

# THE B.A.S. SPEAKER

EDITOR-IN-CHIEF: Michael Riggs  
COORDINATING EDITOR: Bernard Gregoire  
STAFF: Henry Belot, Robert Borden, Joyce Brinton,  
Dana Craig, Frank Farlow, Robert Graham, Lawrence  
Kaufman, James Lindquist, Peter Mitchell, John  
Schlafer, Jack Stevens, James Topali, Peter Watters

THE BOSTON AUDIO SOCIETY  
P.O. BOX 7  
BOSTON, MASSACHUSETTS 02215

PUBLISHER: James Brinton, President, BAS

VOLUME 5, NUMBER 6  
MARCH 1977

---

THE BOSTON AUDIO SOCIETY DOES NOT ENDORSE OR CRITICIZE PRODUCTS, DEALERS,  
OR SERVICES. OPINIONS EXPRESSED HEREIN REFLECT THE VIEWS OF THEIR AUTHORS  
AND ARE FOR THE INFORMATION OF THE MEMBERS.

---

## In This Issue

We have a meal of many courses this month. Fans of British loudspeaker design will enjoy Collins Beagle's account of his search for a good, small loudspeaker and why he chose the KEF Corelli. At the other end of the reproduction chain, our guest speaker for February, Dr. Bruce Meier of Discwasher, introduces a host of interesting new products. Among these are a clip-on tone arm damper and an alternative to Sound Guard.

Elsewhere in this issue you'll find first word of Sony's plans to market in the U.S. their PCM audio recording adapter for the Betamax, some impressions of two Sony cassette recorders, and a discouraging word on SAE's Impulse Noise Suppressor. J. J. Thompson reports on the Ariston turntable.

Finally two articles close the issue -- a user's report by Collins Beagle on the Audio Research SP-4 and some perspectives on hi-fi specifications from Al Foster.

Stay tuned to this station. We have a bundle of good stuff on tap for the next few months, including a preamp input impedance survey, a kit that will allow you to make those impedance measurements yourself, and reviews of a number of low-cost (under \$300) receivers, the Audio/Pulse Model One, the Shure M615AS equalization analyzer and the Dynaco ST-150 power amp in both stock and modified versions.

---

Membership dues are \$14 per year (October 1 to September 30) or portion thereof. Dues include a one-year subscription to the BAS Speaker. (Note that almost the full amount of dues is allocated to production of the Speaker. The local activities of the BAS are strictly self-supporting.) For further information and application form, write to: The Boston Audio Society, P.O. Box 7, Kenmore Square Station, Boston, Mass. 02215.

