

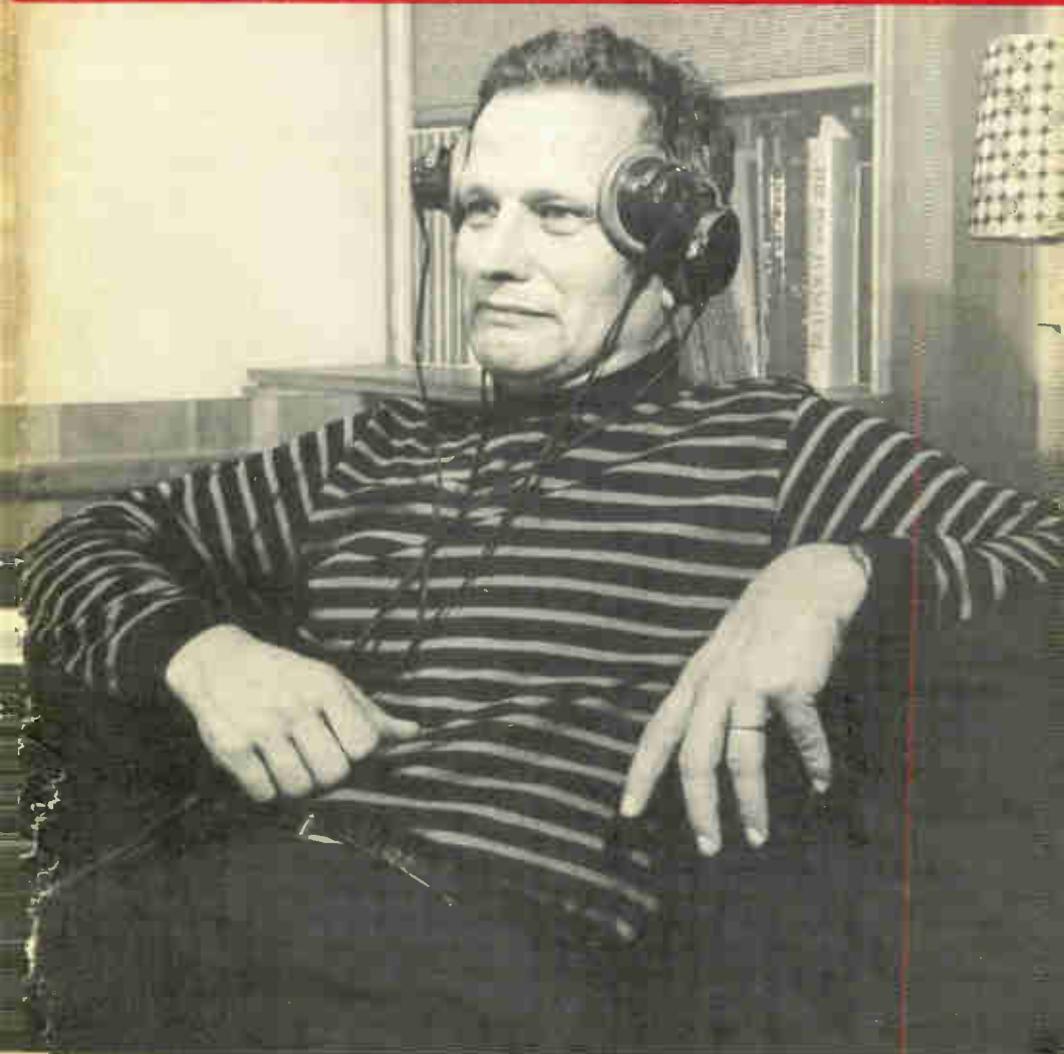
the

stereophile

Summer (2)

1968

For the High-Fidelity Stereo Perfectionist



Reports on: The Decalift; Dynaco A-25 speaker system; Acoustic Research amplifier.

Contents

Equipment Reports	
The Deccalift.....	7
Dynaco A-25 Speaker System.....	10
Acoustic Research Amplifier....	14
On Tape	
Professional Bias.....	21
Letters.....	25
Letters You'll Never Believe.....	29
Recommended Components.....	30
The Servo-Static I:	
A Preliminary Report.....	32
Miscellany.....	33
Audio Mart.....	34

Staff

J. Gordon Holt...Editor, Publisher,
Staff Writer, Chief
Tester & Drudge

Mary E. Holt.....Circulation Mgr.,
Assistant Editor,
Spouse & Drudge

The Stereophile is published four times a year by J. Gordon Holt. Circulation and editorial offices at Box 49, Elwyn, Pa. 19063. Published at 900 Sussex Blvd., Broomall, Pa. 19008.

Second-class postage paid at Philadelphia, Pa.

Subscription rates: U.S. \$5; Possessions and Canada \$6 (U.S. Curr.); Other Foreign Countries \$7. Printed in the U.S.A. Copyright 1969 by J. Gordon Holt. All rights reserved.

The Cover

Rising to the challenge of the new 4-channel tapes, at least one manufacturer has already unveiled a new breed of preamplifier equipped with headphone outputs. Now, all we need is a new breed of homo sapiens (or homo ausculans?) that is properly equipped to appreciate the new, improved sound-reproducing medium.

As We See It...

Two More Channels?

Four-channel stereo is here, but for how long?

By the time this gets in print, it is extremely unlikely that any of our readers will have escaped being told that 4-channel stereo is here. "Two channels brought us direction," the announcements trumpet. "Now, four channels bring us dimension." Now, for the first time in the history of hi-fi,* modern technology can bring us hall acoustics in stereo, to surround us with the sense of spaciousness that we hear in the concert hall.

On first hearing of this, our reaction was Whoopee! A breakthrough in realism! The more we read about it, though, and the more we think about it, the less inclined we are to do cartwheels of joy over this latest incentive to increased component sales.

Don't misunderstand; we like the idea very much. It is sound in principle, and it works just the way it is claimed to. In fact, if you haven't heard it, it's hard to imagine how much two channels of nothing but reverberation can enhance concert-hall realism. On the other hand, it is hard to believe how unrealistic this can be when those benighted recording engineers start playing games with the new 4-channel medium.

Just in case you've been living in a cave somewhere for the past

*Fascinating footnote: The Japanese pronounce it "hee-fee."

few months, we'll fill you in, briefly. In a concert hall, we hear not only the direct sounds from the instruments, but also a complex pattern of reflections from the sides and rear of the concert hall. Most of the time, we are not much aware of these reflections reaching us from all directions, because we tend to concentrate on the stereo-from-in-front that we our money to hear. But the subconscious mind does respond to the reflections, and tells us on the basis of their direction that we are indeed in a large enclosed space.

At home, in front of the two-channel stereo system, we concentrate once again on the instruments and the few reflections that are coming from their general direction, and we think "How realistic it is!" But the subconscious prods us in the ribs and whispers "But there's no concert hall around you. You're not in the hall; you're just peeking into it through a large doorway." And it keeps prodding, until we add another two stereo channels to reproduce the reflections from the right and the left behind us. Suddenly, the subconscious is placated, and the reproduction sounds more "realistic" to us, even though we may never before have been really aware that anything was missing.

In other words, 4-channel stereo is another giant step toward the you-are-there kind of realism that 2-channel stereo promised but never quite delivered. Of course, it costs another tape machine (or another playback head and two more preamps), another stereo amplifier, a completely new breed of stereo preamp with four channels, two balance controls and a 4-gang volume control, and two more speakers. But exorbitant cost has never stood in the way of audio advancement before, so why should it now? Because 4-channel stereo may not necessarily pave the way to greater realism.

Those old fogies among us who can hark back to the first days of 2-channel stereo may recall that

the added expense of the second channel was justified by the audio industry on the basis of enhanced realism. Learned treatises in the audio journals explained that, since stereo increased the detail of the sound, it was no longer necessary to spotlight soloists as in the old days, and microphones could be moved farther back to improve instrumental blending and to pick up more of the hall reverberation that contributed the sense of spaciousness in stereo sound.

Some early stereo discs were made in this way (notably by RCA Victor and London and, a bit later, by Deutsche-Grammophon), and they were stunningly realistic. Because of the simple and rather distant miking of the orchestra, stereo separation wasn't very wide; the instruments occupied a relatively small segment of the stereo "stage" between the speakers, while the rest of the space to the left and right of this segment was hall reverberation or "spaciousness." This was actually pretty much as one would hear things at a concert, from any seat more than about 50 feet from the stage. At that distance, you can tell that an instrumental section is approximately in that direction, but pinpoint location of instruments by ear alone is almost impossible.

Dwindling Ambience

But it soon became apparent to the record makers that this sort of recording perspective would not do. Perhaps it was because most record buyers insisted on console "stereos" with closely-spaced speakers, or perhaps it was because most record buyers, who hadn't been in a concert hall for years, didn't react at all to the sensation of spaciousness, and demanded instrumental directionality as proof that a stereo recording was actually different from a mono one. But whatever the reason, stereo recordings started getting closer and closer more and more widely separated, and as the instruments spread out toward

the loudspeakers, the space available for the ambient reverberation -- for the hall acoustics -- dwindled until it became nothing more than a shroud overlaying the whole panorama of direct sounds from the instruments.

Since the background reverberation no longer gave any information about the size of the performing hall, the recording industry decided what the hell, and took to adding the reverb via an echo chamber whose reflection characteristics bore no resemblance to those of any existing concert hall. The performing hall, as an aspect of recorded sound, was flushed down the drain along with most of the other niceties of sonic "realism" until, finally, we reached a point where recording engineers were admitting publicly (to the applause of some record critics who should know better) that recording was now an art form unto itself, divorced from the concert hall, in which the name of the game is "pleasant sounds." If a recording director thought an oboe would sound "more effective" if it resembled nervous flatulence, or if the market researchers had found that the public expected violins to sound like musical saws, the means were on hand to accomplish these things. And they were accomplished on increasing numbers of recordings, not in the name of music, but in the name of sound. Now, they have four channels to play with!

Sound-In-the-Round

Already, some of the 4-channel promoters are demonstrating honest-to-goodness sound-in-the-round, with instruments spritzing the listener from all directions like the spray jets of a speedy auto wash. But some other demonstrations, using the rear channels for hall ambience, have shown that the 4-channel medium can indeed produce a markedly better simulation of the you-are-there illusion than we are accustomed to hearing. But we wonder -- how much difference would there be between

the 2- and the 4-channel media if the 2-channel variety hadn't ceased to carry ambience information?

New Dimensions

Okay, you say, but if 4-channel stereo provides any significant improvement in realism, it's worthwhile isn't it? We agree that it could be, but whether or not it actually is depends upon what the recording companies who use it decide to do with it. Certainly, it will be great fun to see how it can be used to add, literally, new dimensions to popular music, which is a field where sonic innovation is an essential part of its growth. But it took hundreds of years of such innovation to refine the sound of a symphony orchestra and its environment to its present point, and we do not feel that a recording director with one eye on the cash register and the other on his creative fulfillment has the right to decide for us what an orchestra would have sounded like if Beethoven had had access to modern technology. And we are afraid it is this, rather than enhanced realism, that the two new channels will be used for.

Acoustic Research, Inc. (who led the development of the 4-channel medium) informed us that the first releases, from Vanguard, will be true ambient-stereo recordings, and will be issued only on 7½-ips open-reel format, to establish 4-channel at the outset as a quality medium. This is supposed to make it attractive to the hobbyists and serious listeners who form the stable base from which new developments gain public acceptance.

But Vanguard is just one of hundreds of recording companies, and most of them have proven through their past actions that they have less concern for fidelity, and the people who appreciate it, than Vanguard has demonstrated. In other words, we don't believe the rest of the industry is going to bother with the quality market. If Vanguard is not prepared to jump right in with

4-channel cassette and cartridge releases featuring instruments from four directions, we're willing to bet many of the other companies will.

Don't think for a moment that no "responsible" recording company would stoop to make the internationally-renowned Luxitania Philharmonic Orchestra sound like a musical carousel. Who would have thought that London Records would start using their "strictly-for-fun" Phase-4 technique for classical works, but now they're doing just that. And after the first 4-channel recordings of the Verdi Requiem and "Wellington's Victory" (with front and rear channels reversible, depending on whether we currently favor the English or the French) and some antiphonal religious works, what's a recording director to do? Keep his hands off the ambience channels? Not likely!

Sit Tight

On the other hand, what's an audiophile to do? Rush right out and buy all the new stuff necessary to play 4-channel tapes, in the hope that they will be more realistic and will be around for a while, or sit back and see which way the wind blows? Our inclination would be to sit tight, at least until the first spate of poorly-designed 4-channel preamps have bitten the dust and been superseded by ones that are worth buying.

