatment of “I Only Have Eyes for You” and a massacre of the lilting bossa nova “Waters of March” that would chill Antonio Carlos Jobim even in the heat of tropical Brazil.

Nevertheless, it all seems very, very pretty, and *wunderkind* Richard Perry’s slick, lush production supports this textural prettiness admirably. Strings, horns, background vocals, overdubbing—all provide a sense of aural depth that unfortunately cannot compensate for shallowness elsewhere. The recording itself, handled at numerous different locations by several engineers, is impeccable throughout. No sign here of Art Halee, trusted producer/engineer of the duo for many years, and considered by many the group’s third member.

Perhaps maturity is a key concept in understanding the sundered Simon and Garfunkel team. Their past musical association and the simultaneous release of their albums, both containing the joint effort “My Little Town,” forces a comparison between two artists who are no longer comparable. There is a tendency to dismiss the solo Garfunkel as a sentimental balladeer, whose borrowed songs of love and pain smack of the fanciful romanticism of youth. Paul Simon, however, rock poet *extraordinaire*, has that air of wizened

maturity, that squinty-eyed gaze that attempts to put things into perspective. This maturity carries over to the realms of musical taste and imagination, leading Simon to draw upon supporting musicians as disparate as Los



Incas, Toots Thielmans and the Jessie Dixon Singers, all with fascinating results.

But enough—we are neither here to praise Simon, *nor* to bury him. Instead, we gather to lament the failure of *Still Crazy After All These Years*. Despite the fact that it is a better-than-average rock album, it is (here comes another kick for the cat) a terribly disappointing *Paul Simon* album. The once warm, wry observations of the human condition have slipped into dispassionate cynicism. His air of maturity has deteriorated into fatigue. Tired, too, are his lyrics and melodies, inviting comparison with earlier, better treatments of similar themes. “Night Game” is a frail, thin shadow of the powerful “Boxer” of the *Bridge*

*Over Troubled Water* album. “Silent Eyes” is a surprisingly uninspired inspirational song. The much-aired “My Little Town” repeats Simon and Garfunkel products of the past with similar harmonies and a couple of fine lines (“As I pledged allegiance to the wall”) but an overall, unrelenting bleakness of tone persists that I find depressing.

There *are* shining moments: Sivuca’s odd and delicious accordion and vocal solo in “I Do It for Your Love,” the string and woodwind arrangements by the talented Bob James, and Simon’s wry delivery of the line “I said I appreciate that” on “Fifty Ways to Leave Your Lover.”

Once again, an excellent production job, here by Phil Ramone and Paul Simon, with Ramone also acting as recording engineer. The blending of Simon’s choice of disparate musical elements is handled smoothly and subtly, creating seamless instrumental entrances and fine balances between choral levels and soloists. Characteristic of both *Still Crazy* and *Breakaway* are a lavishing of technical expertise on substandard material. But Paul Simon’s standards are so high, his intellect and taste so far above the common rock muddle that *Still Crazy* appears as a mere misstep by an artist whose direction has long been firmly established. My cats and I are betting that he is suffering from a temporary case of life-fatigue and will bounce back rhythmin’ on his next effort.

**ART GARFUNKEL: *Breakaway*.** [Richard Perry, producer; “My Little Town” produced by Paul Simon, Art Garfunkel and Phil Ramone; Brooks Arthur and Dee Robb (“Break Away” and “Waters of March”), engineers; recorded at various studios in New York, Los Angeles and London. Columbia PC 33700.]

**PAUL SIMON: *Still Crazy After All These Years*.** Paul Simon and Phil Ramone, producers; Phil Ramone, engineer; “My Little Town,” same info as above.] Columbia PC 33540.

wise, it was roughly Lennon/McCartney carrying Harrison/Starr. After his recent tour, I had all but written him off; so it was with less than enthusiasm that I picked up his new release, *Extra Texture*.

Just looking at the cover told me that something was up. The apple (trademark for Apple Records) was eaten to the core, rather than with just a bite missing. There is a photo of Harrison slyly smiling above a caption "OHNOTHIMAGEN." Intrigued, I looked closer to discover that this is entirely a Harrison show, handling all of the production. The cast of characters was impressive as usual, so I put it on. Hey, his voice is back, almost to the quality of his Beatle days. And what's this, no Far East influence? Wow, he's even gone so far as to learn a few new licks!

