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JULY, 1960
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JULY, 1960 VOL. 44, No. 7

Successor to RADIO, Est. 1917.

AUDIO

ENGINEERING MUSIC SOUND REPRODUCTION

CONTENTS

COVER PHOTO—A custom-built monophonic system which is presently only a phonograph with built-in TV. Space above the Leak Varislope III preamp is provided for a future FM tuner, and the drawers at the bottom will be replaced with a tape deck as the system progresses. The loudspeaker enclosures are custom-crafted to match the components cabinet, but are separate and can be placed elsewhere. In their present position they appear to be an integral part of the main cabinet. Design by C. F. Barton, audio consultant of Bridgeport, Connecticut. This photo was intended to be accompanied by a descriptive article, which got pushed into the August issue.

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AUDIO clinic

JOSEPH GIOVANELLI

Matching Cartridges to Preamplifiers

Q. I have been puzzled by the various recommended load impedances of magnetic and ceramic cartridges and the phono input loads built into most preamplifiers. Is a matching of the two necessary in a high fidelity system?

I have noted that recommended loads for magnetic cartridges vary from 27 k to 100 k, the most common being 47 k. Phono input impedances on preamplifiers vary also, though here again, the common one is 47 k.

As an example of an uncommon phono input impedance I refer you to the Lafayette KT-600 Stereo Control Center, whose input load is 96 k. How does one match a magnetic cartridge whose recommended load is 47 k to this unit? Also, since the ceramic phono input is coupled to the magnetic phono input, how is a ceramic cartridge matched?

I understand that there is a level set for the phono input following the preamplifier. Does this have any effect on the input load of the unit? A. F. Carrano, East Haven, Conn.

A. It is best to match the impedance of the cartridge to that of the preamplifier into which it feeds. If this cannot be done, it is best that the preamplifier's impedance be higher than that of the cartridge. In the case of a magnetic type, too low an input impedance will result in a deterioration of the high-frequency response, but a crystal or ceramic cartridge will have its lows attenuated when the impedance presented to it is lower than that recommended by the manufacturer.

The Lafayette preamplifier is interesting. Suppose that you have a cartridge whose recommended load impedance is 47,000 (47 k) ohms. The Lafayette is provided with a 96,000-ohm input impedance. As I have already stated, this is not the worst possible situation since this impedance is higher than the desired 47 k of the particular theoretical cartridge we are now discussing. If you do wish to match impedances, all you need do is shunt the cartridge with a 100,000-ohm resistor; this resistor will be in parallel with the 96,000 ohm resistor in the preamplifier, and the resulting resistance will be approximately 47,000 ohms. In the Lafayette preamplifier the input resistance for ceramic cartridges is lower than that which is recommended by many of these cartridge manufacturers. This was done because the ceramic cartridge input is coupled to the magnetic cartridge portion of the preamplifier as you stated, and this was done for a very good reason. The coupling network is designed in such a manner that it alters the characteristics of ceramic cartridges so that their frequency characteristics resemble those of the magnetic cartridges. This allows the ceramic cartridge to be equalized to the various curves listed in the instruction book, just as is done with magnetic cartridges. This feature could not be provided were it not for this method of wiring.

The level-set control is inserted following the preamplifier. It therefore cannot reflect any change into the input circuit of the preamplifier. Even when the level-set control is connected directly across the cartridge (not done in the Lafayette unit), the impedance seen by the cartridge is not affected because the arm of the level pot is connected in most cases to a grid of a vacuum tube which puts no load on the cartridge. (This is not strictly true since there are some capacitive effects and a very slight degree of Miller effect, but these considerations are rarely of concern to designers of audio equipment because their effects are only slightly detectable at audio frequencies.)

Sometimes the phono input is shunted with a potentiometer wired as a variable resistor, rather than by a fixed resistor. Varying the resistance of this control varies the impedance across the cartridge. The dial with which this control is associated is often calibrated in terms of the resistance of the pot at various degrees of shaft rotation. This resistance will be equal to the impedance seen by the cartridge. This system makes it possible for any cartridge impedance within reason to be accommodated by the preamplifier using this system. This device is employed with magnetic cartridges exclusively so far as I know.

The usual ceramic cartridge requires an input impedance of 0.5 megohm or higher. Under this condition the cartridge is connected to its own input, and will give a response curve according to whichever recording characteristic its manufacturer specifies. The equalization adjustments provided for the normal magnetic cartridge input will be ineffective under this condition because the ceramic cartridge is connected to a stage following the magnetic preamplifier's equalization network.

Mikes and Bass Cutting

Q. I'm trying to decide the best way to make the preamplifier and power supply for a condenser mike head so that I can use it for recording. I do not anticipate any problems as far as the basic preamplifier design is concerned, as I'll use a triode tube with a very large grid resistor, a cathode-follower tube at the output, and so on. However, it occurred to me that it would be

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desirable if I could install a switch (probably at the output of the power supply that would allow me flat amplification and also the choice of one or preferably two bass cuts. If you could suggest the values of capacitors and resistors connected either to the triode's plate, or, across the signal output of the cathode follower, allowing me to cut the bass 17 db at 40 cps and/or 6 db at 40 cps, I would greatly appreciate it. On the one hand we'd have a bass cut of 6 db/octave starting at 300 cps, and for the second instance we'd have a 6 db/octave bass cut starting at 80 cps. N. Brenes, New York, N. Y.

A. We do not agree about the bass cut required for this microphone project of yours. I agree that is desirable to cut the bass when the singer stands close to the mike, but if he stands more than 18 to 24 inches from it, I see no need for cutting. If you cut at 300 cps, you will alter the sound of the voice being recorded, reducing the naturalness, especially if the performer is a male. I have found that a rolloff below 60 to 70 cps will give more than adequate results for most applications. When recording a large chorus, it is sometimes well to restrict the response of the system below 20 cps to prevent low-frequency beating.

Whether you agree with this philosophy or not, the matter of the design of rolloff circuitry is the same. Let's assume that you will roll off in the cathode follower stage. You must determine the impedance of the stage into which the cathode follower will work. (I chose the cathode follower stage because it is easier to work out a circuit arrangement whereby the bass-cut selector switch can be mounted on the power supply assembly rather than on the preamplifier and mike head assembly.) The load is shunted by an appropriate inductance whose reactance is equal to the desired rolloff point. The coupling capacitor is similarly adjusted when 12 db/octave slopes are required, whereas only the capacitor need be involved if 6 db/octave slopes are needed; no inductance is used under these conditions. This design is similar to what is done in crossover network design for loudspeaker systems.

The actual arrangement would be something like this: The output of your cathode follower would be taken through a large coupling capacitor, perhaps 2 μf at an appropriate working voltage. This lead goes through all the appropriate cable to the power supply. This "hot" signal lead is connected to the arm of the selector switch whose contacts are provided with the appropriate smaller capacitors as previously described. The free ends of these capacitors are connected together and go to the hot output terminal, mounted on the power-supply. If you wish a 12 db/octave slope, you will have to provide a second deck on the switch which will serve to switch the inductances in and out.

As you said, the microphone assembly must use a tube having a very high grid return resistor. Be sure that the tube selected for this service is one which permits such a high return to be used. In addition, this tube should be selected for low-noise characteristics. Filament power should be provided from a direct current supply. This is necessary because the low output of the microphone head would otherwise be down in the hum level, and because the input resistance is sufficiently high that a slight amount of a.c. flowing through the grid resistor would equal a considerable voltage drop, and this would indeed be a serious source of hum. Æ

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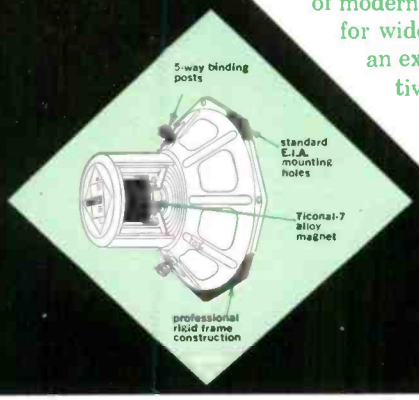

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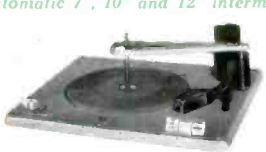

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LETTERS

Misinformation—but whose?

SIR:

I would like to take exception to a statement made in the EDITOR'S REVIEW in the June issue that the only stereo broadcasts now on the air are from simultaneous use of AM and FM stations.

Radio stations WHCU-FM and WVBR-FM of Ithaca, N. Y. have been broadcasting FM-FM "full fidelity" stereo every Saturday evening since April, 1959. This service was begun and has been carried on through the co-operation of these stations and Alcor, Incorporated, also in Ithaca, and one of central New York's largest high fidelity outlets.

Technical problems existed only during the first broadcast and were quickly ironed out by the engineers of Alcor and the two stations.

AM-FM stereo is also broadcast over WHCU and WHCU-FM on Sunday afternoons. These broadcasts have been in progress since August, 1958.

PETER H. DEGRAFF, Service Manager,
ALCOR, Inc.,
Ithaca, N. Y.

(We didn't say quite that—quoting from the June issue, these are the exact words: "The only stereo broadcasts now on the air are from simultaneous use of FM and AM stations, according to the EIA release. . . ." We then followed it by mentioning two FM-FM stations that we listen to in this area. Apparently EIA was misinformed. ED.)

Organ Enthusiast

SIR:

AUDIO is my favorite magazine because hi-fi is my hobby. However, I would like to see some articles on electronic organs. *(We have run many in the past few years.* ED.)

The following information, from observations made while servicing my Conn Artist model 713 organ with Leslie speaker, might be of interest to other hobbyists.

Accuracy of pedal tuning may be checked directly against the regulated 60-cps power supply by alternately playing pedals $A\sharp_1$ and B_1, using a very soft voice without tremolo. If the master generator for the octave is properly tuned, frequencies of these notes will be 58.27 and 61.73 cps, respectively. Therefore, there will be an equal number of beats between either pedal tone and the normal faint power hum. The same is true for pedal tones $A\sharp_2$ and B_2 with respect to the 120-cps hum. This is a quick method of verifying accuracy, since a lopsided number of beats is easily discernible.

K. B. COBLE,
c/o So. Calif. Edison Co.,
East Highlands, California.

Erratum

SIR:

I was happy to see my stereo preamp article appear in the June issue, but I regret that you did not include the change that I submitted with my acceptance of your offer of publication. R_{16} should be 2700 ohms rather than the 1500 ohms shown. I would appreciate it if you could list this change in the next issue.

W. B. BERNARD,
3150 South Glebe Road,
Arlington 2, Va.

The Air Spring Article

SIR:

Mr. Rebort Avedon's "More on the Air Spring and the Ultra-Compact Loudspeaker" in the June issue seems to be the first—only—study of the loudspeaker back air chamber as other than an adiabatic situation. Mr. Avedon's penetration of the thermo-dynamics involved both analytically and experimentally indicates his grasp of the physics and mechanical engineering involved. The finding that an absorbent packing achieves something between adiabatic and isothermal is in keeping with what one should expect. The significance of the results acoustically seem to me to be large. *Figure* 9 of the text (actually *Fig.* 8) shows one decibel difference between the padded and non-padded box. The paradox of a padded box exhibiting a higher effective capacitance than the unpadded box is shown to affect the acoustic response of a speaker by a negligible amount.

Mr. Avedon's paper appears to me to be an important contribution.

PAUL W. KLIPSCH,
Klipsch and Associates, Inc.
Hope, Arkansas.

Defeatist

SIR:

I am content to have my subscription expire with the July issue. I am no longer interested in high fidelity developments after the mess resulting from so-called stereo. I have a system including a "name-brand" speaker of fair size and have yet to find any set-up which will improve the fidelity of the sound. How many stereo records are really better than monophonic on any kind of a system? Possibly tape could offer some improvement but the chaos of cartridges and speeds in that field would not encourage any attempt to find a better set of components. Nor can I imagine having two of these large speakers in an average size room, or getting better sound from two "pint-size" speakers.

NAME WITHHELD

(We wonder if this reader actually does have only one speaker out of which he expects to hear stereo. If so, we must have fallen down somewhere, but it seems that we must have made it clear at least a dozen times in the past year—and the reader has been receiving AUDIO *for at least a year—that it was absolutely necessary to have two loudspeakers.*

However, we disagree with him on the quality of stereo records. Some are superb, and some are just ordinary. May we suggest that he get one of the Medallion sampler stereo records and try it out with two amplifiers and two speakers, making sure that both channels are equally good, and that the loudspeakers are properly phased. If this sampler can't show some of the finer points of stereo, we must conclude that the reader might possibly be deaf in one ear. ED.)

"Flying in the Face Of" Department

SIR:

Anent the well known "hole in the middle," I tried an approach I had not heard of heretofore, and with some startling effects. I realize that it is incorrect and unorthodox and flying in the face of all we know.

I hooked up my center speaker to one channel and the two outboard speakers to the other channel. Sitting facing the center, I noted a tremendous spread of sound, with "stereo" on both sides. Walking across the room, I still had stereo effect on either side of center. Please try this out, or have Mr. Canby try it and make his comments.

On monophonic material the effect is unique in that the point source is almost

(Continued on page 57)

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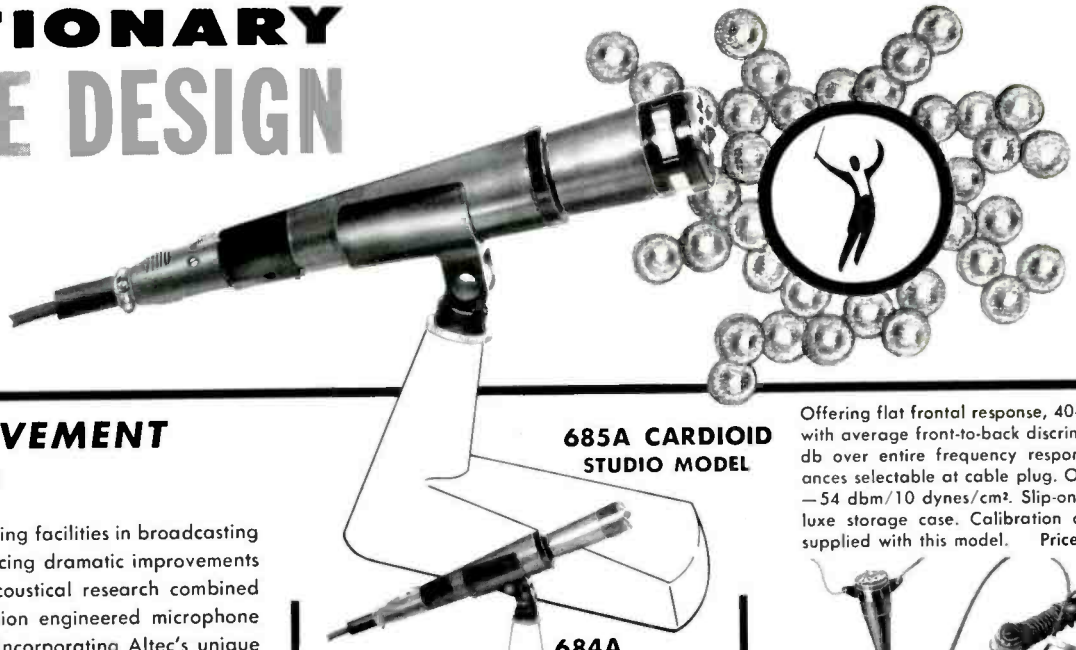

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CHESTER SANTON*

The symbol ✪ indicates the United Stereo Tapes 4-track 7½ ips tape number. When Mr. Santon has listened to the tape only, the tape number is listed first. Otherwise, the corresponding tape number is furnished by United Stereo Tapes.

STEREOPHONIC

Ros on Broadway
✪ M 70012; London 110

Hoch und Deutschmeister Kapelle
M 70015; London 111

Until the day when the record industry gets around to the moderately expensive job of re-mastering the older stereo records, tape is in a good position to move in with an updated version of the original stereo recordings. The latest London tapes released by UST include some of the earliest material brought out by London when the stereo disc was just getting started. The Austrian band in the Hoch etc. album undergoes considerably more improvement in its tape version than does the Latin orchestra of Edmundo Ros. Whereas the band's stereo disc is under par in cleanliness of sound, the tape places it with the newer London releases in audio quality. The light marches and waltzes played by this Viennese regimental band are not to be confused with the labors of the typical German street-corner band. The crump of lower brass heard in the right channel should satisfy all requirements in that area.

The stereo disc of Broadway tunes by Edmundo Ros still sounds very clean today with a reasonably flat stereo pickup. Clean enough to hold its own with the tape version, provided the disc playback facilities are above average. The gaiety in the wind section of the orchestra holds up very well with the passage of time.

Roger Williams: Always
Kapp ✪ KT 41024

Shipments of 7.5 ips review tapes have reached the point where I find it possible to compare releases of varying vintage by the same artist. On hand are two different tapes by pianist Roger Williams—some seven months apart in release dates. If any pop material offers a valid basis for evaluation of refinements in the processing of open-reel tapes, the recordings of Mr. Williams are excellent candidates. His carefully relaxed sound is regarded as too valuable a commodity by his employer to permit changes in style or the studio setting of piano and string orchestra. It's safe to assume that any significant difference between the "Fabulous Century" tape reviewed earlier and this present item can be traced to changes in the duplicating process evolved by Ampex. The strings in this recording provide more clues about changes in progress than does the piano although it too is appreciably cleaner. The improvement in the range and clarity of the orchestra appears to be somewhere in the neighborhood of twenty per cent. Not bad when you consider they're still using conventional tape.

Richard Hayman: Great Motion Picture Themes of Victor Young
Mercury ✪ STC 60012

This tape recording indicates that Mercury's mood music sound is not entirely dependent on the Chicago studios they've been using in recent years. In these motion picture tunes, Hayman's well-known stylings for strings and solo harmonica were taped in a New York studio. An elaborate miking setup similar to that used in Chicago sessions gives Mercury almost a duplicate of earlier sound. The only important difference is the decision to use less reverberation—a loss that will be apparent only in the case of anemic playback equipment. Stereo fans who have survived the months of discussion dealing with binaural vs. stereo sound may read with a twinge the information on the jacket that the two condenser mikes for over-all stereo pickup were only twelve inches apart. Mercury justifies such usage for pop music by filling up the studio with other mikes for closeup work—one atop each small cluster of instruments. In effect, the two high-altitude mikes end up supplying just about as much reverb as they do stereo. The point isn't vital in this case because Hollywood tunes from the pen of Victor Young can hold up under any type of recording condition.

Arthur Tracy, the Street Singer
Audio Fidelity AFSD 5929

This one really rolls back the years. Only the veteran radio fan, upon hearing the Street Singer again, will understand why the Editor's REVIEW mentioned this record a few months ago. Audio Fidelity went all out attempting to revive the past. The discreet accompaniment of the small ensemble parallels that of the usual string orchestra heard back in the days when Arthur Tracy was one of the stellar attractions on the air. So neat is the illusion of an old time radio program, one would scarcely be surprised to hear the voice of Tony Wons insinuate itself between songs with a short poem. Hearing old songs such as *Marta, Beautiful Love, Vilia*, etc. in the ripe style that hasn't changed with the years points up one factor I didn't notice on the old receivers. They really enunciated the lyrics in those days in order to "get through" the static and be understood on the equipment then in general use. Tracy's voice, still reasonably fresh throughout most of its range, may sound quaint to the neophyte but it will bring back the big time to the rest of us.

Paul Weston: The Sweet and the Swingin'
Capitol ST 1361

Weston has changed his style in this release. It's a change brought about, on Capitol's own admission, by the gradual increase in stereo listening on the mood music level. Apparently the reaction of the average stereo disc customer has not been very encouraging. I can understand how the straightforward, easygoing arrangements used all these years by Paul Weston could sound rather tame in stereo if the speakers were too close together. The fault does not lie with the orchestra or the recording crew. On my setup I've been getting ample orchestral contrast on the preceding Weston stereo items due to adequate spacing between speakers. The problem won't be solved until a six-foot interval between speakers is commonplace or the console angling of speakers is worked out. In the meantime, Weston attempts to satisfy everyone through use of a male chorus that swings countermelodies in the right channel.

Andre Kostelanetz: Gypsy Passion
Columbia CS 8228

This is the first Kostelanetz stereo disc to arrive for review since the start of this column. An album of gypsy music hardly gives the entire orchestra a chance to shine but the record suggests that the Kostelanetz king-size crew benefits from the type of stereo processing Columbia has now attained. Despite the fact that much of the music on this record was meant to be played around the campfire—and the arrangers treat it that way—the sweep of sound at times recalls personal appearances of the orchestra. It certainly takes me back to the days when a Kostelanetz broadcast from the CBS Theatre on Broadway was one of the town's major attractions in popular music. Are the arrangements featured at that time still in existence? If so, how would they sound in stereo? The present A & R staff at Columbia should contain at least one wireless fan who might be persuaded to record in stereo some of the highlights of the Kostelanetz radio career. For the present, although not the last word in native style, this album offers relaxed listening and the reliability of intonation tossed off by New York's top free lance musicians.

Bob Thompson: MMM Nice
RCA Victor LSP 2117

The lightest touch currently in use by outfits specializing in novelty arrangements for chorus and orchestra belongs to California's Bob Thompson. His first disc, "Just For Kicks," was one of the more refreshing highlights of the past year. The sonic surprises of the previous release are not surpassed in this recording. He is consistently amusing without overstepping the narrow line that separates the novel from the corny. Thompson's style is not easy to describe. The sophistication of the ideas for mixed chorus is combined with the enormous bounce and vitality of the singers he has trained. This incongruity is the secret of his distinctive sound. Three Thompson originals round out a predominantly show-tune roster. Victor's Hollywood crew places a bit more stress on the extremities of the audio range than do their East Coast colleagues. They cannot resist the urge to slip in an extra mike in order to build up the lowest register of the male singers or the impact of instrumental highs.

Norman Luboff: Moments To Remember
Columbia CS 8220

The Sound Of Children
RCA Victor LSP 2159

The Norman Luboff Choir's familiar treatment of ballads from the late '30s scarcely prepares one for the other choral group released about the same time. The Luboff voices are robust, polished—predictable veterans of many recording sessions. They work with easy precision for each studied effect. RCA's disc, on the other hand, features twenty-two youngsters between the ages of eight and twelve who were given a dozen grownup songs to play with. The contrast is tremendous. After the initial shock, the unbiased listener will be forced to admit that any ballad or show tune can be rejuvenated if one is willing to go to these extremes. The producers deserve an award of some kind for patience beyond the line of duty in auditioning about a hundred kids and then drilling the final group into performances of such professional finish. The perfectionist may still insist on the Luboff technique for the long haul but you'll have to go some to top the novelty of a tune such as *The Whiffenpoof Song* in the hands of these boys and girls.

(*Continued on page 61*)

* *12 Forest Ave., Hastings-on-Hudson, N. Y.*

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Edward Tatnall Canby

TAPE PLAYER

WHAT WE NEED now is a good hi-fi tape player. I mean a player—not a recorder.

The situation in tape right now has some increasingly odd sides to it. The sources of ready-to-play tape are again growing larger, after near-eclipse. The cartridges, both RCA's and Columbia's, still exert a heavy influence upon tape thinking, if not much upon the market. Four-track stereo tapes are spreading out. But what of the tape machines that do the playing?

If you are looking for playback units on which to play your tapes, as you play discs on record players, you won't find any. They don't exist. Not without complications—the ever-present and very expensive recording feature. Only among the assemble-yourself component tape decks can you acquire a device that is purely and simply a tape *player*, as a turntable and cartridge-arm unit is a record player.

A California correspondent, a producer himself of disc records and a few tapes, wrote me recently on the subject and hit several nails on the head, just where I had been getting ready to aim myself. His feeling is that the tape industry, "wittingly or unwittingly," is seriously getting in its own way, not as to tapes but in respect to playback equipment.

"Consider the situation of the disc enthusiast," he writes. "He can buy an excellent turntable and pickup for $150 to 175. He has to pay $600 or more for comparable equipment to handle tape. The less expensive tape units will not satisfy the demand for fidelity. (*I would add reliability and long life, too. E.T.C.*) The result is no market for recorded tapes among such people. The people who own tape recorders, even good ones, are not buying recorded tapes, because they make their own. They record live music, they take music off the air, and they dub from stereo discs owned by their friends."

You may want to quibble about prices and you'll probably feel that the argument is a bit overdone—people with tape recorders do beg, borrow, or steal taped material; but they most likely buy tapes, too. Ask the tape producers. Nevertheless, the argument has a ring of solid truth in it.

The thing we need, this man says, is not more tapes but better and simpler tape playback, and, above all, playback detached from the expensive and inevitable recording feature, which seems to be a universal requirement these days.

"It is possible to produce a truly hi-fi tape player at a price comparable to that of a disc player," he goes on. "Ampex is now installing four-track replacement heads on existing tape machines at only $50. They could easily market a simple tape deck without electronics for $100. Thus for $150 a tape user could equip himself to play tape directly into the low-level tape input of his audio equipment. Ampex is not offering such a unit. . . ."

I can imagine that Ampex will raise its collective head in surprise at this possibly oversimplified suggestion, and I would not want to make such very specific cost-and-marketing guesses. Nor am I sure that if Ampex did offer such a tape player, it "would cut into their recorder sales." But, he continues, the lack of such an offering is "cutting the throat" of the Ampex-promoted United Stereo Tapes, which puts out the present four-track reel-to-reel offerings of many record companies. He says they agree with him at United Stereo.

"In short," he concluded, "the vicious circle will be broken when we see full-page ads in the hi-fi magazines offering a high-quality tape deck for $150 to $175 and recorded tapes of the highest quality in four-track stereo at $6 for 60 minutes' playing time. All of this is entirely feasible.

Let's put aside specific prices. The fact is, and you can't very well put this aside, that at no level of component quality do we now have a readily available tape *player* unit for hi-fi installations—nor, for that matter, is tape playing equipment being offered in the popular "home machine" lines. One must always buy (with the aforementioned exception of the Viking-type tape deck equipment) a tape *recorder*, in order to own tape *playback* facilities. The two are indissoluble, as things now stand, and the entire place of recorded tape in the home is tied to this fact.

Curious. I'm not annoyed with the tape machine makers for their failure to provide what my correspondent wants; I'm simply intrigued, and wonder just why. The policy is obviously deliberate, for there's no technological reason why we can't have tape players galore—they're easier to make than tape recorders.

Why are we so tied to the tape recorder?

Why not? Once you have a basic tape-moving mechanism you might just as well add what it takes to make tape recordings, as well as play them. It seems like not very much, at first thought. Just an erase head, a simple recording preamp and some extra switching and circuitry; use one head for both playback and recording (though it must be to some extent a compromise)—or add an extra head (stereo, in-line). Use whatever you can of the electronics for double-purpose. Sometimes it's quite a lot. Or, for fancy quality, add more wires. There's room.

It would be silly—this argument goes—to build a complete tape player without recording function. Look at it: you have two thirds of a recorder already. Who wants a three-wheeled auto with one wheel left off?

It's a very convincing argument, if superficial, and it is of the sort that now reposes in most minds among the tape-using public, if preferences are any guide. Might as well get the works, people say.

In fact, they have to get the works—there isn't any alternative. And people do not, therefore, realize how much more they pay for the whole tape recorder than they might for a deliberately functional tape player, designed to match the record player and the radio tuner as a source of hi-fi sound.

There's more to it. Unfortunately, every tape playback machine I have set my eyes on, so far, has looked exactly like a recorder. An incomplete, emasculated recorder.

Build a fine tape transport unit, like, say, the home Ampex, and leave out the recording feature? All that lovely precision machinery and nothing but playback? Unthinkable! If it looks like a recorder, it ought to be one. Worse—entirely too many people are likely to think it *is* one, with subsequent misunderstandings on the sales floor that defy imagination. Department of utter confusion! No wonder the tape player has been lost in the shuffle.

You can see the sort of reasoning that now goes on, among the customers and, by reaction among the manufacturers who must sell to them. As things stand now, we think of recording first—we put the playback function into an inevitable second order of importance. If you build a recorder, you have to provide playback, too. Every recorder is also a playback unit. We gear the entire operation to the recording feature—and thus to the dual function, record/playback.

If you put recording first, you will determine the very shape, size, cost, according to the dual function. There must be room for both.

Thus inevitably, until now, the playback machine has been no more than a standard record/playback transport unit with part of its innards left out. It's a sort of stripped-down model, with blank spaces here and there. It works, but it has a dreadfully negative quality to it. It reeks of things that are "missing." And it breeds confusion by looking like the "real" thing, the complete machine.

The very fact that such a unit is basically a recorder without the record feature makes it a poorly adapted affair, too big, unnecessarily complex, unfunctional. It is a misfit, any way you look at it. It just begs for its full function, as a record-player. The public hasn't ever gone for such units, and rightly. I doubt if it ever will.