We might even be inclined to wait a bit longer than that, because we are not at all convinced that 4-channel stereo is here to stay. Here's why.

We may have trouble proving this, but it is our belief that 2-channel stereo succeeded with the buying public for three main reasons. First, it did not take any judgement on anyone's part to perceive that it was basically different from monophonic sound. The press did a fine job of informing the public that stereo was new and better, but if they hadn't been able to hear the difference and to assume that directionality

alone was what made it better, they would not have bought it. Second, since the stereo disc was compatible with the established home-music medium, the LP disc, it did not require the learning of new patterns of handling, as did open-reel stereo tape (which had to be threaded, and did not go over the with the general public). And finally, the stereo disc appealed to all types of music buyers, from the audiophile to the tin ear that liked music but didn't give a damn about hifi. This allowed the whole recording industry to become geared to the stereo disc as the home-music medium, establishing it on its present rather firm base.

Now, how does the 4-channel-stereo medium shape up? Is it different from 2-channel stereo? Not really. Mono had no directionality, but 2-channel stereo has, and so has 4-channel stereo. More of the same, but not different. Is it compatible with the existing standard home-music medium? Not entirely. It is not practical at the present state of the art to put 4 channels in a single disc groove, so the person who wants four channels will have to get them on tapes. These, and their players, will probably be compatible with current 2-channel tapes and players, and since cassettes or cartridges look as if they may well become the "standard" mass-market medium for home music, we can grant that 4-channel tape will be compatible with a standard existing medium.

The hooker, though, is the matter of appeal. Who'll buy the 4-channel tapes?

Disc Holdouts

There should be no difficulty convincing serious-listener types -- audiophiles and record collectors -- that 4-channel stereo provides considerably greater realism. But both groups of buyers are likely to be strongly committed to the disc medium now, and while many of them -- the hobbyists in particular -- will probably get set up for 4-channel tapes, we doubt that they will

be eager to switch allegiances. Pre-recorded tapes have improved tremendously in recent years, but they still have a long way to go before they can equal the consistent quality of discs in terms of high-end response (tapes vary widely), hiss and over-all transparency. Then there is the simple but important matter of commitment. People who collect recordings (as opposed to those who buy them, play them to death and then discard them) generally collect discs rather than tapes, because the tape medium is too subject to technological obsolescence, often at the expense of fidelity. So this "hard core" of potential 4-channel users may be less than wholehearted in their acceptance of 4-channel tape, if indeed they accept it at all. We may recall that there was no such dilemma facing the record collector when 2-channel stereo came out. He could still play his treasured old discs on the same phono unit that played stereo discs, so nothing was lost as a result of the switch. Of course, he can still keep his phono unit and supplement it with a 4-channel tape machine, but that means more money and more space, and it doesn't change the fact that the increased spatial realism of the new medium must be gained at the expense of higher hiss, reduced transparency, and variable high end.

What about the rest of the buying public; the ones who determine in the long run whether something new can pay its own way? We may be proven wrong in this, but we do not think that J. Q. Public is going to pay for the two extra channels for the privilege of hearing reverberation in 3-D, because it won't mean anything to him. If you have never been in a concert hall often enough to develop even a subconscious affinity for aural spaciousness, you can't have learned to value it enough to pay money for it. They won't respond to it in four channels any more than they did in two channels, and will demand instrumental

directionality from all four directions. Plenty of record companies will be happy to give it to them, too, but the more the medium leans in this direction, the less it is going to interest the serious-music listeners. And although the record companies like to believe that it is the mass market that supports them (it is, economically), it is the hobbyists and the serious collectors who give a new technological advance the stability it needs to escape rapid obsolescence. They are often hard to convince, at the start, but when they accept something new, they do so out of appreciation for its intrinsic worth rather than for its fad value or snob appeal. It will not be hard to convince them that true ambient stereo is a legitimate technological advance, but it remains to be seen whether they will trade the other points of disc superiority for this one aspect of 4-channel tape's superiority.

As we see it, there is only one thing that might ensure the long-term success of the 4-channel medium: A serious effort on the part of the recording companies to produce tapes which are really sonically competitive with discs. At the present state of the art, this would mean using low-noise tape, end-to-end Dolbyization from master to final tape, automated quality control to reject tapes with dropouts, flutter and deviate treble response, and one-to-one-speed duplication (as opposed to the current high-speed duplication) directly from the original master tape (or final reduction copy of a multitrack master). It might also be a help if the industry offered a public commitment to make all future releases for the next ten years compatible with the present ones. Considering the likelihood of all this, we expect the two-channel stereo disc to be the leading high-fidelity recording medium for a long time yet, even if the recording engineers don't elect to use the two new channels for fun and games with Mozart.



stereophile reports



Stereophile Reports are primarily subjective reports, based on actual use of components in the home. Components for testing are taken from dealers' stock or, when not available locally, are obtained from the manufacturer, and only one sample is tested unless indications are that it is defective. If a retest is necessary, our experience with both samples will be reported. The manufacturer is sent a copy of the report prior to publication, and may if he wishes append a manufacturer's comment. He cannot, however, demand that the report be changed or that it not be published. Stereophile Reports are copyrighted, and may not be reprinted or quoted without the written permission of the publisher.

The Deccalift

DESCRIPTION: An automatic cueing device for transcription tone arms.
Dimensions: See detail drawings.
Price: \$35. IMPORTER: Paoli High Fidelity Consultants, P.O. Box 876, Paoli, Pa. 19301

Some years ago, the Rek-O-Kut Company introduced the first automated tone arm under the name of Auto-Poise. It consisted of Rek-O-Kut's best transcription arm, with a mechanized lift-up and set-down device that duplicated the functions of a record changer in every respect except for the record dropping. It went over like the proverbial lead balloon.

Perhaps this was because most casual record listeners wanted the convenience of a real record changer, while most serious hobbyists resented the implication in Rek-O-Kut's literature that their discs would get better care if they kept their hands off their tone arms.

Now, six years later, we have a device from England that looks like another Auto-Poise, but isn't.

Like the usual record changer, the Auto-Poise could place the stylus in the lead-in groove, or lift the arm from the disc and return it to the at-rest position, but it could not lift the arm in mid-play without returning it to its at-rest position. In addition, the automating mechanism could not be used with any tone arm except that particular Rek-O-Kut model, and there were some other arms that many

users preferred to that one.

The Deccalift is not like a record changer. It will not position the stylus over the lead-in groove, and it will not lift automatically or return the arm to its rest post after the side is finished. But it can be used with most available tone arms, and when it lifts the pickup in mid-play, it holds it poised until lowered again -- usually right into the same groove.

This is why we believe the Deccalift may succeed where the Auto-Poise failed. When you're standing right at the record player, as you would be after having just laid a disc on the platter, it is easy enough to position the pickup over the lead-in and lower it. The fact that the Auto-Poise did the same things automatically might provoke a passionate ho-hum.

But if you want to position the pickup, and then saunter back to your chair and pour a Martini before you start listening, neither manual lowering nor Automated Poising will do the trick. The Deccalift will. And if you want to interrupt a side between bands, or even in the middle of a selection, without having to leave your seat, the Deccalift will do this, too, and will allow you to resume playing the disc whenever you feel like it. And to us, this is a convenience that is worth something, particularly if your listening location is some 30 feet from the phono unit.

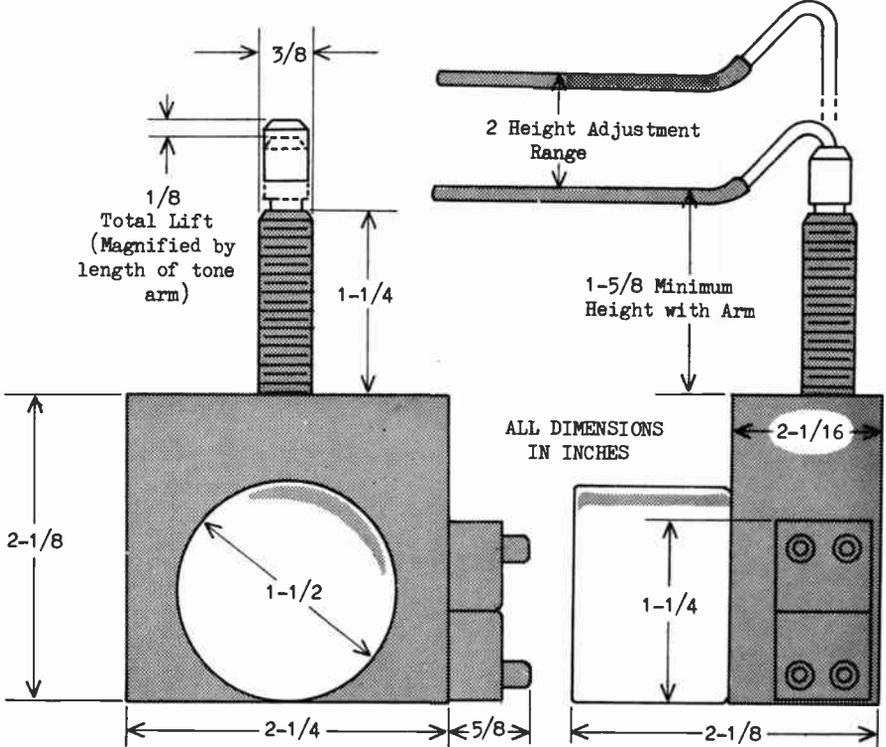
The design of this device is so simple that it is most unlikely that it could get out of adjustment or wear out with normal use. A small,

slow-speed motor with an eccentric cam on it raises and lowers the tone arm once for each revolution of the cam, and two simple leaf-spring switches are so arranged as to shut off the motor after each half revolution. An external switch starts the motor by feeding power through the leaf-spring switch that is closed, and lets it run until it shuts itself off. Then, flipping the switch to feed through the other leaf-spring switch runs the motor through another half revolution until it shuts itself off again.

The motor is a 6-volt AC type, which means there are no lethal voltages brought outside of the phono unit, and little possibility of a shock even if you should drop the remote-control switch into the bathtub with you. The 6.3 volts can be drawn from the heater circuit of a tube-type amplifier, or from one of

the small filament transformers sold by parts supply houses. The motor draws less than 0.1 amps of current, and only during those brief periods when it is actually running.

If you use an amplifier for the 6-volt source, make sure its heater supply is grounded directly to the chassis, rather than through a "bias supply" network that would put it 50 to 100 volts above chassis potential. With an insulated control cable and the fully-enclosed switch that is provided, a shock would be unlikely anyway, but there's no sense asking for trouble. (Such a shock could be painful but hardly lethal, because of the high-resistance source.) Since most people are now using solid-state amplifiers, which don't have heater supplies, the external transformer will be the most usual power source, and this presents no shock hazards at all.



The transformer may be installed directly under the turntable (as far from the pickup as possible), and supplied from the turntable's AC switch, or can be placed near the electronic equipment and supplied from any switched AC outlet. Hum radiation from it will rarely be a problem, even with acutely susceptible inductive components in the vicinity, because of the small amount of power going through the transformer.

As originally supplied by Decca, the Deccalift comes with a single remote-control switch, and no inter-connecting wire. The importer that supplied us with our test sample is adding a second switch to every Deccalift, to allow control either from the remote location or from right at the turntable, should you choose to install both switches. Alternately, you can use both switches as remote controls, but this necessitates running six wires to one of the switches, which will make for a pretty bulky cable.

Normally, the remote-control cable will be a three-conductor light-duty variety, available from most parts suppliers.

Decca's installation instructions proved to be incorrect (the wrong mounting location was cited), but importer Paoli High Fidelity Consultants has made appropriate corrections in the instructions. We are amazed though that a firm with English Decca's international reputation could make such silly errors. Even with the revised instructions, installation of the Deccalift is not the simplest of tasks. Physical mounting is a snap -- the device mounts in a 3/8-inch round hole in front of the tone arm base. The only slightly tricky phase of the operation is the correct positioning of the hole so that the Deccalift clears any obstructions under the motor board and still contacts the arm at the right point. We are publishing dimensional views of the Deccalift so you can determine beforehand whether or not it will fit

your favorite arm-and-table combination.

To anyone who feels that something like the Deccalift is in rather the same "gadget" category as power windows in an automobile, we can only say "Of course it is." But like power windows, we've found the Deccalift useful enough that we would rather not do without it in future. Call it laziness if you wish, but isn't laziness really the reason for every one of our modern "conveniences?"