---

## For Sale

- \*One pair of AR-12 speaker systems; one pair of new AR-7 speaker systems in sealed cartons; one AR-1W speaker system. Call 687-6016.
- \*Grace G-940 (damped) tone arm, \$80; latest Supex cartridge, SD 909, \$80; Marantz SE -15 electrostatic headphones (including energizer), \$65. A. Balgalvis, 193-15B 69th Avenue, Flushing, NY 11365, (212) 454-3205.
- \*Heathkit Modulus system AN-2016, \$950 -- digital FM/AM tuner, four-channel preamp and two AA-1506 dual 60 W/ch power amplifiers. Included are optional modules for FM Dolby, CD-4 and SQ. Cost \$1250 before assembly. Unit is assembled, aligned and tested. A. Balgalvis, 193-15B 69th Avenue, Flushing, NY 11365, (212) 454-3205.
- \*KLH 9 electrostatic speakers, new condition, \$850; ERA turntable, \$125; Thorens TD-125 turntable with Grace 707, \$265; Son of Ampzilla amp, new, \$340; Advent 300 receiver, new, \$230; Sansui CD-5 electronic crossover, \$25; Electrovoice T-35 tweeter, \$15; CTS 15-inch woofers, \$25 each; CTS 6-inch midranges, \$5 each; Tandberg 6000 tape deck, \$225; Phase Linear 400 amp, new \$325; Dual 704 with Shure V15-III, \$230; Audio Dimensions preamp, \$200; Audio Dimensions preamp with Win Labs cartridge, \$200; Southwest Tech 215A amp, \$60; H speaker system, \$450. Gayle Glidewell, 7724 Querida, Dallas, TX 75248, (214) 239-4103.
- \*dbx 119, \$130; Sony SQD 2020, \$150; B&O MMC 6000, \$50; Koss 2+2 headphones with case, \$45; Realistic DVM, \$75; Heath IO-17 3-inch scope, \$60; Texas Instruments SR-50 calculator, \$25; SR-51A, \$45. Everything in good to excellent condition, complete with manuals. All prices include shipping. J. J. Thompson, 281 Warren Avenue, Kenmore, NY 14217.
- \*Quad 33/303, \$325; "classic" Sony ST-5000FW; Revox F36 "electric eye" tape recorder (used 30 hours), collector's item. Ross, (519) 945-8486.
- \*Harman/Kardon Citation Twelve, \$185 including insurance and shipping via UPS. John Tooley, (302) 684-3443 (home) or (302) 856-5260 (work).
- \*Ampzilla, metered, still in warranty, recently checked out "OK" at Crown clinic, \$575; Audio Research SP-3A-1N with all factory mods, Amperex/Telefunken tubes (new), "uniformity checked" at factory, \$450 firm; Sony ST-5130 tuner, recently returned from factory check-up and alignment, \$195. Ted Macklin, (919) 722-4566.
- \*SAE Mark 17 ten-band stereo equalizer, \$225; dbx 117, \$100; dbx 119, \$100; Sansui cassette deck, \$100. All prices open to offer. Mike, (617) 247-0137.
- \*Trevor Lees preamp, professionally wired on new PAS-3X chassis, used for A-B comparisons (4-6 hrs.). Includes Telefunken tubes and Trevor Lees faceplate, asking \$275. Brand new Quad 405 dumping amp -- factory sealed carton with warranty, latest production run (11,300 series, asking \$315. Please call (408) 625-2433 and ask for Mr. Meyers.
- \*Collector's Item -- Thorens Turntable/Changer CD-43-N, direct-drive, stacks up to 12 records (any size or speed). Will pause up to 13 minutes between records, variable speed control, repeat and reject, manual or automatic. Perfect condition, \$150 with base. Also Supex SD-900E, \$75. Supex SDT-180 Variable Transformer, \$90. Never used, both \$150. Vestigal Arm, never connected, \$60. (206) 282-0155.
- \*Dahlquist DQ-10's, latest version, mirror-imaged, \$625 pr.; Quad FM-3 tuner, \$150. Dennis Curley, (617) 658-6568.
- \*Dyna PAS preamp, \$60; Dyna PAS preamp with 4 new LUX 12AX7 tubes, \$75; 2 Dyna Stereo 70 power amps, \$60 each; Sherwood tube stereo tuner, \$35; Direct Box (built from plans in Recording Engineer/Producer), \$10; Binaural microphones (electret condenser, built from plans Audio), \$20; misc. cables and adapters, \$10. Stephen Bayle, (617) 547-2836.
- \*Recording Tape (new): Audio Magnetics -- LN reels 1800', \$2.85; XHE cassettes -- C90, \$2.40, C120, \$2.85 (these are excellent C120 cassettes); XHE cartridges -- C90, \$2.25; LN cassettes C90, \$1.00; LN cartridges -- C45, \$1.10, C90, \$1.35. Minimum order is 10, can be mixed. If you order a case of the same tape (24 reels, 48 cassettes or cartridges), take 7% off for saving me from repacking. Add shipping: I'll refund the excess. Bob Sellman, 14 Station Ave., Haddon Heights, NJ 08035.

## Wanted

- \*Mint pair of Advent MDC-1 microphones. John Tooley, (302) 856-5260 (work) or (302) 684-3443 (home).