This album is possibly the best he's ever done. The production is tasteful, due, I feel, to Harrison's increase during his tour of rapport with his public, and he knows his limitations in the studio. Obviously, he's also picked up a thing or two from George Martin.

What makes this recording better than his past releases, and a highlight in his career, is that he has found an equal balance between the lyrics and the music. The instrumentation on this album supports the lyrics, while changes in mood are accentuated by acoustic piano, the featured instrument on the album. The other parts are arranged as a large rhythm section, with every part distinct, *a la* George Martin. Whatever *Extra Texture* Harrison has added, it has done him justice. He certainly has a right to smile.

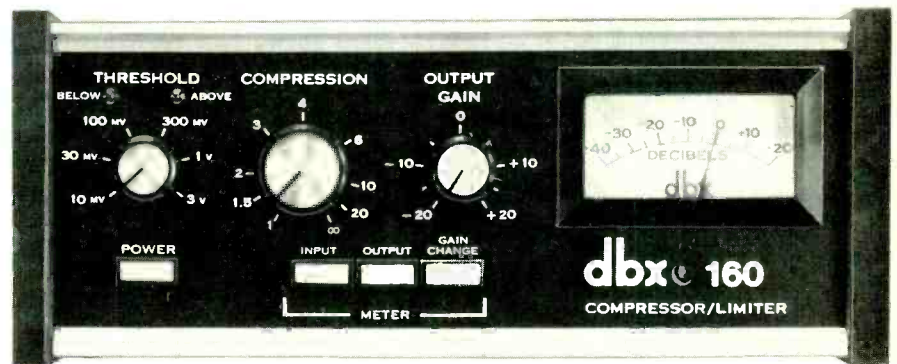
G.P.

**HOLLIES: *Another Night*.** [Ron Richards, producer; Alan Parsons and Mike Jarrat, engineers; recorded at Abbey Road.] Epic PE 33387.

Performance: **Distinctive**  
Recording: **Crisp and true**

The Hollies are among the only survivors of the first generation post-Beatle invasion (joined by the Stones, the Who, and the Kinks—rather distinguished company, eh wot?). They've received ten years of critical acclaim and commercial success, and graduate Graham Nash has become a superstar in his own right. Yet, the Hollies have never really gained wide acceptance among serious rock audiophiles—par-

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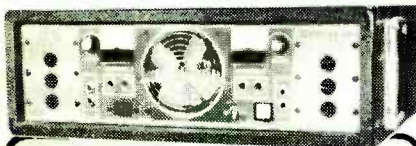
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tially due to their Top-10 image and partially due to their emphasis on vocal and overall sound quality over lyrical content.

*Another Night* could, and should, bring the Hollies the recognition they deserve. Once again, their immaculate high harmonies surround and enrich Allan Clarke's distinctively strong and precise lead vocals. Once again, producer Ron Richards has come up with a sound so crisp and true that most good domestic recordings sound muddy by comparison. For the first time since Nash's departure, however, the material is consistently up to the performance.

The powerful lament "Another Night" and Bruce Springsteen's classic ballad "Sandy" have already received considerable exposure. "I'm Down," "Give Me Time," "Lucy" and "Lonely Hobo Lullaby" are beautiful, melodic MOR tunes. "Second-Hand Hangups," "Look Out Johnny," "You Gave Me Life" and "Time Machine Jive" are driving rockers *a la* "Long Cool Woman."

As usual, the lyrics are the album's weakest point (with the exception of Springsteen's "Sandy"), but the rest of the songs—all Hollies collaborations—do show a new maturity and promise in that direction. As one of those rare albums that can be heard frequently and still be enjoyable from beginning to end, *Another Night* is much more than just "another album."

B.W.

### LOGGINS AND MESSINA: *So Fine*.

[Jim Messina, producer; Alex Kazanegras and Jim Messina, engineers; recorded on location by Haji Sound.] Columbia PC 33810.

Performance: **Okay**

Recording: **Professional**

This collection of hits from the '50's and early '60's is another professional effort from Loggins and Messina. Like its predecessor, *Mother Lode*, it was recorded at Messina's ranch in Ojai, Cal. (see *Modern Recording*, Vol. 1, No. 1) and it features excellent musicianship and production. What is it, then, that makes *So Fine* somewhat disappointing?