MFR'S COMMENT: As mentioned in the report, the Deccalift is almost a necessity for the audiophile whose equipment is in a different room from his loudspeakers. However, we feel the Deccalift is more than just a convenience even when used from close to the phono unit.

Many loudspeaker manufacturers have reported burnouts from high-powered amplifiers as the result of dropping the pickup onto the record. In minimizing the likelihood of this, the Deccalift is as much a safety device as a "convenience."

The Deccalift is manufactured by the Decca Gramophone Co., Ltd., of England, which is in no way associated with Decca Records in the U. S. A.

Dynaco A-25 Speaker System

MFR'S SPECS-- Type: Two-way dynamic bookshelf loudspeaker system. Impedance: 8 ohms. Power ratings: minimum amplifier 15 watts contin. sine watts/ch; maximum signal 70 watts program. Dimensions: 19-3/4 inch W by 11 1/2 H by 10 D. Price: \$79.95. MFR: Dynaco, Inc., 3060 Jefferson St., Philadelphia, Pa. 19121

Everyone knows that a lot of serious music listeners -- that is, those who listen to music instead

of using it as a conversational background — have neither the space nor the money for a pair of typical floor-standing speakers, and must make do with bookshelf-type systems that are actually small enough to put in a bookshelf. But while the typical audio perfectionist will freely admit that there is a place in the audio sun for these dinky little speakers, he cannot really take them seriously, particularly when they're priced significantly under \$100 each. At least, that has been our feeling about the cute little boxes we've tested, and as a result, we have always tended to marvel at any pretensions to quality in them, rather than compare them directly with the "full-sized" systems that we have come to expect something from.

Dynaco warned us in advance that the A-25's were "something special," but since we have heard exactly the same kind of ballyhoo about every other new product we've ever tested, we could be forgiven for being just a little skeptical. Of course, Dyna's stuff had been pretty good in the past, but how much could anyone really do with a speaker just a little bit bigger than a large bread box. Nice highs, maybe, but perfectionist-type bass? Not a chance!

According to the laws of physics, small dimensions are just not conducive to deep-bass reproduction. Small cones tend to be lighter than large cones, and thus resonate at a higher frequency. And a woofer's output normally falls off progressively below its resonance point. Enclosing the woofer tends to raise its resonant frequency even further, and the smaller the enclosure, the more the resonance is raised, and the more pronounced it becomes. And as if that weren't enough, a small cone can't get a big enough "bite" on the air to produce long-wavelength pressure changes. Hence, the speaker's efficiency diminishes as the frequency goes down. These are the hard facts of audio life, but while

there is no known way of repealing the physical laws involved, there are ways of circumventing them.

For example, it was learned many years ago that the dwindling low-end efficiency of a cone could be offset to a large extent by letting the enclosure resonate at a lower frequency than the cone, and cutting a hole in the front of cabinet to let its internal pressure augment that from the front of the cone. The hole also relieved some of the internal pressure buildup (making the enclosure behave as though it were somewhat larger), and it was found subsequently that if the passage of air back and forth through the hole were limited to some extent by the addition of acoustic resistance (via a couple of layers of burlap, for instance), the sharpness of the two resonant peaks could be reduced to the point where the whole low end was acceptably smooth. This "bass reflex" system (generally attributed to Jensen Loudspeakers, Inc.) was the accepted way of producing "small" (that is, smaller than large horn-type) speaker systems until Ed Villchur spawned the acoustic-suspension system.

By the end of the 1940's, some designers had found that stuffing an enclosure full of fiber glass had the effect of making it behave like a larger enclosure, and also helped to smooth out resonances. If the enclosure were totally sealed, only one resonance would develop, and if the proper design parameters were chosen, the resulting system could give smoother bass and just as good low-end range as a bass-reflex system of comparable size.

Because of the lack of augmentation from internal pressures, the whole bass range was slightly less efficient than from a bass-reflex system, but since higher-powered amplifiers were becoming increasingly common, it was no great disadvantage to have to reduce the system's upper-range efficiency slightly in order to match the low end.

Villchur's acoustic suspension system just carried the stuffed "infinite baffle" principle (used in Bozak speakers at that time) a step further. The suspension of the woofer cone was made exceedingly flexible (to reduce its free-air resonance to an extremely low frequency), and the air pressure in a small enclosure was used as the main source of "restoring force" (the force needed to return the cone to its "at-rest" position between vibrations). The combination of a heavy cone, a small sealed box and just the right amount of internal stuffing yielded a broad low-end resonance that could maintain a fairly flat low end down to around 30 Hz, and although the efficiency was now even lower in the bass range than that of the larger completely-enclosed systems, 50-watt amplifiers made it practical to reduce the entire upper-range efficiency even further, to match the low end.

The first AR system (the AR-1) and its successor, the AR-3, were the ideal size for no-holds-barred low-end response, and the slightly smaller AR-2 carried the principle down to its practical limit of miniaturization. Smaller systems ran into the same inflexible laws of physics as before (before the fiber-glass stuffing, that is), and in order to cover up the resulting lack of deep bass from them, designers found it necessary to underdamp their mid-bass resonance to give "fullness" to their sound. So while these ultra-compact systems sounded balanced, they also had a characteristic boominess and a conspicuous absence of output below their boom range. Clearly, the acoustic suspension system was no longer enough.

In view of the history of the small loudspeaker, it is surprising that nobody thought of Dynaco's "aperiodic" system a long time ago. The bass-reflex system allowed for a significant reduction in cabinet size without undue sacrifice in low end range, without any stuffing in the cabinet. Eventually, it must

have occurred to someone to add a reflex port to a stuffed enclosure.

We don't really know whether or not the A-25 qualifies as a genuine bass-reflex system, but its construction and behavior suggest that that is exactly what it is, although this particular variety works the way earlier versions should have but never quite did.

As before, the hole in the A-25 enclosure relieves some of the internal pressure buildup and feeds some out through the front to augment the woofer's front radiation, and a "plug" of acoustically resistant material in the hole reduces the amplitude of the system resonances and spreads them out to the point where they become virtually a smooth low-end rise through the range where the woofer would normally fall off. The result is not quite an "aperiodic" system, but is at least "essentially nonresonant," to quote from Dyna's poop sheet.

The A-25 differs from other acoustic-suspension-type systems in another respect, too. Most of these use rather heavy cones, to keep the system resonance as low as possible, concomitant with the other design parameters. The A-25's cone is considerably lighter, and this plus a lower-than-usual crossover frequency (1500 Hz as opposed to about 2 kHz) should, at least in theory, assure better transient response than is typical of such systems.

The tweeter is described as a non-rigid hemispheric (dome) type, whatever that may be, and tweeter/woofer balance is adjustable by a five-position switch at the rear of the enclosure. The switch knob, by the way, is quite small and relatively difficult to turn. It won't challenge the average adult, but it will frustrate any child who's too young to have learned to keep his mitts off things.

We compared the A-25's with two systems of comparable price — the Acoustic Research AR-4x (\$57) and

the KLH Model Seventeen (\$70) -- and some top-rated higher-priced systems -- Janszen Z-600's, Acoustic Research AR-3a's, and a single pair of KLH Model Nine panels. Readers of previous *Stereophile* reports will recall that we have faulted many an otherwise-excellent loudspeaker system for coloring the critical musical range, because we feel that if a speaker distorts instrumental timbres, no amount of dispersion or bass or treble range can make it any more accurate a reproducer of music. The speakers we put up against the A-25's were all outstandingly good in this respect, so we were most curious to see which, if any, the A-25's could match. Would you believe, the A-25's beat out all of them!

This is one of the very few speaker systems we have ever heard that seemed to have virtually no sound of its own. Brasses, strings, woodwinds and most percussion instruments were reproduced equally naturally and with nary a trace of hollowness or nasality or steeliness, and it was just not possible to characterize the sound as Row-A or Row-G or Row-M. In these respects, it was slightly better than the best of the other systems we compared it with.

Dynaco has the center position of the balance switch indicated as the Flat position, so we started our tests with the balance set accordingly. We found no reason to change this, in the three rather acoustically different rooms we listened in, so the following comments apply to the systems with that balance setting.

Treble dispersion was excellent: estimated at about 100 degrees, and without any significant interference effects between drivers. As a result, stereo imaging was excellent, and good stereo spread was obtained even when sitting to the left of the left-hand speaker (and vice versa). Efficiency was typically low for a compact system -- around 1% -- but power-handling ability was consid-

erable. These speakers were able to put out rather more clean sound than some slightly-higher-efficiency systems, including the Janszen Z-600's, which tended to get a bit muddy at equivalent levels. Dynaco's literature makes a strong point about the smoothness of the A-25's impedance curve, explaining that solid-state amplifiers are less tolerant of load impedance variations than were tubed amplifiers. This is true, but we did not think the problem was quite as acute as the A-25 proved it to be. By actual comparisons, the AR-3a is only slightly less efficient than the A-25. But we were able to get almost 4 db more clean signal from the A-25's than from the AR's, which do have rather more variable impedance.

At the high end, the A-25's were good but not really outstanding. Generally, the impression was of considerable smoothness but with a very subtle roughness up around 10 kHz and a mildly soft quality which we found much more agreeable than the hardness which passes for hi-fi in a lot of other small systems. We judged the A-25's about equal to the AR-4x's at the top and somewhat smoother than the KLH Seventeens. At the low end, though, it was a different story.

Unlike most small systems, which need all the low-end augmentation they can get, the A-25's tend to put out too much bottom in most rooms when placed on the floor or in the room corners. Best results were obtained in most instances with the speakers a couple of feet above floor level, which is convenient in view of the fact that these are, after all, supposed to be bookshelf systems.

Both the AR-4x and the Seventeen have a noticeable amount of the mid-bass heaviness that seems almost to be an innate characteristic of ultra-compact systems, so whatever output they may have in the extreme low-bass range is rather effectively masked by the upper-range weight. By contrast, the A-25's seemed at

first to be deficient through the entire low end, at least until some really deep stuff came along. When it did, what came out of the A-25's simply defied belief, for they went deeper even than two of our "standard" systems, the Z-600's and the KLH Nines.

We knew that a single pair of Nines, with the panels separated, start to roll off below about 50 Hz, and that the Z-600's in most rooms start to dwindle below 40 Hz. But we were certainly not prepared to find these piddling little Dyna systems going flat down to 35 Hz and rattling windows at a hair below 30 Hz! And this with a degree of detail and tightness that rivalled the Nine's and ran circles around the Z-600's.

The AR-3a, of course, is practically in a class by itself when it comes to low-end range. With virtually flat bottom down to around 25 Hz, nothing short of some monster systems can equal it in this respect. Certainly, the A-25's couldn't. But in the matter of transient response, particularly through the woofer's range, the AR-3a has left something to be desired, and it is here where the A-25's offer the AR-3a's some real competition.

In test after test, the A-25's revealed more bass detail than the AR-3a's and, in most cases, produced a more natural bass/treble balance than the larger AR's. Some listeners have complained about a certain "heavy" or "thick" quality about the AR-3a's sound. The A-25's had virtually none of this, and neither did they have any of the mildly distressing "crinkling-paper" sound that is so common in small acoustic-suspension-type systems. In other words, as ridiculous as this may sound in view of the price difference, we would opt for a pair of the A-25's over a pair of AR-3a's.

As we mentioned, the AR-3a's real point of superiority is in low-end range. But since both systems more than span the low-end range on commercial recordings, the AR-3a's su-

periority down there strikes us as being somewhat academic.

Only in one respect did we find the A-25's to be clearly inferior to two of the systems we compared them with: transparency. By comparison with the liquid clarity of the electrostatic systems, the A-25's had a dry, almost grainy quality and a somewhat dead sound. There was however practically no sense of restricted high end, so we attribute the difference mainly to the simple fact that nobody has yet managed to design a dynamic loudspeaker driver whose transient response can challenge that of an electrostatic.

Actually, we have heard some dynamic systems (like the Altec A-7-500 and some of the Hartley units) that had more apparent transparency than the A-25's, but these were much higher-priced and had a few minor shortcomings of their own. Actually, although we were not able to make direct comparisons, the A-25's reminded us more of the KLH Model Twelves than anything else we've heard, although our recollection was that the Twelves had a shade more impact and detail at the bottom, a somewhat better-detailed high end, and a subtly drier sound than the A-25's.

Summing up, then, we feel that these A-25's are better than anything else we've ever encountered for less than \$200 each, and are worth consideration in any but the highest price category. We will even go so far as to say that they are quite probably the best buy in high fidelity today.