\*Rabco SL-8E (not 8) tone arms, any time, any condition. Will pay freight. P. H. Faiss, 34 Anden 3 Steinen, D-6000 Frankfurt/M. 50, West Germany.  
\*Audio Research Dual 150; Accuphase T-100; Naim NAP 250; Gale GS-401A (pair). Ross, (519) 945-8486.  
\*dbx 124; RTR ESR-6 speakers (pair). As I plan to triamp the RTRs, I don't care if the crossover works, as long as I can hook them up directly to an amp. Please let me know the condition of the units and your price including shipping. Bob Sellman, 14 Station Ave. , Haddon Heights, NJ 08035.

## Update . . . Old Colony Crossovers

I would like to update the information given by Roger Sanders (December 1976 Speaker) on the Old Colony electronic crossovers.

We now supply redesigned glass/epoxy circuit boards with our crossover kits. While the original version used TO-5 ICs, our new board is laid out for 8-pin DIP 741's, allowing the user to try out more easily his favorite IC's via Molex pins or sockets. Compensation components can easily be soldered to the underside of the board if needed. The new board also has eyelets installed, so the frequency determining components can be changed and resoldered many times without foil damage.

Available crossover points are 60, 120, 240, 480, 960, 1,920, 5,000 and 10,000 Hz. The kits require a  $\pm 18$  V supply (which we can also supply), case and hardware. Current per channel prices are: DG13R P-C board only, \$3.00; Biamp 2-way kit, \$8.50; Triamp 3-way kit, \$10.50; all prices postpaid.  
-- Ron Subka (Old Colony Sound Lab, New Hampshire)

## Ortofon MC-20 "Grand Prix" at Japan Audio Fair

The January 1977 issue of The BAS Speaker has a commentary by Peter Mitchell on the Japan Audio Fair. I would like to make one small correction to his comments.

He mentions that Ortofon introduced the MC-20 cartridge at the Japan Audio Fair, and then he says that "to step up its signal level Ortofon has finally given up the transformer and has produced a head amp, the MCA-76." Ortofon is producing a pre-preamp, or head amp, but we have not given up the transformer. We offer both products, giving the customer a choice.

One extraneous comment regarding the Japan show: shortly after the show, Japanese reviewers voted the Ortofon MC-20 the "Grand Prix" as the finest imported item of the year.  
-- David Hafler (Florida)

## Still More on Acoustic Suspension

In reference to the letters in the January Speaker, commenting on my letter in the November issue, I'd like to set a couple of things straight. First, I admit to being caught up in what was perhaps excessive excitement over the edge suspension treatment of my AR-1Ws. However, the improvement noticed was considerable. I did not mean to imply that any speaker would somehow become better than originally engineered, except in cases where the seals were not adequately designed in the first place (an unnecessary consideration when dealing with any of the reputable speaker manufacturers). And, obviously, nobody would seriously attempt to absolutely seal an acoustic suspension cabinet.

My particular speaker system has a woofer crossover at 250 Hz, so the probable high frequency loss caused by the edge treatment is of no concern to me. The woofer itself is of the older AR design and has a cloth skiver. As Tyson suggests, the butyl coating deteriorated and the skiver was brittle and dry. Applying the silicone coating restored the original life into the driver,

and produced better sound than I had previously heard from them, as the speakers were already five years old when I bought them. (I have since heard of someone else with a pair of KLH speakers whose sonic character began to change after many years. Upon return to the factory, the cloth edges were re-doped, and the speakers once again sounded like new.) So, nothing magical was intended in my letter, only my observation of the importance of utilizing an acoustic suspension woofer as intended in its design.

The moral: If you have old AR or KLH speakers with cloth edges, you may restore their original punch by carefully coating them with a diluted mixture of silicone rubber and toluene. If you have newer speakers with polyurethane or similarly modern skivers, take Roy Allison's sage advice and leave them alone.  
-- Bob Graham (Massachusetts)

## B & W Backtalk

John Puccio is incorrect in stating (in the December issue) that all the B&W speakers use the same tweeter. The one used in the DM-4 and in the DM-2A is, I believe, made by Celestion. The one they put in the DM-6 and in the DM-5 is of their own manufacture and is a fair amount more accurate than the Celestion unit.