Perhaps L & M should have injected more of their own sound into these standards. With the exception of the instrumental "Honky Tonk Part II,"

the cuts that stay closest to the originals ("So Fine," "Hello Mary Lou," "Wake Up, Little Susie" and "Splish Splash") don't have the enthusiasm of the rearranged cuts ("My Baby Left Me," "I'm Movin' On," "I Like It Like That," and "Lover's Question"). Also, the material is limited to simple R & B-influenced rock 'n' roll and simple C & W-influenced rock 'n' roll. A group that has so successfully tempered rock with jazz, reggae and ballads in the past could have tackled a more diverse selection. How about an old four-part harmony tune of the Crests or Penguins? Or something from the likes of Orbison, Holly, Sedaka, Vee or Pitney? There are too many kinds of Oldies to stick so close to the basics.

The Band's *Juke Joint Matinee* is a collection of Goldies that disappoints in much the same way as *So Fine*. So the problem may lie in even doing an all-Oldies album at all—because the remake rarely measures up to the original. It might therefore be wiser to intersperse the old material with new songs. It's not that *So Fine* isn't fine, it's just that L & M can be so much finer.

B.W.

### JONI MITCHELL: *The Hissing of Summer Lawns*.

[Joni Mitchell and Henry Lewy, engineer; recorded at A & M Studios, Los Angeles, Cal.] Asylum 7E-1051.

Performance: **Poetic**

Recording: **Highly textured**

Joni Mitchell is probably the most commercial pop artist we have. Each time a new album is released, the voices rise as a Greek chorus: brilliant, but too weird, too difficult to absorb, you have to play it too often before you can get into it. And each time we play it as often as necessary, letting the weirdness filter through us, latching on to the lyrics or vocal effects or details in the cover art. The real fans have come to expect nothing less. Even *Miles of Aisles*, the "live" double-album released prior to *The Hissing of Summer Lawns*, held surprises in the jazzy reprises of old tunes. If *Miles* can in any way be considered a summary to that point in time (I believe it can), *Hissing* is an attempt to travel a new path.

The universality of Ms. Mitchell's earlier songs—"Urge For Going," "Both Sides Now," "Circle Game"—is



**JONI MITCHELL—Letting the weirdness filter through.**

gone. The settings are, as stated, jazzy and more sophisticated now—Ms. Mitchell herself overdubbing many of the synthesizer and multiple vocal tracks—and the lyrics a wellspring of

impressionistic musings. And there is great unity of voice, lyric and melody, sometimes at the expense of coherency. Contrast, for example, the flowing essence of “The Boho Dance” with

the insistent rhythm-as-statement of “The Jungle Line.” Or imagine a three-minute cartoon of “In France They Kiss on Main Street.” Sometimes one wishes Ms. Mitchell’s language were French.

*Hissing* has its failings, mostly in its over-ambitiousness and in the lack of real subject matter in its songs. But if form has overtaken content it is in the name of etching out a new approach. Besides, we need something to complain about. I.M.

**KENNY RANKIN: *Inside*.** [Michael Stewart and Yvonne Rankin, producers; Ron Malo, engineer; recorded at Devonshire Sound Studios, Los Angeles.] Little David Records LD 1009.

Performance: **An injustice**  
Recording: **Lost in the mix**

Ever since I heard Kenny’s second album, *Like a Seed*, I’ve been a fan. His jazzy, bossa-nova guitar style is surpassed only by the warmth and feeling of his voice. When you add his great potential as a songwriter, you have a talent of sizeable importance.

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## The Quintessential Roy Eldridge

by Nat Hentoff

When jam sessions and after-hours jousts abounded, tales used to be told of especially galvanic contests. As when, late one night in Harlem in the early 1940's, Dizzy Gillespie, having failed many times to best Roy Eldridge (the flesh and symbol of swing-era hot jazz trumpet) finally toppled that fiery master. The young bopper's triumph gave heart to all the then beleaguered avant-gardists. If "Little Jazz" (as Roy was called) could fall, why then the walls of the city would soon crumble.

Eldridge, perhaps the fiercest competitor in the history of jazz, took the defeat hard but kept honing his skills, playing his own way, refusing to adopt the musical linguistics of bop, and survived. Once modern jazz had become pervasively established, Eldridge survived in a kind of twilight, like many swing players. An energetic devotee of the work ethic, Roy always found jobs, but he was out of fashion even though his playing remained stingingly, cracklingly exciting—a full-throated lyricism powered by a lashing beat.