PLAYBACK ONLY

A playback unit intended from the very

beginning for playback alone should be something rather different, I think.

It would require a basically new design, both in looks and in its functioning parts, which from the start would *permanently exclude* the recording feature—and thus break away from the dual-purpose necessity. It would concentrate exclusively on high quality, simple tape playback, with single-purpose ingenuity and care. It *wouldn't* even look like a tape recorder—and this is psychologically important. In no way, except for some of the uncompromised inner parts, (the playback head and so on), would it be interchangable with the tape recorder.

Now this is clearly what my correspondent really wants, and he is right. A real tape player, so designed, could at last offer top tape sound at a reasonable component price—or even, in the cheaper home equipment, a unit offering "excellent" tape sound, better than comparable home phonographs for disc and at a price much lower than that for a home recorder.

A bevy of tape players of these sorts, in the various sales areas, could boost reel-to-reel tape up where it wants to go, free it from the stranglehold of the tape recorder. But is it feasible to launch such a tape player?

That's the question. It's a big order, and a dangerous one. It would be a gambling sort of venture even if there were only one kind of tape, reel-to-reel stereo at 7½ inches. With those nasty cartridges still hovering ominously, it is an even more doubtful manufacturing proposition—for nobody can yet say that the tape cartridge is not a threat to reel-to-reel. Yet some things are clear.

First, the easy way out, the tape player that is merely adapted from a recorder, minus the recording feature, is not likely to work, though it would cost peanuts. It is doomed, and has been right along. That's why there aren't any such tape players now.

There isn't a customer in the land who is going to be happy with a tape machine that looks like a recorder and isn't one. He has turned them down in the past and he will again. Nor will he appreciate a compromise unit that wasn't designed for playback and wastes space and technology on its "missing" aspects, the obviously absent record feature.

Second, though the brand new and specifically designed tape player is an awful risk in many ways, it is not merely the only way out—it is already a necessity. It just has to be built soon, if tape is to grow.

As to the first point, may I remind you that there were tape players—for awhile. For instance, the very first RCA stereo tape machine was a player unit—no recording. It came in two pieces, table-top type on brass legs. One unit housed speakers and a tape player—it was, of course, a conventional transport minus the recording feature. The other held the second set of speakers and was empty. This was before stereo disc; clearly, the intention at that point was eventually to put a stereo disc player in the other unit. The thinking at that ime was clear enough, you see. Two stereo *playback units*, of equivalent importance, for tape and disc, using the common audio system.

But that first Stereotape player lasted only months. In an astonishingly short time RCA replaced it with another model that looked almost exactly the same. The difference was important. The newer unit had recording, as well as playback. (Single-channel recording, stereo playback.) And the price had gone way, way up—maybe thirty or forty per cent.

That's what happened to the earlier playback machines. The public didn't like them, didn't even know what they were (since they looked like recorders), and they just didn't sell. Hopeless confusion. I suspect that not even the dealers could remember which were recorders and which weren't. The answer seemed just what everybody wanted—make 'em all recorders, and jack up the price. No more confusion . . . well, not so much, anyhow.

Can it really be true, still, that a standard tape transport minus the recording feature is basically unsaleable and unfunctional, as well as confusing?

Well, I suppose you could paint the non-recording models bright green, or put differently shaped plastic covers over their works—but I don't think it would do much good. The emphasis would still be on the negative features, the "missing" parts. It could be tried again, and perhaps it might work now, what with the new and much less expensive tapes now on the market. I doubt it.

But I can't help sensing that the more radical approach is likely to succeed. I feel that the risk in designing a playback-only machine of really outstanding quality and reasonableness of price, a machine that *doesn't even look like a tape recorder*, will pay off in acceptance by the hi-fi public. The more ingenious and simple the design, the better will it stand out on its own, unconfused with the tape recorder.

As to my second point, above, that this machine just has to be built, as things now stand, I can see that the project must be clearly a cooperative one, between the tape producers and the tape machine makers, for the common good of both. The machine must above all offer a big, new value—it must be both very good and relatively inexpensive. I suggest, therefore, that its place should be as a "loss leader," to sell more tape to the customers. The loss would necessarily have to be spread around, but this should not be a major problem; some companies, Ampex for instance, are already in both fields, tapes and playing equipment. The right hand surely can help out the left, in such a situation.

It would be fatal, I think, to price the tape players too high—or to grade their quality too low. They must offer really top-quality sound, to get the vaunted best off the tape and to beat the disc at the hi-fi game. They must, too, offer a quality bargain that will dramatically bring the cost of high-quality tape sound down, at least to the level of good FM radio if not lower. The loss leader idea, the units deliberately selling at a tiny profit or even at a technical loss, might swing the deal for tape, where shorter-sighted profit compromise would fail.

In this connection, don't fail to remember the LP at its beginning. The new record was a success largely because Columbia had the canny sense to put out good-quality players for everybody, at a low price. They

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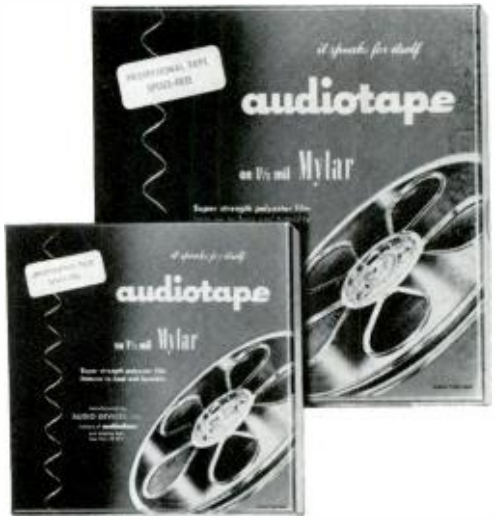

"Mylar" is DuPont's trademark for its polyester film—the toughest, most durable recording tape base material known to man. "Mylar" cannot dry out or become brittle with age. Radical differences in temperature and humidity have no effect on it. Recording tapes on "Mylar" can't break or stretch in normal use, regardless of temperature or humidity. Most importantly, "Mylar" is a known, tested base material—proven by years of use in telemetry, automation and electronic computing applications. Millions of feet have been recorded by professional and amateur sound recordists, too.

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were so good, so cheap, that even the dismal problems of compatibility were no deterrent. At $10, how could you lose? And you could have a changer, too, that was for a number of years the best sound-bargain on the market, complete at around $18.

Rumor has it that those machines were deliberately sold at a loss, to promote LP. I remember them well enough to suspect this must have been so. They were excellent and they sold LP, to the point where the larger industry could take hold. Then they disappeared.

The quality and price of those players was precisely calculated for an optimum impact under the circumstances—to sell the largest possible number of the new records, to build confidence in LP quality, and so to launch the LP business. It is true that those calculations were on a quite different plane from those we might make in the present tape situation. Quality is higher, cost is greater. Yet the principle is the same. Get out new, attractive, high-quality one-purpose playing equipment and sell it at the lowest possible price, even at a loss—to build yourself a market for tapes.

There'll still be the tape recorders, of course. People who own them will be in the market for tapes as they are now, on a side-line basis. There's little to lose in this direction. And lots to gain among new users of the simpler tape player.

To conclude, I can see more or less how the public's point of view must change, before the tape player can establish itself solidly, well removed from the tape recorder. The attitude that must be cultivated is one that envisions "extras," rather than missing functions. The tape recorder is a double package in this respect, combining several functions and many uses—at a price. As in an FM-AM tuner, or a tuner-amplifier, you pay more, you get more. The tape player is a single unit with only one function, specialized. It resembles the FM tuner in this respect.

We'll be thinking of these units in three ways.

1. You buy a double-purpose unit, a tape recorder, with your main interest in the recording feature. Playback is an automatic associated function. In this case, the machine offers an "extra," at its high price, in that it will also play commercial tapes. The machine is worth the cost in these terms.

This is the most common attitude at the moment as far as tape recorders and stereo recorded tapes are concerned. The tapes are the "extra" feature—when and if.

2. You buy a tape recorder in order to play stereo tapes—you accept the recording feature, but don't plan to use it much. Recording is thus your "extra," here. But it is expensive, and the unit as a whole is very much too expensive for a tape player. This is the other common situation today—and it hurts tape, as well as the tape-playing customer.

3. The new addition, the saving grace, is the tape player. It avoids both situations where there are "extras," in favor of a single function, playing tapes, and it not only plays them well but is relatively inexpensive. It tends to promote more and more tape buying, fits easily into the hi-fi family as a component, fits into the home

(*Continued on page 57*)

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EDITOR'S REVIEW

MULTIPLEX AGAIN

WE STILL HAVE no definite information about the possible action by the F.C.C. on stereo broadcasting, but one item of interest has come to our attention. The Commission has done considerable work in evaluating the various systems proposed—fourteen in all—and seven of them were eliminated either because they were withdrawn by the proponent or rejected as impractical. One additional proposal submitted by Philco was added to the seven remaining from the first group.

Since our own experience in the motion picture industry indoctrinated us thoroughly in the principle that no matter what improvements were made in the studio to expand the service in one way or another, the new sound track must be capable of being reproduced by the projectors already in the field without modification. Only those houses which were willing to make what modifications might be necessary to take advantage of the additional service would be able to enjoy the improvements, to be sure, and the large presentation houses usually made the necessary changes. But the mass of movie theaters still played the new film on their old equipment. We believe this to be a valid principle.

The first few FM-multiplex systems that were proposed were careful to follow this principle to a greater or lesser degree. Certainly there is no question that the transmission of A + B on the main channel will provide a complete signal to listeners who do not find it desirable or worthwhile to add the necessary equipment to enable them to enjoy stereo broadcasts. Those that want it can add the necessary adapter—regardless of its specific configuration—and they will then be able to reproduce stereo. In any case, the listener who does not wish to add an adapter could still receive monophonic broadcasts.

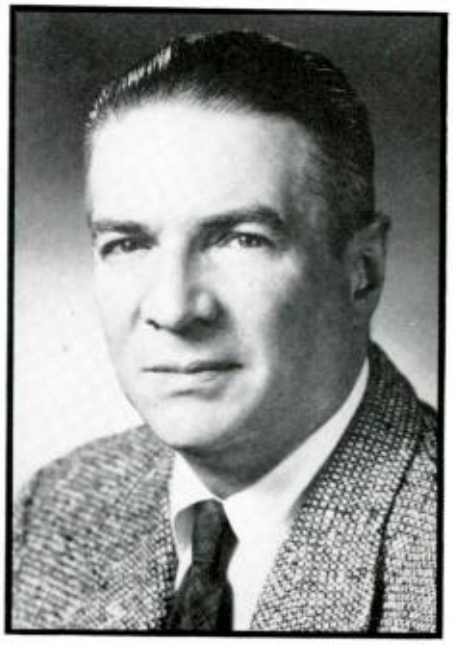
However, should the listener want stereo, he can add the adapter to his present FM receiver in *only a few of the systems*. Others of the proposed systems will not work for stereo unless the existing FM receiver is extensively rebuilt to accommodate the new signal. The owner of a standard type of FM receiver would thus be required to rebuild his set—or, more likely, to have it rebuilt at a fairly high cost, since custom work of that nature runs high—before he could take advantage of stereo broadcasting. This is almost like providing only diesel fuel in all the gas stations on the turnpikes so everyone would have to convert his present car to diesel operation if he wanted to continue to use the high-speed roads. We believe firmly that the F.C.C. should keep in mind the need for keeping the cost down to a practical minimum and not load the cost unnecessarily by choosing any system that will make the change prohibitively expensive.

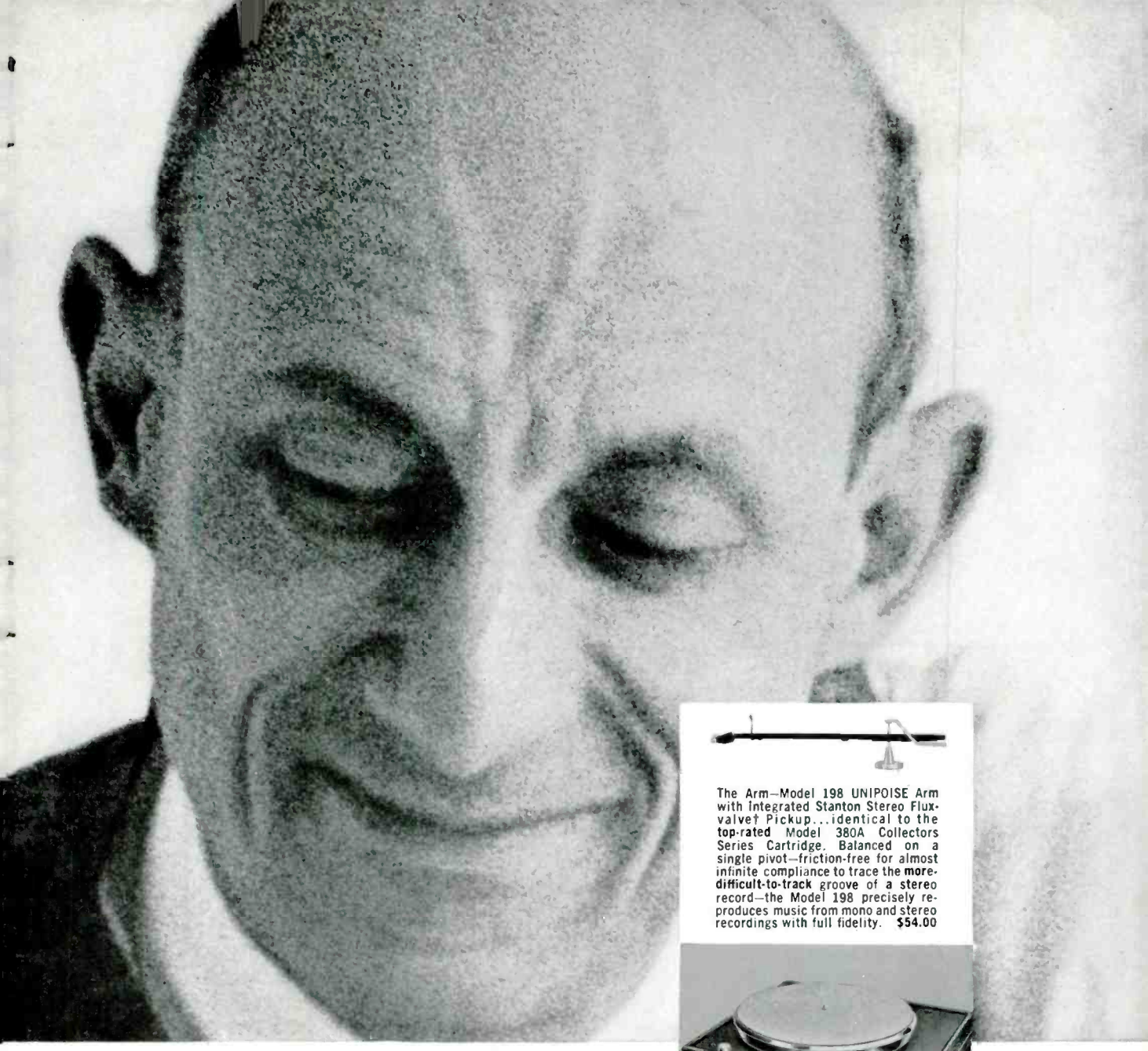
Harrie K. Richardson

It is with deepest regret that we must chronicle the passing of Harrie K. Richardson early on the morning of June 12 as a result of a heart attack. Associate Editor of AUDIO since June, 1951, he was responsible for several departments of the magazine and served as a good-will ambassador throughout the New York City area.

Harrie had a strong background in publication and radio work, with his first position being Radio Editor of *The Daily Oklahoman*. In 1929 he became chief announcer of KVOO in Tulsa, moving to Hollywood three years later for more work with networks as producer, announcer, and writer. After three years on the coast, he went to Chicago where he held a number of executive positions in the radio advertising field. During the war he worked as editor of Sonar instruction manuals published for the U. S. Navy by the Office of Scientific Research and Development in New York, and it is from this background that he came to AUDIO.

Harrie is survived by a wife, Cecile, and three children. A resident of Glen Rock, N. J., he was well known in the village for his activities in community affairs, and particularly among the children with whom he spent a large part of his time while being a real companion to his own. All of us will miss him.





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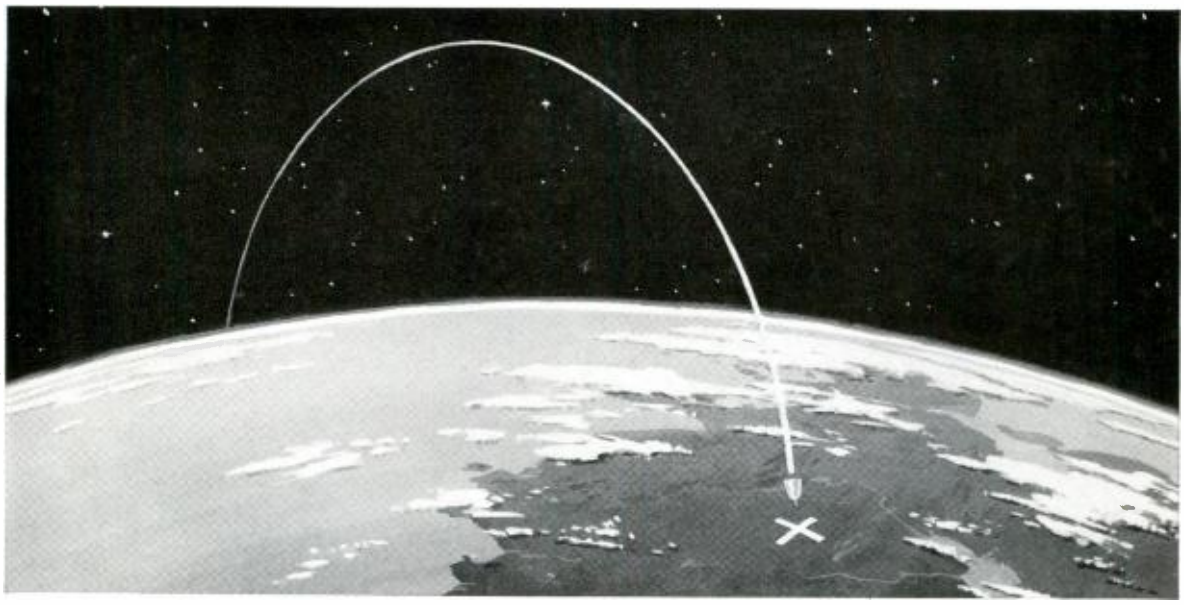

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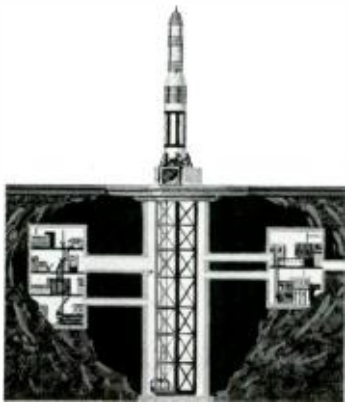

Bell Laboratories scientists and engineers designed the transmission and switching systems for the world's most versatile telephone network, developed much of our nation's radar, and pioneered in missile systems. From their vast storehouse of knowledge and experience comes the guidance system for the Titan.

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The Silicon Diode in Audio Equipment

Silicon diodes are rapidly becoming popular with designers of audio equipment. The author discusses their use as power rectifiers and as bias regulators.

L. B. DALZELL*

AUDIO POWER SUPPLIES using vacuum tube rectifiers have been around for a long time. The rectifier tubes have certainly worked out well, and have been improved over the years. While they are quite reliable today, the rectifier is still the most frequently replaced tube in audio equipment.

Copper oxide and, later, selenium rectifiers have seen some use as substitutes for the tube, but the voltage and current requirements of audio equipment forced the use of large units, as sizable heat dissipating fins are required to cool the rectifying junctions. Copper oxide rectifiers are frequently used in meter circuits, while selenium is common in bias supplies today.

* *1162 Fleetridge Drive, San Diego 6, California*

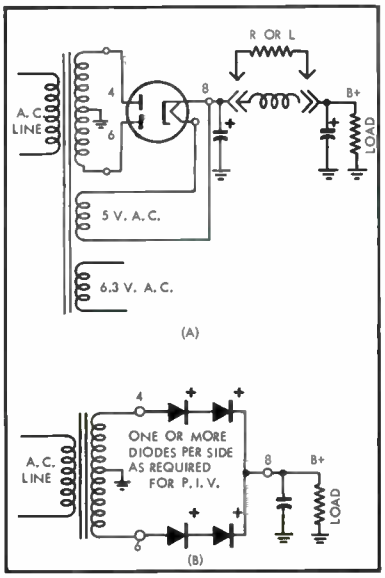


Fig. 1. (A), The familiar full-wave center tapped rectifier circuit using a vacuum tube of the more advanced indirectly heated type. (B) is the silicon-diode equivalent of (A). Pin designations are for the 5AR4 and 5V4 type or replacement rectifier or diode unit.

As an offspring of the transistor, a whole new family of semi-conductor rectifiers has developed in the last few years. Germanium diodes are small, but more suited to higher powers at low voltage levels. The comparatively recent silicon diode rectifier seems to have eliminated the problems of size and heat—at least at audio power levels.

It seems fantastic that four tiny wafers of pure silicon with hyper-accurately controlled impurities can do the same job as a conventional full-wave vacuum-tube rectifier. They can even do the job better, for they waste little power, take little space, and in a properly designed circuit they will probably last for years.

Manufacturing methods have been rapidly improved, and silicon rectifiers, which but three years ago were too expensive for serious consideration in audio equipment, are coming into a price range that allows direct competition with the vacuum tube, and there are real advantages in their use. There are problems too, and in this article an attempt is made to cover the design of silicon rectifier power supplies for audio amplifiers. Many of the same ideas apply to the design of supplies for pre-amplifiers and tuners, but in class AB or class B amplifier circuits the power supply requirements are much more severe. The current drain is higher, and usually there is a substantial difference between zero-signal and full-output current—especially when the amplifier is tested with steady-state sine waves.

To simplify our discussion, let us refer to the vacuum tube full wave rectifier as a tube, and the semi-conductor silicon diode rectifier as a diode.

First, consider the conventional full wave center-tapped power supply of *Fig.* 1. The transformer serves to:

(1) Isolate the line supply voltage.

(2) Provide a high-voltage secondary for conversion to the high-voltage d.c. or B plus.

(3) Provide a 5 volt rectifier tube heater secondary (Fig. 1a). ,

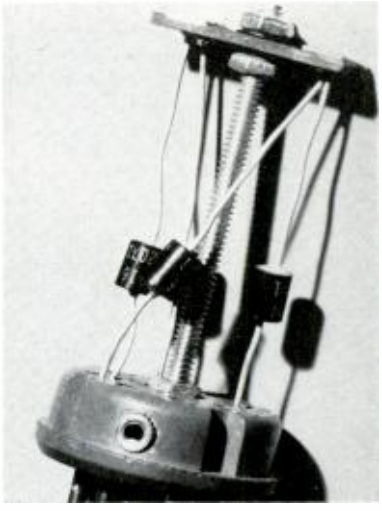


Fig. 2. Internal construction of an experimental silicon rectifier unit which can replace conventional vacuum-tube rectifiers in certain situations.

(4) Provide a 6.3V secondary to heat the other tubes in the circuit.

The rectifier tube heater may draw up to 3 amperes at 5 volts, which is 15 watts that the transformer has to handle. A powerful amplifier, or a large stereo amplifier, might require two rectifier tubes, thus doubling this portion of the transformer load.

The full-wave center-tapped rectifier arrangement is covered in any number of texts and tube manuals. However, a review of P.I.V.—peak inverse voltage—seems in order, as this will be an important consideration in the use of silicon diodes.

Peak Inverse Voltage

If a variable d.c. supply is arranged with positive connected to the cathode and negative to the anode of a rectifier tube or silicon diode, at low voltage the units will present a very high resistance, and only a minute current will flow. As the voltage of this inverse connection is slowly increased, the current will remain very low until an inverse break-

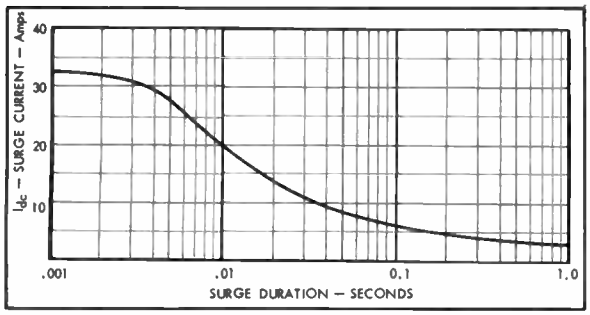


Fig. 3. This curve, which opplies to Texos Instrument 1N2069, 1N2070, and 1N2071 silicon diodes, shows the extremely high surge current thot these rectifiers con obsorb.

down point is reached. The current will then increase drastically, and the tube or diode will usually be destroyed. With an increasing a.c. applied, the units will block on the half cycle when the potential is inverse, until the peak inverse voltage equals or exceeds the reverse break-down point, and again a high current can flow and the units would probably be destroyed.

The peak a.c. voltage is most important, for the usual a.c. meter indicates r.m.s. voltages, and such an indication multiplied by 1.414 indicates peak, but only if the wave is sinusoidal.

Now let us consider the power supplies of (A) and (B) in *Fig.* 1. If the transformer delivers 400–0–400 r.m.s. volts, and the supply is a sine wave, then each tube plate or diode pair woud see 400×1.414 or 565 peak volts. At the peak instant, one end of the secondary will be positive by 565 volts in relation to the ground center tap; the other end will be negative by 565; and 2×565 or 1130 peak volts will be applied in the inverse direction across the half of the tube or one diode pair that is at the most negative point, and this must be blocked—usually with an ample safety margin. With no load connected, the filter capacitors will be charged to 565 volts in both cases.

Here now is one great difference between the tube and the diode. All electrical conductors in audio use have some resistance. The forward resistance of rectifier tubes in general is much higher than that of the silicon diode.

After the capacitors are charged, in *Fig.* 1, there will be only a tiny leakage current flowing until the load is connected. When the load is applied and a current begins to flow, the effective resistance of the transformer plus the internal resistance of the tube or diodes will cause a voltage drop. An increased current causes a higher drop across the supply and any external inductance or resistance in the filter, and the term "regulation" is used to indicate the reduction in B plus with increased current. If the power-supply regulation is poor, there will be a large voltage reduction as the current drain becomes greater.

To study the adaptation of silicon diodes to the conventional full wave center-tapped power supply, the author has undertaken a series of experiments. Directly replaceable silicon diode substitutes for the rectifier tubes in common use are available. A rather complete series is manufactured by International Rectifier Corporation and by Sarkes Tarzian, but in the interest of self-education an experimental unit was constructed.

Experimental Set-up

Single diodes rated at a P.I.V. over 1500 volts are available, but they are expensive and usually carry too low a forward current. However, if diodes are connected in series, the allowable P.I.V. will increase as the number of diodes. They can still carry their rated forward current, and they will be comparatively low in price. About 1200 volts P.I.V. looked like a minimum for experiment, and four Texas Instruments 1N2071 diodes were used. Their characteristics are:

P.I.V.	600 v
R.M.S. Input	420 v
Avg Rectified Forward Current	750 ma
Recurrent Peak Current	6 a
Operating Temp	0 to 100° C
Max Reverse Current	0.2 ma
Max Forward Voltage Drop	0.6 v

These diodes are quite small, the body being about 0.25 inches long and 0.2 inches in diameter. The body is insulated, and there are silver pig tail leads for connection and that act as heat sinks, although no measurable heating has been experienced. Two diodes in series in each leg give the desired 1200 volt P.I.V., and can handle 750 M.A.—about equivalent to three 5U4GB or 5AR4/Z34

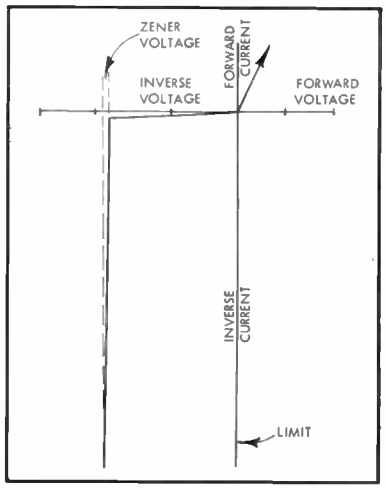


Fig. 5. Choracteristics of the Zener diode.

tubes. The four diodes were wired in two series strings, as at (B) in *Fig.* 1, with the anodes connected to pins 4 and 6 and the common cathodes connected to pin 8 of a Vector G2-10 Octal plug-in unit. A 3-inch 6-32 screw acts as the center support, and a modified 2-terminal insulated tie-point acts as the upper support member. An aluminum case covers the whole assembly. The internal construction is illustrated in *Fig.* 2.