Also, the DM-6 is much better than the DM-2A. Although they have a similar sound, the DM-6 has better imaging and a better low end and, quite simply, is just a more accurate speaker system.  
-- David Sherwood (New Jersey)

I was somewhat surprised at John Puccio's comments on the B&W loudspeakers in the December Speaker. I also have recently done considerable listening to these speakers, but I've reached some quite different conclusions. My experience is that the DM-6 (\$1200/pair) is far superior to the DM-2A (\$700/pair) in any characteristic -- clarity, definition, overall smoothness, frequency response, imaging, dispersion, whatever. Indeed, it is really no contest. The naturalness of the DM-6 is uncanny. It's one of the finest speakers I've ever heard.

The DM-6 and the DM-2A have no drivers in common. The DM-2A is really an earlier generation. The DM-5 (\$300/pair), on the other hand, uses the DM-6 midrange driver as a bass/midrange unit and also uses the same tweeter as the DM-6. These two speakers therefore sound very much alike through the midrange and high end. The DM-5 is, of course, rather lacking in bass response. But I'd buy a pair of DM-5's before I'd buy DM-2A's, even if the prices were reversed. (A combination of DM-6's and DM-5's would make a very nice four-channel setup.)

But anyone who is thinking of spending \$1200 for speakers (and has a room to match his bankroll) really should listen to the Snell speaker. This is truly an impressive beast, if you have the room for it.

And herein lies a provocative (I think) question. The DM-6 and the Snell are both going to cost the U.S. consumer about \$1200 (exclusive of taxes). The Snell is manufactured locally; it costs \$1200 locally. The B&W is manufactured in England; it can be bought retail in England (again, exclusive of taxes) for about \$600 (at present exchange rates), so half of what you pay locally is going for shipping, import duties, and distributor markup.

Question: Is it fair to compare these to each other as \$1200 loudspeakers? Or are we comparing a \$600 with a \$1200 loudspeaker? (The proportions grow even more ridiculous if one makes the comparison in England. Maybe there's some geographic point on earth where it all evens out.) But then I'm told that AR speakers sell well in England, where the reverse situation obtains.  
-- Bob Borden (Massachusetts)

John Puccio says that the B&W DM-2A and DM-6 have the same tweeter. Unless the DM-2A has changed (making it a DM-2B) it uses a Celestion HF 1300 MkII and a Coles 4001G HF array; the DM-6 uses a new B&W dome. And to my ears they don't sound even vaguely similar. The high end of the 6 seems spitty and overemphasizes harmonics, while the 2A seems a little bright.

More to the point, this discussion raises the issue of judging speakers in dealer showrooms.

In that situation there are so many unfamiliar variables that making a meaningful assessment is close to impossible. To add fuel to the fire, most dealers (including those who should know better) give hopelessly inadequate demonstrations: no attempt at level matching, correct room placement, or use of decent ancillary equipment. Even when dealers pretend to match levels one is often worse off because he/she is operating under the delusion that levels are matched, when, in truth, nobody really knows. Your December amp review points out this problem rather forcefully by demonstrating the erroneous conclusions one can reach when levels are different. The best suggestion I have is to listen to equipment in a variety of surroundings and to choose on the basis of those qualities which appear consistently. Readers of the Speaker can offer assistance by sharing their comments.

-- Thomas Martin (Rhode Island)

## UDXL/II Rising; Avilyn Declining?

In late 1975 we found that the TDK type SA (Avilyn) cassette provided a significant performance advantage over the best CrO<sub>2</sub> tapes and so was the first ferric-based tape to be better overall than chrome. It had 3 to 4 dB better headroom at low and middle frequencies and concomitantly lower distortion of bass and midrange material at normal recording levels (-10 to 0 VU). Other people also discovered this advantage of course, and during 1976 TDK captured from Maxell the leadership position in premium cassette sales. But late in 1976 Maxell made a comeback by introducing UDXL/II cassettes having the same excellent headroom as SA and claiming a better oxide binder. The significance of the latter is that some batches of SA exhibited substantial oxide shedding, dropouts and print-through. So Maxell UDXL/II has in recent months become the premium cassette of choice.