If you're looking for some small loudspeakers for a second, remote listening location, these would seem to be the logical choice. For a main, price-no-object speaker setup, you can buy better transients and more efficiency and, perhaps, deeper bass with equivalent or better detail, but you'll have a hard time buying more musical naturalness at any price. Just one other suggestion, though: don't tell your status-

conscious friends how much they cost. They don't sound quite as good when you know.

MFR'S COMMENT: The aperiodic design is not a bass-reflex approach, since there is no acoustic output through the port. The characteristics of the "plug" in the port are quite critical, necessitating individual adjustment of each system. This added acoustical impedance damps the woofer, improving its response to transient signals.

Examination of the woofer cone motion shows that, with this aperiodic design (on which patents are pending), the cone follows the input signal all the way down to DC with far greater precision than is the case with either bass-reflex or acoustic-suspension designs.

Acoustic Research Amplifier

MFR'S SPECS-- Type: Integrated solid-state stereo amplifier. Power rating: 60 watts/ch contin. sine-wave into 4 ohms; 50 watts/ch into 8 ohms; 30 watts/ch into 16 ohms. Dimensions: 15-3/4 inch W by 4 1/2 H by 10 D, with wood cover. Price: \$250 with black aluminum cover; \$265 with oiled walnut cover. MFR: Acoustic Research, Inc., 24 Thorn-dike St., Cambridge, Mass. 02141

The first time we saw an AR amplifier (at a Hi-Fi Show), we were struck by its bland, almost anti-septic appearance. Amidst all those other audio products that looked as though they had been high-styled for Madame's boudoir, the unadorned simplicity of the AR amplifier made it stand out like an Eames chair at Williamsburg.

Well, now that we've looked at that simple, symmetrical control panel for a while, we have come to feel rather differently about it. We

still feel it is bland, and maybe even antiseptic-looking, but like simply-designed furniture, it is easy to live with, it doesn't draw attention to itself, and it blends with any decor. As a matter of fact, we began to notice how garish most other control panels are.

To the hi-fi hobbyist, the first reaction to the AR amplifier is likely to be "Where are all the controls?" There are in fact fewer controls on it than on most competing units, but whereas many others have some rarely-needed controls, or oft-needed ones that don't function very well, the AR has about the most useful controls of anything currently on the market.

There is a total of nine front-panel controls: input selector, volume, tape monitor switch, coaxial (slip-clutch) bass and treble controls, and a mode switch to select Mono (A+B), Stereo or Null.

The Null position is a test mode, and is used for establishing exact electrical balance between the two stereo channels. Unlike the Mono mode, which adds the input signals (A+B) by combining them in phase, the Null mode combines them out of phase to make the signals subtract from one another (A-B). Thus, when the signals to the two stereo channels are the same, and of exactly the same volume, the result is almost-perfect cancellation, or a "null."

The channel blending takes place after the channel balance control, so if slightly unequal volumes fail to "null" completely, they can be balanced by adjusting the balance control for maximum nulling. And since both amplifier channels have essentially identical gain following the balance control, the signal balance required for maximum nulling will deliver equal outputs to the speakers when the Mode switch is set to reproduce program material.

The null adjustment must be carried out with monophonic program material, because if the input signals to both channels are not iden-

tical, they won't cancel each other completely no matter how perfectly they are matched in volume. Consequently, although the Nulling feature allows one to correct for inherent imbalances between the outputs of tuners, pickups, and so on, it can't be used to set the balance of a stereo signal. On the other hand, as far as we're concerned, if you can't hear an imbalance between stereo channels, why worry about it? And if you can, who needs a special test mode to help you correct it?

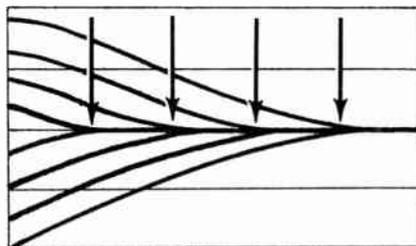
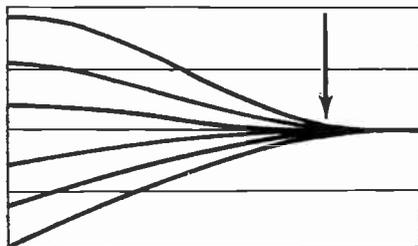
In addition, it must also be noted that, even with mono material, electrical channel balance does not ensure acoustical balance. Differences in loudspeaker efficiencies, differences in tweeter balance settings, and asymmetrical room acoustics can still make the system sound unbalanced, even when the amplifier output signals are perfectly matched. So although the Null is useful for establishing a starting point, the balance control setting that you use must ultimately be determined by the stereo balance that you hear.

Most modern preamps are equipped with two sets of magnetic phono in-

to source without a drastic change in volume. And with a separate level-set for each phono channel, the pickup outputs can be made perfectly equal.

Perhaps the most conspicuous departure from "traditional" design, though, is in the AR amp's lack of any "loudness control." We have yet to find a preamplifier whose loudness control really worked properly. So-called loudness-compensated volume controls, in which the compensation can be turned on or off with a switch, almost invariably provide either too much or too little compensation. Most perfectionists just leave the switch turned Off all the time, but this does nothing to ameliorate the rather poor volume-control tracking that is caused by the volume control taps that operate the automatic loudness compensation circuits.

Acoustic Research decided, wisely in our opinion, to abandon the automatic type of loudness compensation and simply design the unit's bass and treble controls to provide whatever degree of loudness correction that the user wishes to apply. The



Variable-slope (left) and variable-inflection bass control curves, with arrows showing inflection points where control action begins.

puts: for high- or low-output pickups. The AR has what we consider to be a far superior arrangement: a single pair of mag phono inputs and level-set controls. Thus, not only can a wide range of pickups be accommodated, they can also be matched in level to the amplifier's high-level inputs, so the Input selector can be switched from source

fact that the resulting tone control action is eminently useful for other forms of tonal correction may or may not be coincidental.

The action of these controls strikes us as being as close to ideal as any we've ever used. The bass control is of the so-called variable-inflection type, which affects only the lowest frequencies

at moderate control settings, and moves the inflection point -- the frequency at which boosting or cutting starts to take place -- upwards as the control is turned farther from its Flat position. Thus, it can be used to fill out the extreme bottom end of a speaker system that rolls off gradually below 60 Hz (as do most moderate-sized systems), or can be advanced farther to fill out the entire low end of a thin-sounding program source. You can also, incidentally, do a better job of loudness compensation with it than you can with practically any so-called loudness control.

At the high end, the tone control action is essentially variable-slope, which is to say, the inflection point changes relatively little but the steepness of the curves increases as you rotate the control from its mid point. This is rather less effective for dealing with loudspeaker problems, but is ideal for coping with most of the high-end deviations encountered in typical program material.

About the only thing for which an audio hobbyist might fault the AR amplifier is its relatively small number of inputs. Besides the mag phono inputs, there are only two high-level inputs. This arrangement will handle a turntable, a tuner and a tape machine, but if you hope to include also a TV sound input or a second turntable or a videotape recorder in your system, you will need external switching facilities for them. On the other hand, adding the necessary switching should be no problem for anyone who's handy with tools. Just remember to shield the switch connections, keep high-level signal grounds isolated from phono grounds and left-channel grounds isolated from right-channel grounds, and use the shortest possible lengths of shielded cable to and from the switches.

As far as protective features are concerned, AR seems to be much more confident about the durability of their amplifier than most other

solid-state amp manufacturers. There are no instant-acting shutdown circuits in the amp at all; the line fuse and the thermal cutoff relays on the output stages are both slow-acting devices intended to protect only against prolonged overloads or catastrophic power-supply failures. There are however a couple of fast-acting fuses in series with the loudspeaker lines, and while these are ostensibly there to prevent loudspeaker damage,* they also provide a degree of overload protection for the output transistors themselves. Rather than satisfy our curiosity about this at the outset of our tests, though, we left the blowout-protection checks until last.

We tested the AR amplifier with three varieties of loudspeaker: an all-dynamic system (Dynaco A-25's), a dynamic/electrostatic system (Janszen Z-600's), and a full-range electrostatic (the KLH Nine). On all three, the sound was very clean and lucid, but not without some degree of coloration.

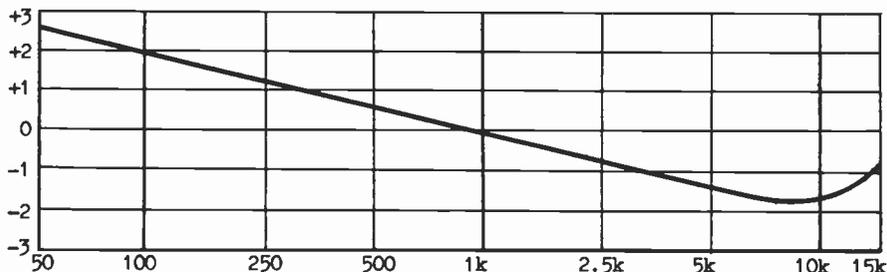
Transparency was very good despite a barely detectable hint of graininess, crescendos were handled very cleanly and solidly, overload recovery was extremely fast (unless the protective thermal breakers let go, in which case it took several seconds for the dead channel to come on again), and when mild clipping occurred, the resulting clicks were judged relatively innocuous.

In comparison with other top-of-the-pile amp/preamp combinations we have heard, the AR amplifier sounded somewhat heavy and soft, as though most of the frequency response curve

*Solid-state amplifiers are much more prone to blow out loudspeakers than were tube-type amps because of their superior low-frequency power-output capability. A subsonic pulse that would simply saturate the core of an output transformer may pass through a solid-state amplifier at close to full power output, and few speakers can handle such an impulse without tearing themselves apart.

was tilted downwards towards the right. Frequency response measurements revealed a very slight rolloff at the high end, but nothing to suggest why the amplifier sounded the way it did. To the contrary, the AR amplifier sounded as if it were very slightly tipped up at the extreme top -- above about 10,000 Hz -- when driving either of the electrostatic-tweeter systems, so we were forced to conclude that our measurements were meaningless. As has often been the case in the past, the best thing we can do this time is shrug our shoulders at the measurements and say "Well, that's the way we read

the extreme low end; the deepest material gets louder, but nothing else is affected. Open it up to about 3 o'clock, and the whole bass range comes up, while the deep material gets stronger still. Only beyond this point does the sound, typically, start to get boomy, and if it happened to be bass-shy to begin with, the result would be a pretty good job of correction. Similarly, at moderate cut settings, only the extreme bottom is affected. Deep rumble, tubbiness due to hall resonances, and even moderate amounts of hum can be reduced without a drastic effect on the over-all sound.



Subjective -- that is, apparent as opposed to measured -- frequency response of the AR amplifier with all tone controls set to Flat.

it, and this is the way it sounds." If you can visualise balance from a response curve, the one above will give you an idea of the extent of the coloration. It is by no means pronounced, but it is audible.

In case you're wondering, it was not possible to correct for this mild coloration by means of the tone controls, for when these gave adequate correction in the mid-bass and lower treble ranges, they gave much too much correction in the low-bass and extreme treble ranges. If they had been able to do the job, they would have been much less efficacious in treating program-material aberrations. You can't have everything, you know.

On program material, though, the tone controls were a pleasure to use. Advance the bass control to a bit past 1 o'clock, and the only thing you notice is a strengthening of

We found the treble controls a little less useful. The musical overtone range can be very nicely controlled, but material with inadequate or excessive brilliance could not be adjusted properly without overdoing the correction in the higher ranges. But since most problems in current program material do occur in the overtone range, there are more things the AR's treble control will do than things it won't.

Volume control tracking in our sample AR amp was exemplary. There was no more than 3/4 db of tracking error through the control's entire range, and just a hair over 1/2 db of error through the normal operating range. The control's action was smooth and even (as was the case with the tone controls, too).

Bass performance was extremely good -- deep, tight and solid. We'll admit that we were a little sur-

prised that the AR amplifier's low end sounded as detailed as it did, for some experiments we conducted a number of years ago had shown that insertion of fuses in series with loudspeaker lines caused an audible loss of amplifier damping; the low end would become somewhat heavy and flabby.

Just to satisfy our curiosity, we replaced each of the output fuses in the AR amp with an identical length of copper tubing, and listened for a change in the low end. If there was any at all, we couldn't hear it, so we put the fuses back and forgot about them, which is what we advise anyone else to do, too. The penny-in-the-fuse gambit has never been a smart idea, and it isn't here, either. Fuses are installed for a purpose, and too many people have found out the hard way what that purpose is. Evidently, they serve their purpose in the AR amplifier without upsetting anything else.