The unit was tested in a number of situations; but to illustrate the problems encountered, the experiences with one amplifier are outlined. The amplifier was a modified Mullard, using EL34's and rated at 40 watts. It has a 200-ma 400–0–400 volt power transformer, and a 5U4GB rectifier tube. The input capacitor is a 30-μf, 500 v. electrolytic followed by a 100-ohm choke. A series of rectifier tubes and the diode unit were plugged into the rectifier socket in turn, and the resultant d.c. output was measured at the B-plus primary tap of the output transformer as follows:

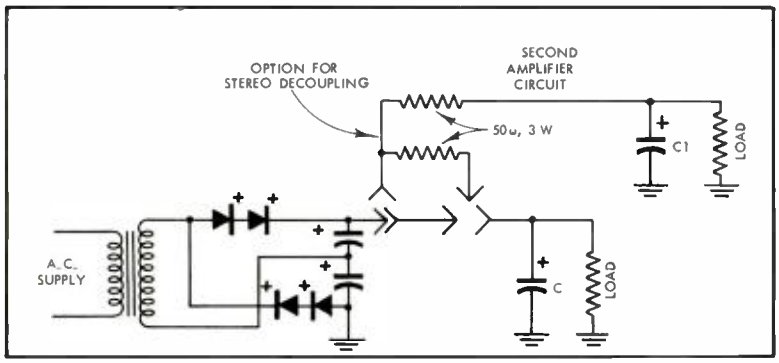


Fig. 4. The conventional full-wove doubler. C is optionol for ripple reduction. The number of diodes per leg will depend on the P.I.V. See text.

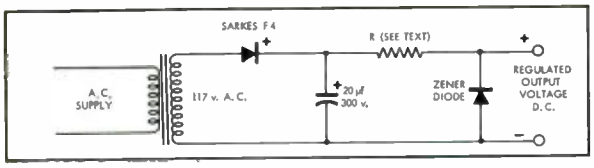


Fig. 6. A regulated voltage standard for shop use Meters may be checked at the output.

Rectifier	B Plus Voltage D. C.
5R4GY	425
5U4GB	450
5AR4/GZ34	475
Diode Unit	505

It is evident that the low forward resistance of the diode unit resulted in a substantially higher d.c. output. When the amplifier was driven to the clipping point the B plus with the 5U4GB dropped from 450 v. to 420 v. With the diode unit the B plus dropped from 505 v. to 490 v. at clipping.

The diode unit gave much superior regulation, but the B plus was now too high. A power resistor connected between pin 8 of the rectifier socket and the first electrolytic capacitor would reduce the voltage to the original 450 v. d.c., but with this improvisation the regulation was about the same as with the 5U4GB. A 350–0–350 volt 200-ma power transformer was then substituted. The resultant B plus was then 455 volts, and the regulation was still 15 volts from zero signal to full drive.

That about winds up the experiment except to say that the diode unit has been in daily operation for well over a year, and the output has not deteriorated a bit.

The experience outlined above brings up a couple of problems. Diodes don't wait for a heater to warm them before they conduct, hence peak voltage is applied to the filter capacitors and the audio tubes until current is drawn by the load, which will then reduce the B plus to its operating level. With the 350–0–350 volt transformer used, the peak is $1.414 \times 350 = 495$ volts. A purist might want to use a time delay device to hold down the B plus until the audio tubes heat. On the other hand, the diode supply with the lower voltage transformer is easier on the 500-volt electrolytic capacitors than the previous arrangement was.

Surge Current

Rectifier tubes will not handle the surge current that diodes will. *Figure* 3 illustrates the astonishing surge current that the 1N2071 will take in stride. It is not uncommon for someone to "fix" his ailing audio equipment by turning it off for an instant, then right back on. The filter capacitors may be pretty well discharged, the tubes still hot and conductive, and the resultant surge can "fix" a rectifier tube right out of existence. Silicon-diode supplies have repeatedly absorbed such surges without a complaint.

To eliminate surge, or hot switching troubles, tube manufacturers specify the minimum effective plate resistance. This resistance per plate includes the transformers' effective resistance, which may be calculated as follows:

$$R_{eff} = R_s + n^2 R_p$$

where

R_s is the resistance of the secondary
R_p is the resistance of the primary
n is the ratio:

$$\frac{\text{Secondary voltage}}{\text{Primary voltage}}$$

In *Fig.* 1, secondary refers to one half, i.e. from ground to one end of the winding.

Additional resistance in series with the tube anodes or cathode is usually required to meet the specified condition, but these limits are too frequently ignored in practice. The effective plate resistance of the transformer alone is usually sufficient to limit surges well below the maximum for silicon-diode supplies.

The choke or resistor and second filter capacitor, of (A) in *Fig.* 1a, are completely superfluous with a diode supply —in the author's opinion. Push-pull output configurations may be easily balanced to eliminate the effect of ripple, and a filter capacitor of about 60 μf is all that is required. Chokes and resistors simply make regulation worse and waste power. Of course, this applies only to push-pull output stages.

In fairness to the rectifier tube, it should be pointed out that two parallel rectifier tubes will have one-half the drop of a single tube. Further, the 5AR4/GZ34 rectifier tube is nearly as good as diodes for regulation, and it heats slowly, eliminating the B plus overthrow when it is first turned on.

Voltage Doublers

The voltage doubler supply is gaining popularity, especially when used with diodes. The doubler makes use of a lower voltage transformer without a center tap, which can be less expensive. See *Fig.* 4. It does require two fairly large electrolytic capacitors, but these can be lower voltage units than the full-wave supply requires. The doubler simply charges one capacitor on the first half cycle and the other capacitor on the second half cycle. The capacitors are in series, hence their voltages are additive. Because the source alternates between the two storage capacitors, a 160-volt 500 ma transformer can supply 250 ma at $1.414 \times 160 \times 2$ or 453 volts, less transformer and diode losses.

In practice, the doubler supply using diodes does not have the high peak (zero current drain) voltage of the full wave center-tapped supply. Transformers designed for doubler operation have low effective resistance, hence with good ca-

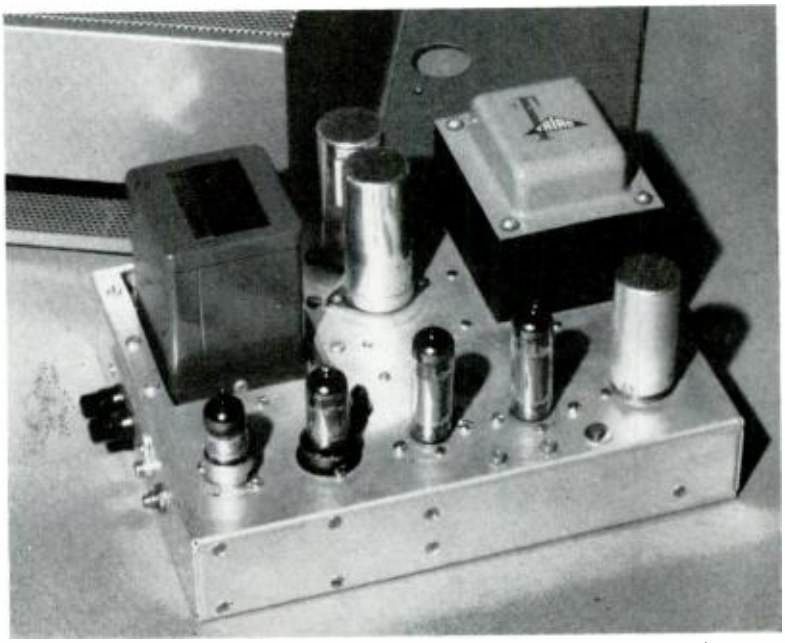


Fig. 7. Experimental 20-watt amplifier with the outside cage removed.

pacitors doublers regulate better also. (See "A 60-Watt Amplifier with Silicon-Diode Power Supply," AUDIO, March, 1959.) As one storage capacitor is being charged while the other discharges, ripple has a different wave shape, which seems slightly less troublesome than the full-wave center-tapped supply as far as hum is concerned. Finally, the doubler is less sensitive to variation of a.c. source than a full-wave supply.

As a practical example of the doubler power supply, the Triad R93A power transformer, which was designed for this purpose, can be connected to supply 166 v. a.c. to the diode doubler. Peak d.c. voltage at the zero-current condition will be $166 \times 1.414 \times 2 = 468$ v. At a drain of 130 ma, this reduces to a steady 455 v. d.c., while a drain of 250 ma causes the B plus to drop to about 440 v. d.c. This is very good regulation indeed. The diodes in each side of the doubler have to block a P.I.V. of $2 \times E_{sec} \times 1.414$. It is wise to allow a good factor of safety in this case.

The series doubler capacitors should be at least 100 μf each, and greater values give better results. Their voltage ratings should add to a level above the operating B plus.

A ten-volt drop in the a.c. supply reduces the B plus about 40 volts with the doubler supply, while the full wave center-tapped supply voltage drops almost 55 volts.

When silicon diodes are used in power supplies, whether full wave or doubler, there are real improvements. The superior regulation and ability to handle surges have two big advantages. Higher amplifier power can be obtained, and transient peaks have little or no effect on the supply voltage as recovery time is so short. The supplies have to be designed as a unit, as the voltages furnished by the transformer should be lower than when tubes are used. So it will not be possible to simply convert to

(*Continued on page 59*)

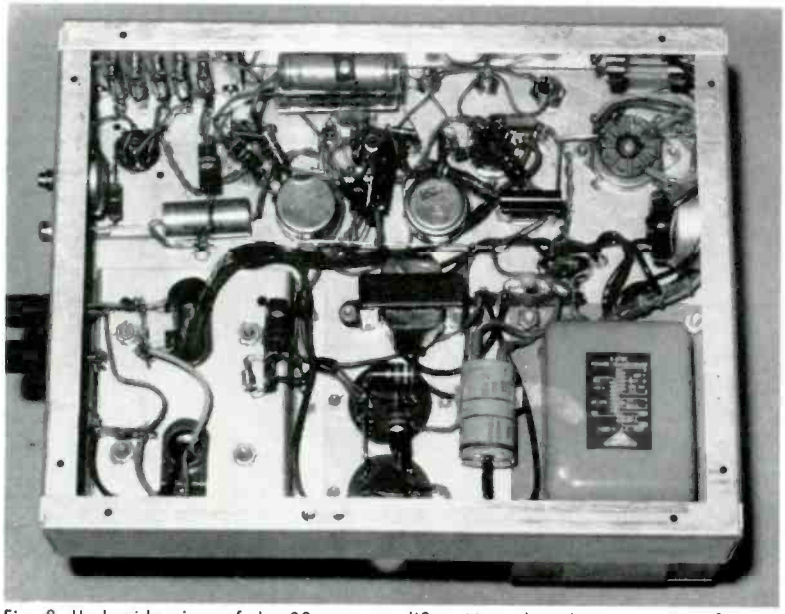


Fig. 8. Underside view of the 20-watt amplifier. Note that the output transformer, at left front corner, is mounted on a bracked to reduce above-chassis height and to allow assembly into the cover.

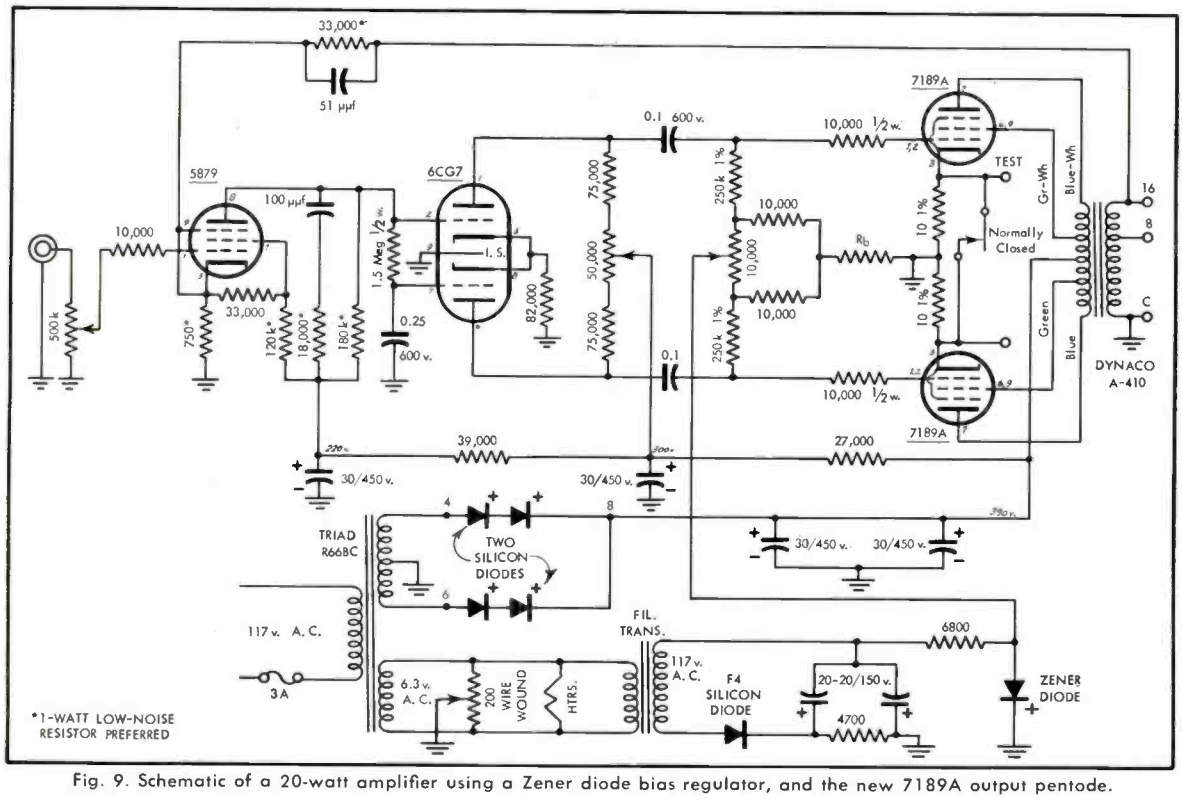


Fig. 9. Schematic of a 20-watt amplifier using a Zener diode bias regulator, and the new 7189A output pentode.

A Ribbon Microphone for High-Quality Recording

M. L. GAYFORD*

In describing a specific model of ribbon microphone, the author presents the theory and operating principles of the type which is also known as velocity or pressure gradient.

A MICROPHONE of the best possible quality is essential for recording or reproducing music to the highest present day standards of fidelity. It is in fact necessary for the performance of the microphone to be substantially up to the standard of modern amplifiers as regards frequency response, non-linear distortion, and transient response. The purely acoustic attributes of the microphone, such as its polar response in both the horizontal and vertical planes, must also be satisfactory at all frequencies.

It is extremely difficult to check the performance of microphones in quantitative terms. Anechoic rooms and acoustic standardizing apparatus of proved accuracy are necessary to establish microphone frequency responses and polar curves. An estimate of the all-important transient response of a microphone can usually only be arrived at by indirect methods.

Thus the average user, who is not in a position to do reliable measurements on microphones, has to buy a given type of microphone of known reputation if he wishes to make recordings of the highest quality.

A comparatively poor microphone is often thought to be satisfactory for use with home tape recorders and similar uses. This is a fallacy if good musical recordings of any type are desired. It might be argued that the shortcomings of other pieces of equipment in the chain, such as the loudspeaker, are sufficiently marked to mask any relatively minor defects in the microphone or microphones used. In practice, the properties of different items in the reproducing chain do not always seem to "add up" in this way. H. J. Leak demonstrated many years ago that the intermodulation tones resulting from a controlled increase in the rated non-linear distortion of an amplifier from 0.1 up to 1 per cent were clearly audible over a good loudspeaker system. A good "clean" well balanced signal from a microphone still sounds good on reproducing gear of only moderate performance, and it will sound better as the reproducing gear is improved.

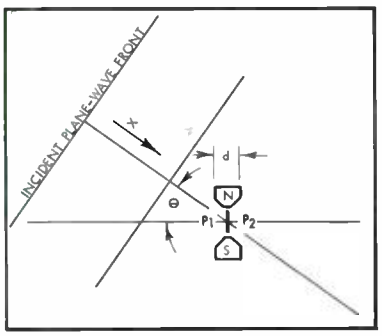


Fig. 1. Plan view of a ribbon between two pole pieces showing a plane sound wave incident at an angle θ to the microphone axis.

It is not easy to explain the reason for this apparent contradiction of the laws of superposition, as evidenced by the failure of defects later in the chain to mask those at the input end. It may be connected with the ability of the brain to concentrate on that which it wishes to hear, i.e. the input signal to the system, while subconsciously eliminating other defects which it is accustomed to hearing, i.e. those arising in the rest of the gear and, therefore, to some extent common to all programs.

It is in musical reproduction that the quality of the input becomes of paramount importance. In general, the greater the number of performers and the better the acoustics of the recording auditorium, the more outstanding will be the difference between a good microphone and an indifferent one.

Ribbon Microphone Theory

The ribbon principle has long been appreciated as being capable of providing one of the best types of microphone because the moving element can be extremely light and well controlled. The lightness and the low value of acoustic impedance of the ribbon mean that it is basically only suitable for an indoor studio microphone and that precautions have to be taken to avoid air movements, such as severe draughts, or mechanical vibration of the microphone mountings. Both can give rise to heavy low frequency rumbling noises.

The basic theory[1] of ribbon microphones analyzes a transducer of the sort in which a light rectangular ribbon is suspended between two rod-like pole pieces energized by a permanent magnet across their ends, so that a transverse magnetic field is maintained across the ribbon. The latter has free access to the sound field in both front and rear directions. As a sound wave strikes the poles, it flows around them. The fact that there is a mean effective distance "d" between the front and back surfaces of the ribbon ensures that there is, at any instant, a phase displacement between the acoustic pressures p_1 and p_2 at the front and rear of the ribbon. The resultant pressure difference $p_1 - p_2$ is available to move the ribbon. Such a pressure difference related to a distance is called a pressure gradient vector.

In mathematical terms, for sine waves:

$$p_1 = p_o\, e^{-j\frac{\omega}{c}x}$$

$$p_2 = p_1\,(1 - j\frac{\omega}{c}d\cos\theta),$$

$$\therefore\ p_1 - p_2 = j\frac{\omega}{c}p_1\, d\cos\theta \qquad (1)$$

Where

$\omega = 2\pi \times$ frequency
d = acoustic distance around poles.
c = velocity of sound.
λ = wavelength of sound.
θ = angle of sound incidence.
p_1 = Acoustic pressure at front of ribbon
p_2 = Acoustic pressure at rear of ribbon.
x = distance.

* *Standard Telephones and Cables Limited, London, England. (An I. T. & T. Associate)*

[1] H. F. Olson, *"Elements of Acoustical Engineering,"* D. Van Nostrand. 1947. p. 237 et seq.

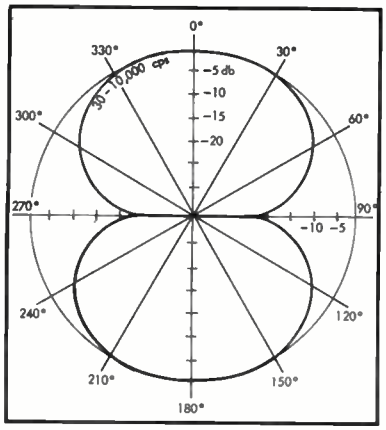


Fig. 2. Polar response of a ribbon microphone in the horizontal plane.

d is assumed to be small compared to λ. Thus, to a first approximation, the driving pressure on the ribbon is proportional to frequency. A flat frequency response requires the ribbon to be driven at constant r.m.s. velocity at all frequencies in accordance with the usual expressions:

$$e = B\,l\,v \times 10^{-8} \text{ volts} \qquad (2)$$

$$v = \frac{p_1 - p_2}{Z_M\,A} \qquad (3)$$

Where

B = magnetic flux density (gauss) between pole pieces.
l = length of ribbon in cms.
v = velocity of ribbon in cm/sec.
A = area of ribbon.
Z_M = acoustic impedance of the ribbon (acoustic ohms)

If Z_M is substantially a mass reactance $j\omega M_o$, then from Eqs. (*1*) and (*3*):

$$V = \frac{P_1\,d}{c\,M_o\,A}\cos\theta \qquad (1)$$

where M_o = mass of ribbon.

In this case, the ribbon velocity is constant at all frequencies and the polar response is a cosine function of θ.

Some of the above physical relationships are illustrated in *Fig.* 1. The basic design requirements for a ribbon microphone now become clearer. The ribbon must be very flexible and must have its fundamental resonance at the lowest bass frequency, so that it approximates to a mass-controlled element over substantially the entire audio frequency range. The magnitude of the driving pressure $p_1 - p_2$ actually follows a sine function as the frequency increases, reaching a maximum at a frequency such that the distance d represents a half-wavelength. $P_1 - p_2$ becomes zero when a frequency is reached such that d is a complete wavelength. We can summarize by saying that the ribbon must be made to behave as a simple mass, i.e. its resonances must be completely controlled, and the shape of the pole pieces, magnet, outer case, and so on must be designed so as to make the incident sound wave produce a constant ribbon velocity at all frequencies; i.e. the tendency of the response to fall off at the higher frequencies must be compensated by various constructional artifices.

It is well known that the polar response exhibited by a ribbon microphone, as the source of sound is moved round it, is a bi-directional cosine or "figure-eight" curve in both horizontal and vertical planes; the solid polar figure being represented by two spheres touching at a point representing the origin of the graphs. This is a very useful sound pick-up pattern, in that performers can be arranged within an angle of ± 60 deg. on either side of the microphone, unwanted sounds sometimes being largely excluded by arranging that the "dead" 90-deg. axis of the microphone is in the plane in which the unwanted noises (due to ventilators, air conditioning units, and the like) may lie. Also random reverberant sounds and general background noises, which almost invariably are excessive in normal rooms and auditoria, are reduced by 66 per cent (4.8 db) by the figure-eight polar curve. (See *Fig.* 2).

It is easily demonstrated that the bass response of a pressure-gradient microphone rises considerably when it is used at close quarters to a relatively small source of sound such as a human voice. It can be shown mathematically[2] that the acoustic sound pressure gradient field due to a small sound source contains an auxiliary term inversely dependent on *frequency* × (*distance*).[3] *Figure* 3 gives curves showing the magnitude of the bass rise at different talking distances which results from this effect. This bass rise is called the "proximity effect." It is also noteworthy that microphones of this type are often called "velocity microphones" because the velocity of the ribbon when operated on by the pressure gradient corresponds to the air particle velocity in the sound wave over a fair part of the frequency range.[1,3]

Design Details of a High Grade Microphone

The first points to be settled in the design are the details of the ribbon itself. Its area, aspect ratio and the side clearance slits at the pole pieces are fixed. The slits are .007 in. wide so as to allow safe clearance with a thin ribbon. A high sensitivity figure demands that the area of the ribbon should be large compared to that of the side slits, the final area being fixed at slightly over 1 sq. cm. The effect of diffraction and wave phase interferences on the vertical polar curve restricts the vertical length of the ribbon to 1 in., its width then being just under ¼ in. Equation (*2*) shows that a good sensitivity demands a magnetic gap flux density of 5000 gauss or more. Research by various authorities has shown that the use of a part-toroidal ring form of magnet is an economical way of generating the flux across a wide (¼-in.) magnetic gap. Having fixed the general proportions of the microphone, a considerable amount of development is needed to ensure that the ribbon functions correctly; the frequency response of the microphone can then largely be controlled by the shape of the pole pieces and certain subsidiary parts such as the outer case and some guaze baffles, which are fitted around the pole pieces.

A microphone ribbon behaves like an elastic bar and its fundamental resonance is given by[4]:

$$f = \frac{3.56}{l^2}\sqrt{\frac{QK^2}{\rho}} \qquad (5)$$

zero tension is assumed.
Where

l = ribbon length in cm.
ρ = density of material
Q = modulus of elasticity of material
K = Radius of gyration of the ribbon cross section.

It is essential that all resonances from the fundamental upwards are critically damped, or else the transient response and, to a lesser extent, the frequency response of the microphone will be affected. Any lack of damping of the vibrational modes of the ribbon means that the modal frequencies are shock excited by transients and can persist as an unwanted "tail" to the reproduced transient. As a large part of all program matter is transient in nature the seriousness of a poor transient response is apparent. That is why, of two microphones with apparently similar frequency re-

[2] *Ibid.*, page 255, 256.
[3] *Ibid.*, page 250.
[4] H. F. Olson, *R. C. A. Broadcast News*, March–April 1950, p. 14 et seq.

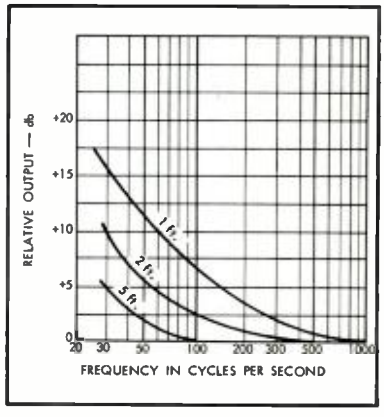


Fig. 3. Proximity-effect relationships for a ribbon microphone at 1, 2, and 5 feet from a small source.

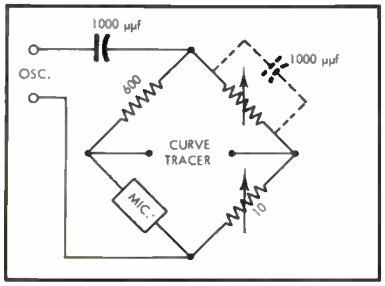


Fig. 4. Schematic of a motional impedance bridge used to measure ribbon microphones.

sponse, one will sound clean and smooth, while the other, with a poor transient response, will sound rough and harsh. Unfortunately, it is almost impossible to make a direct check on the transient response of a microphone, as an acoustic source or loudspeaker with a known near-perfect transient response is usually unobtainable.

The easiest indirect general assessment of a microphone's response can be made by examining its electrical "motional impedance." This is obtained by examining the impedance looking into the microphone terminals with a special bridge which balances out the "static" component of its electrical impedance, leaving unbalanced only the dynamic component, which is a faithful replica of the net effective motion of the ribbon at the test frequency. *Figure* 4 shows the bridge circuit and *Fig.* 5 shows motional-impedance frequency runs on (A) satisfactory and (B) unsatisfactory ribbons. The ribbon of curve (A) is made from a soft aluminum leaf material a quarter of a mil thick. The radiation resistance load of the air and the coupled acoustic resistance of the protective wire gauzes on the poles give a smooth curve, indicating critical damping of all the vibrational modes of the ribbon. Curve (B) shows the response of a thicker ribbon made of harder material. This shows the number of undamped resonances which an unsuitable ribbon can exhibit.

The ribbon is clamped to electrical terminal blocks at the top and bottom, its back and forth movement in the pole gap magnetic field generating an e.m.f. Its electrical resistance is usually about 0.25 ohm, and thus a small input transformer has to be mounted in the base of the microphone in order to step up this e.m.f. and match the ribbon to the usual amplifier input impedance (30 ohms, 150 ohms, or whatever). The transformer must be fitted with a magnetic shield, and the wiring between it and the ribbon must be arranged in a "hum-bucking" layout so as to neutralize the effects of any stray electro-magnetic field originating from power transformers in the vicinity of the microphone. If these precautions are not taken, the ribbon and its wiring form a considerable loop and the microphone is likely to pick up hum.

Figure 6 gives a view of a high-quality ribbon microphone with part of the outer case removed so as to show the construction.

The ribbon is very light, its weight being 0.2 milligrams/sq. cm. and this, combined with the very effective acoustic damping, gives the microphone an outstandingly good transient response. A flat frequency response and high efficiency have also been achieved, due to careful proportioning of the pole pieces and the magnet, the former being precision castings in vanadium permendur, while the latter is a high-energy-content magnet alloy. The driving force on the ribbon is approximately proportional to $d \cos \theta$ where d in Fig. 1 represents the effective distance corresponding to the sound pressure gradient force, θ being the angle of sound incidence relative to the normal. A flat response results if d is small compared to the wavelength of sound, so that the pressure-gradient force is proportional to frequency, and if the ribbon acoustic or mechanical impedance is mass controlled.

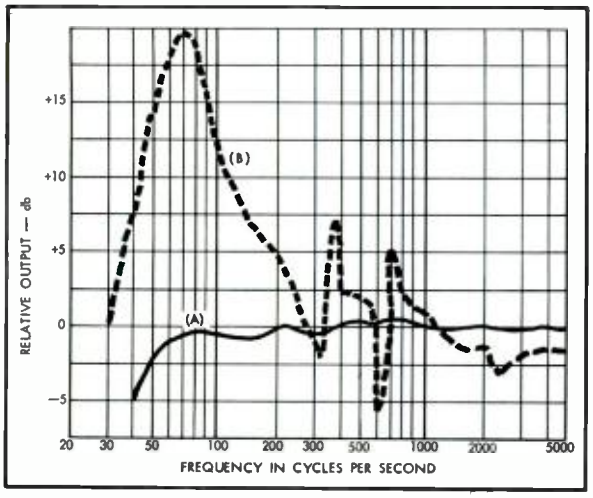


Fig. 5. Motional impedance characteristics of two ribbons. (A) is an aluminum leaf ribbon 0.25 mils thick as used in the microphone illustrated in Fig. 6. (B) is a rolled aluminum ribbon 2.5 mils thick. It will be noted that the resonances of (A) are completely damped but (B) shows many undamped resonances.