Now, with Norman Granz back in the record business (the label is Pablo), Eldridge, after fifteen years of extremely intermittent recording, is abundantly featured in the Pablo catalogue. So far, the two sets sure to become key additions to the Eldridge canon are *Oscar Peterson & Roy Eldridge* and *Happy Time*. The former (one of a series in which necessarily resourceful trumpet players are paired with just piano) is an absorbing revelation of the scope and depth of Eldridge's powers at the advanced age (for a trumpet player) of sixty-four. Still rampant are his cockiness, wit, pungency of sound (whether open or muted) and that lithe, crisp beat. There is, it should be noted, a long "Bad Hat Blues" (with Peterson on organ) that is one of the most graceful, intimately ardent blues trumpet performances in all of jazz literature. Roy, soft, can be as shattering as Roy riding thunderbolts.

*Happy Times*—on which Eldridge is appreciatively accompanied by Peterson, bassist Ray Brown, guitarist Joe

Pass and drummer Eddie Locke—not only contains more of Roy's intense horn but also, as a rather rare bonus, his singing as well. Eldridge's vocals are an extension of his horn playing, the phrasing being instrumental, and they are just as warm as his horn. The playing and the singing reverberate with such an undiminished delight in the life of improvisatory music, even after all these decades, that Norman Granz may very well be right when he says that Roy is the quintessential spirit of jazz.

These recordings, like practically all in the Pablo line, are engineered with an admirable sensitivity to the need in a jazz recording (any recording, for that matter) for the kind of space-clarity which enables all the parts to be heard all the time.

Also on Pablo is a quite astonishing 21-year-old trumpet player whom Charles Mingus was one of the first to unearth. In *Oscar Peterson & Jon Faddis*, the latter indicates he already has prodigious technique but also a lyrical sweep and a boldness of conception that should insure a formidable career. Currently, Faddis is more than somewhat influenced by Dizzy Gillespie, but this will pass as he comes into his own age; and perhaps one day, at an after-hours tournament somewhere, Faddis will do to Dizzy what Dizzy did to Roy. And Dizzy too will more than survive.

**ROY ELDRIDGE: *Oscar Peterson & Roy Eldridge*.** [Norman Granz, producer; Ed Green, engineer; recorded at MGM Studios, Los Angeles, Cal.] Pablo 2310-739.

**ROY ELDRIDGE: *Happy Time*.** [Norman Granz, producer; Bob Simpson, engineer; recorded at RCA Recording Studios, New York, N.Y.] Pablo 2310-746.

**ROY ELDRIDGE: *Oscar Peterson & Jon Faddis*.** [Norman Granz, producer; Bob Simpson, engineer; recorded at RCA Recording Studios, New York, N.Y.] Pablo 2310-743.

However, *Inside*, Rankin's fourth album, disappoints and disturbs me due to his apparent interest in cultivating only his voice. His guitar work—what little there is—is barely audible in the background. His songwriting has gone from writing, along with his wife, all of the material on *Seed*, to just one tune on this new release.

It's not a total about-face, for his last album, *Silver Morning*, began to demonstrate more outside influences and material. In a business glutted with interpreters of song, Rankin would normally stand his own. Unfortunately, the material chosen doesn't do him justice. G.P.

**LINDA RONSTADT: Prisoner in Disguise.** [Peter Asher, producer; Val Garay, engineer; recorded at The Sound Factory, Los Angeles.] East/West 7E-1045.

Performance: **Tasty, with feeling**  
Recording: **Imaginative**

Until Linda Ronstadt teamed with Peter Asher, she was known as a country singer whose recorded performances were uneven. Asher helped her evolve from a great voice into a great interpretive singer on two consistently polished albums. Asher again has selected songs from a wide range of contemporary artists like J.D. Souther, James Taylor and Neil Young.

Like most English musicians who rejuvenated rock in the '60's, Asher has a penchant for early Motown, a formula which was successful on Ronstadt's last outing. Asher has also reinstated the art of male background vocals. Not only does it highlight Ronstadt's sad, sweet vibrato, it's a pleasant contrast, especially since the male chorus has all but disappeared. My only complaint with the album is that with the exception of "Heat Wave," there are no up-beat numbers.

It was obvious with *Heart Like a Wheel* that Ronstadt had arrived, and *Prisoner* leaves no doubt that she is one of the great interpreters of song ever to travel down Tobacco Road to Hollywood Blvd. G.P.