In our report on the Dynaco PAT-4 preamplifier, we noted that although the measured phono preamp equalization agreed almost perfectly with the RIAA-standard curve, disc reproduction sounded somewhat sparse at the low end, in comparison with the sound of high-quality tapes feeding high-level inputs. Well, the AR's measured equalization was very slightly down at the low end, yet its phono reproduction sounded almost exactly like the comparison tapes. We would just love to be able to offer a simple explanation for this, but again, all we can do is shrug our shoulders, etc., etc.

Specifically, here's how the AR amplifier sounded on the three loudspeaker systems we used for the bulk of our tests:

With the Dyna A-25's, the sound was rather heavy and markedly dull at the top. These speakers are normally a shade soft at the high end, but they were noticeably moreso with the AR amp, although turning their tweeters up a notch or two and helping them along a bit with the AR's treble controls allowed us to get

very natural, balanced sound from them.

With the Janszen Z-600's, we found somewhat the same thing: a bit heavy over-all and a bit short of brilliance, but here there was also a very subtle aura of "zizz" at the extreme top. In this case, there was little that could be done to improve matters, as the speakers have no tweeter-level controls, and the amplifier's treble control emphasized the "zizz" too much before it began to have any appreciable effect on the brilliance of the sound.

With the KLH Nine, the "zizz" at the extreme top was quite pronounced, and proved very annoying to listeners whose hearing range went appreciably beyond 12,000 Hz, although variations in the degree and the apparent frequency of the "zizz" from one recording to another raised some speculation that what we were hearing might be high-end resonance peaks in the recording microphones and disc cutter-heads, reproduced somewhat more prominently than usual. If this is the case, there is really no way of knowing whether the AR amplifier was tending to exaggerate the audibility of these peaks or whether it was actually reproducing them through the Nine in their proper relationship to the rest of the program material, in which case, amplifiers that do not reproduce this "zizz" as prominently would not be feeding as accurate a signal to the Nine as the AR amplifier. It's an interesting question, but a rather academic one in terms of subjective results. Wherever lies the fault, there is no doubt but that amplifiers which yield a softer top from the Nine make it sound more musically listenable than does the AR amplifier.

In all other respects, though, the AR amplifier's performance with a single pair of KLH Nine panels was superb. When the two panels of the Nine are separated, for a wider stereo "stage," their combined response often tends to be rather thin

at the bottom and tipped up at the top. Careful experimentation with placement will usually remedy the situation, but the ultimate location may not be ideal in terms of stereo imaging or center fill. As it turned out, the AR amplifier's characteristic sound was almost perfectly complementary to that of a separated-panel Model Nine system, resulting in better over-all balance than is usually obtained from other amplifiers.

Like all other solid-state amps that we've encountered, the AR unit is designed for loudspeakers of 4 to 8 ohms impedance, and loses almost half of its 8-ohm power when connected to a nominally-16-ohm load like a Model Nine panel. But unlike previous mismatched solid-state amplifiers we have tried with the Nines, which sounded on the verge of overload much of the time, the AR amplifier sounded quite "comfortable" with the Nines, and when brief overloads did occur, the resulting clicks were noticeably less offensive than usual. All of which makes the high-end "zizz" even more disappointing.

After we completed our main round of tests, we decided that it might be nice to answer what seemed to us (and would to most readers, too) a very logical question: namely, How would the AR amplifier sound with AR speakers?

For this test, we borrowed a pair of AR's best speakers: AR-3a's, and tried them in several different locations in three rooms. Not surprisingly, the AR amplifier affected them in much the same way as it had affected the Dyna A-25's -- with their tweeter balance controls set for what sounded flattest on most other top-notch amplifiers, the AR amplifier made them sound somewhat more bottoms-up and tops-down. We were able to get better over-all correction with the AR-3a's two balance controls than with the A-25's one control, but it struck us that more bottom was one of the last things that AR-3a's need.

Whether or not the particular sound of the AR amplifier is worth your consideration depends on the loudspeakers you use it with, the way they behave in your listening room, and your own personal taste for reproduced sound. For example, we have encountered cases where no amount of careful placement of loudspeakers could make them sound anything but thin, and it was not always the fault of the speakers, either. Tweeter balance controls are rarely able to correct a condition like this, and very few tone controls can do it either. But the peculiar behaviour of the AR amplifier did solve the problem very nicely in two such instances.

Finally, we got around to testing the AR's fail-safe provisions. We specifically avoided doing the one thing that AR admits will blow things apart: shorting together the two Hot loudspeaker terminals. But we did try just about everything else we could think of, including shorting the outputs and then yanking the phono leads from their receptacles with the gain turned up full. We were not able to pop any transistors, although we did go through several of the "speaker-protection" fuses. We will admit, though, that we did not try to find out whether these would actually protect our standard test loudspeakers from burnout. We'll take AR's word for that.

So, just how good is the AR amplifier? Better, we would estimate, than about 95% of the current competition. But beyond that, we are going to have to hedge a bit, because specific comparisons tend to become somewhat "iffy." For example, the AR amplifier is price-competitive with the Dynaco PAT-4/Stereo 120 combination, which sounds a shade sweeter at the top, has equal transparency, and more-natural over-all balance, except on phono reproduction which is thin. And the PAT-4's tone control action is as lousy as the AR's is good. A Stereo 120 and PAS-3x preamp will give fine

low end from phono too, but the tone controls are almost as bad as in the PAT-4, and the sound is not as clean nor lucid as that of the AR, although the over-all cost is a bit less. On the other hand, if there are any similarly-priced amp/preamp combinations that sound as good as either the Dynas or the AR, we have yet to find them. As to the choice between them, though, it should be obvious by now that there's no clearcut winner. A buyer who's considering something in this price range must decide for himself, based on whichever aspects of amplifier performance -- balance, transparency, tone control action, etc. -- he deems to be of most importance to him.

Postponements

Goldring G-800-Series Pickups

These are some of the most intriguing devices we have tested for some time -- not because of any brilliant design innovations (although there are a couple), but because we are never quite sure whether the sample we are testing is a current model or has already been rendered obsolete by a new design refinement.

Importer/distributor Irving M. Fried (IMF) tells us that all improvements are incorporated into the pickups as soon as said improvements can be put into production, which is lovely as long as the model number gets changed, too. But at the time of this writing (September '69), there appears to be two obsolete versions of the Super E model, one current model, and another improved one "in development." But if you go out to buy a G-800 Super E, how can you tell which one you're getting? It is important to know, because some of the samples we tested were pretty bad, with mediocre tracking ability and weird frequency-response curves. Excellent separation, though.

Our latest report on the Goldring G-800E and Super E pickups has just been flushed down the

drain, pending arrival of a "current" version of both pickups. If those are still current by the time the next issue goes to press, we will publish the report. If not, we'll just call the whole thing off.

As a matter of fact, the best Goldring pickup we have tested to date, and one which is not in a constant state of mutation, was a spherical-tip G-800. This, we are told, is not being imported into the U.S., and there are not at present any plans to do so. The reason? Americans won't buy sphericals Oh, well....

Decca International Arm

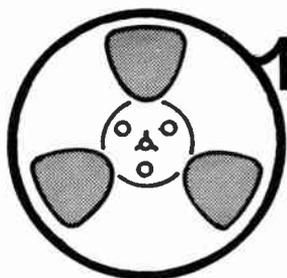
The scheduled report on this component has been postponed, pending changes that the importer is making to correct the instruction sheets and adapt the arm for more universal applications.

As originally supplied by English Decca, the International arm had incorrect tangency recommendations, an excessively heavy counterweight (except for use with heavy cartridges, of which there are few), and too much depth in the base to fit on most current "thin-profile" turntable bases. Our feeling about this sort of mess would normally be To hell with it! Unfortunately, the International arm works too well (when properly installed) to dismiss as a waste of time. So, we will wait to see what transpires.

We are beginning to think, though, that English Decca's "special products" division would be well advised in future to turn their basically good ideas over to some Japanese firm for development into consumer products.

Coming Up

Components scheduled for reporting in the next issue include the Crown DC-300 and D-40 power amplifiers, the Thorens TD-125 turntable, the Shure M-91E pickup, and the Revox A-77 tape recorder.



on tape

The Professional Bias

The sophisticated reader of equipment reports realizes that those meticulously tabulated test results are nearly always based on one sample of the component in question, and that said sample may or may not be representative of "average production" from the assembly line. Within the normal tolerances of production, some samples may be better than most and some will have barely passed inspection, but the vast majority will lie pretty much in the middle of the permissible range. With modern production techniques, though, the range of variation between samples is not usually very great, even when a considerable number of factory adjustments are required, as with FM tuners.

But there is one kind of audio component -- the tape recorder -- which is not amenable to precise factory adjustment, and whose published test results do not necessarily reflect the kind of performance a buyer can expect.

Recorders, like FM tuners, have certain internal adjustments that must be set to "align" the unit. But whereas a tuner can be aligned to a standardized set of broadcast frequencies, there are no such standards pertaining to tape characteristics. Different varieties of recording tape require different amounts of bias current and recording equalization, so it is just not possible to adjust any tape machine for optimum performance with all of the tapes that might be used on it.

Manufacturers of professional

tape machines assume that the buyer will adjust his recorder to the tape he plans to use, so they rarely bother to make any such adjustments at the factory. All they do is check to make sure the adjustments adjust.

The better home-type tape machines are generally set up for one or another of the more popular varieties of tape, and a few manufacturers even go so far as to specify what tape they have adjusted for. But with any other kind of tape, the machine will not perform at its best, and in most cases, some user adjustments will improve the machine's performance even with its recommended tape. Factory adjustments are never done with the care of a proud owner.

The behaviour of a tape oxide depends on the size, uniformity and orientation of its needle-shaped oxide particles, their ease of magnetization (coercivity), the amount of magnetism they can retain (retentivity), and the thickness and surface smoothness of the coating. Each of these factors helps to determine how much ultrasonic bias current and treble equalization are needed to yield the best recording. And since different tapes have different magnetic and physical properties, the one setup adjustment that is ideal for one tape is not likely to be ideal for any other tape. This is why a recorder that is very carefully adjusted to suit a mediocre variety of tape will more than likely give worse performance with an inherently better variety of tape.

Like just about every other product we can think of, the tape recording system is an amalgum of design compromises, and for the

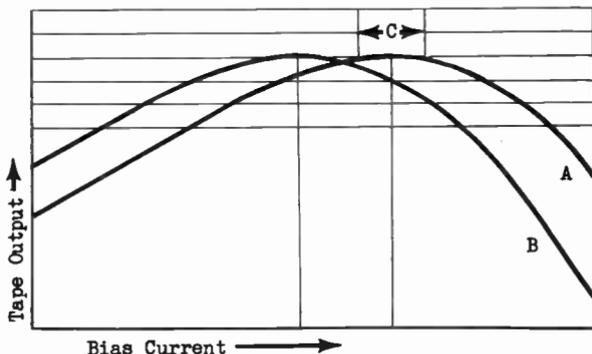
usual reasons: Certain desirable characteristics have conflicting requirements. In tape recording, it is noise-and-distortion that must be balanced against high-frequency response, for one normally excludes the other.

For example, a certain tape requires a certain fairly critical bias current through the record head in order to retain the maximum amount of magnetic information. A graph of this relationship between bias current and retained magnetism might look like Curve A, in the group of curves below. The bias current that gives maximum signal

frequency of 1,000 Hz, a similar curve for 10,000 Hz would probably look like Curve B. There is still the same peak at the center of the curve, but the amount of bias current that yields this peak output is less than the amount that peaked the 1,000-Hz signal. Result: Peak bias at 1,000 Hz will produce a condition of overbias at 10,000 Hz, causing loss of high-frequency response. In other words, no single bias setting can be optimal for the entire audio range.

Electrical equalization (during the Record mode) can be used to compensate for most of the high-end

Tape output versus record current at middle frequencies (Curve A) and high frequencies (Curve B). Peak bias is that amount of record current that produces maximum tape output.



retention (maximum output in playback) is called the "peak bias," and deviations from this are referred to as conditions of underbiasing or overbiasing.

The residual background hiss of a tape is relatively unaffected by the bias current, so it is obvious that the point of maximum output -- the peak-bias point -- will yield the maximum attainable signal-to-noise ratio from the tape. And since the peak-bias condition also produces an essentially distortionless recording, this would seem to be the ideal operating condition.