Fig. 6. A high-quality ribbon microphone with the outer case and the inner ribbon damping gauzes removed.

Several difficulties are encountered in practice. First, it is difficult to assign one simple value to d, as it is impossible to make the pole piece cross-section the same all the way down. The poles have to be enlarged at the bottom to meet the necessarily greater area of the magnet face. The net result is that the gradient distance d tends to have a larger value at the bottom of the poles than at the top. The larger distance gives a gradient driving force of larger magnitude but with a high-frequency cutoff at a lower frequency than is given by the smaller top distance. Such ribbon microphones are likely to have a range of several db in magnitude in their frequency response at middle or high frequencies. In the present design, the pole piece and magnet proportions are such that the effect is quite negligible. The response tends to fall at frequencies below about 150 cps due to the introduction of resistance control rather than mass control, a result of the critical damping of the natural resonances of the ribbon. A porous gauze baffle with a fairly low value of acoustic resistance is fitted around the pole pieces and magnet window in order to compensate for this loss. The baffle performs this function because the constant pressure difference built up between its front and rear surfaces at all frequencies is a significant addition to the small low-frequency pressure differ-

(*Continued on page 61*)

Development of a Tailored Home Sound System

There is no reason why neat and attractive installations should be limited to broadcast station studios which are visible to visitors—in the home, we look at our "rigs" all the time, so why shouldn't they be as attractive and efficiently installed as possible?

FRED GORDON*

THE PROBLEM AT HAND was that of planning and designing a sound system for the home with certain considerations in mind. To start with, the speaker, a University Model 312 was already installed in its present position, even while the naked components were standing on a table during the cabinet construction period. These considerations were:

1. Cabinets were to be wall hung thereby giving clear space underneath for cleaning.
2. There were to be no swinging doors either outward or upward, yet components such as the tape deck and the turntable must be covered but still readily accessible.
3. No piece of electronic gear or operable equipment was to be mounted on slides or sliding drawers.
4. Provisions were to be made for optimum air flow entering the bottom of the enclosures with ample egress for the heated air. The cold air was to be filtered through replaceable fiberglass filters so that the components would remain relatively dust-free.
5. Arrangement should be so that any component could be easily serviced without:
   A. Moving cabinets from wall.
   B. Using tools to open cabinets.
   C. Getting into an awkward uncomfortable position.
   D. Using an external light source.
6. No single cabinet was to have any component directly above another.
7. All wiring and cables was to be either inside the cabinets or within the walls.
8. All components were to be shock mounted with vibration isolators.
9. All controls were to be conveniently located on one panel so that they could be comfortably manipulated from a sitting *or* standing position.

* *8206 Encino Ave., Northridge, Calif.*

Fig. 2. Aluminum "Flexdoor" provides access to tape recorder, actuates light switch in completely open position.

Fig. 1. Wall-hung system finished in coral and blue formica and trimmed with aluminum provides for phono, tuner, amp-preamp, and the tape recorder.

It seemed, at first, that an impossible task was outlined here. The ensuing description will endeavor to show how the final design complied with the given circumstances.

Both cabinets are wall hung by using hanger bolts anchored in the wall studs. These fit through holes in the backs of the cabinets which are fastened to them with wingnuts and wide washers. For the

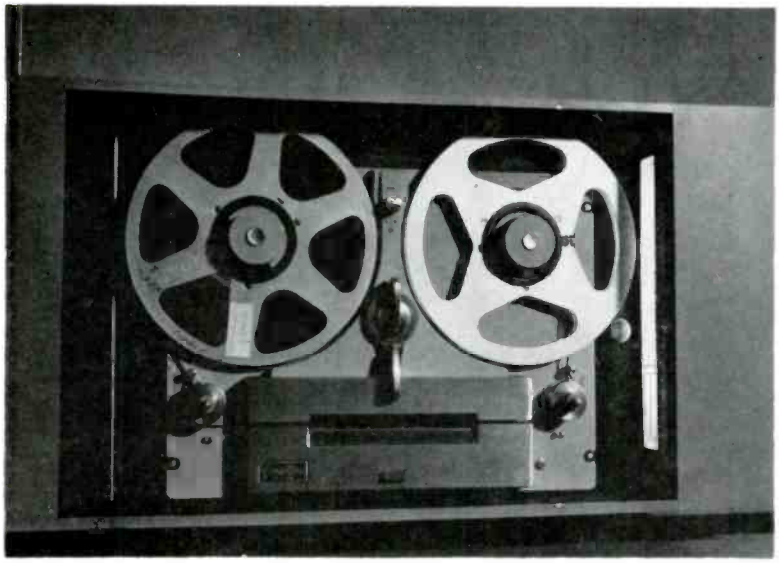


Fig. 3. Interior of tape recorder compartment, showing position of flush-enclosed light.

top cabinet containing the Concertone tape transport, the finish is sixteen coats of automobile lacquer, turquoise in color. Access to the deck is through a brushed aluminum "Flexdoor" (*Figs.* 1 and 2), which, when completely opened, activates a flush enclosed light illuminating the entire face of the deck (*Fig.* 3). By moving the Flexdoor just ½-in. from the completely opened position the light can be extinguished with still enough space to operate the tape recorder. The deck is mounted in its own door frame fastened to a piano hinge and can be disengaged so that it swings out for minor servicing and maintenance simply by rotating the lock knob 180 deg. (*Fig.* 4). For major servicing the entire door containing the deck can be removed from the cabinet by pushing a latch underneath the cabinet. This raises the full length piano hinge pin enough so that it can be grasped from above and completely removed. Since the construction of this cabinet is of a closed nature the

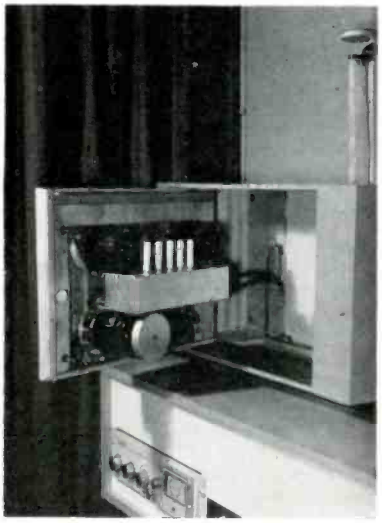


Fig. 4. Tape compartment door open for necessary servicing. Note lamp raised above top of cabinet for easy changing.

Fig. 5. Sliding "wood terrazzo" panel covers phono compartment when desired, and when slid aside turns on light.

manner of changing the 12-in. 40-watt Lumiline lamp is by way of a socket bar sliding in a vertical track with a spring tension on the cabling so that it does not foul the Flexdoor while it is in the working position. The socket bar is topped by a disk which rests flush with the top of the cabinet (see *Figs.* 3 and 4). The cabling from the deck goes through a roller equipped opening in the cabinet back, (*Fig.* 4), through the wall and down to a similar opening leading to the main cabinet and then plugged into the tape preamp. An ample opening is provided at the bottom of the transport cabinet with a corresponding one of perforated metal installed flush at the top.

Formica was the material chosen as the covering of the main cabinet—white on front and the remainder coral. The panel is set back 1 in. by the use of a return of that dimension. This cuts down on the possibility of the control knobs being brushed against accidentally thereby throwing them out of adjustment.

In order to expose the turntable, a sliding panel of "wood terrazzo" slides to the left and at the extreme open position turns on a shielded tubular light inside the turntable cavity, (*Figs.* 2 and 5). The lamp is in a swivel-mounted socket which swings out to simplify replacement. The far end of the lamp is held in position by a spring-loaded clip fastened to the inside of the cavity.

The wood-terrazzo panel, the bottom of which is completely lined with felt, maintains its alignment through the design of the front aluminum moulding which grasps the return at the front and a bearing-surface-equipped channel at the rear of the top of the cabinet. The panel acts also as a switch similar to the Flexdoor on the transport enclosure so that the turntable may be run with the light off.

To do any kind of maintenance on the components within this enclosure, the entire top is removed. A special slide latch is located inside at the turntable end of the enclosure. By releasing this latch and lifting and pulling slightly on the cabinet top an interlock at the other end is disengaged and the entire piece can be removed and hung on the door, (*Fig.* 6), out of the way leaving the interior with all the components completely accessible.

Power coming into the unit goes first through a main circuit breaker, then to a concealed main power switch located

(*Continued on page 53*)

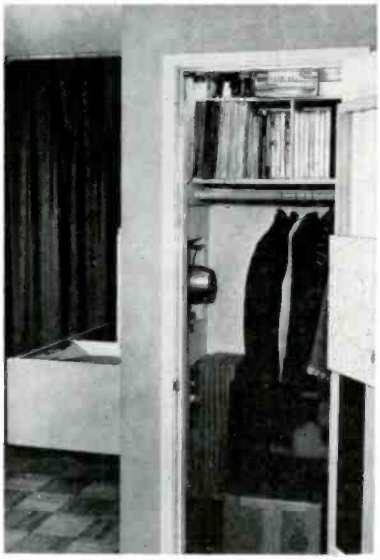


Fig. 6. Simplifying maintenance, the entire top panel may be removed to provide access to all components. Hanging it on interior of closet door avoids damage and keeps it out of the way.

The Tape Guide

More About Tape Heads

Tape recorder performance depends very largely on the quality of the heads. Understanding their functioning and the factors which affect their performance will aid in selecting a recorder.

HERMAN BURSTEIN*

IN AN EARLIER ARTICLE in this series—"How Many Heads for the Tape Recorder?"—tape heads were discussed principally in terms of their functions, relating to the advantages and disadvantages of using separate heads for record and playback or of using a single head for both purposes. In the present article, at the risk of a slight amount of repetition, we should like to go deeper into the subject of how the heads operate. It may be pointed out that while a good deal has appeared in the popular electronics literature to explain the operation of phonograph cartridges, comparatively little has been said about their important counterpart, tape heads. Yet a basic understanding of the playback head, as well as of the record and erase heads, can prove of substantial value to the audiofan concerned with the purchase of a tape machine, with replacing heads, with maintenance, or with simple repairs.

In most home machines the same head is used for both recording and playback. However, to facilitate discussion, we shall speak of record and playback heads as separate units.

* *280 Twin Lane E., Wantagh, N. Y.*

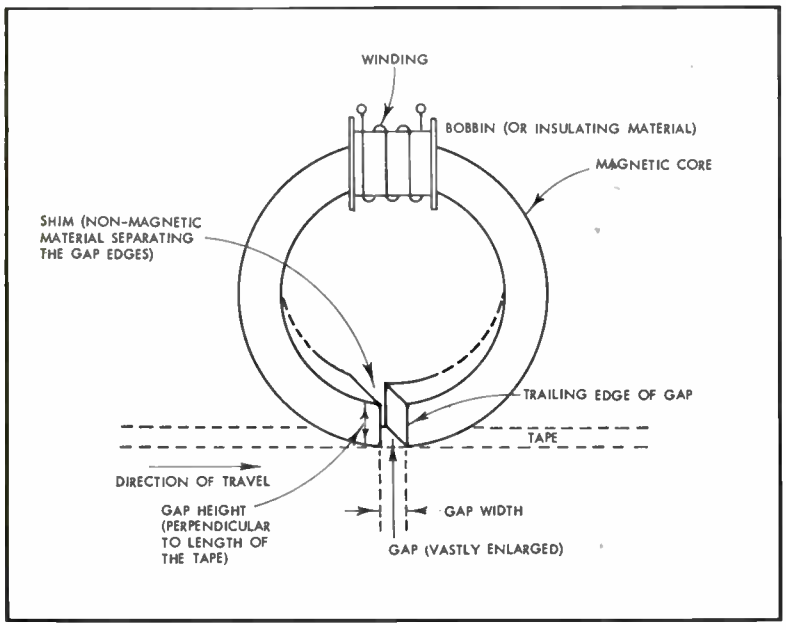


Fig. 1. Basic structure of the tape head.

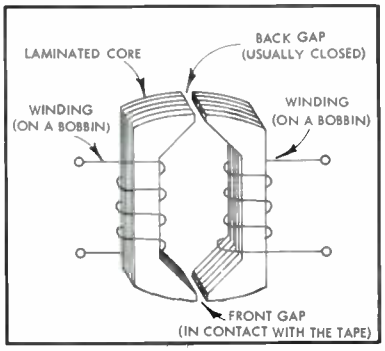


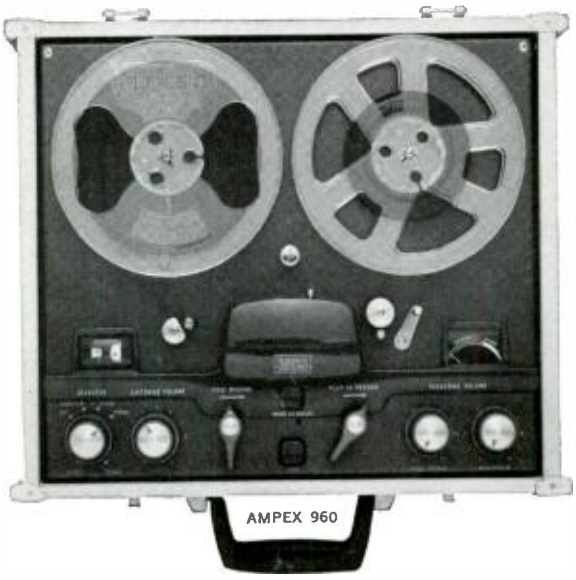
Fig. 2. Construction of a laminated tape head.

Structure of the Heads

Record, playback, and erase heads all have three basic elements, shown in *Fig.* 1: a core of magnetic material, a gap in the core, and a winding around the core. The head is enclosed in a protective housing made partly of magnetic material to prevent the coil from picking up hum from external sources such as motors and transformers.

The tape and the head make contact at the gap. In the case of the record and erase heads, a magnetic field passing through the core enters the tape at the gap and either causes a signal to be recorded on the tape or erases a previously existing signal. In the case of the playback head, a magnetic field on the tape enters the core through the gap.

Cores are sometimes laminated, as in *Fig.* 2, and sometimes non-laminated, as in *Fig.* 3. The better, and usually more



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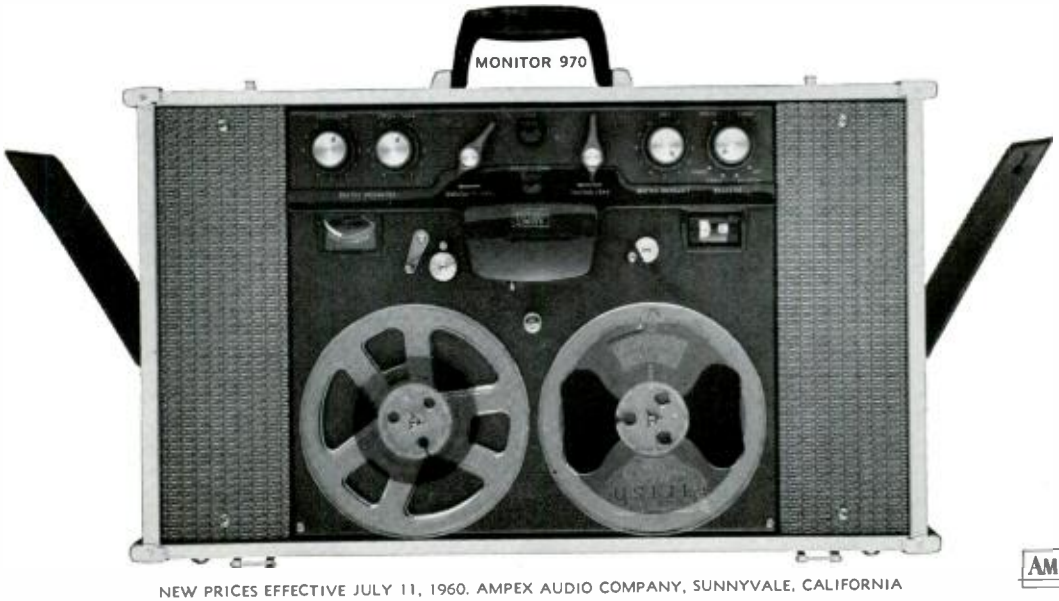

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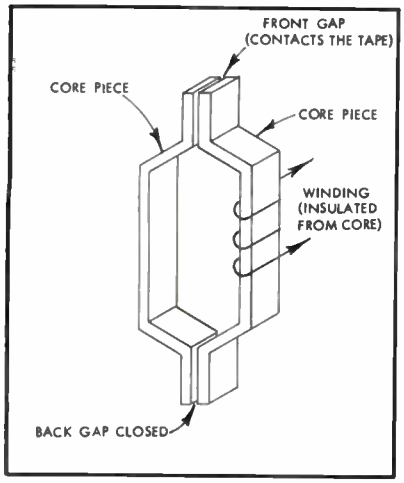

Fig. 3. Construction of a non-laminated tape head.

expensive, heads are generally laminated and have more signal output because they contain a greater volume of magnetic material. The laminations reduce certain magnetic losses (eddy-current losses), which can produce an appreciable drop in treble response.

For maximum efficiency and to cancel hum, most heads employ two windings, one on either side of the gap, as in *Fig.* 2. In a playback (or record-playback) head the windings are connected in series for maximum voltage, output, which is the important thing in playback in order to keep the signal level well above the noise and hum produced by the tape playback amplifier. In the case of record and erase heads, however, the windings are usually connected in parallel, because maximum current-carrying ability then becomes the important consideration in achieving efficient operation. This is the kind of thing to keep in mind if one is replacing a head and has the option of wiring the windings in series or parallel. *Figure* 4 illustrates the series connection, and *Fig.* 5 the parallel one.

The playback head should have a large

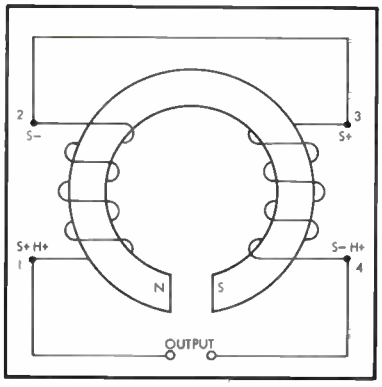

Fig. 4. Series connection of dual windings.

number of winding turns in order to produce high signal output, which increases with number of turns. The record and erase heads, on the other hand, should have a relatively small number of turns to permit the easy passage of current through the winding. This is one of the conflicts involved in using the same head for recording and playback.

The playback head must have a very narrow gap in order to reproduce the high frequencies. Recording, however, does not require a narrow gap. While successful recording is possible with the extremely fine gaps used for playback, some as narrow as .00009 in., a relatively wider gap, about .0005 in., tends to be optimum. Erasure definitely requires a wide gap, about .0005 to .001 in. Thus the magnetic field emanating from the core can span a substantial portion of the tape and erase effectively.

Operation of the Record Head

Figure 6 illustrates what happens when audio current is fed to the wind-

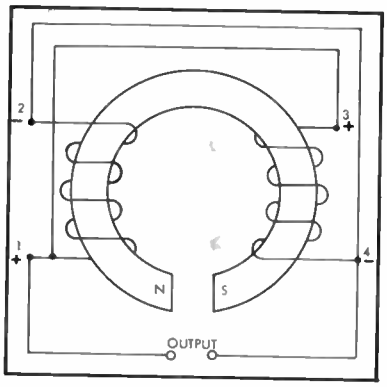

Fig. 5. Parallel connection of dual windings.

ing of the record head. This current produces a magnetic field in the core. Since the tape bridges the gap in the core, the magnetic field flows through the tape, which offers less resistance to this field than does the gap. The tape becomes magnetized in accordance with the variations of audio current. This magnetization continues until the instant the tape leaves the trailing edge of the gap (see *Fig.* 1); the magnetization remaining on the tape corresponds to the tape's magnetic condition at this instant. For optimum results, the trailing edge must be as straight and sharp as possible. Here is one of the principal differences between mediocre and high-quality heads.

The amount of audio signal that can be fed to a record head before tape distortion becomes excessive—about 3 per cent harmonic distortion—varies among heads of different manufacture. Should

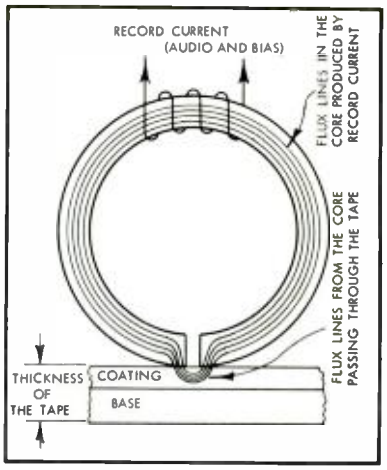

Fig. 6. Operation of the record head.

you substitute a head of a different brand for the one you have now, this factor must be taken into account. The manufacturer of the head can supply information on how much signal may be fed to the head and how this can be measured by the service technician or possibly yourself.

When audio current is fed to the record head, a high-frequency current, called bias, is also fed to the head, as shown in *Fig.* 7. Bias current plays a role analogous to that of a catalytic agent in a chemical process. In the absence of bias current, distortion on the tape would be intolerable and the signal level recorded on the tape would be very low. Up to a point, which ordinarily is not reached at 7.5 ips and lower speeds, the greater the bias current the less is the distortion. It might seem, therefore, that one merely has to crank up the bias current until distortion is at a minimum. Unfortunately, bias current makes the record head behave in the same manner as an erase head, particularly at high frequencies. In short, excessive bias spoils treble response. Therefore bias current must be chosen so as to achieve a satisfactory combination of good treble and low distortion.

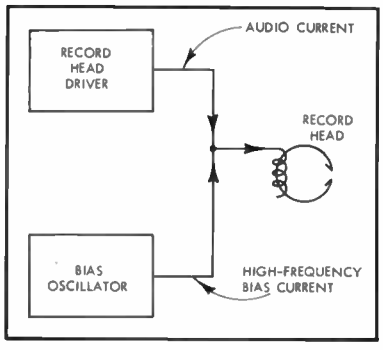

Fig. 7. Supplying audio and bias current to the record head.

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Consider the record you are about to hear. The original recording may very well have been made with a Presto professional tape recorder. It is also likely that the master was made on a Presto disc recorder, using a Presto turntable, a Presto recording lathe and a Presto cutting head. Presto has been serving the recording and broadcast industries for many years, and is the only manufacturer of both—professional tape and disc recording equipment.

It's logical that the people who make the equipment—that puts the quality into the records—are most likely to make equipment that will preserve this quality in playback. Which is probably why there are so many Presto turntables in professional use.

The quality of a modern home music system need be no different from that of a professional studio. The same records are played, and the quality of the amplifier and speaker components can be quite comparable. Bogen-Presto offers you this professional studio quality in the record playback equipment, as well.

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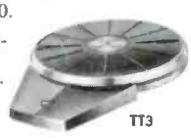

TT3

MODEL TT5 Powered by heavy-duty, recording-type hysteresis-synchronous motor—otherwise identical to TT4. *Less arm,* $129.50.

MODEL TT3 Single speed (33⅓ rpm)—belt-driven by hysteresis-synchronous motor—same turntable material and shaft-bearing design as TT4 and TT5. *Less arm,* $59.95.

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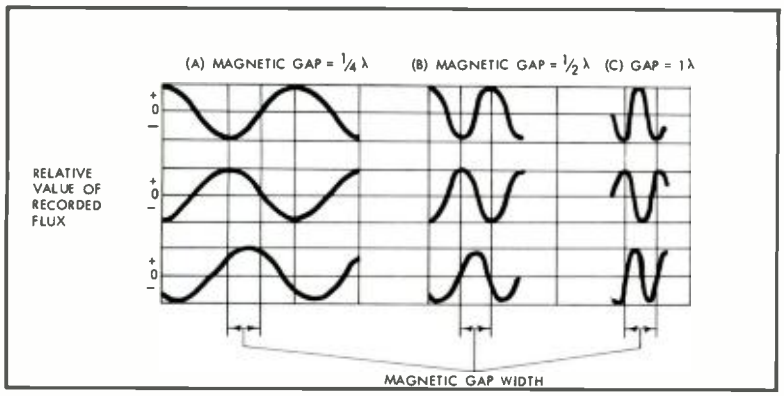

Fig. 10. Magnetic potentials scanned by the gap of a playback head for three wavelengths, (A), (B), and (C), at different phases of the waveform, (1), (2), and (3).

The bias frequency and the harmonics of the audio frequency tend to "clash"—beat is the technical term—resulting in audible noises. To minimize this, the bias frequency should be at least four or five times the highest audio frequencies that the tape machine is capable of recording with moderate losses. Thus if the upper limit is 12,000 cps, the bias frequency should be at least 50,000 to 60,000 cps. Before purchasing a tape recorder, it pays to check what the specifications say about bias frequency.

Operation of the Playback Head

Operation of the playback head is essentially the converse of the record head. The magnetic field on the tape enters one gap edge, flows through the core, and comes out the other edge to re-enter the tape. The field passing through the core induces a voltage in the winding, which is then fed to the playback amplifier.

Assuming that all frequencies are recorded at equal strength on a tape, it is in the nature of a playback head to produce increasing voltage output as frequency rises. As frequency doubles (goes up one octave), head output also doubles (increases 6 db). Hence the rising characteristic of the head is termed a 6-db-per-octave line. The rise continues until treble losses due to gap width take effect. The net result is shown in *Fig. 8*, based on a tape speed of 7.5 ips, a gap width of .00025 in., and the assumption of signals of equal strength on the tape at all frequencies.

Why does head output increase with frequency? A voltage is induced in the winding as the result of a *changing* magnetic field. The greater the number of changes per second, the greater is the induced voltage. The field is that which flows from the tape into the core of the head. This field changes along the tape in correspondence with the audio signal that was recorded. A high-frequency signal entails more changes (cycles) per second, or per inch of tape, than a low-frequency signal. Therefore the variations in magnetic field representing high frequencies induce a greater voltage than do the variations representing low frequencies.

The narrower the gap, the more extended is the treble response of the playback head at any given tape speed. If tape speed is reduced, the gap must be proportionately narrower to maintain treble. Thus at 3.75 ips the gap must be half as wide as at 7.5 ips for equally good performance at the high end. Whereas a head with a gap of .0002 to .00025 in. is considered adequate for reproducing a tape at 7.5 ips, a gap of about .0001 in. is called for at 3.75 ips.

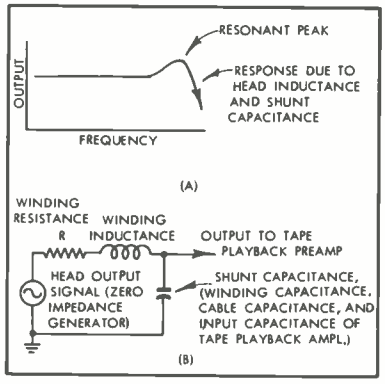

Fig. 11. Effect of shunt capacitance upon playback-head output. A shows frequency response characteristic and (B) is the electrical equivalent circuit of the head.

An approximation to the useful frequency response of a playback head is given by the formula $f = S/2G$, where f is frequency in cps, S is tape speed in ips, and G is gap width stated as a fraction of an inch. Thus at 7.5 ips a gap width of .00025 in., according to this formula, indicates useful response to about 15,000 cps.

The formula allows for the fact that "magnetic" width of the gap tends to be somewhat greater than the physical dimensions of the gap, thereby reducing high-frequency response. The sharper and straighter the edges of the gap, the less is the difference between the magnetic width and the physical width of the gap. In a high-quality head, the magnetic gap will tend to be about 10 per cent greater than the physical width. In a poor head, the difference may be much greater than this. It can be understood, therefore, why it is possible for a good head with a physical gap of .00015 in. to achieve better high-frequency response in playback than a poor one with a gap of, say, .0001 in.

Table 1 shows the approximate upper response limit for the gap widths most commonly encountered, at the tape speeds in common use. An important note of caution is in order here. The table only shows the maximum frequency that a head can *play back*. This does not signify that such a frequency can necessarily be recorded at the indicatetd speeds. There are severe recording losses that impose a limit on treble response; the higher the frequency or the slower the tape speed, the greater is the recording loss. To illustrate, the table shows that at 3.75 ips a modern head with a .00009 in. gap permits response to about 21,000 cps. However, high-frequency losses in recording are so great at this speed as to prevent such extended response in the present state of the art. (On the other hand, continued progress in the audio art may permit recording to 20,000 cps at 3.75 ips in a few years.)