**LEO SAYER: Another Year.** [Adam Faith and Russ Ballard, producers; Louie Austin, engineer; recorded at Kingsway Recorders.] Warner Bros. BS-2885.

Performance: **Outstanding**  
Recording: **Clean and crisp**

*Another Year*, the new Warner Bros. release by Leo Sayer, is another solid album by this talented, but underrated artist. The songs wind their way from gentle love ballads ("Unluck in Love" and "Only Dreaming") through rockers ("Moonlighting" and "On the Old Dirt Road") to the caustic social comments of "Bedsitterland" and "Streets of Your Town."

The style and quality of the material is markedly reminiscent of early Elton John and Bernie Taupin circa *Tumbleweed Connection*. Leo's vocals, the strongest feature of the album, are crisp and easily understandable. The straightforward production, with minimal use of effects and orchestration, brings the messages and stories directly to the listener.

*Another Year* may be Leo Sayer's finest album to date. No longer the clown, he's ready to make his mark. S.R.M.

**TOM WAITS: Nighthawks at the Diner.** [Bones Howe, producer and engineer; recorded at Record Plant, Los Angeles, Cal.] Asylum 7E-2008.

Performance: **In the "beat" tradition**  
Recording: **Good "live" presence**

In a recent *Rolling Stone*, Jon Landau wrote of how Tom Waits is the first truly distinctive music personality to emerge in the '70's. A few years ago, the Eagles smoothed out "Ol' '55" to bring Waits a modicum of recognition, but those listening to his first two albums—*Closing Time* and *Heart of Saturday Night*—expecting more California country rock were in for a rude shock. Waits is a beat poet and humorist who uses music as a medium of communication.

*Nighthawks At the Diner* is a series of poem/monologue/songs recorded "live" in the studio before an audience of believers. Waits, who normally has a special ability to play to an audience, performs for the record, the "live" ambience superbly captured. A jazz quartet backs his own guitar and piano, shading the recitations, compensating for the facial expressions and hand gestures that are a part of his speech patterns. (As good as all three recordings are, nothing surpasses the sight of Waits on stage by himself, fingers snapping, cigarette in

hand, a look of satisfaction that an audience of strangers is making the effort to relate to his world.)

If you've never heard Waits, ease into this album slowly. "Eggs and Sausage," "Warm Beer and Cold Women" and "Big Joe and Phantom 309" make good starters. If you are familiar with his work, this is the album that balances the others. It will be a long time before another artist as literate and as brilliant as Waits emerges. Savor him. I.M.



**BEETHOVEN: Missa Solemnis.** Gundula Janowitz, Agnes Baltsa, Peter Schreier, Jose van Dam; Vienna Singverein; Berlin Philharmonic, Herbert von Karajan cond. [Michel Glotz, producer; Wolfgang Guelich, engineer; recorded in the Berlin Philharmonie.] Angel S-3821 (two records).

Performance: **Aggravating**  
Recording: **Good**

Beethoven's *Missa Solemnis* is among the handful of truly great masses and religious choral works. Only Bach's *B minor Mass*, Handel's *Messiah*, Mozart's *Requiem* and perhaps Verdi's *Requiem* offer any challenge to its eminence.

Karajan, the aging *wunderkind*, has seen fit to record the work three times in stereo, for reasons that he and his maker alone must share. His most recent outing is an aggravating recording. With good sound, fine soloists, the Berlin Philharmonic and the Vienna Singverein (probably the best chorus to record this work), the conductor himself manages to dissipate all these advantages with an arbitrary reading which seems different for difference's sake. When Karajan relents and lets the music alone (as he does for the Sanctus and most of the Benedictus) the radiance of Beethoven shines through. Mostly, though, fast is too fast, slow is too slow, loud is deafening and soft, inaudible. Three recordings and Karajan still won't deliver.

Karl Boehm's new DG recording, hailed by English critics, is, to this listener, dull and distantly recorded. Perhaps its stolidity and lack of excite-

# Advent's Superior Cassettes

by Norman Eisenberg

My reaction on hearing Advent's first group of CR/70 series cassettes was that of "future shock" happening right now. They sounded like nothing I'd ever heard in cassette form before—really state-of-the-art sound. That was about a year ago. Could they, would they, maintain this sonic excellence in subsequent releases? I asked.