Unfortunately, noise and distortion aren't the only criteria for a high-fidelity recording. Frequency response counts for something, and the bias affects this, too.

If Curve A had been plotted for a

loss due to mid-range peak biasing, but there are limits to its effectiveness. With early tapes and recorder heads, high-end losses were so severe with mid-range peak biasing that $7\frac{1}{2}$ ips was considered a strictly mediocre-fi speed. Drastic compromises had to be made somewhere, so professional-recorder designers generally opted for peak bias, choosing low noise and distortion over high-end range, while home-recorder manufacturers typically underbiased their machines, to give more-impressive-looking frequency response specs.

With modern high-coercivity oxides and narrow-gap heads, mid-range peak biasing can be used without any appreciable sacrifice of treble response, and peak biasing is in fact what is now recommended by

most tape recorder manufacturers. But since the amount of bias current that constitutes peak bias varies according to the variety of tape being used, it is not possible to set the bias properly without actually observing its effect on the tape in question. Thus, the commonly-recommended procedure of measuring bias current or voltage is of little value to the critical recordist.

The ideal way of setting bias is by feeding a mid-range test tone (250 to 1,000 Hz) to the recorder, recording this on the tape at or about full recording level, and adjusting the bias current until the measured output from the tape indicates that the bias is correct. This is one reason why no demanding tape recordist would ever own a machine that has no provision for monitoring tape playback while recording. Without this feature, the normally-simple bias-setting procedure becomes a tedious and time-consuming project.

As was mentioned before, most recorder manufacturers recommend biasing for peak output, which will most certainly give better results than assuming that the machine is properly biased when purchased. But a careful scrutiny of Curve A will show why peak biasing is not really very accurate.

The curve for bias versus output does not have a well-defined peak point. There is a small segment at the top of the curve (designated as C on our graph) which is so close to being a straight horizontal line that the output meter will read the

same value across that whole segment. Thus, there is no way of knowing whether your "peak bias" point is at the center of that segment or at either end of it. The meter will read "peak" at any point between those extremes, but the tape's output at high frequencies will vary considerably over that range of bias currents. This is useful in cases where there are no high-frequency record equalization adjustments in the machine, for slight bias adjustments within the normal peaking range can flatten out and match the high ends of the two stereo channels. But when a recorder has its own treble record equalization, the broad segment of "peak" bias becomes a liability, because you can no longer judge your exact point on the segment by its effect on the high end. You could end up with each channel "peaked" at opposite ends of the segment and still have almost identical high-end response in each channel, because the equalization adjustments can make up for the difference.

Okay, if the two channels can be matched anyway, despite the slight biasing difference, why worry? Simply because channel balance obtained in this way is seldom consistently maintained.

Different batches of the same kind of tape often have slightly different magnetic properties, and require a slightly different amount of bias current for "center peak" biasing. This has the effect of moving the bias curve a little bit to

STATEMENT OF OWNERSHIP, MANAGEMENT & CIRCULATION

1: October 1, 1968. 2: The Stereophile. 3: Four times per year. 4: 900 Sussex Blvd, Broomall, Pa. 19008. 5: Box 49, Elwyn, Pa. 19063. 6 & 7: Editor, publisher and sole owner: J. Gordon Holt, RD2 Box 314, Glen Mills, Pa. 19342. Managing editor: None.

	Average	Last Issue
10: a.	4,000	4,500
b-1.	0	0
b-2.	3,500	4,218
c.	3,500	4,218
d.	200	180
e.	3,700	4,298
f.	300	202
g.	4,000	4,500

right or left of its original position.

At mid and low frequencies, where the tape was originally biased somewhere on the almost-horizontal top of the curve, this slight bias shift may not have any audible effect on the tape's output. But with the high end of both channels lying on the steeply curved right-hand slope of the curve, a slight shift in its position will cause a significant change in high-end output. And since this part of the curve is curved, a given amount of horizontal shift will cause more high-end change in one channel than in the other. The result: high-end imbalance, and a consequent disturbance of stereo directionality, varying in degree from one batch of tape to another.

In other words, the only thing that's really wrong with peak biasing as a recorder setup procedure is that, in practice, it is almost impossible to set the precise peak point. There is no such problem when overbiasing.

As noted previously, biasing a tape beyond its peak point causes a progressive loss of output at middle frequencies and, generally, an even more rapid loss at high frequencies. An overbias loss of, say, $\frac{1}{2}$ db at middle frequencies may pull down the response at 15 kHz by as much as 3 db, some of which is recoverable via the recorder's equalization adjustments. And the loss of over-all signal/noise ratio will be completely inaudible. But what will this tiny amount of overbiasing gain us?

First, it will permit precise determination of the bias point, by getting this off the essentially-flat top of the bias curve. There are only two points on the bias curve where mid-range tape output is $\frac{1}{2}$ db below peak output, and only one of these is in the overbias range. With both stereo channels set at this point, we can be assured that both are identically biased, and that any slight changes that occur due to differences between tapes will occur equally in both

channels.

There are other advantages, too. The effects of differences between different oxide coatings are reduced, minimizing the audible change in sound from one tape batch to another (particularly at slow recording speeds). Drop-outs — momentary losses of signal due to tape surface irregularities — are reduced in severity, and although no-one seems to have investigated this objectively, there also appears to be a slight reduction in distortion from the tape. And all this at the cost of a db or so of extreme-high-end loss!

As they say, You pays yer money and you takes yer choice. And you may choose to wring the last db of high end from your tapes, by biasing for peak output. (As a matter of fact, you may even decide to go overboard in this respect, with a small amount of underbiasing for an even hotter high end, but the tapes you get will be degraded in the same respects and to about the same degree as they would be improved by overbiasing, but that's up to you.)

The terminology applying to overbiasing can be confusing, but it's worth trying to understand. When bias current is increased beyond the peak point, tape output begins to diminish. It is this reduction in tape output that is used to "measure" the degree of overbiasing. Thus, when the measured output falls by 1 db, we say the tape is overbiased by 1 db.

Note that this does not mean that we use 1 db more (or less) of bias current itself. This is a common point of confusion among recordists whose machines are equipped with a "bias metering" facility. Bias metering allows the recorder's VU meter to be switched to read bias current, as a quick and easy way of determining whether or not the bias is still where you set it originally. Typically, after the bias has been adjusted, internal meter-calibration potentiometers are set so that each

(To page 34)



Musical Distortion

I take issue with your note in issue 3/4-67 about the Kent Musical Products Company. (We viewed-with-dismay their guitar-distorting amplifier. Ye Ed.) Pray remember that a guitar amplifier is a production rather than a reproduction device. No musical instrument that I know of, electronic or otherwise, produces a pure, single tone. The cavity in an acoustical guitar does not merely serve to make the sound louder; it is intended to change the quality of the string tone -- to "add sonic filth," to quote your item in the magazine. Likewise a piano's sounding board. And think of the enormous amount of "harmonic distortion" in the tone of an oboe.

Jon Lundell
Oakland, Ca.

Our snide comment about the guitar distorter was what might be called a gut-reaction to an idea that is basically repellent to us: that of deliberately fouling up the sound of an instrument we happen to like (in its primitive acoustical form). Since we wrote that item, though, we have come to admit to ourselves, grudgingly at first, that distortion of conventional musical sounds to achieve unconventional sounds is musically valid, even though the results may not always be what we think are musically pleasant.

Some of these effects we have heard on rock recordings are extremely effective and musically appropriate, but there's quite a difference between these new sounds and what we think of as "sonic

filth." The addition of "spurious" harmonics to musical sounds can produce new and musical sounds, even when the harmonics are not always "harmonious" to a reactionary's ear. But large amounts of plain, ordinary intermodulation distortion or electronic peak-clipping that are introduced intentionally can be just as conducive to Excedrin headaches as when introduced inadvertently by a third-rate amplifier in the throes of gross overload.

Perhaps, without having listened to Kent's distorter, we did it an injustice by condemning it out of hand. But we have spent many years learning to recognize overload distortion and trying to avoid it, and whether it is there by intent or by happenstance does not affect our reaction to it. We cringe.

Spiffing Again

I was surprised and more than slightly taken aback by the advice you gave your readers in your Spring 1968 issue (Pages 31, 32) regarding spiffing and its influence on a salesman's recommendation of one component over another.

I agree with your suggestion that the buyer exercise caution and judgement when making a costly purchase; I would not advocate buying solely on the advice of a single salesman with whom one has never dealt. But to state that "the safest thing to do is ignore any proffered advice from a salesman on any subject that would affect your choice of components" is to give your readers the kind of guidance that will ultimately prove to be to their disadvantage.

Surely you are aware that spiffs, in one form or another, are awarded by virtually every manufacturer. Thus, any advantages a manufacturer would hypothetically gain in volume of sales due to spiffing will not actually be realized, simply because of the near-universality of the practice. To suggest that spiffing

is a major factor in the promotion by a salesman of a particular product is to exaggerate and distort the reality of the situation.

It is my confirmed belief that, spiffed or not, the salesman is the consumer's best-qualified and best-informed source of assistance in matters of component selection. There are very few salesmen who are not ardent audiophiles; they are dedicated to quality reproduction of sound, first and foremost, and are consistent in their efforts to keep abreast of new developments in the field. The consumer should seek and value this advice, rather than avoid it or ignore it.

Ted Widmer
President, Audio East
Chairman, New York
Audio Society

The very fact that spiffs are, as you stated, awarded by "virtually" every manufacturer, means that some manufacturers, however few, are going to be at a disadvantage as far as selling-incentive is concerned. And how does the customer know which of a dealer's products are being spiffed and which aren't?

Your statement that "there are very few salesmen who are not ardent audiophiles" may be true of Audio East, or possibly even of New York City as a whole, but it is far from true in most of the country. And if someone has to travel to the nearest big city, or to New York specifically, in order to find audio salesmen who are any more knowledgeable than the local TV repairman, it is difficult to establish the kind of salesman-customer relationship wherein the latter can be considered as much more than fair game for the former. If a salesman knows you're going to cart your purchase to your home 200 miles away, and that you won't have the opportunity to compare his recommended system with any other, will he sell you what he honestly thinks

is best for you, or the one that brings the most spiffing return?

An unofficial survey on our part revealed the interesting fact that many knowledgeable salesmen buy, for their own systems, components that their stores don't even sell. Are they going to recommend these to potential customers?

The point that we were making in our Spring '68 issue was simply the obvious one that there is no way in which a customer can be sure that a salesman is being honest with him. Where money is involved, honesty is not an overly common thing, although as you intimated, taking the time to get to know a good (i.e., competent) local salesman is as good a way as any of encouraging his sincere cooperation with your audio problems.

75-Ohm Zip

On your Spring 1968 (so-called) cover, there is zip cord connected to the 75-ohm antenna terminals on what looks like a Dyna FM-3 tuner.

How come?

H. Messner
Ann Arbor, Mi.

T'aint zip cord, it's twin-lead, with the end strip of ribbon cut off it. It is slightly twisted in the photo, and the foreshortening makes it look narrower than it is.

The 75-ohm connection was a goof on our part. The connection was made for the photo, and we were obviously thinking more of the latter than of the former.

A Pause to Recover

In your last issue's "Miscellany" note about the Deccalift, you said "Oh, what the heck! Start (the record) from the beginning again." I realize you were just making a point of the convenience of being able to resume playing exactly where you left off, but lest some readers

get the wrong idea, I think it might be a good idea to point out that, to preserve your records, you should not replay any part of them after a short interval.

The groove needs time to recover from the slight elastic deformation which takes place when the stylus passes through it. If deformed again before it has recovered, the added deformation is likely to exceed the elastic limit of the vinyl and become permanent. A 30-minute interval between plays is probably okay, although Acoustic Research's Roy Allison advocates an interval of 24 hours to be on the safe side.

Dr. Leonard Drasin
Jamaica, N. Y.

Your point is well taken. A disc does require some time between plays to recover its groove shape, but to our knowledge, nobody has yet determined just how much time it does require. Perhaps it would be best, with new and treasured recordings, to follow Roy Allison's suggestion, just to be on the safe side.

Anyone who feels compelled to listen over and over to a new disc should either put it on tape with the first play and use the tape for his aural orgy, or be prepared to mutilate his new disc in a day.

Frustrating Fi

I am so goddamned frustrated about the state of the recording "art" that I feel tempted to drive all the way to New York City for the privilege of peeing on the RCA building.