Why does successful reproduction of the high frequencies require a narrow gap? To provide the basis for the answer, let us consider *Fig. 9*, which shows that when a sine wave is recorded on tape, this is equivalent to arranging the magnetic coating into a series of bar magnets. Each bar corresponds to half of a sine wave, and it has a north pole and a south pole. When a low frequency is recorded, comparatively few bar magnets are recorded on each inch of tape. When a high frequency is recorded, many bar magnets are recorded in the same space; or, to put it differently, the magnets become shorter. In technical terms, the recorded wavelength is long at low frequencies and short at high frequencies.

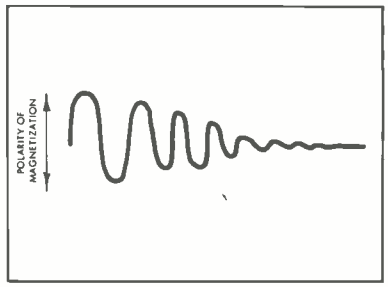

Fig. 12. Magnetization experienced by a tape particle during the erase process.

Figure 9 shows the gap of the playback head in contact with the equivalent

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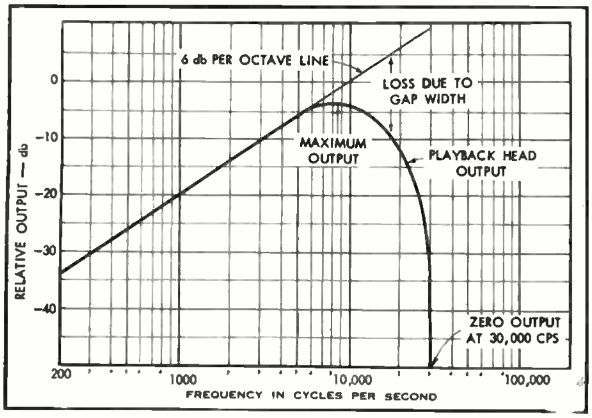

Fig. 8. Theoretical output of a playback head with a .00025-in. gap at 7.5 ips.

bar magnets on the tape. As the succession of magnets go by the head, they present a changing magnetic field, which induces a voltage in the winding of the head. However, it is not enough that there be a changing magnetic field. It is also necessary that there be a difference in the magnetic intensity of the field at each edge of the gap. As shown, one edge of the gap is half-way between the north and south poles of the first bar magnet, whereas the other edge is nearer to the south pole. Hence there is a difference in magnetic intensity, called a magnetic potential.

If frequency increases sufficiently, meaning if the recorded wavelength grows short enough, a magnetic potential will no longer be presented to the gap. This happens when the (magnetic) gap width becomes equal to one wavelength. When there is no magnetic potential across the gap, the head produces no signal output. Output of the playback head falls very rapidly as gap width approaches one wavelength.

This can be clarified with the aid of *Fig.* 10. This shows the relationship of the gap width to three successively higher recorded frequencies; i.e., to three successive-shorter wavelengths. In (A), the gap is equal to ¼ wavelength; in (B), to ½ wavelength; in (C), to 1 wavelength. It may be seen in (A) and (B) that a magnetic potential will appear across the gap of the playback as various portions of waveform pass the gap. In (C), however, no matter where the gap is in relation to the waveform, both edges of the gap are always at the same stage of the waveform, so that a magnetic potential never develops across the gap. Hence the head delivers no signal.

The narrower the gap, the higher is the frequency at which the gap approaches one wavelength. Therefore the point at which response begins to fall off is moved upward in the frequency range.

Record-playback heads and, particularly, heads intended only for playback have a large number of turns in order to maximize signal output. This raises a problem of treble losses due to capacitance across the head, such as the capacitance added by the cable from the head to the playback amplifier, and the input capacitance of the amplifier. Moreover, the winding itself has capacitance, namely that between turns of the coil; the more turns, the greater is the winding capacitance. As shown at (B) in *Fig.* 11, the inductance of the playback head and the total shunt capacitance (of the winding, the cable between the head and the playback amplifier, and the amplifier) form a low-pass filter, producing a decline in treble response beyond the resonant frequency determined by the values of the winding inductance and of the shunt capacitance. The greater the winding inductance, which increases with turns, and the greater the shunt capacitance, the lower is the frequency at which the treble drop begins. This frequency can occur within the audio range. To minimize the danger of substantial treble loss, the cable from the head to the tape amplifier should be of minimum length and minimum capacitance per foot.

On the other hand, the resonant peak produced by the head inductance and shunt capacitance, shown at (A) in *Fig.* 11, can be put to work to *improve* treble response. This is done by adjusting the shunt capacitance so that the peak occurs at a suitable point, say at about 14,000 or 15,000 cps. Thereby response is given a lift at the top end of the useful audio range, with the fall-off occurring beyond 15,000 caps, where it does little or no harm. For the purpose of so adjusting the shunt capacitance, manufacturers of tape machines sometimes place a capacitor of proper value across the tape playback head.

Operation of the Erase Head

The erase head is powered by a high-frequency current, generally obtained from the same oscillator that supplies bias current to the record head. *Figure* 12 illustrates what happens to a given particle of tape in the erasing process. At first the particle is heavily magnetized in a given "direction"—say, with its north pole on the right. This destroys

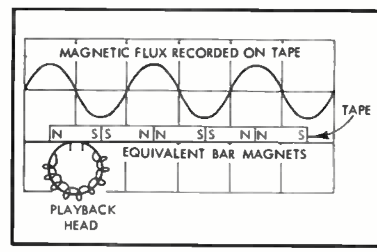

Fig. 9. Equivalent bar magnets produced by a sine wave recorded on tape.

any previously existing magnetic pattern on the tape. A brief instant later, the particle is magnetized in the opposite direction, with its north pole to the left. These alternate magnetizations grow weaker and weaker is the particle recedes from the head, until the magnetization reaches zero or very close to zero.

Since the erase head is powered by the same oscillator that supplies bias to the record head, the frequency of the erase current is typically between 30,000 and 100,000 cps. Erasure tends to be less effective at the higher frequencies. Therefore it would be desirable to use a low erase frequency, for example 30,000 cps. But this conflicts with, and must give way to, the desirability of a high bias frequency for recording purposes, namely to avoid audible beats between the bias frequency and the upper harmonies of the audio signals. Consequently the erase frequency tends to be upward of 50,000 cps.

A few of the least expensive home machines employ a permanent magnet instead of the electromagnetic type of erase head just described. The basic principle of operation is the same. A series of two or three magnets, in one housing, alternately differ in magnetic polarity. They subject the tape to a changing magnetic field, and one that gradually decreases in strength, as the tape moves past and

(*Continued on page 57*)

TABLE 1

APPROXIMATE TREBLE RESPONSE LIMITS FOR VARIOUS GAP WIDTHS AT TAPE SPEEDS IN COMMON USE

SPEED ips	GAP WIDTH					
	.0005	.000[illegible]5	00020	.000[illegible]	.00[illegible]0[illegible]	[illegible]
15	15,000	30,000	37,500	50,000	83,000	cps
7.5	7,500	15,000	18,750	25,000	41,700	cps
3.75	3,750	7,500	9,375	12,500	20,800	cps
1.875	1,875	3,750	4,700	6,250	10,400	cps

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Output Impedance : 200 ohms balanced
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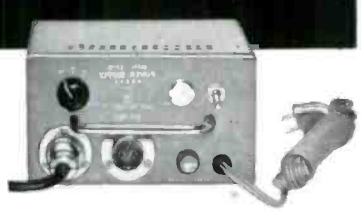

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- Can be held, used as lavalier, or concealed
- Flexible, detachable antenna
- No FCC license is required

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- Squelch circuit for elimination of interference
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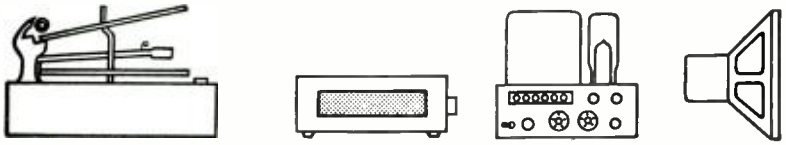

DYNAKIT PAS-2 STEREO PREAMPLIFIER

Many of the readers of these columns are intensely interested in various types of kits for several reasons. Primarily, it is possible to save an appreciable amount of money by assembling a kit rather than purchasing a factory-built model. But in addition to that there are several other reasons —some of them are important to one group of hobbyists and others are important to another group. For instance, it is possible for the kit builder to plan in advance for the specific applications he demands of his installation (of which, more later), and he may make certain modifications in the physical layout to enable the completed unit to fit into his decor more suitably.

A high degree of engineering must go into a kit to make it almost impossible for the novice to build a unit which does not perform according to the specifications. This *must* apply to any kit that stays on the market for any length of time, for if the constructor spends his money for the kit and his time in putting it together, it had better work or someone is going to hear about it.

The Dynakit Stereo Preamplifier, Model PAS-2, is housed in a vinyl-covered steel case 4 in. high, 13 in. wide, and 8 in. deep, and provides practically any control facility required. There are four slide switches and eight knobs on the panel, as seen in Fig. 1. The left knob is the input selector, with positions for phono, tape head, "special," FM-AM, FM-multiplex, and spare. The next knob is the volume-loudness control, with a slide switch below it which cuts in the compensation when desired. The two center knobs control the mode of operation, with the upper one combining the usual mono-stereo switching with a blend control in an unusual manner, and the lower serving as a conventional balance control. The switch has three stereo positions, marked with a long rectangle, a medium rectangle, and a short rectangle respectively, and three mono positions. The rectangles indicate the size of the "stereo stage," with the smaller rectangles indicating a narrower source which is done by feeding graduated amounts of signal from the opposite channel. The next two knobs are tone controls for the left channel, while the last two control the tone in the right channel. From left to right the four slide switches control tape monitor, loudness compensation, scratch filter, and power.

On the back panel there are nine phono jacks for each channel: three are for low-level inputs from phono, tape head, and "special," four are high-level inputs from FM-AM, FM-multiplex, spare, and tape amplifier; and the remaining jacks provide tape feed and audio outputs. Four a.c. receptacles are provided, two being switched from the power switch on the front panel, and two remaining "hot" all the time.

The "special" input deserves some mention. This jack may be wired to serve on a second phono input, thus making it convenient to use for both turntable and changer, in conjunction with the normal phono jack. It may be wired as a flat preamp to accommodate a dynamic or velocity microphone, or it may be used as a separate mono input to the two channels individually, using the mode switch to mix them together. Other functions can be accommodated by making suitable connections or by adding the required equalization.

The unit has a self-contained power supply which provides well filtered d.c. for the plate circuits as well as 24 volts d.c. for the heaters. The circuit uses a similar arrangement to that employed in the mono preamp kit.

The two amplifier channels are essentially identical, and each consists of a 12AX7 as a preamp stage which employs feedback from the plate of the second section to the cathode of the first for equalization. The outputs are fed back to the selector switch, and the chosen input is fed through the tape monitor switch to the mode switch, thence to the balance control and to the ganged volume-loudness control, with the arm of the volume control feeding the grid of one section of the second 12AX7, and its plate, in turn, feeds the grid of the final 12AX7 section through the scratch filter. The output of this last tube section is fed through the tone-control network to the output jack. Tone control is effected by a feedback network from the output plate to the cathode of the first section.

Performance

This unit is exceptionally quiet in operation, and the kit we constructed—about an eight-hour job, it happens—measured completely in accordance with the specifications. With the volume control set for a 1-volt output and a phono input of 10 mv, hum and noise measured 74 db below 1 volt; with the volume control wide open—which would give a 1-volt output for a 1.1-mv input—the hum and noise was 60 db below 1 volt, which is exceptionally good. On high-level inputs, regardless of the volume-control setting, the noise figure of 74 db below 1 volt was also obtained. We had previously wired the "special" input to accommodate a microphone, and for a 1-volt output the mike input was measured at 1.3 mv; for the same output from tape head, the input was 1.9 mv. At a 1-volt audio output, the tape-feed output measured 0.12 volts, and on the high-level inputs a signal of 0.121 volts gave the reference output signal.

At 5 volts output, the harmonic distortion measured 0.13 per cent at 50, 100, and 1000 cps, and 0.11 per cent at 5000 and 10,000 cps. The test oscillator distortion was 0.12 at 50 cps, 0.11 at 100, .07 at 1000, .04 at 5000, and .06 at 10,000 cps, so it is obvious that most of the measured distortion came from the source signal.

Phono equalization was within ± 1 db from RIAA throughout the range, and tape-head equalization fitted the NAB curve for 7½ ips within 2 db throughout. The tone controls provided equalizations of +16 and −14 db at 50 cps and +10 and −13 db at 10,000 cps respectively. Crosstalk between channels measured −56 db at 1000 cps with an output of 1 volt on one channel; with the "blend" control in the mid position the channel separation was 25 db, and in the narrow position the separation measured 16 db.

The kit builds very easily since most of the difficult work is already done in the form of two printed-circuit panels which come with all the parts mounted and soldered in place. The instructions are simple and thoroughly adequate, and anyone should be able to do a creditable job in a reasonably short time.

In listening quality the unit is excellent, the control tapers provide smooth operation, and it may be said to be completely humless. Its neatness and compactness will make the PAS-2 fit easily into almost any decor. G-24

Fig. 1. Dynakit stereo preamplifier, Model PAS-2.

This is a real breakthrough — a weatherproof speaker that brings you fine quality, realistic, full-range music outdoors! Nothing like it has ever been offered to the public!

When you hear the Bozak M-108 you'll be amazed by the clean, true bass, the smooth midrange, and the singing highs — all from a single 8-inch cone-type speaker. Transient response is extraordinarily good. Much research and work have gone into this unit, in order to give its sound the carrying characteristic needed for outdoors, and yet keep it thoroughly pleasing and satisfying to the musically trained ear.

You'll be further pleased by the simple installation requirements. Large volume enclosure is not needed. The speaker works beautifully from a bookshelf-size box or mounted on a plywood panel. The profile is shallow to permit mounting the speaker in a wall, between studding. The entire unit, cone and all, is fully weatherproof. You can install it practically anywhere; an endless variety of exciting outdoor sound possibilities are available to you.

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Fig. 2. Transis-Tranics' new all-transistar power amplifier—25 watts in each channel and a twa-year guarantee.

TRANSISTORIZED STEREO AMPLIFIER, MODEL TEC-25

The first all-transistor amplifier that we have had the opportunity of testing and observing in action is the new TEC-25 by Transis-Tronics, Inc., and after testing a number of conventional amplifiers of high power, we are inclined to say that the summer is the time for transistor units—they do not give off a few hundred watts of heat. The TEC-25 employs transistors for every amplifier function and solid-state (in this case, silicon) rectifier when operating from the a.c. line.

Handsome in appearance, the TEC-25 employs five 2N321's, one 2N1136, and two 2N1136A's in each channel to provide an output of 25 watts steady-state, and 34 watts of music-power output. One of its greatest advantages is the complete lack of heat from the unit under normal operating conditions—we left it on for 48 hours and it remained at room temperature. Of course, if a maximum signal had been applied to it for that time, there would have been some heat from the output stage, but a steady 25-watt output is rarely called for in any hi-fi installation.

Circuitry

From the very nature of transistor circuitry, it is fairly normal practice to employ the entire amplifier for every function, attenuating the high-level signals at the input so that all levels at the first transistor are approximately the same. In the TEC-25, the selector switch provides for a wide variety of combinations of the sixteen inputs. Switch positions are provided for TV-TV, AM-AM, AM-FM, FM-FM, phono 1, phono 2, tape head, microphone, and "aux." The function switch follows, and provides for stereo, stereo reverse, mono A, mono B, and mono A + B. The output of the function switch feeds through the rumble filter to the first transistor which is direct coupled to the second, both being 2N321's. The various equalizations are provided by a feedback network from the collector of the second transistor to the emitter circuit of the first. Passing through the tone-control network, the signal next reaches the base of the third 2N321 where it is again amplified and fed to the volume-loudness control, with the contour switch adding compensation to the control in the loudness position. The arm of the volume control feeds the next 2N321 through a receptacle which permits the use of a remote volume control to provide for adjustment of volume and balance from a listening position. A series pot in the circuit permits level adjustment from the rear panel so as to compensate for different loudspeaker efficiencies. The fourth 2N321 is direct coupled to the fifth, which in turn feeds the 2N1136 driver, and it is transformer coupled to a pair of 2N1136A's in the output stage. Load matching is provided by an auto transformer or tapped inductance connected between the emitters of the two output transistors, and provide for load impedances of 4, 8, and 16 ohms. A phase switch interchanges the connections of the output stage emitters in the "A" channel only.

The tone control circuit is a version of the desirable Baxandall arrangement which performs the required shaping of the curves by the use of an appreciable amount of feedback. A balance control is provided in the circuit just ahead of the volume controls, and consists of a potentiometer with the ends connected to the "tops" of the two volume controls and the center (A) grounded. It is somewhat disconcerting to see circuits which are similar in appearance yet so different in operation from the conventional vacuum-tube circuits with which most of us are far more familiar. But since transistors are current-actuated devices, we must learn a new mode of circuit. For instance, it seems odd that the tone controls are 50,000-ohm pots, when we are so used to components of ten to twenty times that value. In the power supply filter, there are 8000 μf of capacitors at the input, followed by a 1-ohm filter resistor and 4000 μf at the point where the driver transistor is fed.

The a.c. power supply employs a full-wave rectifier operating from a center-tapped transformer secondary. When desired, the amplifier may be operated from 12 to 18 volts of battery, making it possible to take your amplifier to the summer camp or the beach if desired, operating it from your car battery. The amplifier is very efficient, and when we made the measurements of power consumption we took time out to check the calibration of the a.c. wattmeter. We read 70 watts with both channels operating at rated power output and could hardly believe it. The usual a.c. power consumption for a 25-25 stereo amplifier is more likely to be in the vicinity of 250 watts, and of course most of this is radiated into the room as heat, which is why we expressed a preference for transistorized amplifiers in the summertime. A power consumption of 250 watts from a 12-volt battery—assuming 100 per cent efficiency from the converter to get the 117-volt a.c.—would be something over 20 amperes, and few car batteries will stand that for very long. The TEC-25 draws less than 20 watts at outputs ranging from 1 to 5 watts, and this is less than 2 amperes at 12 volts—which any car battery can stand for several hours under normal conditions. At least it does give some idea of transistor efficiency, even though you may not want to take the amplifier out to the beach. For public address work from a car it would be ideal, but of course Transis-Tronics, Inc. makes amplifiers for just this purpose. It would be very easy, however, to stage a street dance with a TEC-25, two loudspeakers, and a pocket transistor portable radio if you are in receiving distance from any of the popular-music stations.

Performance

A thorough check of the performance brought out some interesting figures. As to phono equalization, the curves follow the RIAA standard within ±1.5 db from 30 to 15,000 cps, and a 1-watt output is obtained from a phono signal of 1.22 mv. With the volume control set for a 10-mv signal and an output of 1 watt, the hum and noise measured 63 db *below 1 watt*, which is more commonly stated as 77 db (approximately) below rated output—exceptionally good on the phono input. A signal of 0.23 mv at the tape-head jack gave the 1-watt reference output, with the same noise level measured when the volume control was set for a 2-mv input signal. At the microphone jack, an input signal of 3.6 mv gave the reference output, and at the high level inputs an input of 0.83 volts gave the same 1-watt output.

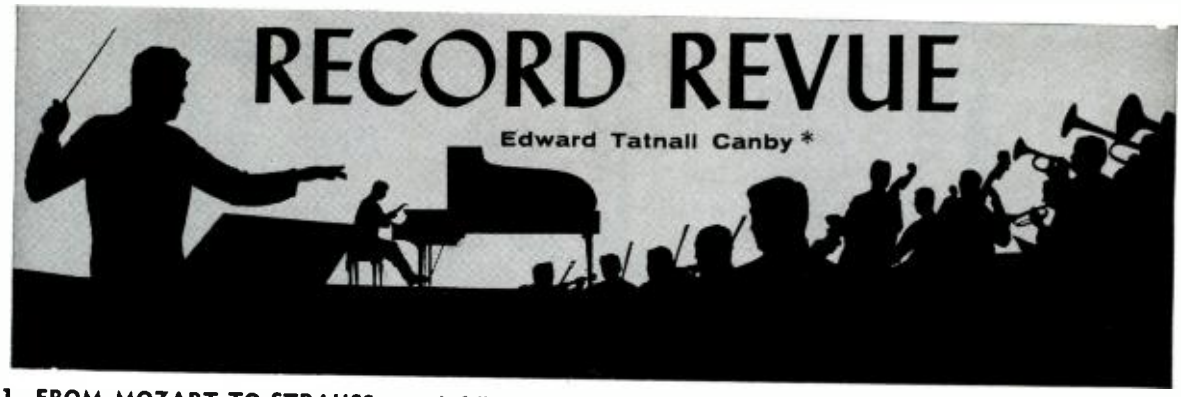
The tone controls gave a range from +15 to −15 db at 100 cps and from +15 to −15 db at 10,000 cps. With the volume control set at 30 db down from maximum, the compensation curves showed a boost of 7.2 db at 100 cps and a boost of 7.9 db at 10,000 cps. Crosstalk between the two channels measured −44 db at 1000 cps when one channel was putting out the rated 25 watts; at 10,000 cps it was −32 db, and at 100 it was −38 db—due, we presume, to coupling through the filter capacitors at the lower frequency, and to stray capacitances in the wiring at the higher tone.

At 25 watts output, harmonic distortion measured 0.72 per cent at 1000 cps, with the figure dropping to 0.53 per cent at 2 watts output. Intermodulation distortion measured 0.98 per cent at 25 watts, 0.65 per cent at 2 watts.

Among the other features of the TEC-25 are the provision for a A + B output at a point ahead of the tone controls, which is where the tape outputs are connected. A shorting plug in the remote-control receptacle permits normal operation without this facility when it is not considered necessary or desirable. The unit is equipped with three a.c. receptacles for additional equipment, and all are switched. When the amplifier is to be used with battery supply, the same power switch controls the battery. The a.c. input is fused at 1 ampere, while the convenience receptacles are fused at 3 amperes.

The unit is a handsome piece of equipment with black and satin aluminum panel, aluminum knobs, black perforated cover, and walnut end pieces. Because of the low heat given off, it would be perfectly possible to use an FM tuner right on top of the amplifier—a practice that usually causes a lot of drift. There is no noticeable difference in quality between the sound from the TEC-25 and any other high-quality amplifier—if you were not told you would never know any difference at all unless you noticed that it was exceptionally "clean." It finally appears that this transistorized amplifier, at least, has finally "made the grade."

It puts out in excess of 20 watts at 20 cps, and sounds good at both extremes of the spectrum as well as in the easy-to-get midrange. It is a delight to use, and the advantages of transistors are clearly shown with this instrument. G-25



1. FROM MOZART TO STRAUSS

Mozart, Piano Concerti in B Flat, K, 456, B Flat, K. 595. Ingrid Haebler; Vienna Symphony, C. von Dohnanyi.

Epic BC 1075 stereo

Epic has picked up in Ingrid Haebler one of the very finest Mozart pianists to appear in years—a splendid addition to the music of another and older great lady of Mozart pianism on Epic, Clara Haskil. It's odd that Mozart seems, in our time at least, to be especially suited to the woman pianist. Perhaps the Steinway Grand has led our menfolk into too much high-sounding Chopin and Rachmaninoff, where superior muscle and endurance count strongly. Just as most women drivers don't feel they must race every traffic light, so, too, the woman Mozart pianists are able to take him for size, without physically belittling the small sound or blowing it up to coarseness.

A nice theory, anyhow, but there is no doubt of the fact of Haebler's exquisitely shaped and utterly intelligent playing. Every run, every decorative passage, is as perfectly laid out as the proverbial row of pearls—and the analogy is good, too, since it is the marvelously even shaping of minute gradations of piano tone that make this superb sound possible.

The general impression of these two works is a bit on the restrained side. With Haebler, it is merely a complete musical understanding and control that does not need flamboyance for expression; in the orchestral accompaniment there is a slight chasteness and rigidity that might, perhaps, be the conductor's lack. Her music has more life in it than his.

Mozart: String Quartet in B Flat, K. 458 ("The Hunt"). Haydn: Quartet in D, Op. 76, No. 5. The Claremont String Quartet.

American Society SAS 1005 stereo

This new label is fully titled "American Society Concerts-in-the-Home" and it is produced by Arthur Shimkin Enterprises, Inc., for Bell Records, Inc., recorded by Bouree Productions . . . a typically complex kettle of fish, if you ask me. Forget it, and note that the proof of this fish-pudding is in the eating, which is darned good.

The Claremont Quartet dates from 1954 and was, we are told, acclaimed by the unanimous verdict of press and public. So is every other organization that gets promoted, these days, but this one *is* good—tops.

The Claremont Haydn is about as beautifully played as any Haydn quartet music I can think of, bar none. The Mozart is near-tops, too; my favorite of all Mozart Quartets is given a careful musical styling, as well shaped and as knowing as that of the incomparable Budapest. Only a greater sense of urgency, a deeper intensity of awareness, makes the Budapest's performance, over the years, a bigger one. This Mozart is a bit on the Haydn side, low in tension where there might be higher intensity. But it's lovely, even so.

Bouree's stereo of this string quartet is wonderfully successful in a tricky area—for you must achieve stereo presence and roundness, a sense of individual placement, yet without lining up your four men in an imaginary straight line. Too much stereo separation and that's what you get. Too little separation and your recording is no better than mono.

Why *not* in a straight line? Because at this stage in our musical tradition it just seems crazy—quartets don't play that way. We must still, most of us, visualize the quartet as seated in the usual practical positions, first fiddle left front, cello left rear . . . though for a record collector who has never seen a quartet in action the visualization is purely arbitrary and a straight-line image is just as acceptable. (A quartet doesn't play that way because the players must be able to see each other, hear each other and turn each other's pages at many crucial moments.)

Anyhow, for the present I'd place Bouree's quartet stereo at the top in effectiveness, and I put the Claremont Quartet right into the upper echelons, on the basis of this record.

This is one of a set of recordings casually being called the Picasso series, because the covers are reproductions of Picasso drawing minus any lettering—you have to look at the back to find out what's inside. An odd idea and very nice for art lovers. Buy your Picasso here, and just throw out the record if you don't enjoy music.

Haydn: String Quartets in C Minor, G Minor, Op. 74, Nos. 1 and 3. Amadeus Quartet.

Deutsche Grammophon 138072 stereo

In direct comparison with the Claremont Quartet Haydn (above), this Haydn from the better known Amadeus Quartet is oddly more formal and just a trace on the academic side. The difference is not really qualitative—if I enjoy the new Claremont players, the Amadeus has just as much to offer. Theirs, however, has a higher tension and involvement in the music than Claremont's. They are a trace grimmer in the serious moments, more explosive in the light finale music (which is full of meaning and shape, light or no).

Somehow, the Amadeus group plays more obviously in a "quartetty" manner, so to speak. You are more aware of the quartetness of the music than in the Claremont recording. Most musical instruments have their professionalisms of this sort—harpists who sound harpy, flutists who are almost ostentatiously flute experts, fiddlers whose violin sounds very violinistic. It isn't really objectionable, and yet it can sometimes be mildly annoying to those who are neutral as to their feelings about various instruments' special styles and traditions. That's all. The Amadeus sounds like a quartet working extremely hard to be a very fine quartet—which it undoubtedly is in the highest professional sense. The Claremont players sound like four good string men playing the music of Haydn, rather genially and at low tension.

The Amadeus recording is at a greater distance and in a larger space than the Claremont—undoubtedly, the Amadeus sound is picked up by one of the European single-position stereo mike techniques (two mikes built into one housing), whereas the Claremont is without a doubt miked in the American style, via two separate mikes spaced apart. The Amadeus is a bit on the colorless side as sound, somewhat dull and slightly over-blurred (for my American ear). The Claremont sound is sharper, the instruments at closer range and with a slightly exaggerated distinctness.

Interesting comparison, on various counts.

Mozart: Clarinet Quintet, K. 581; Eine Kleine Nachtmusik. David Oppenheim, clarinet; Budapest Quartet, Julius Levine, bass.

Columbia MS 6127 stereo

Columbia coyly identifies Mr. Oppenheim as "no stranger to the Budapest recording sessions, for he participated in them during the 1950's". He certainly did, as a top Columbia recording executive, though he is now elsewhere, a TV producer. He was a clarinetist before he began supervising Columbia's recordings; if I am right, he once recorded a Bernstein Clarinet Sonata (not for Columbia) with the great Lenny himself at the piano.

He is a good clarinetist of the modern sort, not particularly elegant and not at all mystical, as was once the classical clarinet manner. His sense for the music is good but his control is less than ideal; the tone is relatively earthy and a bit nasal, smacking just a trace of jazz sound—higher notes that are brittle and glassy, low notes that take on a vaguely frog-like quality. Not the sound Mozart once got, but it is increasingly common today and it does no great damage to the Mozart Clarinet conception, unless you are a very pure purist.