The answer is here in the form of a new batch of cassettes that amply fulfill the promise of the earlier releases, and that offer to boot a broad selection of repertoire to appeal to a very wide range of musical tastes: "heavy" symphonic fare played by the London Symphony conducted by Jascha Horenstein; piano rags executed by Joshua Rifkin; turn-of-the-century nostalgia sung by Joan Morris accompanied by William Bolcom; Bolcom himself in a full album of piano music by Gershwin; the sonic psychedelia of the popular *Ancient Voices of Children* by Crumb; virtuoso cornet solos by Gerard Schwarz (coupled with Stephen Foster songs sung by Jan DeGaetani and Leslie Guinn with Gilbert Kalish at the piano and melodeon); small orchestral showpieces such as Weill's Suite from *The Three-Penny Opera* and Milhaud's *La Creation du Monde*; classical piano recitals of Beethoven and Chopin by Antonio Barbosa.

These are complete albums containing the equivalent of normal size discs; in some instances, one side of the cassette is left blank for your own recording. Packaging, by the way, is very good. Each cassette comes in a hinged plastic box with a printed folder listing titles, performers, and running time. For detailed program notes you have to send in an enclosed card to Advent.

It doesn't take very long to recognize the superior sound of these cassettes. By the standards applied to any program material—wide frequency range, dynamic range, freedom from noise, clarity, perception of internal detail, stereo balance, inaudible

distortion, spectrum balance, fullness and definition at all frequencies—these cassettes are at least the equal of the best stereo discs and, to the extent that repeated playing will not degrade their original out-of-the-package quality, they could be said to be better. From the standpoint of tape quality, and especially of cassette quality (which has had to prove itself against slow speed and narrow track width), they are just short of unbelievable when played on a decent cassette deck that has a Dolby circuit and accurate switching for handling chrome tape. There is no hiss, no wow, and there is a smooth extended high end that lends the signal an easy, natural, "open" tonal quality.

The cassettes are processed by Advent from master tapes borrowed from the libraries of Nonesuch and Connoisseur Society. The actual duplicating system remains something of a secret, but Advent claims that it minimizes losses in sonic quality usually associated with dubbings from master tapes to cassettes. Also involved is a monitoring set-up that enables Advent to check a much greater number of processed cassettes than in conventional duplicating systems. Produced this way on chromium-dioxide tapes with the Dolby "B" system of noise-reduction, it is small wonder that these releases sound so good.

Space does not permit listing—let alone discussing—all the releases available, but a query to Advent should get the catalogue. I have sampled all the cassettes that have been sent to date and find them uniformly fantastic. Each merits a rave, but my special favorites are: Piano Music By George Gershwin (D 1024); the Weill and Milhaud, with Bolcom's *Frescoes* on side 2 (F 1036); Hindemith's *Mathis der Maler* with Strauss's *Death and Transfiguration* (D 1043); the Mahler Third (E 1009). An earlier blockbuster, the one that really set me raving about this series, is the Tchaikovsky Fourth (E 1020).

Somehow it seems poetic justice that Advent, which first promoted the idea of a high-quality cassette format with its model 201 deck that incorporated both Dolby "B" and chrome tape switching, is now earning kudos for producing program material based on the same approach: that small size can mean big (and excellent) sound.

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## DON'T PEEK

Below is the solution to a crossword that you will find on page 72. Have you read this issue thoroughly? Eleven questions relate to either music, recording or a technical matter. And eight of the questions directly involve MR articles.

R	E	P	P	E	P	W	N	O	S
N	E		Y	R	O	P	A	S	R
Z	R	E	P	A	R	T	A	H	A
I	E	S	U	E	S	S	E	R	A
S	H	A	T	E	T	C	I	O	
E	T	N	E	S	T	A	L	A	N
H	S	O	T	I	N	C	M	R	E
T	N	E	I	D	E	V	E	S	I
N	H	I	R	E	S	T	E	R	L
Y	T	T	L	A	L	R	E	B	U
S	I	N	L	I	E	U	F	A	O
R	O	R	E	C	T	O	R	P	H



ment are the virtues the English critics seek.

Probably the most desirable recordings of this masterpiece are Jochum's on Philips and the Klemperer on Angel. The Jochum set is well-played, sensibly conceived and properly executed. While it hasn't the verve of the old Toscanini recording or the passion of Klemperer, it is a satisfying performance; good, if not great. The Klemperer must be among this conductor's great recordings. It is a masterful conception with a fine sense of detail, both orchestral and vocal. Powerfully emotional, this recording has an immediacy and excitement unmatched by any except possibly Toscanini. Since its sonics are quite fine, it would get the nod for most people. H.R.