What can possibly motivate those clods, anyway? They finally get to record one of the finest-sounding orchestras in the world -- the Philadelphia Orchestra -- and then use all of the technological resources of RCA to corrupt the sound of the orchestra into a ghastly travesty of the real thing. I used to think Columbia did a lousy job, with their shrill violins and

zooming woodwinds, but at least Columbia's Philadelphia Orchestra recordings had some low end on them, sometimes. RCA's efforts don't seem to have a damned thing on them below 60 Hz. And have you ever heard a bass drum with a 60-Hz cutoff? It sounds like someone whipping a sofa cushion with a salami.

When are these overpaid screw-driver mechanics that call themselves recording engineers going to stop trying to be impressarios creating lovely patterns of super-sound, and leave the damned music alone? Most people who like good music like the sound of live music, so why go to such costly and complicated lengths to insure that recordings don't sound like live music?

I understand that, after many years with RCA, the Boston Symphony is going to switch to Deutsche-Grammophon. To say that I am encouraged by this is to understate the matter, but before I unloose a cheer or two I want to make sure that DGG doesn't suddenly do an about-face and decide that an American orchestra should be recorded American-style -- that is, with glitter, polish and superficiality. Even some of DGG's recent discs have been getting closer-sounding and hotter at the high end. Is there no recording company in the world that is interested in making realistic recordings any more?

Charles D. Worrall
Philadelphia, Pa.

Sorry, but it doesn't look that way. See our own observations about this, starting on page 2 of this issue.

Foolish Quote

Whoever composed the Mfr's Comment for your report on the PAT-4 had a nice prose style but chose an unfortunate quote to paraphrase as an illustration of his main point.

The original quote (and I believe it is generally attributed to "honest Abe" Lincoln) was not "You can please all of the people some of the time, etc etc," but was "You can fool all of the people some of the time, etc etc."

Considering the context of Dynaco's quotation, this would seem like an amusing case of the foot in the mouth.

Henry Coslett
Cambridge, Ma.

Dynaco's Robert Tucker, who composed the A-25 Comment, explained that Of Course he knew what the original quote was, but felt that his paraphrased version made his point about pleasing the public as well as the original made its point about fooling them. He also knew that the original was the work, not of Abe Lincoln, but of that all-time-great con artist P. T. Barnum.

Unfair Trade

Judging by his recent letter in support of the practice of "fair-trading" premium-quality high-fidelity equipment, Mr. Denton ("Letters," issue dated Autumn-Winter '67) must either be a dealer or a manufacturer.

Actually, the so-called "fair trade agreement" is nothing more than price fixing under a more-pleasant-sounding name. The manufacturer grants the dealer a monopoly or near-monopoly in his area under the guise of a franchise, and guarantees him a high mark-up which cannot be challenged by other dealers. In return, the manufacturer receives the assurance that his products will be "pushed" more than others of comparable quality. This assurance need not be spelled out explicitly; the dealer will push the fair-traded line in preference to the competitively-priced lines just because it is profitable to do so, not because of their inherent quality. The fair trade is no more than

a legitimized spiff of a dealer by a manufacturer: "You push my product, and I'll protect your monopoly and your mark-up."

The loser in this deal is, as usual, the consumer -- the buyer who is sold McIntosh when Dyna would do just as well, or the buyer who does pay the fair-trade list price when others receive an under-the-table discount or a padded trade-in allowance. Ever wonder why the fair-trade

No Answer?

Although there are few things more frustrating than writing letters that never get answered, we must confess that we are simply unable to reply individually to all the letters we receive between any two issues. We just don't have the staff to cope.

Some questions and comments of general interest get published in each issue, and we try to respond privately to all questions that can be answered simply and that are accompanied by a return-addressed envelope or post card, but we just cannot "discuss" or "compare" on an individual basis. We wish we could, but that's the way it is.

We do not however merely toss all unanswerable correspondence into our circular file. Every letter is read and the contents noted, mentally or otherwise, and we would like to take this opportunity to say Thanks once again to those of you who have written to us about this or that, usually with the full realization that we can't answer you privately. We need your letters, because without them we would have no idea of what we can do to better suit the magazine to your needs. So, even if we can't reply individually, keep those cards and letters coming in!

shops take trade-ins while the "schlock houses" sell for cash? You can be liberal about trade-in allowances when you're making a 40%-above-cost mark-up. Still another loser is the buyer who cannot recognize the ingenuity and economy of design that went into the creation of a product like the AR turntable because it happens to be cheap, or will not design to own one because it lacks prestige. Apparently, there are some people who prefer to pay high prices for their equipment, because this price determines its limited clientele and consequently its prestige.

Perhaps the manufacturers could do just as well if their products were marketed at competitive prices, since more people would be able to afford them. But alas, there will always be some consumers who want to pay to be exclusive, and some dealers who will cater to this need.

William A. Goldsmith
Salt Lake City, Ut.

It's not that they want to pay more, it's just that they can't tell good from bad, and believe that high cost is a guarantee of high quality.

Letters You'll Never Believe

From a Well-Known
Amplifier Manufacturer:

"Thank you for your letter expressing your dissatisfaction with our SPA-140 amplifier. The "hardness" that you hear in the sound is not due to your associated equipment, but stems from a drastic increase in the amplifier's distortion at low power levels. This, we hasten to add, is really quite a common thing in solid-state amplifiers that were designed in a hurry in order to meet the New York hi-fi show deadline.

There is nothing you can do about the problem, except to buy our next-year's model, which will probably have other problems that you never dreamed of.

Sincerely, etc.."

From an Importer of
Foreign-Made Pickup Cartridges

"We checked your pickup for you and found it to be within specifications, so we are returning it. Of course, there will be no charge for this service.

The 5-db difference in channel outputs and the 8-db peak at 9 kHz in one channel are normal for

average-production pickups. Foreigners have quality-control problems, too, you know.

If you are unhappy with the pickup, we suggest that you trade it in on one of our special HP (hand-picked) models, which is the same as the standard models except that it is tested before being shipped from the factory.

Sincerely, etc.."

From a Leading
Loudspeaker Manufacturer

"We are dismayed to hear that you are so unhappy with the Omnipotent 500 speaker systems that you purchased. It is true of course that they are horribly overpriced and as ugly as a baboon's butt, and we are sorry to hear that one of them fell through your living room floor, but we do not really feel they sound as bad as all that.

You must understand that these were not designed to sound realistic. Our market researchers have found that normal people prefer hi-fi to music, and if a speaker has to be shrill and boomy to sell -- well, our team of design engineers hasn't failed us yet, bless their hearts.

Perhaps you should stop going to

orchestra concerts and learn what true hi-fi is.

Very truly yours..."

From a Manufacturer of
Modestly-Priced Tape Recorders

"Of course your Model 152STA battery-operated portable has battery problems! If I told our design department once I told them a thousand times, one penlight battery just won't be enough to run the motor and the record amplifier and the 10-watt monitor amplifier for forty minutes, but no, they wouldn't listen.

I suppose you could buy one of our AC converters and use the recorder from a wall outlet, but if I were you I would try and palm off the thing on somebody and buy one made by an outfit that knows what it is doing.

Sincerely...."

From the Editor & Publisher of the
Stereophile

"We can understand your dissatisfaction with the Acme Super 2000 receiver that you bought on the basis of our excellent review. We too found that the outputs were out of phase and that it took a pair of gas pliers to turn the Function switch, but since Acme buys a full-color four-page foldout in each issue, we felt it unnecessary to add any more test criteria to the already-comprehensive objective measurements that we make on every product.

As a matter of fact, we felt at first that the unit was so bad that our readers would not be interested in reading about it at all, but the manufacturer magnanimously agreed to continue his advertising support if we ran the report without mention of the phasing, the stiff switch, the unreadable dial markings, the thunderous switching pops and the subtle odor of burning insulation that we observed. We are confident that you will understand our position.

Sincerely,...."

Recommended Components

These are listings of components which we have found to be outstandingly good in each of four quality classes.

Components are selected for listing on the basis of our own tests as well as reports in other magazines and from users.

All component ratings are biased to an extent by our feeling that things added to reproduced sound — flutter, distortion, and various forms of coloration — are of somewhat more concern to the musically-oriented listener than things subtracted from the sound, such as a half octave or so of extreme-bass or extreme-treble range. On the other hand, components which are markedly deficient in one or more respects are marked down according to the extent to which we feel their deficiencies interfere with the full realization of the program material that is likely to be fed to them.

Because many top-grade pickups, arms and turntables are mutually incompatible, phono units are listed as groups which have been found to perform satisfactorily together. Phono units are rated primarily on the basis of naturalness, tracking cleanliness, and freedom from mechanical problems.

Loudspeakers are rated according to overall naturalness first, with other characteristics assigned secondary significance. For details about loudspeakers and other components listed here, we refer readers to our reports on the items listed, in past issues of The Stereophile and other publications which carry even moderately honest test reports.

The order in which components are listed within each category has NOTHING to do with their relative quality. The only section where orders of listing have any significance at all is Loudspeakers, where we have listed the ones under each category in order of increasing efficiency.

As some sharp-eyed readers will notice, a few items listed hereunder are officially discontinued items. These are listed simply because, discontinued or not, they are still excellent components and well worth buying if you come across them.

Component categories are as follows—
Class A: Price-no-object, best possible sound. Class B: Sound almost equal to that of Class A, but lower in cost and generally better-suited for average-sized listening rooms. Class C: Lower-quality sound, but far better than average home hi-fi. Class D: Good, musical sound, but significantly less so than the best available.

Phono Units*

- (A) Thorens TD-125 or Sony TTS-3000 'table, Audio & Design arm, Stanton 681A pckp; Thorens TD-124-II 'table, Decca International or SME 3009 arm, Decca 4RC, Decca Mark II, or Stanton 681A pckp.
- (B) Thorens TD-124-II or TD-121 'table, Decca International arm w/ Decca 4RC pckp or SME 3009 arm w/ Decca Mark II or 4RC pckp; Thorens TD-150 tt, Audio & Design arm, Stanton 681A pckp.
- (C) Thorens TD-121 'table, ADC arm, Shure M92G; Dual 1009 or 1019 chgr, Shure M92G pckp.
- (D) Acoustic Research TA or XA 'table & arm w/ Shure M92G or M75E pckp; Bogen B-52 'table & arm w/ Shure M92G pckp.

Tuners

- (A) Marantz 10B.
- (B) McIntosh MR-71 (MI-3 optional); Heath AJ-15.
- (C) Dynaco FM-3.
- (D) EICO 3200; Heath AJ-13.

Tape Recorders

- (A) Ampex AG-440-2; Scully 282-2.
- (B) Revox A-77.
- (C) Sony 560D; Magnecord 1020; Sony 155 (playback only).
- (D) Sony 250A or 155 (playback only).

Microphones

- (A) Sony C-37FET; Neumann U-87.
- (B) B&O 100; Sony C-22FET; PML capacitor.
- (C) B&O 53.

Preamps

- (A) Marantz 7C; McIntosh C-22.
- (B) Dynaco PAS-3; Dynaco PAT-4.

Amplifiers

- (A) Crown DC-300; Marantz 9A; SAE Mark II; Futterman H-3A.

- (B) Crown D-40; Dynaco Stereo 70; Dynaco Stereo 120; Acoustic Research (integrated amp/prmp).
- (C) Heath AA-15; Dynaco SCA-35 (integrated amp/prmps).

Receiver

- (B) Heathkit AR-15.

Headphones

- (A) Beyer DT-48S w/ round cushions; Koss PRO-4A.
- (B) Beyer DT-90.
- (C) Sharpe HA-10 Mk II.
- (D) Koss SP-3xc.

Speaker Systems

- (A) Two KLH Nines (4 panels) or single KLH Nine; Bozak B-310; E-V Patrician 800; Altec A-7-500.
- (B) Dynaco A-25; Janszen Z-600; Janszen Z-960; Quad Electrostatic (use Quad amplifier).
- (C) Dynaco A-25.
- (D) Acoustic Research AR-4x; ADC 404.

*Decca pickups should be checked for separation and smoothness before purchasing.

THE SERVO-STATIC I

A Preliminary Report on a Promising New Product

A short time ago, we were invited by an earnest, likable young man named Arnold Nudell, to hear a new loudspeaker system that his company (Infinity Systems, Inc.) is manufacturing as the Servo-Static 1.

This wasn't the first time we've had such invitations, and the claims Mr. Nudell was making for his brain-child were all too reminiscent of some earlier, disappointing audition sessions. But the demonstration was to be held within easy driving distance of our home base (at Music and Sound, on the outskirts of Philadelphia), so we accepted. We're glad we did.