The quartet give him superb support in a close and warm microphoning; the clarinet is off in space, somewhat detached, the way a French horn sounds in ensemble. Impressive, and it smooths out the tone.

Mozart's familiar little "Night Music" seems always to be falling between musical stools, on records. There are the heavily orchestral versions—the standard way of playing the music until recently—and they come through with good effect, if not they are not exactly authentic to the original. There are the chamber orchestra versions and those, as here, which use five solo instruments, one to a part. Mozart didn't bother to specify what might be best for us, in 20th century terms.

The music is clear enough, even so. It is cast in the *divertimento* style of his day—not chamber music, not orchestral either, played freely with groups of various size according to need. It was a common style then, though it falls betwixt and between for us. The small string group is the best bet for recording, but what really matters is the style of the playing itself, and here the Budapest falls down.

If they had done this piece as a straight chamber work, quartet-style, it might have had more conviction. But they knew that it isn't that sort of music—not chamber music at all. And so they have tried a curiously

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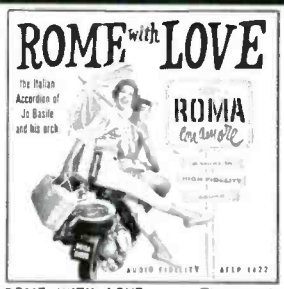

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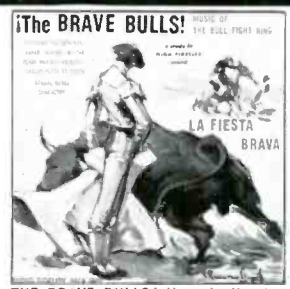

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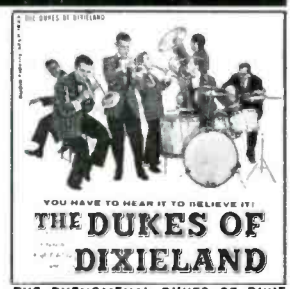

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AFLP 1823/AFSD 5823

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heavy-handed, jabbing sort of approach, as though to give an orchestral impact with solo players. It is far from the easy-going divertimento style which would have been desirable here. For once, the Budapest seems out of its depth. Should have played something else.

Beethoven: Octet in E Flat, Op. 103 (1792). Dvorak: Serenade in D Minor, Op. 44. Marlboro Festival Octet, Woodwind Ensemble, Marcel and Louis Moyse.
Columbia MS 6116 stereo

This one is another product of Rudolph Serkin's dynamic little summer school and festival in Vermont, played by the resident musicians under a pair of the master performers who are on hand. An earlier disc featured Mozart, with Serkin himself and Alexander Schneider conducting (ML 5209).

The Dvorak Serenade is, in spite of its casual title, one of the very finest of all his works, notably the inner movements, a passionate and moving andante (con moto) and a wry, bitter-sweet minuet. This performance is a curious one. The players are tremendously fluent, the ensemble is impeccable and the whole is highly musical—but there is the oddest indefinable sense of a master-class, a group of very advanced students, playing smartly at attention before the maestro who conducts. The high-Romantic expression is there, the styling is right, but the emotion is somehow borrowed. It is not the work of conviction, out of personal experience—or so it sounds to me, anyhow.

The Beethoven, a youthful novelty, fares better in its less deviously emotional content. Excellent.

Schubert: Symphonies Nos. 3 and 5. Royal Philharmonic, Beecham.
Capitol SG 7212 stereo

Periodically, Sir Thomas Beecham does up one or two of the Schubert little symphonies—the First through the Sixth—in his special and admirable manner, tailored with extraordinary exactitude down to the tiniest details of phrasing and expression. The music has a sound that is on the large side for these very-small-scale works, but that is the customary sound of Sir Thomas' conductorial generation. Recording technique gives the clarity of a smaller orchestra.

So much richness of detail is brought out in the Beecham Schubert that the tempi are apt to be on the slow side. But, done his way, the music requires it; other, more careless performances can afford to whip along it high-tension speed—not Sir Thomas. The Beecham style is no longer quite stylish, but the interpretations are good enough to last as long as records can be played.

Mendelssohn: Piano Concertos No. 1, No. 2. Philadelphia Orch., Columbia Symphony, Ormandy.
Columbia MS 6128 stereo

If anybody could make sense and impact out of these Mendelssohn works, Serkin could—and does, as far as it is possible in this modern age. His usual dynamic self is very much in evidence in both, to maximum advantage.

In fact the strongest appeal in Mendelssohn's stylized music for us is the nervous tensity that underlies its pat "Victorian" musical clichés, evidence that the man himself was, indeed, a human dynamo who virtually burnt himself out at a quite early age. This authentic aspect of the music is projected convincingly by that modern dynamo, Serkin, where other less discerning pianists make Mendelssohn sound merely glittering.

Even so, most of us will find two piano works by Mendelssohn a bit too much to take in one sitting. The stuff is dreadfully dated; its effects are of the sort that, in our time, are old fashioned to a degree of sheer inanity, yet not well enough aged by time to sound "classic" and therefore precious.

Mendelssohn obviously played up to the tastes of his time; his musical language was conservative and conventional, bound rigidly within an academic sort of harmony for the most part. It's not easy to see the perfection of outward form, the ease and fluency of thought, the nervous tension, that do distinguish these characteristic works in spite of their insipid styling; it's a question whether they can ever mean much for us, at this stage in our own dynamic century.

It is characteristic, too, that of these two the earlier work is the most interesting. Mendelssohn's best music was largely from his early years; the typical late works seemed only to revolve endlessly about the same thoughts, less and less convincingly. Matter of personality. Why do some people grow in stature and others merely put on weight?

Miss Ann Schein—A Truly Brilliant Pianist. (Chopin: Four Scherzi).
Kapp KC 9040S stereo

Record titles are ranging far and wide these days—this one is enough to scare away a lot of people who might really find Miss Schein truly brilliant. Maybe it will bring in enough newcomers to score a net profit.

She is good, this Schein, though not as yet quite a master pianist. She belongs clearly to the younger generation, the pianists whose fingers fly faster than ever before, who tend to make Romantic music come forth hard and brilliant, or monotonous and deadpan, and usually half again as fast as anybody dared try a quarter century ago. She plays her Chopin in this manner, more or less—it goes like the wind, yet is straightforward and minus eccentricities, short-haired, so to speak.

What counts, over and beyond the style, is that this lady does listen to the music and to its harmonies and melodic structure, and she does them proper service. That is, she is musical. Some fleet-fingered pianists aren't, or don't act so.

She plays like a whirlwind and her tone is modern, but she never blurs harmonies together, she knows always when to bring out a melodic line and subordinate an accompaniment. Good Chopin, if still rather cool in the coloration.

Liszt: Piano Sonata in B Minor. Weber: Piano Sonata #4; Invitation to the Dance. Leon Fleisher.

Epic LC 3675

I found this disc a problem in technology—the recording itself influenced my musical opinion of the playing.

Fleisher is the youngish pianist whose Brahms First Piano Concerto, with George Szell, was the finest recording of that difficult music I'd yet heard, a year or so ago. He is a follower of Schnabel, a profound and serious musician as well as a quick man with his fingers. I had every reason to expect a terrific reading of these solo piano works—the Liszt, his biggest and most important piece, the Weber sonata an important and rarely heard work of early Romanticism. On first hearing I was disappointed, decidedly.

The music seemed thin and lifeless, lacking in impact. I analyzed it in my mind—what was missing? It suddenly struck me: bass. I jacked up my bass boost control almost all the way, and presto, the Liszt sonata began to sound like real Liszt. The piano took on presence and solidity. Fleisher suddenly became the pianist I had thought he was. Unfortunately, though, there was rumble, along with the added bass; so I threw in a 50-cps bass cutoff, and the music was fine. The rumble mostly was gone, but the musical fullness at the bottom remained.

The explanation, I'd guess, is that (a) this music, especially the Liszt, is enormously potent in the crucial lower bass and (b) the music, especially the Liszt, is long. In order to get the whole of it onto LP it must have been necessary to roll off the bass in the cutting, thereby allowing for closer grooves, with less sidewise excursion on the loud bass passages. But this almost threw out the baby with the bath, since the missing bass makes for a thin musical impact.

It was bass rolloff, not a cutoff, I gather. My amplifier bass-boost brought it back smoothly and effectively. Indeed, at one point, before I had put in the low-bass cutoff, the room began actually to shake, exactly as it might with a large piano jiggling the floor under violent impact from an active player. Wonderful! The frequency of that shake was, I'd guess, around 10 cps—it was a periodic standing wave, a room resonance, set up by the AR speakers. I would have enjoyed leaving it in action, but I was afraid the speakers might tear themselves straight out of their suspensions. The 50-cps cutoff instantly removed the shaking, and probably just as well.

Given a bit of bass boost, these are, indeed, splendid performances. The Weber is a pleasure to hear—its main theme obviously relates to the main opening idea of the Liszt and the choice surely was Fleisher's. Astonishingly pre-Wagnerian stuff, too.

Kirsten Flagstad Sings Wagner (Wesendonck Songs; excs. from Lohengrin, Parsifal, Die Walküre). with the Vienna Philharmonic, Knappertsbusch.

London OS 25101 stereo

To hear Flagstad sing these Wagnerian items in stereo is roughly like hearing that Franklin D. Roosevelt is back in the Presidency—she's hard to believe, this still-operating grand lady of Wagner, out of the Thirties. But it is really not so surprising when one understands how a well kept voice and a superb ear may go on living over the years.

Ill-used voices wear out; poor technique can force a voice less and less into extremes as age comes on. Superficial musicianship, style that is merely sensational, can put a singer out of business as soon as music moves on to new sensations. But a voice like Flagstad's grows older as the woman herself—it maintains its original freshness and quality as long as she herself is mature, losing only the one vital attribute—stamina, endurance.

plus a gradual attrition of the extreme registers, just as the singer's own physical strength grows slowly less over the years.

In the case of Flagstad, this has involved very interesting happenings—perhaps the first time such a situation has ever occurred involving a great singer. Her retirement from opera came, as it always does, when the tremendous strain of whole evening-long performances grew too great even for her heroically powerful voice and physique. She "retired" numerous times, but the inevitability of decreasing stamina had its usual way with her in the end.

Now most singers of her sort turn gracefully to their memories, or to the Lied—the art song. Lotte Lehmann, for instance, was world famous in that capacity for years after her opera career ended. But Flagstad isn't that type—she is big, in every sense, and it is music on the grand scale that she does best. And so, the modern miracle. She—or her canny managers—realized that even though her stage career might be done, opera on records was something else again, or indeed, any music of large proportions.

For the plain fact is that such a voice retains a large part of its useful sound long after the stamina goes. In these late years, she lacks only the ability to hit really high notes easily, and her instrument is a bit darker and heavier than it was; otherwise she is much the same, and clearly as fine a musician as ever. In her recordings only an occasional high note is forced, uncomfortably. (She sings it on pitch, no matter how much it hurts, where lesser voices just sing flat.) The rest, honestly and truly, is great singing that is easily comparable to her earlier and famous "live" performances and her early recordings, a quarter century ago! Extraordinary.

The secret, of course, is modern recording technique. She does not have to sing longer than she is able; she can try again and again, for optimum musical effect. She can, above all, sing excerpts from the enormously demanding operas that once kept her going for hours with scarcely a break. For a few brief minutes, in these excerpts, Flagstad can still rise to her old heights.

On this record are the five Wesendonck songs, several of them studies for familiar operatic passages, here arranged with orchestral accompaniment (one by Wagner). The originals were with piano, but the style is orchestral, of course, and this is their proper medium. The Flagstad performances are somewhat on the reserved side, but lovely.

Also you will find astonishingly moving performances of Elsa's Dream (Lohengrin), Kundry's "Ich sah das Kind" from Parsifal and two stunning excerpts from the first act of Walküre—"Der Manner Sippe" and "Du bist der Lenz," these last probably out of her complete recording of that act in a London album. So moving are these, indeed, that the sudden end to each, cut off in mid-flow, is a shock—one could go on and on with such listening. Those sudden endings are the price of time itself.

Chopin: The 24 Preludes. Alexander Brailowsky, piano.

Columbia MS 6119 stereo

How much can recording technique affect the apparent musical qualities of a performance? That's a question that will never have a final answer—it all depends. But there is no doubt that a change in recording technique has often seemed to change the musical product that is the result.

I've never heard Brailowsky in person. He recorded for RCA for many a year, and I have a strong cumulative impression of dislike for his recorded performances. Was any part of this due to the recorded medium itself?

Here is the same Brailowsky on the Columbia stereo label, with a piano sound very unlike that of the earlier (and mono) RCA offerings.

At first, the playing seemed to me a tremendous improvement—such presence, such conviction, such a grand instrumental effect! But as the Preludes continued, I began to get annoyed once again. My continuing conclusion, unfortunately, is that Mr. Brailowsky is a big pianist, an elder statesman of long experience, a Chopin specialist of many years, who nevertheless does things to the elementary musical sense that for me are still just plain unmusical. A lack of feel for the soaring melody, for melodic drama, for the proper rhythmic place of accompaniments, a tendency to blur harmonies together, to miss the big moments in the musical poetry as though they didn't matter, a rubato that seems to me false, artificial, ostentatious . . .

It's easy for any critic to run along like this in terms of words, I know. It could be hot air, and Mr. B. himself will be quite within his musical rights to think so. Nevertheless, they do represent part of a continuing feeling, that seems to me to have survived even the change from one recording company to another, from medium-fi to hi-er fi and from mono to stereo.

Strauss: Don Juan; Death and Transfiguration. Minneapolis Symphony, Dorati.

Mercury SR 90202 stereo

The oddest thing about Mercury's three-channel original recording is its peculiar effect upon the instruments of the orchestra, which seem somehow to be suspended in nearby space, each one equidistant from the mike, minus depth perspective.

It is actually the microphones, of course, that are suspended in space; the orchestra sits on a solid stage before them. But the spatial quality is transferred by the triple-mike system to every part of the orchestra itself. The players dangle, like so many puppets hanging by their strings in mid-air.

I don't mean that the effect is poor. New ways of projecting orchestral sound are always welcome and I am the last person to

(*Continued on page 55*)

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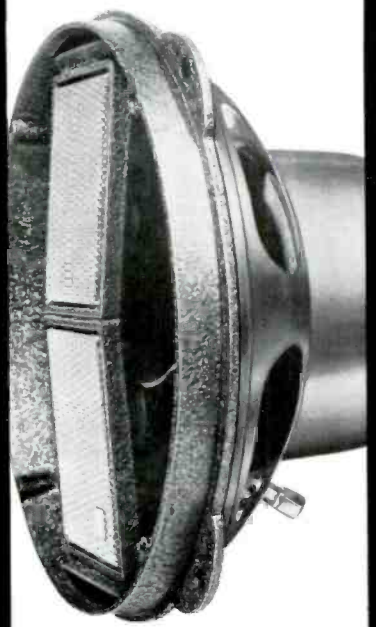

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CHARLES A. ROBERTSON*

STEREOPHONIC

This Here Is Bobby Timmons
Riverside 1164

Les McCann Plays The Truth
Pacific Jazz 2

While certain to blossom profusely at the hands of a few gifted soloists, the jazz waltz was never a thrifty plant and rarely survives when cultivated by less than accomplished attendants. A prize hybrid introduced this season shows every sign of being wilt resistant. Developed from the rhythmic shout of gospel songsters, the new strain also contains the strength of the blues and is readily available in the popular variety *This Here*, an All American Gold Medal Winner for 1960, first packaged by the Cannonball Adderley Quintet in San Francisco. Due to the success of that offering, with the composer at the piano, Bobby Timmons now makes his LP debut as leader and lists the tune along with three other originals. Making an initial recorded appearance at the same time is Les McCann, a Los Angeles pianist who proves to be equally adept at creating this species of waltz.

Timmons grew up in Philadelphia and began studying organ and piano at the age of six. As the grandfather who raised him was a minister, gospel music entered his life even earlier and became firmly rooted when he played organ in church while still a youngster. That Timmons calls on this background frequently in his writing is no sign of distinction. Jazz players have always drawn on spirituals and camp-meeting songs as well as the blues. Where Timmons makes his mark is in fusing these diverse elements into a work that owes more to the hand-clapping enthusiasm of vocal groups than to strict ballroom meters. The fact that it is a waltz seems to escape a good many of the Quintet's listeners, according to the liner notes, causing them to get fearfully tangled up in their clapping.

No one is likely to be confused by the composer's trio version. With the support of bassist Sam Jones and drummer Jimmy Cobb, he stresses the lyric qualities of the theme and makes it sing. Judicious editing reduces the length to about one-fourth the Quintet's exuberant reading, but the amount of swing remains undiminished. Where the conventional waltz must depend upon the individual artistry of a Milt Jackson, Benny Carter or Sonny Rollins to swing, this tune is virtually foolproof. With fine stereo and the composer in charge, nothing impedes it here.

Timmons also revisits *Moanin'*, which first drew attention his way when he recorded it with Art Blakey's Jazz Messengers. He drives furiously through *Joy Ride*, and strives mightily on *Dat Dere*, a Latinized sequel to *This Here*. After the ample servings of soul supplied in his own music, he apparently feels safe in betraying classical training on such ballads as *My Funny Valentine*, *Lush Life*, and *Prelude To A Kiss*.

Les McCann looks like the surprise discovery of the year, particularly as he hails from an area where his brand of the truth seldom reaches a studio. In addition to getting around the piano with considerable two-handed skill, he packs four originals to the brim with gospel spirit. The lovely waltz theme of the tune which gives the album its title is bound to stick in the memory. Equally enticing are *A Little 3/4 For God & Co.*, and *Fish This Week But Next Week Chitlings*. Traces of Garner and Oscar Peterson are apt to crop up on such standards as *I'll Remember April* and *How High The Moon*. But his main influence is the late Carl Perkins, another self-taught pianist, who receives a moving tribute. Credit for this goes to bassist Leroy Vinnegar, an admirable accompanist throughout, along with drummer Ron Jefferson.

Dick Bock has come up with a real find to mark the resumption of releases on the Pacific Jazz label. After being absorbed into the corporate image of World-Pacific for a time, the series makes a healthy return to the lists. As before, the engineering is the best and stereo frames the trio beautifully.

Dukes of Dixieland: Piano Ragtime
Audio Fidelity AFSD5928

In chalking up album eleven, the Dukes of Dixieland bring Stanley Mendelson front and center to enjoy a ragtime outing. The pianist delves into several classic tunes, discovering afresh the gaiety and syncopation of *Grace And Beauty*, *Grandpa's Spells*, and *Maple Leaf Rag*. A thorough grounding in ragtime has long contributed to his work with numerous dixieland groups. One of the mainstays of the Dukes, by today's standard he also is a veteran of the New Orleans revival. Among his many virtues is the ability to adapt solos to easy band tempos, and each selection is paced for relaxed listening or dancing. At this stage of the game, Mendelson rightly deserves an album to himself, one that would allow him to operate under his own head of steam.

As it is, the rest of the Dukes receive ample opportunity to display their wares from various points on the stereo stage. The Assuntos are out in force on such venerable standards as *Tiger Rag*, *San*, *Copenhagen*, and *Kansas City Stomp*. Gerlad Fulla's clarinet tone is sweet and true, while Lowell Miller, tuba and bass, and drummer Norman Hawley provide a firm underpinning. As always, the recording quality is excellent.

The Lawson-Haggart Band: Dixieland Goes West
Everest SDBR1084

Barney Richards: Dixie In Hi Society
Mercury SR60185

Credit British writer Graham Boatfield with coining "rumpty-tum," a brave, new description of dixieland *joie de vivre*. While departing from traditional fare in this instance, both groups perform with considerable eclat on westerns or show tunes. If any of the material seems lacking in rumpty-tum content, the quota is more than filled in each case by rambunctious stereo. Both recordings are designed for dancing and weekend partying. The team of Yank Lawson and Bob Haggart wheel through a dozen familiar western melodies—no television quickies included. No arrangements either, just plain, hard riding on *Eyes Of Texas*, *Empty Saddles*, and *High Noon*. Bud Freeman and Bill Stegmeyer are among the outriders, and Lou Stein's piano is right next to the chuck wagon. Drummer Cliff Leeman thunders over the horizon every once in a while, so give him plenty of room.

Barney Richards formed his septet eight years ago, collecting former dance band musicians who, like himself, had settled into prosaic full-time jobs. Working in the Chicago area, pianist Richards found the customer favored show tunes with an accent on two-beat. To have stayed together so long, the band must also approve, and each of the four front horns plays lead. Richards slips an original blues in among *Blue Room*, *Thou Swell*, and *Mountain Greenery*, while Slip Lepp is a trombonest worthy of the name.

Harry Breuer: The Happy Sound Of Ragtime
Audio Fidelity AFSD5912

Most students of ragtime today go right to the classic compositions of Joplin, Scott, and Lamb, bypassing the large body of works by later composers on the theory that it is wholly infected by the taint of commercialism. Harry Breuer believes differently, having grown up with the music of Tin Pan Alley during its worst period—or best, according to the viewpoint. More important, he knows how the tawdriest tune should be treated. Kid around with J. Lenzberg's *Hungarian Rag*, or put anything less into it than the composer did, and it becomes a mockery. Played straight, with a dash of ragtime bravura, it takes a rightful position as a delightfully humorous period piece. Helped by crack studio men, Breuer does exactly this, managing to keep tongue in cheek even on a tune titled *Turkish Trophies*. Only once does he slip, on *Bugle Call Rag*, where a caustic bebop quote is interpolated from *Salt Peanuts*.

No doubt about the tunes being more spectacular than a majority of the items concocted especially to show off the medium of stereo. Each boasts built-in effects that are a joy to the ear. Some seem to totter on the brink of disaster, yet all are saved by the skill of the musicians and engineers. A wizard on vibes and xylophone, Breuer is showcased on his own *Ebony and Ivory*, and *Raggin' the Scale*. In the choice accompanying groups are Doc Severinson, Al Klink, Boomie Richman, Carmen Mastren, and Don Butterfield. The younger generation never heard most of the tunes, and earlier ones never heard them played like this.

Andy Gibson: Mainstream Jazz
RCA Camden CAS554

With this release, Stanley Dance moves his mainstream entourage to RCA Camden and produces an agreeably low-priced summary of the subject. One of the English critic's major premises in his definition of the term is often passed over too lightly. It is the belief that this type of music is not static and holds a great deal of appeal for younger musicians. Some of the ideas behind the new Art Farmer-Benny Golson Jazztet would seem to bear him out, as does the personnel of the two groups set up for this data. In the assembled fifteen-piece band, one of the brightest of modern guitarists, Kenney Burrell, neatly balances the expressive soloing of Prince Robinson, a veteran clarinetist who is heard all too seldom. They work out on *Blueprint*, which develops into one of the longest arrangements ever recorded by a big band, consuming more than fifteen minutes before the sound of Jimmie Crawford's last vocal exhortation fades away on the final ensemble chorus. Andy Gibson, who plotted the course to allow ample space for ad-lib solos, directs the spontaneous outbursts and provides firm footing for an exciting terminal dash on tenor sax by Paul Gonsalves. The trombone section of Eli Robinson, Vic Dickenson, and Dickie Wells excels itself, and Emmett Berry's muted trumpet prepares the way for the climactic ending.

Shorty Baker, long a mainstay in Duke Ellington's trumpet section, heads a sextet and sketches three numbers to fill out the re-

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Literature available: Complete specifications, applications, and data:

SHURE BROTHERS, INCORPORATED
222 Hartrey Avenue, Evanston, Illinois

verse side. Dickenson returns, while Jimmy Forrest completes the front line on tenor sax. Good solos abound and the tempos are right for dancing, but a slow blues would provide a change of pace. One of the more ambitious Camden stereo projects, it is also the most successful.

Charles Mingus: Mingus Dynasty
Columbia CS8236

The second Charles Mingus opus for this label is as fully rewarding as the first, and it would be hard to find a brace of jazz LP's more crammed with enlightenment and plain good fun. Television scores for westerns and private-eye dramas may remain the same after the humorous poke taken at them on *Gunslinging Bird*, but one can only wonder if the medium will endure after three Mingus compositions are screened next fall. One, from the CBS play "Song With Orange," features an earthy plunger-muted solo by trombonist Jimmy Knepper. The other pair forms part of the score to "Frankie and Johnny," a television ballet starring Melissa Hayden. Gracing a septet of stalwart Mingus followers are cellist Maurice Brown and Seymour Barab on the opening theme, *Put Me in that Dungeon*, and on a lively sequel to *Better Get it in Your Soul*, which served as a rehearsal piece for the dancers. It also is filled with the joyous lilt of gospel three-quarter time and impelled, from the depths of the stereo stage, by the impromptu cries of drummer Danny Richmond. Unless the little Gods of television schedule these programs at an impossible hour, just prior to "Sunrise Semester," for instance, some ramparts will fall.

Two Ellington works, the only ones in the set not penned by Mingus, are also played by the septet, with the leader pouring his prowess on bass into a solo on *Mood Indigo*, while Booker Ervin's tenor sax is featured on *Things Ain't What They Used to Be*. Jerome Richardson, Benny Golson and a vibraphonist swell the ranks on *Diane*, where Mingus manages to be both atonal and melodic, and on *Far Wells, Mill Valley*, which swings more than the liner notes would indicate.

One of the problems plaguing Mingus is the discovery of a trumpet player capable of living up to his expectations. If Dick Williams, his current protege, develops as rapidly as Knepper and Richmond, prospects for an early solution are good. Knepper's muted solos on this occasion are revelations, and he is learning to shout in the old J. C. Higginbotham manner. When he accomplishes that, none of the present crop of trombonists will be able to touch him.

Teddy Wilson: And Then They Wrote . . .
Columbia CS8238
Andre Previn Plays Songs By Jerome Kern
Contemporary S7567

These pianists are eminently fitted for the tasks assigned and to conceive of anyone else doing them so well seems impossible. Teddy Wilson's only regret is the omission of Art Tatum among the dozen pianists whose original works are interpreted here. A search failed to locate anything of Tatum's in published form, but plans for a second volume will bring more artists to the fore. Certainly no single pianist is better equipped to span the years separating Morton and Brubeck or James P. Johnson and Thelonious Monk. Much idle curiosity might be satisfied were Monk to undertake a similar project, but the results would hardly be the same. Wilson is playing the best piano of his career, having trimmed from his style the embellishments which caught the public fancy while he was with Benny Goodman. His own theme, *Sunny Morning*, is listed among well-known compositions by Waller, Ellington, Hines, Basie, Kenton, and Shearing. Major Holley, bass, and drummer Bert Dahlander complete the trio. Good sound in the stereo version, almost as great as some of the titles.

Andre Previn resumes his solo piano examination of show composers, an enterprise started with an album of Vernon Duke songs. Turning to Jerome Kern, he goes all the way back to 1917 for *Go Little Boat*, and to 1920 for *Whip-Poor-Will*. Previn shares Wilson's flair for ballads, and both know how to make older songs appear modish, without destroying the original flavor or smothering it in slickness. Previn's *They Didn't Believe Me*, beautifully preserved in stereo, is to be treasured.

Frank Pourcel: French Wine-Drinking Music
Capitol ST10229
Michel Legrand: I Love Paris
Columbia CS8237

Eddie Condon's famed remark, indirectly addressed to a visiting jazz critic, about Americans not telling the French how to step on a grape, is applicable here. It seems one of this country's former jazz writers, Dave Dexter, Jr., has ventured where Condon would fear to tread. Not only has he advised Frank Pourcel about mood music, as producer at the session, but he also wrote an ode in praise of *Champagne*. It nestles among eleven other heady tunes dedicated to assorted wine-growing regions. Most of the varieties are light and sparkling, with bubbling strings arrayed in terraces for the benefit of stereo. Nothing as heavy as port for this cellar, and Pourcel also has the assistance of Les Baxter and Bobby Black in bottling salutes to *Chablis, Beaujolais*, and *Riesling*.

Michel Legrand stomps on a grape with slightly greater force than Pourcel, but the end result is still romantic mood music. The pianist draws on both spirited jazz rhythms and waltz time to run down the list of songs about Paris. Complementing him in excellent stereo are Guy Pederson, bass, and drummer Gus Wallez.

The Seafarers: We Sing Of The Sea
Elektra EKS7179
The Kingston Trio: Sold Out
Capitol ST1352

The six chantymen of The Seafarers are paced by the lead voice of Eugene Brice on hearty songs used to raise sail or hoist anchor on windjammers of yore. Milt Okun acts as bosun and directs the work, having prepared arrangements to outfit a crew making its first voyage. He supplies traditional verses meant to steady a sailor during hardships at sea from *Haul On The Bowline*, at the start, to the welcome words of *Rolling Home*. Ned

Wright sings the comforting hymn *Eternal Father*, while Bob DeCormier joins in on *New Bedford Whalers*, and Bob Harter on *Hangin' Johnny*. There can be no mistaking the crew's joy at the sight of *Girl With The Blue Dess On*. Engineer Dave Jones lines the shipmates up in working order for stereo, and an illustrated booklet contains texts.