**RACHMANINOFF: Symphony No. 2.** The Philadelphia Orchestra, Eugene Ormandy cond. [Max Wilcox, producer; Paul Goodman, engineer; recorded in Town Hall, Philadelphia.] RCA ARL 1-1159.

Performance: **Authoritative**  
Recording: **Rich and clean**

This is Ormandy's fourth recording of this work, but only his first of the complete score *sans* cuts. His previous recordings (which I have not heard) are reportedly all faster and leaner than this new effort, but I feel that the weight and breadth of this interpretation are nearly all to the music's favor. In fact, there are portions when I would prefer broader tempos (e.g., the opening *Largo* and the whole of the third movement *Adagio*).

But in most cases, even though one occasionally senses impatience with the sections which he previously cut, Ormandy is unquestionably involved and excited with matters at hand. In particular, the thick string textures are the cleanest, most carefully sculpted on record—and would have even further benefitted by left-right division of the first and second violins—and the entire orchestra digs into accents with unprecedented verve. I am rarely emotionally moved by Ormandy's performances, but the culminating breadth of the great *cantabile* tune at the conclusion of the final movement is overwhelming in its grandeur and magnificence of conception.

A few miked-up wind solos apart, the recorded sound is excellent. RCA's

surfaces are improving. And Jack Diether's fine notes are a decided plus.

Of other recent uncut recordings, Previn on Angel is good, but a trifle over-ripe in spots. The well-paced, straightforward reading by James Loughran and the Halle Orchestra, available only in England on E.M.I.'s Classics for Pleasure label, is not so well recorded, but is perhaps the best all-around recommendation. S.C.

**WAGNER: Preludes: Die Meistersinger von Nurnberg; Tristan und Isolde** (with Liebestod); **Parsifal**; Act I and Act III, **Lohengrin.** Concertgebouw Orchestra, Amsterdam, Bernard Haitink, cond. [Volker Strauss, producer; recorded in the Concertgebouw, Amsterdam.] Phillips 6500 932.

Performance: **Warm and expressive**  
Recording: **Full-bodied sonorities**

Haitink's eloquence with these preludes emphasizes their "summation value" with regard to the operas they introduce while at the same time it elicits values—of interest to the serious listener—from the music itself, irrespective of their being tied to specific stage works.

In the latter sense these pieces are genuine *Konzertstuecke* or, as in the case of the present format, eminently suited "*Heimstuecke*" for enjoyment on a good stereo system. The combination of sensitive handling of the score



**BERNARD HAITINK**  
An eloquent Wagnerian.

and brilliant sonics in the recording are well-nigh irresistible, even to one who has heard these pieces countless times before. Aside from an occasional muffled sound in the timpani, everything is lucidly recorded in widestage stereo. Surfaces are ultra-clean. N.E.

**Music from Great Shakespearean Films.** National Philharmonic Orchestra, Bernard Herrmann cond. [Raymond Few, producer; Arthur Lilley, engineer.] London Phase-4 SPC 21132.

Performance: **Imposing and majestic**  
Recording: **A sonic orgasm**

This recording is hereby declared "Lease-breaker of the Year" for 1975. As one of the finest accomplishments of Phase-4 technology, this disc boasts rich brass sonorities, vivid, full-toned, dynamic timpani, recorded with obvious care to prevent leakage and make each stroke perfectly audible, bass drum presence that will knock you out of your seat, sweeping harp panoramas, and full, sweet violin tone. This disc is a real blockbuster!

Side one opens with Sir William Walton's Prelude from his music for Olivier's *Richard III*. This performance is considerably broader (some will say too much so) than Sir William's own on Seraphim, but there is no comparison in the sound, and Herrmann's tempos have a powerful majesty that makes the composer's seem almost trivial in comparison.

The selections of Miklos Rosza's music for *Julius Caesar* are perhaps more notable for their massive tenacity than melodic inspiration—especially the *Bolero*-like "Approach of Octavian's Army and Death of Brutus"—but, with the ample assistance from the engineers, these cuts make a powerful effect.