After about three hours of listening, to a wide variety of program material, our reaction was that this was probably the best sound reproducing system we have ever heard anywhere, at any price. Dispersion was excellent, stereo imaging was superb, transparency was typical of the best electrostatics (which is to say, better than anything else), coloration seemed virtually absent, and the low-end range and control was almost too much to believe. The only criticism we could make was that the sound seemed rather on the hard side. But then, we have also observed this quality from the Marantz 7T preamp, which was being used in this demonstration.

The Servo-Static 1 is a combination electrostatic-dynamic system. Two flat panels about 2 by 3 feet by 6 inches thick house a set of mid-range and upper-range electrostatic panels and their associated power supply. The woofer section is a single 18-inch cone-type driver in a 4-cubic-foot box, and a separate

electronics section contains a special driving amp for the woofer (with feedback control of the cone), plus the electronic crossover network for the upper-range amplifiers. That's right: amplifiers. Two stereo power amps are needed for the upper ranges -- a high-powered unit for the middle ranges (Infinity suggests the Crown DC-300), and a moderate-powered one for the tweeters. And the amplifier requirements are stiff. Evidently, the electrostatic speakers provide an even nastier amplifier load than do the KLH Nines, which means that most normally-stable amplifiers are likely to become unstable when driving these speakers.

If you've come to suspect that this is no budget-type system, you are very right. The speaker system alone costs \$1,795, including the bass amp and crossover. The two power amplifiers cost whatever you want to pay for them, but if you follow the manufacturer's recommendations for these (and you should), they will cost you upwards of \$200 more. But if what we heard was any real indication of the Servo-Static 1's capabilities, it may well be worth the expense to anyone who can swing it.

We have been promised one of the Servo-Static 1 systems for testing within the next few weeks, and will get the report in print as soon as possible. Meanwhile, take a listen to it yourself if you get the chance, bearing in mind that with electrostatics, every bit of amplifier distortion is likely to be audible, and is all too easy to blame on the loudspeakers.

Miscellany

Goodies to Come

The next issue of the Stereophile promises to be one of our best yet, with full reports on several perfectionist-oriented products (See page 20), the first batch of a series of capsule reports covering all the items listed in the Recommended Components section, plus some that aren't, and part One of a series of articles on how to do your own Stereophile-type subjective testing of loudspeakers.

That's why we suggest you take a glance at your mailing label on this issue, to make sure it isn't the last one coming to you on your subscription. If your label has a number code of either 2-9 or 2-68, your sub has expired, which means you won't get the next issue unless you renew. And that's one issue we don't think you'll want to miss.

Incidentally, our rates will be going up again soon. See below.

Price Hike

In the last issue, we asked you to let us know how you'd feel about

paying \$1 or so more per subscription if it would enable us to send all Stereophiles by first-class mail. Over 90% of the responses were in favor of this, so it has been done. The new rates, listed on the Subscription Order on page 34, are effective now for all new subscriptions. Those subscribers who wish to renew their subs may either do so at the new rate and get the benefits of first-class mailing now, or may renew at the old, slow, second-class mail rate at any time until the mailing date of the next issue. After that time, the new rates will apply to all renewals and subscriptions.

The old rates, applicable only to renewals, are as follows: U.S. & Possessions \$4; Canada \$4.50; Pan-American Countries \$4.25 U.S.; Other Foreign Countries \$4.75.

The Audio Amateur

Stereophile readers who've been with us long enough may remember one issue that we devoted almost entirely to a construction article by a Mr. Edward T. Dell, who had built up a beefed-up version of the Dynaco Stereo 70. Most readers will probably recall also the storm of protest that that issue stirred up, from people who insisted that any

Why Not?

If you subscribe to our views, why not subscribe to our magazine? You could probably continue to borrow it from a friend, but that wouldn't help to sustain your only source of commercially unfettered information about audio trends and products. Please bear in mind that subscriptions are our only source of support. We prohibit audio advertising in the magazine, so that we can have complete freedom to report what you should know about equipment before paying \$30 to \$3000 for it. This freedom from commercial considerations costs us over \$15,000 per issue in lost advertising revenue, which is why we must ask so much for subscriptions, and is why we cannot exist without your support. So, please support.

The coupon on the next page can be clipped out without removing any of the magazine's editorial content.

Stereophile space that was not devoted to equipment reports was wasted space.

We are never going to turn all of our editorial space over to reports, but the reactions to that one issue made it perfectly clear where most of our readers' interests lie, so we will continue to follow much the same editorial course that we have from our inception. But what about all those people who do like to build things from scratch, and to modify existing components for improved performance — the so-called solder-and-spaghetti crowd? What publication was there that would cater to their interests? Until now, there weren't any. Now, there's the Audio Amateur, edited and published by Edward T. Dell. If you're curious, you can get a detailed blurb sheet by writing to Audio Amateur, 307 Dickinson Ave., Swarthmore, Pa., 19081.

On Tape (from page 24)

meter reads 0 VU or lines up with a BIAS mark when the meter switch is set to check bias.

Since the meter scale is calibrated in decibels, it is only natu-

ral to assume that a metered bias reading of +1 db above the normal bias reading represents a condition of 1 db overbias, or even that a reading of -1 db means the same thing. Neither is the case. The amount of over- or underbiasing can be measured only by metering the output from the tape itself; the bias-metered readings have nothing to do with it.

In the next issue, we'll describe the complete record and playback setup procedure as it is done by professionals and should be done by critical home recordists.

Audio Mart

FOR SALE

Acoustech X electstatc spkr syst, Klipsch Cornwall spkrs, Marantz 7T prmp, Marantz 15 amp, Marantz 8B amp, McIntosh MC60 amp, McIntosh mono prmp, McIntosh 65 trr, Dual 1019 recd chgr, AR-3a spkrs. All as new. Best offers or trades. Paul Heath, 81 Big Tree St., Livonia, N. Y. Phone 346-5630.

Orign pre-recorded tapes in orign boxes. like new, over 100 diffnt selec-tns, 40% off list price. Send stamp

Subscription Order

SEE "PRICE HIKE" ON PAGE 33

Revised rates for a one-year (4-issue) subscription, including First-Class mailing: United States \$5; Canada and U.S. Possessions \$6 U.S. Curr.; Other Foreign Countries \$7.

Is this a new subscription or a renewal ?

Name _____

Street _____

City & State _____ Zip Code _____

Mail check or money order to: The Stereophile, Box 49, Elwyn, Pa. 19063

for list. Also, for best arms only: ADC 10E Mk II cartidge \$40; Shure M91E \$33; for good arms: Shure M92E \$25, all unused. Ken Massey, 6132 Fairlane Dr., Acton, In. 46257.

10-yr-old Tannoy 15-inch spkr, bass-reflx cabnt. Theodore C. Oakberg, 2119 Laurel Ave., Forest Grove, Or. 97116.

Marantz 10B \$485, 15 \$195; Dynaco PS1 \$3, DSC1 \$2, PAM1 \$14; Ampex 960 \$145; Empire 980 arm \$15; Shure M226 arm \$15; Pilot MX100 \$19; Viking 86 \$85; ADC 990E \$15. Sam Wherry, 1702 Division St., Evansville, Ind. 47714.

Ampex 601-2 2-Tr professnl portbl tape recdr w/ Stereophile flutter-filter, 200-ohm mic inputs, recently-lapped heads, servc manual & parts kit, exc condtn. \$370 complete. J. G. Holt, Box 49, Elwyn, Pa. 19063.

McIntosh C-20 prmp & wlnt cabnt, Mac clinic certif'd 5/8/69. Perf condtn. Best offer. Dr. J. P. Wager, Georgia Baptist Hosp., Atlanta, Ga. 30312.

ADC 25 cartidge syst, brnd new, w/ warranty. Orig \$100, sell for \$80. Write before sendg check & encl stamped return envelope. J. C. Yau, 6349 N. Rockwell, Chicago, Ill. 60645.

University "Classic" theater/auditorium system components: C-15W 15-inch woofer \$90; Cobraflex mid horn & T-30 driver \$55; HF-206 twtr \$35; N-3 "Acoustic Baton" 3-way zover \$35. Rugged home-built Stromberg-Carlson-design folded horn encl for syst, free with purchase of all compnts. W. Grant Kenyon, 326 Snuff Mill Rd., Wilmington, Del. 19807.

Scott 310E FM stereo tnr; Scott 299D stereo integratd amp. Both meet or exced mfr's specs, \$300. B. R. Rubinstein, 3736 Wenig, C.R., Ia. 52402.

Decca Mk II cartdg w/ SME adaptr, \$30; facty-wired Dyna FM-3 tnr, \$70; Dyna PAS-3x prmp, \$50. J. D. Griggs, 3515 Manhattan Ave., Manhattan Beach, Ca. 90266.

Canadians: 2 Quad electstcs, Quad FM stereo tnr, Quad AMII tnr, 2 Quad II amps, Quad 22 prmp, Revox F-36 recdr, Koss PRO-4 phones, AR-XA trntbl, B&O cartrdg, all items used 3-4 hrs. New facty-sealed Soundcraft, RCA 1-mil Mylar tape. Best offers. R. Robinson, 3207 Linwood Pl., Windsor, Ont.

Stereophiles, complete set to date except for Vol. 1 No. 3. Exc condtn. Best offer for all or part. Robert Starrett, 5225 Lexington Ave, Hollywood, Ca. 90029.

Two Sony C-37-FET capac mikes, brand new, warranty, evrything. Will explain why selling price-reduced. Jerry M. Hyde, 301 Springdale, Ave., Wintersville, Oh. 43952.

2 McIntosh MC-60 pwr amps, recondtnd by McIntosh clinic to new specs, \$195 the pair, \$99 each. Will deliver up to 100 miles radius on firm commitment or send REA or UPS prepaid. S. C. Pratt, 100 W. Mason Ave., Alexandria, Va. 22301, Phone: 703-549-3128.

AR integrtd amp, new, \$180; Dyna 120 amp, new condtn, \$140. Blank warranty cards for both. Selling because of unexpected gift of Marantz 16 & prmp. Dr. W. B. Owen, 1308 Vista Rd., Ellensburg, Wash. 98926. Phone 509-925-3323.

JBL mono spk syst, C34 fldd-horn corner encl, D130 & 075 JBL drivers, \$140. AR t'btbl & Shure V-15-II w/ abt 1 yr of use, \$50. All in good condtn. Will deliver within 200-mile radius on firm offer. Henry J. Pratt, 439 Chelsea Circle, Atlanta, Ga. 30307.

Koss PRO-4A stereophones, \$25; JBL LE-8 8" full-range spk, \$78/pair; Grado t'btbl, \$50 or \$70 w/ Grado arm; Heath FM-4 tnr, \$20; Heath TR-1E tape deck (4-track stereo play, 1/2-tr mono record, preamps; kit cost \$180) sell for \$75; Crowhurst-design home-made mono tube amps: 14W RMS \$20, 35W RMS \$30. All used & F.O.B. Lerry Griseil, 780 N.W. Norman, Greasham, Ore. 97030.

REL Precedent 646C FM tnr, superb condtn, best offer over \$200. R. H. Tucker, 316 St. James Pl., Philadelphia, Pa. 19106.

SWAP

Facty-sealed, new Marantz 18 recvr or 10B tnr or 7T prmp & 16 amp, for a used Questar telescope, std model w/ either quartz mirror or wide angle. Tasso Spanos, Opus One, 400 Smithfield St., Pittsburgh, Pa. 15222.

WANTED

STEREOPHILE BACK ISSUES:
Volume 1, reasonable condtn. Name price. R. Wright, 922 Mokulua Dr., Kailua, Hawaii, 96734.

All back issues. Buy, borrow or rent. Howard G. Mullinack, 21 Stuyvesant Oval, New York, N. Y. 10009. Phone 212-677-0213.

Vol. 1, No. 11; buy or borrow. John Crider, 3715 Linkwood, Houston, Tex. 77025.

"Film Themes of Ernest Gold" London tape LPM70079; "Music for Bang, Bearroom and Harp" RCA Victor disc LSP1866; Buy or rent, state price, condtn and terms. Michael Mikita, 3774 E. 91st St, Cleveland, Oh. 44105.

2 RCA LC-1B duo-cone spkrs. Must be in perf condtn. Larry Gobie, 247 W. Dayton Yellow Springs Rd., Fairborn, Oh. 45324.

the stereophile

Box 49, Elwyn, Pa. 19063

Rich. P. K... 1-63
2805 The...
Long Beach Ca 90806