The Kingston Trio's folk-song albums seem destined to outlast the adventure series which detailed the doing of Tom Swift or The Rover Boys. Students at colleges and universities throughout the country regard each volume as part of a required extracurricular course. The institution of higher learning without one or two carbon copies of the group is poor indeed. Even poorer are record companies who have failed to locate one capable of matching The Kingstons on *El Matador, Bimini,* and *Raspberries, Strawberries.* Old grads had better get that banjo or ukulele out of the closet and start studying.

The Statesmen On Stage
RCA Victor LSP2188
Elvis Presley: Elvis Is Back!
RCA Victor LSP2231

Every so often a juicy plum turns up in the batches of country music Chet Atkins sends out from Nashville. Of recent note were the first two LP's by folk-singer Jimmy Driftwood, and the gospel quartet introduced here is an equally rich prize. Since they were organized ten years ago, The Statesmen have developed into one of the foremost singing groups in the South and are reported to outdraw rock-and-roll shows by a wide margin. The reasons for their popularity are all evident in this performance before a live audience at the Ryman Auditorium. The singers are impassioned and rhythmic, while the songs programmed are unsegregated and include Roberta Martin's *He's Already Done.* Jaded ears are likely to find it a new listening experience, and the stereo recording is the best yet from Nashville.

Elvis Presley, fresh from Army service and back in the studios, falls victim of the current effort to elevate rock-and-roll stars on his first release. Even stereo is unable to free him from sticky accompanists and a romantic choral group. The hips sway only when the singer is left alone on *Fever.* At his best, Elvis is a natural child with a gospel shout and the cry of the blues. Rock-and-roll failed to ruin him, but Hollywood and a few more mistakes like this might. If it keeps up, he had better join The Statesmen.

MONOPHONIC

Furry Lewis
Folkways FS3823

While recording the Memphis Jug Band for Folkways, Samuel Charters also located one of the fabled old time singers of country blues, Walter "Furry" Lewis, working for the city as a laborer. Later he returned to record this session and wrote a chapter on the singer for his book "The Country Blues." Like many other early blues artists, Lewis dropped out of sight during the depression and was last recorded in 1929. At the age of fifty-eight, he retains a youthful vigor and will quickly assert, "I'm better now than I ever was." Wishful thinking or not, he does possess a classic purity of style that is virtually unchanged since the late Ralph Peer recorded it more than thirty years ago.

Lewis is heard describing the "Mississippi bottleneck" guitar method and also talks about his rural medicine-show days. He traveled with the shows for years and picked up a number of styles of playing on the way. The need to keep audiences entertained is quite possibly the reason behind the extra verses on *John Henry,* and *Casey Jones.* At least, no song sounds overworked when Lewis sings it, and television medicine men might take the hint. It could cause them to believe in a Lewis blues title, *I Will Turn Your Money Green.* One of his bottleneck tricks is to extend a note into the usual blues guitar cry and then prolong it with a reverse Hawaiian twist, maintaining the same intonation all the while. Charters fails to state whether this is wholly original, or was derived from a Hawaiian selling coconut oil. Anyway, no Hawaiian played this kind of blues before.

(*Continued on page 60*)

NEW PRODUCTS

● **Connoisseur Turntable.** Although modestly priced, this machine offers professional standards of performance in all respects. It is a two-speed table, operating at 33 1/3 and 45 rpm, driven by a constant-speed hysteresis synchronous motor. The speed change is accomplished by means of a double stepped cone, ground integrally on the motor shaft to assure concentricity. The motor shaft is suspended in graphite nylon bearings and all revolving shafts are precision-ground and lapped to a mirror finish. Minimum guaranteed performance: rumble factor is down 50 db when referred

to 7 cm/sec at 1000 cps; wow is 0.15 per cent, and flutter is 0.1 per cent. The turntable proper is a full 12 inches in diameter and is lathe-turned of non-ferrous material. In this illustration, the new turntable is shown in conjunction with the Connoisseur diamond stereo cartridge and automatic-control tone arm. For complete specifications write to Ercona Corporation, 16 W. 46th St., New York 36, N.Y. **G-1**

● **Metallic Cue Tabs.** Highly-conductive, pressure-sensitive, aluminum-foil tabs are now available for application to magnetic recording tape for automatic stop-start-repeat operation. Called Brady Quik-Cue Contact Tabs, they are for use on all tape

recorder-players equipped with an automatic switching feature. Fast and easy to use, they are supplied in units of 42 individual tabs on a handy dispenser card. Permanent adhesive sticks tight on contact, and will not shift, loosen, or jam in the equipment. For more information and testing samples, write W. H. Brady Company, Dept. 173, 727 W. Glendale Ave., Milwaukee 9, Wis. **G-2**

● **PACO Semi-Kit Speaker System.** This two-way wide-range speaker system is furnished with the cabinet completely factory built and finished. It incorporates a special design 10-in. Jensen long-excursion woofer and a horn-loaded compression-type tweeter to afford a frequency range of 45 to 14,000 cps. An adjustable control

at the rear of the cabinet permits the user to balance the system output to match room acoustics. Designed as a high-efficiency system, the Model L-2 permits effective operation with low-power hi-fi amplifiers. The cabinet features a rich, universal decor grille and blends harmoniously with traditional or modern furniture. It is finished on all four sides, permitting its use in either vertical or horizontal (bookshelf) position. Further information may be obtained by writing to PACO Electronics Company, Inc., 70-31 84th St., Glendale 27, N.Y. **G-3**

● **Roberts Stereo Tape Recorder.** Versatility is keynoted in this new all-in-one 4-track stereo tape system, the Roberts Model 990. In one complete unit with monitoring stereo speakers, the 990 offers 4-track record/playback, four monophonic tracks record/playback, and 2-track playback. An exclusive new head assembly providing precise vertical movement of both erase and record/play heads is one of several innovations in the machine. Other unusual features of the 990 are the output facilities, including dual outputs from the heads, dual preamp outputs, dual power amplifier outputs, and improved VU meters for both channels. The recessed carrying

handle on the case makes this recorder ideally suited to wall enclosure installation, as well as for portable use. The 990 weighs 42½ lbs., and dimensions are 9"d x 14"w x 20"h. Roberts Electronics, Inc., 829 N. Highland Ave., Hollywood 38, Calif. **G-4**

● **Knight Dynamic Microphone.** A professional-quality unit at modest price, the KN-4550 is well-suited for all recording and public-address applications requiring wide frequency range and directional pickup pattern. Employing a heart-shaped (cardioid) pattern to obtain an extremely high front-to-back ratio, it reduces the effects of audience noise and other sounds originating at the back or sides. The possibility of acoustic feedback is also minimized. Frequency response of the KN-4550 is 60 to 13,000 cps; output level is −57 db. Impedance can be adjusted at the micro-

phone for either 150 ohms or high impedance. The pressure-cast metal housing of the unit features two tuned chambers, and is finished in satin chrome. Allied Radio Corporation, 100 N. Western Ave., Chicago 80, Ill. **G-5**

● **Wide-Range Portable Oscillator.** The Model 401-B oscillator is a small, versatile source of high-purity audio and ultrasonic sine waves. Distortion is less than 0.1 per cent at full output of 10 volts into 600 ohms. Frequency range of 9.0 cps to 120 kc is covered in four decade bands with generous overlap at each end of the dial. Accuracy is ±2.0 per cent. Output

amplitude is controlled by a five-position decade attenuator plus a continuous control, so that any voltage above 100 microvolts can be selected accurately without the use of external pads, volt boxes, or the like. Output amplitude is independent of frequency within ±0.5 db. The unit's small size of 8"h x 6½"w x 10½"d makes it ideal for portable or field use, as well as adding convenience to the laboratory. Waveforms, Inc., 333 Sixth Ave., New York 14, N.Y. **G-6**

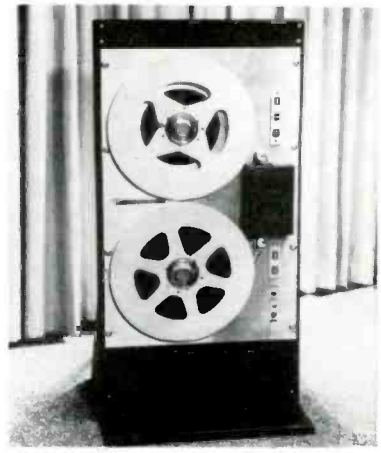
• **Transistorized Midget Recorder.** Measuring only 2½"h x 7½"l x 5½"d, and weighing less than five pounds, the Realistic Model TR-730 plays and records at either 3¾ or 1⅞ ips. It operates on low-cost self-contained batteries, uses standard 3-in. reels, and plays up to 60 minutes. A built-in D'Arsonval-type VU meter shows both recording level and the condition of the

batteries. Three packs are provided for microphone, external speaker, and for headphones. A built-in p.m. speaker is used for monitoring. The motor is driven by eight regular penlight cells, while the amplifier is powered by a standard 9-volt battery available at all radio and camera supply stores. Surprisingly low-priced, the TR-730 is supplied with microphone, zippered carrying bag with accessory pocket, tape, and take-up reel. For full specifications write to Radio Shack Corp., 730 Commonwealth Ave., Boston 17, Mass. **G-7**

• **Rek-O-Kut Portable Sound System.** Called the Rythmaster, this system has particular application in teaching skills which demand synchronized movement such as dancing, typing, skating and the like. The unit embodies Rek-O-Kut's patented "vari-cone" drive assembly, which permits playing speed to be varied continuously from 25 to 100 rpm without stopping the turntable. The complete unit

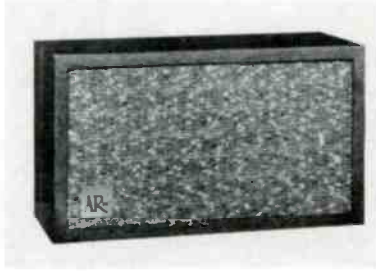
consists of the variable-speed turntable, a 20-watt amplifier, and a portable dual speaker set. The amplifier has separate bass and treble controls, a separate microphone volume control, and another individual control for tuner and phonograph. Frequency response is 20 to 20,000 cps. A microphone can be used while records are being played to superimpose instructions over the music. Two 10-in. p.m. speakers are custom built for high power and excellent fidelity. Sturdy plywood case is covered with scuff-proof and washable Pyroxlin. For full technical specifications write Rek-O-Kut Company, Inc., 38-19 108th St., Corona 68, N.Y. **G-8**

• **Background Music Player.** Engineered primarily for use in background music systems, the Model C-540 is a long-play tape machine capable of playing up to 16 hours of unduplicated music, with indefinite recycling. It is available for either stereophonic or monophonic operation. Ruggedly constructed and designed for continuous unattended operation, the machine uses 14-in. reels which may be rewound in three minutes in either direction. Performance specifications at 3¾ ips: frequency response, virtually flat from 40 to 8000 cps; signal-to-noise ratio in



excess of 50 db; wow and flutter, 0.3 per cent rms. Other features of the C-540 include three motors, two induction-type for reeling, and one hysteresis induction motor for drive: mechanical fail-safe braking, and a safety cut-off sensor to stop the machine if the tape should accidentally break or run out. Manufactured by American Concertone Division, American Electronics, Inc., 9449 W. Washington Blvd., Culver City, Calif. **G-9**

• **AR Accessory Tweeter.** The AR-3st consists of an AR 1⅜-in. dome-type super tweeter (the one used in the AR-3 speaker system), combined with crossover network, level control, and cabinet. It is designed primarily for use with the AR-2 speaker system—converting the AR-2 to the equivalent of an AR-2a—but can also



be used to extend the high-frequency range of an AR-1. When connected directly across an AR-1 or AR-2, the AR-3st takes over at 7500 cps. On-axis response extends to 20,000 cps ± 1.5 db. Dimensions are 5⅛ x 6½ x 11½ in. The unit may be used either horizontally on top of the other speaker, or vertically alongside it. Acoustic Research, Inc., 24 Thorndike St., Cambridge 41, Mass. **G-10**

NEW LITERATURE

• **H. H. Scott, Inc.,** 111 Powdermill Road, Maynard, Mass., announces publication of two technical bulletins: one on the new Scott 272 72-watt complete stereo amplifier, the other on the Model 314 AM-FM tuner. Complete specifications and technical information are included. In view of the excellence of these units, it is suggested that prospective buyers send for both of these sheets before making a final

selection of the equipment they purchase. Requests for copies should be directed to Dept. D. **G-11**

• **The Astatic Corp.**, Conneaut, Ohio, has available a new 12-page catalog covering its entire line of microphones. Included in the publication is information covering applications and prices, along with charts showing typical frequency response characteristics. The catalog also lists microphone accessories such as stands, switch and socket connectors, adaptors, and transformers. Page size of the book is 8½"x 11" and it is punched for insertion in all types of binders. Requests for copies should specify Catalog M10. **G-12**

• **Lectronics of City Line Center Inc.**, 7644 City Line Ave., Philadelphia 31, Pa., will mail on request a handsome four-page folder giving full technical information on the British-made SME tone arm. A precision-built device throughout, the SME is available in two models, differing only in length. **G-13**

• **Yardney Electric Corp.**, 40-50 Leonard St., New York City, N.Y., manufacturer of Silvercel (silver-zinc) and Silcad (silver-cadmium) batteries, has available technical sheets on two new silver-zinc batteries —the P-1517 and the P/N 5522. The P-1517 was designed for such applications as underwater propulsion and aircraft electronics, while the P/N 5522 was developed as a power supply for guidance systems, telemetering, radio beacons, and strobe lights in nose cones. Data sheets for the two batteries are designated P102 and P104, respectively. **G-14**

• **Telectrosonic Corporation**, 35-18 37th St., Long Island City 1, N.Y., is offering its new 900 Series Tape Deck and Preamplifier catalog. This attractive 20-page booklet outlines the advantages of tape, points out the features of tape decks which make for consistent, high-quality operation with a minimum of complication for the user, and describes the five models in the 900 Series with respect to head arrangement and facilities. In addition, it describes their complete line of preamplifiers for recording and playback, giving all of their essential characteristics, and describes bases and cases used for mounting these units. A complete price list is also enclosed. **G-15**

SOUND SYSTEM

(*from page 27*)

on the bottom of the enclosure close to the front. From the main power switch the lines go to a central distribution panel of outlets. As an additional precaution, all components are individually fused. A ground lead goes to a bus equipped with taps so that each component can be properly grounded. Towards the right hand side of the front panel (facing it) is a panel of indicator lights which show when any component is energized.

The elements of the system are:

Speaker—University Model 312
Tuner—Harmon Kardon "Guide" (AM-FM)
Turntable—Bogen-Lenko
Amplifier-Preamp—Eico 20 Watt
Tape Recorder—Concertone

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ABOUT MUSIC

HAROLD LAWRENCE*

A Preview of the "Concert Of The Week"

A BRAVE NEW PROGRAM, conceived by National Telefilm Associates as a musical companion to "The Play Of The Week," is scheduled to make its debut this coming fall. The producers of this latest entry in the field of concert music on television hold with the revolutionary belief that a genuine recital—nothing more, nothing less—will attract and hold a sizeable audience.

Everything about "The Concert Of The Week," as the program is called, runs counter to existing theories and practices regarding the presentation of music on free television. Words today have become to the classical music telecast what horses are to the Western. Only when a musical program is narrated by a "personality" does it fit into the category of entertainment. Among the concert music "explainers" Leonard Bernstein is easily the king. Remove his spoken commentary, and the New York Philharmonic telecasts would probably go the way of the now defunct Chicago Symphony programs, which, despite superb technical production and the attraction of such names as Fritz Reiner and Bruno Walter, failed to gain a firm place on the television scene.

Even a "pops" concert, with its naturally broader appeal, could not earn enough ratings to survive. "The Firestone Hour" is a case in point. In 1954 the program was dropped by NBC, not because it lacked sponsorship—the client, in fact, paid for time, talent, and production—but because the time (Monday evening) had become too precious to the growing network. ABC promptly signed the Firestone program, but it too abandoned the show four years later when accelerated billing transformed Monday from a "throwaway" to a boom night. To bring up to date an old maxim, "Time is (more) money."

Music-minus-talk has not been banished from television; let us say rather that it is seldom allowed to go out alone at night. Pure music appears occasionally on variety shows where an operatic aria or a movement of a violin concerto is sandwiched in between comics and acrobats. The *Spring Festival*, an hour-long concert of light symphonic music, only serves to underscore the meager representation of concert music on television.

Against this background of harsh TV realities, N. T. A.'s projected series of recitals and chamber music concerts might appear foolhardy because of its limited scope of sight and sound. In terms of visual interest alone, the symphony orchestra probably constitutes music's most potent subject for the television cameras. The electronic eye can explore ranks of strings, catch the glint of the brass, zoom in on a row of French horns, or observe the timpanist as he executes an intricate passage. The audio portion of the telecast, too, offers a rich variety of timbres as well as a wide dynamic range; but, in most instances, the signal is unbalanced, poorly monitored, and lacking true musical perspective.

"The Concert Of The Week," on the other hand, seldom will offer more than four musicians, and generally only two, on each two-hour program. Apart from the intermission interview, conducted in the proverbial "green room," no spoken words will embellish the program's musical content. In fact, the producers' guiding principle is to

* *26 W. 9th St., New York, N. Y.*

Television in the Recital Hall.

recreate in every detail the shape and mood of a music recital such as one would expect to attend at a legitimate concert hall.

The first "Concert" was videotaped last May in a former Broadway theatre now occupied by CBS. Joseph Szigeti and Leon Pommers played sonatas by Prokofiev and Brahms, and a sonatina by Schubert; in addition, Szigeti performed Bach's *Chaconne* for unaccompanied violin. The stage background was appropriately simple: there were no sequined curtains, moving spotlights, or "floating" platforms. In deference to the musically sophisticated audience that filled the auditorium, the pair of applause signs located in the proscenium did not light up at the end of each piece.

The audience, incidentally, played a vital role in the program. Its primary function was to supply the element of realism: before the concert and during intermission, the cameras observed people milling around in the lobby, filing into the auditorium to get to their seats, and responding in varying degrees to each work. Once the music began, of course, attention focused exclusively on the artists, just as we would—or should—if we too were sitting in the audience. More important than this visual factor, however, is the unseen current of excitement that flows back and forth from players to listeners when generated by an inspiring performance. The burst of applause that greeted the concluding notes of the *Chaconne* was like the break of a giant wave. Similarly, one can "hear" the stillness that settles over the audience when it is totally absorbed in an expressive piece of music.

When Joseph Szigeti stepped out on the stage accompanied by Leon Pommers (and page turner), he acknowledged the applause, and then, spotting the single microphone suspended above the apron, peered through the strong lights in the direction of the control booth to confirm his exact position. A brief tuning followed and the artists launched into the first work of the program—Prokofiev's Sonata in D. Four cameras were utilized for the videotaping: two in the wings, one in the center, and another in the rear for distant shots. During the afternoon, a stand-in violinist of Szigeti's general height and build had performed the recital for the benefit of the cameramen, producers, and engineers, while the director marked his scores for angles and changes of shots.

There was one particular shot that caught Szigeti unprepared. About a minute into the *Scherzo* movement of the Prokofiev sonata, the center camera suddenly lunged forward, its boom lowering simultaneously for a close-up of the violinist's fingers. The speed of the move even surprised some people in the audience, and Szigeti, who took one startled look at what he later described as the "lion," stopped playing altogether. He quickly regained his composure, however, and began the movement once again. Thanks to the versatility of the medium, the program's sole mishap presented no difficulties; the interrupted take would later be removed from the master videotape.

It was clear sailing for the remainder of the program, except that Szigeti was broiling under the relentless glare of the floodlights throughout the recital his head was bathed in perspiration, streams of sweat flowed down his forehead and collected on the tip of his nose where it spattered on to his Guarneri violin, making the instrument glisten like the underbelly of a Chinook salmon.

This writer watched the event first in a monitor room and later in the theatre itself. There was a marked difference between the "live" and reproduced sound. In the auditorium, the acoustics were dry and intimate; on videotape, it seemed as if Szigeti and Pommers were playing in Carnegie Hall—without an audience. The signal apparently had been reverberated artificially; the resultant pickup might be described as an audio counterpart of the "long shot." This long shot never varied, even when the cameras shifted in rapid succession from a distant view to an intense close-up. When our eyes witness such a change of shot and our ears fail to hear a corresponding change of perspective, we are slightly disappointed. But if we are concerned with maintaining correct musical balance, we would hardly be in favor of manipulating levels to reflect every camera angle. At best, the producer must compromise between reality and musical necessity. Perhaps the answer, in the case of "The Concert Of The Week," would be to strike a more satisfactory balance between "presence" and reverberation.

No one expects "The Concert Of The Week" to rival the cowboys and the private eyes. That such a program is possible within the framework of commercial television is in itself cause for jubilation. Æ

RECORD REVUE

(*from page 45*)

insist on literal concert hall effects. But the Mercury sound still is odd, strange, to my ears and will be to other ears until its values become familiar and expected. We learn how to make use of the sound of various recording techniques simply by becoming accustomed to them. Clearly, many Mercury customers are already familiar with this sound out of Minneapolis, which is far removed from a concert sound even though it was recorded in a concert hall with the orchestra in normal positions on the stage.

The inner workings of a Strauss orchestra are always fascinating to hear at close range and there is much to be enjoyed in these two recordings. But the lack of a big perspective, of a romantically distant over-all view, makes the musical impact less dramatic than Strauss envisioned. Dorati's impartial and accurate performance leaves much that should be warm, or scorching hot, on a cool and impersonal plane instead. Not much musical poetry here.

2. Heavenly Choirs

Berlioz: Requiem. Leopold Simoneau; New England Conservatory Chorus, Boston Symphony Orch., Munch.

RCA Victor LDS 6077 (2) stereo

This is one of the newest batch of Soria specials, a "spectacular" complete with fancy booklet full of pasted-in Skira color reproductions, handsome black-and-whites, wide-spaced text commentary. Fancy, and the subject is an easy one to illustrate via old masters, too.

Musically, this Requiem comes a bit nearer to encompassing the impossible size and scope of the huge work than any previous recording. The stereo is, all in all, more effective, less zany, than the several earlier valiant stereo attempts. You can't very well reproduce the "Tuba Mirum" as intended by Berlioz, with four extra brass bands at the four corners of the compass. Not on any stereo system so far launched. But you can give a noble impression of immensity in sound, to left and right, as an excellent substitute, which is done here in Boston's Symphony Hall—with all the seats taken out, the chorus on stage, orchestra distributed over the floor and the brass bands in the side balaconies. Terrific.

The biggest technical problem of all in this massively eccentric work is that of dynamic range, made intentionally extreme by Berlioz himself. It is most judiciously solved here, for home listening. The soft parts, unlike Westminister's version, do not simply disappear, down in the rumble and scratch—they can be heard. The loud passages, millions of times louder in the flesh, are somehow brought unobtrusively within the practical dynamic range of stereo disc. Good job on RCA's part—this is what I call good recording under trying circumstances. We really do progress in practical recording technique, as the stereo era goes forward.

The Berlioz music is a Munch specialty and he is a part of French music, himself. The affinity is real, the performance therefore authoritative.

The semi-pro student-type chorus is an excellent choice—with youthful purity and vigor but a very necessary professional stamina—that can cope with the taxing music and make some headway in sheer terms of volume against enormous instrumental odds. The tenors in particular, are horribly taxed, solo on their own, and come through beautifully.

The one soloist, tenor Simoneau, is pure-French in his styling (out of Canada), and here is his usual poignant self, teetering on the brink of seeming vocal disaster in the very high passages and thereby adding precisely the right note of desperation to his musical prayers! Berlioz would have wept with joy.

A mighty good spectacular, this album.

Dvorak: Requiem, Op. 89. Stader, Wagner, Haefliger, Borg; Tschechische Philharmonice, Ancerl.

Deutsche Grammophon SLPM 138026/27 (2) stereo

This is an inspiring failure as a recording for home consumption. The piece is simply too much removed from the reality of the home living room and the stereo loudspeakers to come through without immense assist from the musical imagination.

It is huge music, slow, heavy, very long, on a massively large scale but remarkably undynamic on the whole, in spite of numerous relatively violent passages, *allegro*. It would be foolish to say it is a bad work—for it depends on what you mean by bad. This is what Dvorak wanted and, presumably, it suited his times, his listeners, his performers. Who are we to complain if the great vehicle seems turgid and longwinded to us in our living rooms?

Unimaginative recording in stereo adds an extra burden. The orchestral and choral forces are drowned in a huge liveness, at a distance, but the soloists are plonked right down close-up, clean outside of the over-all picture. Why? Isn't stereo a medium for bringing large forces together under, so to speak, one acoustic roof? No point at all in this sort of treatment, for such a large and already-sprawling work.

If you like big Romantic pieces, if you go for king-size Bruckner, Mahler, Delius, you'll find plenty of genuine Dvorak in this piece. But it's not for the Twentieth century masses, decidedly. Our time's worth money, double here, it's better spent on music of conciseness, new or old.

3. Special

Purcell, The Gordian Knot Untied; Suites No. 1 & 2. Pergolesi: Trio Sonata in G Boyce: Symphony No. 8. Telemann. Trio Sonata in C. Saidenberg Little Symphony, Gotham Baroque Ensemble.

American Society SAS 1003 stereo

Handel: Double Concerto No. 3 for Two Wind Choirs and Orch. Vivaldi: Flute Concerto in D ("Il Ga:dellino"). Geminiani: Concerto Grosso in C Minor, Op.

(*Continued on page 63*)

AUDIOMAN NO. 10

Proving once again that a single man has certain advantages in pursuit of his hobby, Curtis H. McDonnell joins the ranks of Audiomen.

WHILE THE APPEARANCE of the living room at the bottom of this page may not give the viewer the impression that it is in a household which does not have the ministrations of a housewife, it must be agreed that it does make provision for a goodly amount of hi-fi equipment that might not be so well received if there were a woman in the house. Dr. McDonnell is, as indicated by his list of equipment, an avid audio hobbist in his spare time—in his working hours he is a urologist in the city of Sacramento, California.

Along the right wall in his living room, Dr. McDonnell has grouped a Fisher Series 80 tuner and a 400-C master stereo control which feeds two McIntosh 30-watt amplifiers; a Thorens CD43N changer and a Rek-O-Kut LP50 turntable, the latter equipped with a Pickering arm, which is used with an ESL C-60 mono pickup and a Pickering 371 for stereo; and a Viking 75 tape deck with an RP61 amplifier provides for stereo and mono playback and for mono recording. The sound emanates from two JBL "Bel Aire" D42020 speakers located on the bookshelves at the two sides of the fireplace.

The entire system is built into the "music center" cabinet, which provides plenty of space for his collection of some 300 LP's, 25 stereo records, 1500 78's, and 25 tapes, along with *one* 45. Rather an imposing group, it would seem, though we can't help but wonder why there is only one of the 45's.

In the tradition of all Audiomen, Dr. McDonnell is constantly consulted by friends, neighbors, and relatives for some professional guidance in the planning and selection of their high fidelity components, and he has actually helped plan and install several complete systems, in addition to providing practical advice to many others of his friends.

Dr. McDonnell has been a subscriber to AUDIO for over eleven years—which makes him practically a charter subscriber—and he particularly enjoys articles which are not "too technical." Aside from being

a music lover, he admits to being a hobbyist and an enthusiast continuously over the past twenty years. He values his collection of records equipment at $7500, not counting "junked equipment."

His other activities include gardening and cooking—the latter a natural result of his being an admitted gourmet and wine-lover (which is a good idea if you live in Sacramento)—he also enjoys occasional golf, boating, and fishing. He attends concerts, opera, and plays as often as able, usually about once a month, and he is active in Rotary Club work and other community activities.

We are pleased to welcome Dr. McDonnell to the growing membership of Audiomen, and he now becomes a Life Subscriber with our compliments. *Æ*

LETTERS

(*from page 6*)

entirely eliminated since the sound seems to emanate from somewhere between the center speaker and each of the two outboard speakers.

J. PUSHKIN,
Hempstead, N. Y.

(*Seems to provide an interesting effect on stereo, though it is not true stereo. It would be an ideal way of covering the long wall of a large room, even though one half of the room would have "stereo reverse." If all the three speakers were alike, and in proper phase, the sound would have to appear to be coming from the center speaker if heard from the middle on monophonic material. With differing speakers, the spread is excellent.* ED.)

AUDIO ETC

(*from page 14*)

machine area too, perhaps, as a "record player" that can do better than a changer for a price well below that of the complete tape recorder.

This last home-machine gambit, I'll admit, is perhaps more dubious and maybe I shouldn't mention it. The tape player I have in mind is basically a hi-fi component, to promote better component hi-fi from tape at a new and reasonable cost. Tape in reel-to-reel form is basically a component medium itself.