Side two is devoted completely to music by Shostakovich for a Russian film of *Hamlet*. Although not his best music, it's less oppressive, more varied and subtle than Rosza's glowering moods. Shostakovich's ear for orchestral color, especially in the percussion department, is a notable plus. The timpani in the "Scene of the Poisoning" cut are particularly vivid, the drums sounding like real skins being struck rather than someone banging away on garbage cans in the back room.

A fine production all around! S.C.

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## ACROSS

1. "Wall of Sound" creator, 2 wds.
10. idiot
11. well; prefix
12. blanket lover
14. rain gear
17. teletype; abbr.
18. last
19. measure of liquids
20. yes, yes in Italy; 2 wds.
22. apparent
24. before; poetic
25. bashful audio manufacturer
26. \_\_\_ carte
28. bird home
30. integrated circuit; abbr.
31. diminutive; suffix
32. owns
33. before one tape head records, another \_\_\_
36. a boy named \_\_\_
38. Miles Davis' "Live-in-Japan" album
40. \_\_\_ Prado
42. Arabic leader
43. Grand Ol' \_\_\_
45. compass point; abbr.
46. winter flakes
47. Beatles' first Sgt.

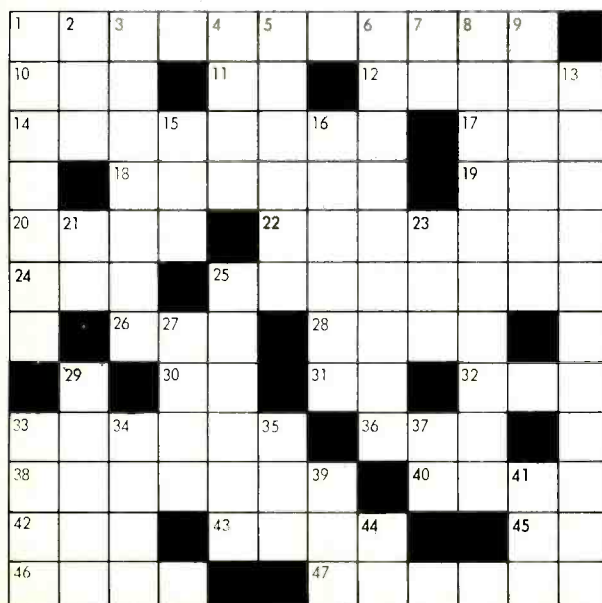
## DOWN

1. magnetic recorder developer
2. \_\_\_ Brosious; audio-techniques chief
3. one if by land, two \_\_\_
4. what an eye does
5. audio manufacturer
6. musical instruments
7. seventh musical syllable
8. if it's not on one, it may be \_\_\_
9. pale-yellow substances
13. Moog's creation
15. Portuguese coin
16. "Wall of Sound" engineer
21. Ohm's Law: E = \_\_\_
23. the shakes
25. Miles Davis' producer
27. girl's name
29. Billy Preston's ax
33. hearing organs
34. Charley Chan's exclamation; 2 wds.
35. oil treatment
37. seven \_\_\_
39. popular synthesizer
41. chemical suffix
44. thou



Answer on page 70.

By Don Casale



## LETTERS—cont. from p. 7

clean, especially for a "live" recording. Because of my interest in recording techniques the Viking personnel welcomed me into their control room which is a semi-trailer with expanding walls. I was very impressed with their assortment of Ampex machines, (including a 24-track), two (2) Audiotronics consoles, Dolby, and AKG echo, to mention but a small part of their equipment, and with the fact that they are known to be the largest mobile recording unit in the world. The *Haji* article was a good one, but an article on Viking Studios might make an even better one!

Keep up the good reporting,

—John Barry  
Denver, Colorado

## Record Review Uncertainty

I am particularly interested in your articles on the history of recording, and photos of recording sessions.

I am not sure what purpose record reviews serve in your magazine's overall plan.

Anyway, good luck.

—Steve Smolian  
Catskill, N.Y.

## Getting Off on Song Development

Enclosed is a check for \$1.75. Please send me a copy of *Modern Recording*, issue Vol. 1 No. 1. I am interested in articles about producing and mixing sessions. Also, I'd really get off on reading about the development of a song from writing through recording, mixing and placement on an album. Maybe you can catch one of those songs that are created in a recording session.

—Jim Fox  
Beaver Falls, Pa.

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# "The Sony TC-756 set new records for performance of home tape decks."

(Stereo Review, February, 1975)

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