It seems likely that if and when the cartridge tape record gets a start it will move into the mass market. As already discussed here, that is its big potentiality. If there are to be mass-type home tape players, then they will probably be in cartridge form. Reel-to-reel stands its best chance in component hi-fi, and it is there that the tape player is really a vital need if tape in this form is to take its place as a part of the hi-fi system.

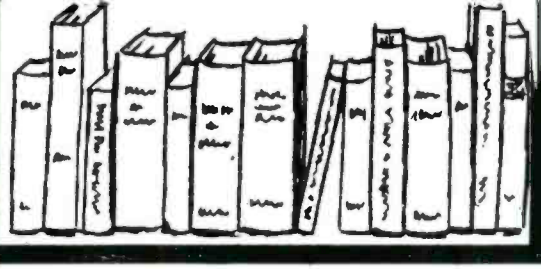
As far as my own feeling about tape playing is concerned, there isn't the slightest doubt that I will keep mostly away from tape records *until* I have a tape player for them—not a recorder. I keep my recorders for other uses. I don't want them cluttering things up as part of my record playing system. I really need a simple tape player of solid quality. So do you. Æ

TAPE GUIDE

(*from page 34*)

away from these magnets. In another form of permanent magnet erase head, a single magnet runs diagonally from the lower to the upper edge of the track, thus subjecting each particle on the track to a magnetic field which is changing in polarity and strength.

Permanent magnet heads generally do not erase as well as electromagnetic heads, and they tend to leave noise on the tape. Orientation of the head with respect to the tape is critical. The head must be automatically moved away from the tape when the recorder is in the playback mode. Hence the permanent magnet head is seldom used. Æ



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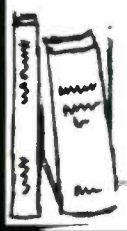

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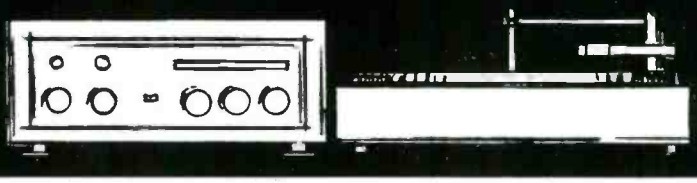

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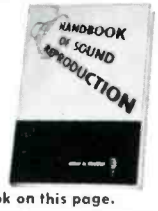

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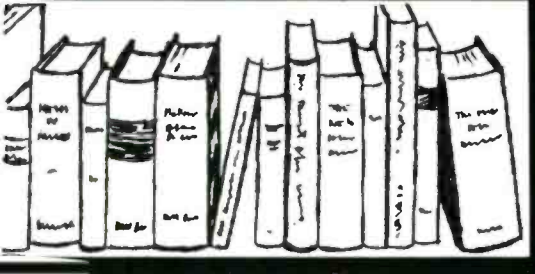

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SILICON DIODE IN AUDIO EQUIPMENT

(*from page 22*)

diodes unless wasteful voltage dropping resistors or chokes are added, and the penalty of somewhat poorer regulation is accepted. Of course there are many ways to mount diodes, and only the layout requirements control the method, for heat is no problem at audio power levels.

Diode Regulators

There is a form of silicon diode that can have valuable application in audio circuitry, and that is the Zener diode. These are silicon diodes with a somewhat different inverse voltage characteristic that makes them excellent voltage regulators.

Referring to *Fig.* 5, as an inverse voltage is applied to a Zener diode, there is a point where diode current will increase a great deal with a minute voltage increase. This is the Zener, or regulating point. Of course the maximum current must be limited. Zener diodes operate like gas regulator tubes, but usually at a lower voltage and higher current. They are small units like rectifiers, and may be connected in series for higher voltage regulation.

Figure 6 illustrates a simple and accurate d.c. voltage standard for shop use. An International Rectifier MZ27 Zener Diode was used. Its individual calibration chart, furnished with the diode, indicated regulation at 28 volts with 8 ma through the diode. Resistance *R* was selected to give the 8 ma with the diode shorted out. A wire-wound resistor was used for safety and stability. At ambient shop temperatures, the unit is simply turned on and meters are checked at the output. International Rectifier Corp. publishes an Engineering Handbook that covers the field quite thoroughly.

New Equipment Design

Now that we have covered many aspects of silicon diode power supplies, let us design a supply for a new amplifier.

The recently announced General Electric Company's 7189A output pentode seems worth a trial. The output tube is similar to the popular EL84, but G.E. has used a new heat-conductive laminated plate (anode) material, and has used all the spare base pins to act as heat sinks for the grids and plate. The tube will stand 440 volts on the plate. The screen will take 400 volts, or even 415 volts with a tapped screen arrangement. The rated voltages will give an output of 20 to 25 watts, which should be about right for most systems.

The popular Mullard circuit, considerably modified through long experiment, is extremely satisfactory, and was chosen. The old Ampex front end, the low-phase-shift 5879, needs about 210 volts for lowest distortion. The long-tailed-pair splitter using a 6CG7 in high-load operation requires 300 volts. The two first stages draw about 4 ma. The 5879 can be, and usually is, a very good tube, but there is an occasional variable that can be very bad, but those "sports" seem less frequent lately.

Depending on the operating mode, class B or AB, the 7189A push-pull pair will draw from 15 to 80 ma at zero signal, and about 125 ma at full drive. Thus a total power supply drain of 150 ma at steady peak drive will suffice for a monophonic amplifier.

To allow a small safety factor, a B plus of 390 volts at zero signal seemed about right. So if there were no power transformer and rectifier diode losses at zero signal, and if we didn't have to draw some current, the secondary voltage for a full wave center-tapped supply would be 390/1.414, or 275 volts on each side of ground for a center-tapped supply. The transformer would obviously have to supply a bit more than 275–0–275 volts, but just how much more was the question.

A 400–0–400 volt power transformer was available for tests. The primary was fed through a 10-ampere Variac to allow exploration of secondary voltage level. Silicon diodes were temporarily connected, a 30–30 μf, 500-volt capacitor was paralleled for 60 μf and was placed across the output. An 80-ma load at 390 v. d.c. would be: 39,000/8 = 4875 ohms, so a string of power resistors was wired to make the test load 5000 ohms, and the experimental supply was fired up. The desired 390 v. d.c. was obtained with 288 volts a.c. on each side of the center tap. A Triad R66BC transformer would fill the bill, as it is rated at 290–0–290 at 270 ma., furnishes 6.3 v. a.c. at 10 amps, and has a 5-volt 3-amp winding which is not necessary with silicon diodes. The transformer would require a rather large rectangular chassis cut-out, but aluminum is easily cut and filed.

The center-tapped full-wave supply was selected, as the amplifier was to be packaged in a California Chassis LTC 469, and space, especially height, was controlling. The output transformer selected was a Dynaco A410, which matches the 7189A's required 8000-ohm load, and will give 25 watts at low distortion.

Now for bias. There are real advantages to be gained in fixed-bias class AB operation, and accurate bias voltage assures consistent operation. An International Rectifier Corp. MZ18 (1N1515) Zener diode could be arranged to regulate the negative bias voltage to a balancing network. A bread-board test indicated that the desired negative 14 volts would hold without variation as the a.c. supply varied from 80 to 130 volts, so here was stability. A Triad F13X transformer has its 6.3 volt winding connected to the 6.3-volt filament supply of the amplifier. The secondary high voltage is rectified with a Sarkes Tarzian F4—another tiny silicon diode unit—and is filtered and fed to the regulating resistor and Zener diode. R_b was selected to give the required −14 volts, and 5000 ohms proved correct with a 19.5-volt regulated source.

The amplifier is shown in *Figs.* 7 and 8 and the circuit is shown in *Fig.* 9. The measured results were:

Power at clipping	22 watts
I.M. distortion at 20 watts	0.6 per cent
I.M. distortion at 5 watts	under 0.1 per cent
B plus at zero signal	390 v. dc
B plus at 20 watts	382 v. dc
Output tube I at zero signal (0.4V at test points)	80 ma
Input signal for 20-watt output	0.6 v. dc

This amplifier has operated daily for a number of months. Periodic measurements have been identical to the initial tests, indicating a very stable design. 7189A tubes operate quite hot, and proper ventilation is required.

This circuit is an adaptation of that described by the author in the March, 1959, issue of Audio, and that article covers component and circuit considerations that can be applied to this smaller unit. The 6CG7 may be replaced with a 12AU7/ECC82 with excellent results.

The Triad R93A power transformer can be connected to supply the proper doubler voltage for a stereo pair of the amplifier circuits, and will handle them at full power. In this case the optional stereo-decoupling of *Fig.* 4 has proved satisfactory.

Diode failure is possible, although theoretically it should be extremely rare. Out of sixty diodes in various circuits the author has experienced one failure, and this after 350 hours of operation. The diode was hot, and found to have 100 ohms resistance in both directions. Its mate in one doubler leg continues to operate properly. Other diodes in doubler and center-tapped supplies and as bias rectifiers have given complete satisfaction. Improved manufacturing methods, including diffused junctions, will make diodes more reliable. Theoretically, at least, they should last for years. Æ

JAZZ AND ALL THAT

(*from page 49*)

Maurice Chevalier: Toujours Maurice
RCA Camden CAL579
Thank Heaven For Maurice Chevalier!
RCA Victor LPM2076

Because on side of the lower-priced Camden reissue is sung in French and favors the music hall stage rather than Hollywood, it earns top billing here. Three numbers date from 1947, the year Chevalier brought his "One Man Show" to New York. The remaining three were recorded in 1930 for export to France, and include a version released in America for the first time of *Paris, Je T'aime D'amour*. Now if only some adventurous company would only import a slew of the vintage sides Chevalier made prior to his first visit to this country in 1928. MGM certainly profited enough from "Gigi" to take the risk.

Most of the hit songs from the star's early seven-year Hollywood stretch are listed on the Victor LP and the reverse Camden side. RCA's apologies for the sound quality on both are really unnecessary. Chevalier enjoys the distinction, along with such popular favorites as Sir Harry Lauder, Enrico Caruso, and Louis Armstrong, of being phonogenic under any conditions.

Brownie McGhee and Sonny Terry: Down Home Blues
Prestige Bluesvile 1002
Lightin' Hopkins: Autobiography In Blues
Tradition TLP1040

Although partners for nearly twenty years, Brownie McGhee and Sonny Terry only recently began to place their songs on records with sonics to do them justice. Long experience before all sorts of audiences has made them more polished performers than the average blues singer, and each number is a carefully sifted composite of older versions. Still, the basic pulse of the blues is never forgotten, and they form a team unique in the field. This installment includes Terry's dashing harmonica chase on *Fox Hunt*, *I'm Prison Bound*, and *Freight Train*. Sound of America, which last year programmed the pair in stereo on Janus, handled the production and the engineering is by Rudy Van Gelder.

Lightin' Hopkins continues his saga at the urging of Mack McCormick, pausing between personalized reworkings of traditional tunes to deliver episodes from life as he finds it in Texas and other Southwestern points. In less time than it takes to get his guitar in position, Hopkins can turn a plain everyday happening into a song. Those winning approval become part of his repertoire, though additions are apt to be made at any time to such themes as *So Long Baby, That Gambling Life*, and *Short Haired Woman*. Whether or not Hopkins is the best blues singer around is of small import when compared to an inventiveness which makes each of his stories true and alive.

Buddy Tate: Tate's Date
Prestige-Swingville 2003

Prestige adds another new division with this release and no better jazz series are to be found than those lurking under the Swingsville and Bluesville labels. The records also are often concealed in stores where dealers may have them placed on the shelves alphabetically, or at the begining, middle or end of the parent Prestige line. All those issued so far are well worth tracking down under any name.

Although the label is aimed at mainstreamers and admirers of older musicians, few jazz fans of any persuasion can afford to ignore Buddy Tate's new offering. It is easily the best made by the former Basie tenor-sax player since critics located him at Harlem's Celebrity Club. Now that the first flurry of excitement is over, the leader has happily settled down and puts the band through its paces just as he does at the club. One lone concession to working in a studio is the drafting of Wendell Marshall, bass, and drummer Osie Johnson. The arrangements are by the band's pianist, Sadik Hakim, and trombonist Eli Robinson, with a couple from Dickie Wells. All are likely to prove irresistible to dancers, while many listeners will experience a flood of pleasant memories at the band's sound.

Red Garland At The Prelude
Prestige 7170
Duke Pearson: Profile
Blue Note 4022

The average LP boasts one or two features which usually can be pointed out in the space of a paragraph or so. Once in a while one so outstanding over-all comes along as to defy such treatment. It could be said that the Prelude audience helps Red Garland to relax, but the pianist is always just as much at ease in a studio. The club atmosphere is nonetheless enjoyable, and a fine recording ensures the listener a choice seat with all the comforts of home. Garland slips an original blues in among a bewildering array of goodies, while cohorts Jimmy Rowser, on bass, and drummer Specs Wright never get in his way. After having gone that far, it would take a detailed analysis to arrive at the same decision—unreservedly recommended.

Duke Pearson proves to be a supremely lyric pianist, although his debut program also turns out to be somewhat baffling. A young newcomer from Atlanta, he seems intent on achieving the stature and independence of a Garland without having decided quite how to go about it. On two original works, he makes a determined bid for the admiration of jazz *aficionados* and fellow musicians, winning points by a wide margin with *Gate City Blues*, and *Two Mile Run*. Five standards are aimed at the large audience which has opened its collective pocketbook to Ahmad Jamal. Pearson not only plays considerably more piano, but is also more persuasive to my ears than Jamal. Gene Taylor provides a bass line as richly melodic as Israel Crosby's on *Witchcraft*, *Black Coffee*, and *I'm Glad There Is You*. Drummer Specs Wright lays down an exotic background on *Taboo*. Some smart managerial genius is likely to decide Pearson's future course. This may be the only chance to discover him before that happens.

Harold Land: The Fox
Hifijazz J612
Clifford Brown: Jazz Immortal
Pacific Jazz PJ3

Despite the absence of Max Roach, both dates contain spirited evidence of the drummer's leadership and recall memories of the not-too-remote heyday of his Quintet. Harold Land, who partnered the late Clifford Brown while with Roach, resides now in Los Angeles and still keeps the flame of their association alive. Gathered about him are four kindred souls, two of whom are making recorded debuts. Dupree Bolton, the newcomer on trumpet, is technically fluent and bears a marked resemblance to Brown, appropriately enough, in the vital drive of his playing. The test of his ballad style must wait until later, however, as the wily lope of the title tune sets the tone of the session. Herbie Lewis, another youngster on bass, is teamed with the seasoned Frank Butler, a drummer who makes every crisp accent mean something. The recording balance is a real treat for anyone who likes to know drums are being handled with restraint and still hear them. Besides leading the pack on tenor sax, Land shares writing honors with veteran pianist Elmo Hope. Most noteworthy is the construction of a tune dedicated to *Little Chris*.

Clifford Brown, while visiting the West Coast with Land and Roach in 1954, made one of the last of his studio appearances away from the regular group. To showcase his trumpet style, Jack Montrose wrote arrangements

for a septet featuring Zoot Sims, Bob Gordon, Stu Williamson, Russ Freeman, and Shelly Manne. As they present Brown in a different context less than two years before his death, the performances assume new value today and four of his originals are included in the reissue.

Thelonious Monk: Work!
Prestige 7169

Gigi Gryce: Nica's Tempo
Savoy MG12137

Now that Thelonious Monk LP's are selling to an ever-widening audience, some of his performances which were so bravely released several years ago are being restored to circulation. The Prestige reissue includes a quintet version of *Friday The Thirteenth*, along with a vivid description of the factors which contributed to the title. Monk's piano is also heard in a trio, where he is joined by Percy Heath and Art Blakey on two originals, and in a quartet headed by Sonny Rollins.

Gigi Gryce directs two groups for Savoy, employing Monk in a quartet and playing three of his originals. The spark of spontaneity is alive throughout, and the alto saxist contributes the title tune. On the reverse side, Gryce is involved in an ambitious duplication of the sound of the Miles Davis group of 1949. Ernestine Anderson sings *Social Call*, prior to the European visit which established her reputation. Each album is worth investigating, either for works not recorded again or because Monk never repeats himself in quite the same way. Æ

RIBBON MICROPHONE

(*from page 25*)

ences produced across the ribbon surfaces by the pole pieces, but is negligible compared to the much larger pressure differences produced by the pole pieces at higher frequencies. The natural tendency for the high frequencies to fall off as the distance d approaches a half wavelength is compensated by a broad resonant cavity gain due to the pole piece chamfer and also by a standing wave reflection gain due to the spacing of the case from the ribbon plane, the acoustic impedance of the holes in the fluted upper part of the case having a preferred value. The frequency response of this microphone is given in *Fig. 7*. The total harmonic distortion has a maximum value of less than 0.1 per cent for the vast majority of frequencies and sound levels normally encountered in operation.

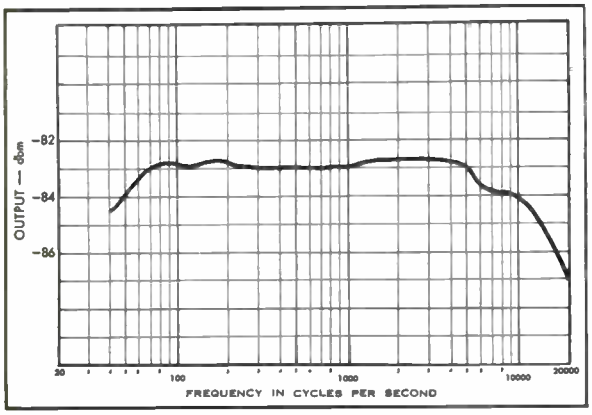

Fig. 7. Frequency-response curve of the microphone of Fig. 6. Impedance = 30 ohms. 0 db = 1 volt/dyne/cm². Plane wave sound incident at 0 deg.

Acknowledgments are due to Messrs. Standard Telephones and Cables, Ltd., for permission to publish this article.

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LIGHT LISTENING

(*from page 8*)

Lehar: The Merry Widow
Angel S 35816

Lehar: The Merry Widow
Vox STVX 421.400

Angel's latest recording of the most popular operetta of the past fifty-five years presents a Sadler's Wells Theatre production in a brand new English version. The Vox recording is a new pressing of a traditional Viennese performance that first came out on two-track stereo tape some years ago. Those who rate this show on its melodic content won't insist on a translation of the dated libretto. The words tend to get underfoot. With judicious treble reduction, the more distantly-miked Viennese cast can be reproduced in acceptable sound. The orchestras are equally competent but Angel's newer sound is especially welcome when the chorus enters.

Dance Along With Russ Morgan
Everest SDBR 1083

Let's Dance Awhile to the Griff Williams Style
Mercury SR 60173

The sweet bands for dancers seem to go on forever. Both of these outfits cater to the ma-

ture customer who likes his music on the folksy side. Russ Morgan has the advantage of Everest's 35-mm magnetic film recording technique but he certainly doesn't need all of that reverberation at full volume. The Griff Williams band continues smoothly despite the loss of its leader about a year ago. Mercury gives it the same elaborate treatment accorded David Carroll and Richard Hayman.

MONOPHONIC

A Thurber Carnival: Original Broadway Cast — Columbia KOL 5500

The special world of James Thurber is a product of drawings and words. Early this year, an anthology of his material reached Broadway in the form of a revue called "A Thurber Carnival." Portions of this quietly hilarious production have been brought to records by Columbia. Thurber fans, listening to this disc, will find it easier to visualize the drawn characters than they would in attending the show. Since the cast has been selected with care and insight, the ear is free to concentrate on the unique turn of phrase that is the trademark of one of the most polished humorists of our generation. There are no songs in the revue but Don Elliott's poised jazz quartet has been engaged to set the mood. The record's opening episode catches four couples dancing. They stop every few seconds for fragments of conversation that demonstrate how sharp a weapon the cliche can be in Thurber's hands. Tom Ewell impersonates the author in a reading of *The Night the Bed Fell* and *Memorial to a Dog*. He is understandably waspish in a sketch dealing with a lengthy and frustrating exchange of letters between the author and several echelons at the office of his publisher. Also included is the famous story of the *Unicorn in the Garden*, the brief *Little Girl and the Wolf* and the yarn about the mermaid in *Casuals of the Keys*. In this release, Columbia has a worthy companion to its other example of mature wit in recent theatre annals—"Mark Twain Tonight."

Bye Bye Birdie: Original Broadway Cast — Columbia KOL 5510

Competition among the leading labels is a rugged affair these days when the recording rights to a hit musical are being assigned. (In those cases where a disc firm puts money into a show, recording privilege then becomes part of the deal.) "Bye Bye Birdie," one of latest hits on Broadway, undoubtedly aroused very little interest within the inner circles of RCA Victor. The central character in the show, Conrad Birdie, happens to be a headlong take-off on their rock and roll star—Elvis Presley. It is a safe guess that Columbia's staff, for that reason alone, derived somewhat more than average pleasure in transferring the show to records. Even the technical crew got in on the fun during the recording session. When Dick Gautier, as Conrad Birdie, launches his first rock and roll song *Honestly Sincere* they throw in three times the reverb anyone has dared to use on the voice and guitar of such artistes. Music and lyrics by Charles Strouse and Lee Adams have just the right degree of tartness in commenting on the antics of Birdie's managers and teenage fans. One of the pleasant surprises in the album is the unhackneyed job turned in by Elliott Lawrence's pit band.

Swing Again — Capitol T 1386

Capitol has set up a separate label to handle reissues called the Star Line, and one of its first releases is this collection of top swing arrangements accumulated in its vaults by Les Brown, Benny Goodman, Glen Gray, Woody Herman, Harry James, and Stan Kenton. Updated pressings offer a crispness and clarity that wasn't there when the records first came out. We're all familiar with reissues on other labels that present top artists on pressings cheaper than those of the original releases but these are full grade in every respect. The new masters prove beyond a doubt that Capitol's studio work was a few years ahead of its time when these sessions were first recorded. AE

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RECORD REVUE

(from page 55)

2, No. 2. Saidenberg Little Symphony, Samuel Baron, flute.
Am. Society SAS 1001 stereo

These recordings have given me considerable anguish; the music upon them is priceless and in my favorite sphere, the project is a noble one in both cases, but I can't stand the playing.

That's where the trouble comes. Why? Saidenberg can well claim to be an early proponent of Baroque music. He is hardly rushing in at this point to capitalize on the current preference. I can't tell, in listening, which aspects of the music are attributable to him and which to the Gotham Ensemble—they do achieve a commendable unity of approach, generally speaking. All I can say is that these performances, speaking generally, violate my sense of Baroque style in very fundamental ways.

The slow movements drag, the end cadences are slowed down throughout in an anachronistic style out of an earlier and fuzzier concept of this now well-known music, the faster movements have a peculiar choppiness that I find very objectionable—and recognize as a too-familiar phenomenon in certain playing circles.

There is that tell-take pounding rhythm, that lack of phrasing, shaping, that is also peculiarly evident in the Baroque playing of many conservatory-trained professional musicians in this country—who would not think of playing Beethoven or Mozart in such a fashion but, for some reason, have come to believe that this jabbing style is the way "old" music ought to be played. It isn't.

Moreover, in line with this same parochial and narrow professional viewpoint, the tempi and expression of many movements simply go dead against what should seem fairly obvious indications to all who are up to date on Baroque practice. Worst of all, the inevitable dotted-rhythm slow introductory movements in several of these works—Purcell and Handel, for instance—are played in the old plodding, literal-minded "symphonic" style exactly "as written," which should have gone out with the Stokowski transcription but hasn't. Anybody ought to know by now that such music is rightly played with double-dots, the short notes taken shorter than written. These people don't (except in the Telemann Trio Sonata, where the rhythms of the opening are more normal).

All this causes me anguish because I think it unfortunate that musicians of the highly respected calibre of these men should still know so little of what goes on in the rest of their own musical world. True—they are busy, they work hard at playing, they have no time for listening and study. But they should take time—somehow. True, we critics are lazy—all we do is listen. I have enormous respect for any working musician and hence my unpleasant feelings in this case, where I can't help criticizing a serious lack of musical information on the part of this group of players, because I seem to have heard what they have not.

It would take a whole issue to discuss each of these works; there are many lovely spots in the playing, in spite of my objections, and the music is of sterling value through out. Read me—then go out and try them anyhow.

—JE

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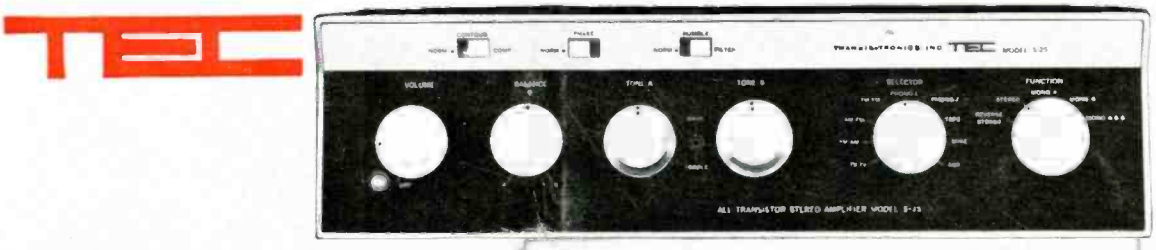

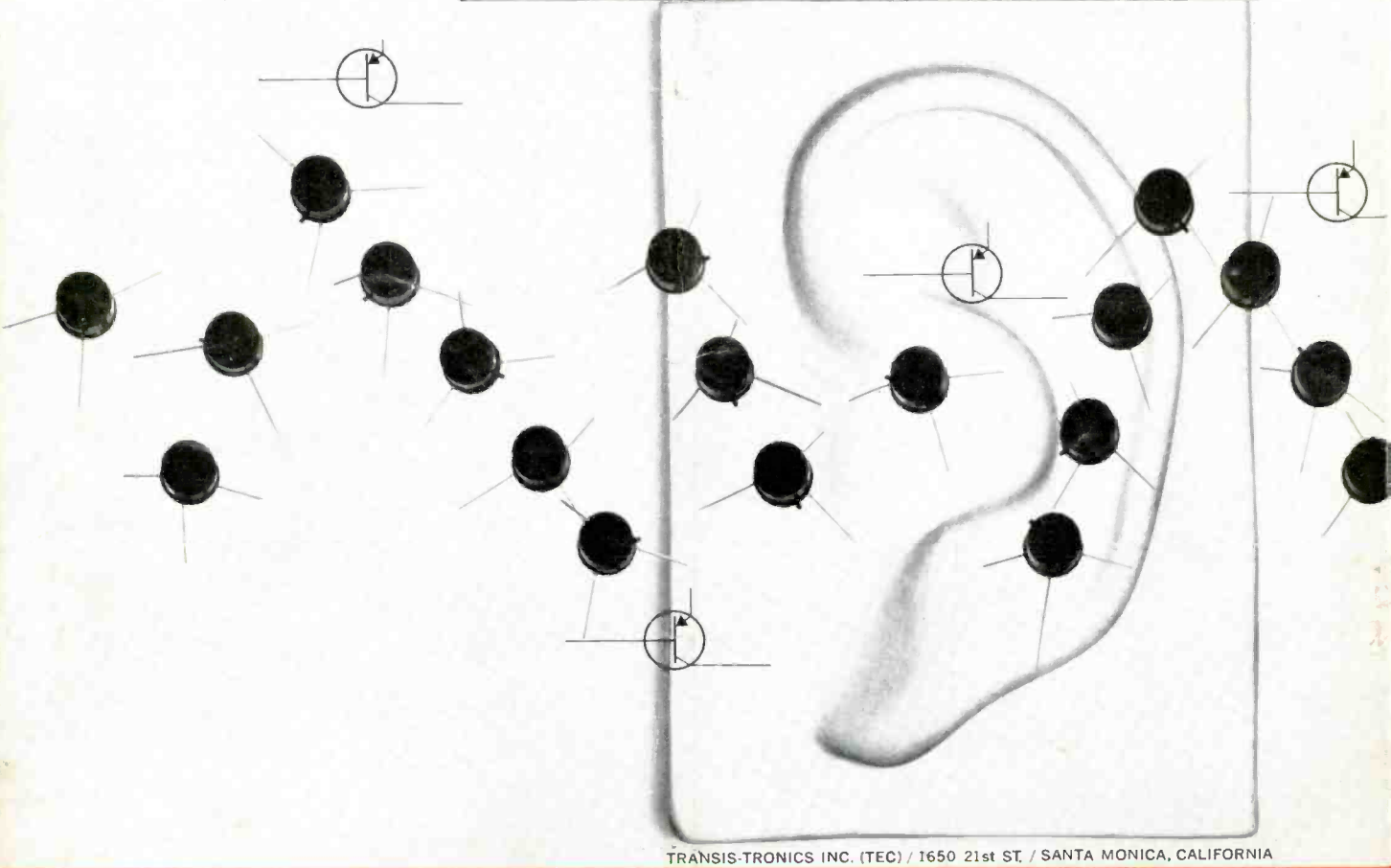

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