It seemed reasonable to suppose that UDXL/II and SA would remain closely competitive, particularly in view of TDK's recent advertisements of a new production run of SA claimed to be freer of dropouts. (The improved SA is signified by a grid pattern engraved in the plastic cassette shell.) But in the February 1977 issue of Hi-Fi News and Record Review (England), Angus McKenzie reports that TDK has actually lowered the performance of the new SA. The reported reason is that though SA and UDXL/II are chrome-compatible in bias and EQ, they are 3 dB more sensitive than CrO<sub>2</sub> and so require a readjustment of the recorder's "rec-cal" controls for correct Dolby tracking. In many Japanese cassette machines, of course, the rec-cal controls are not user-adjustable, being hidden within the machine. So TDK reportedly has reduced the sensitivity of SA to eliminate the need for readjustment of machines set up for CrO<sub>2</sub>. But in so doing they have thrown away the only advantage SA had over chrome! So if McKenzie's report is correct, we are left with the consistently superb Maxell UDXL/II as sole contender for first place, with the better brands of CrO<sub>2</sub> occupying a close second place (and still an attractive alternative as they cost significantly less than Maxell).

-- Peter Mitchell (Massachusetts)

## Atlanta Audio Project

Atlanta Audio Project, 2126 Faulkner Road, Atlanta, GA 30324, owes me money (or equipment) for a prepaid order I placed with them some time ago. I have discovered that they went out of business in January 1977 and that Michael Humphreys, who ran the mail order part of the operation, is not to be found. If anyone else is owed money or equipment by this firm, write or call Ms. Patty Cherry at the Governor's Office of Consumer Affairs, 225 Peachtree Center, Suite 400, Atlanta, GA 30303, (404) 656-3794, and give her full details of your case. As of this writing (January 31), she is conducting the investigation of complaints against this firm. I will update my report as circumstances warrant.

I believe Michael Humphreys also operated under the names "Seriously Audio Sales" (same address) and "Southbound Sound," P.O. Box 52508, Atlanta 30305. Ms. Cherry is aware of these alternate names and will also accept complaints about them.

If you have any information regarding the whereabouts of Michael Humphreys, please contact Ms. Cherry.

-- Bob Sellman (New Jersey)

## The Viennese Light Music Society

This is quite a large international, strictly non-profit Society, aiming to realise in recorded form the vast wealth of rare works entrusted to posterity by the illustrious Viennese Waltz Emperors. To date, the Society's recorded archives contain what is generally considered to be the largest collection of its kind in the world, to which new material is continually being added.

The master recordings are preserved on 15 ips tapes, from which all members' Dolby cassettes are processed (at the correct speed -- not fast-run) via professional, top-quality equipment. The technical standard of Society cassettes is certainly superior to the general commercial issues, while the musical contents could only be compared with the Vienna Philharmonic under Willi Boskovsky, such being the quality of the Biedermeier Konzertorchester under Otto Schulz, the forces in question.

The recordings are, of course, strictly non-commercial and can only be made available to subscribed members of the Society. As members, those interested in this sphere of music receive a copy of the Society's current catalogue, which lists 140 programmed cassettes, and the catalogue itself is brimming full of many of the world's greatest and indeed most beautiful rarities. All Dolby cassettes are made available to members at cost-price, for no profit is allowed to be sought.

Finally, details of the Society's membership rates, etc. The annual subscription is 5 pounds, and the Dolby cassettes are 4 pounds each, inclusive of airpostage to the member. [A sample cassette has been requested and a review will follow. --Ed.] -- Reginald Woollard, Secretary, The Viennese Light Music Society, "Pickwick Papers, " Stickford, Boston, Lincs. England

## Accutrac and the Betamax PCM Adapter

BSR has announced that its marketing plan for the Accutrac turntable has gone into phase two, which involves raising the turntable's price by \$100 (to \$600) -- presumably to help pay for the million-dollar Accutrac advertising program.

The Sony PCM digital audio recording adapter for the Betamax videocassette deck, which was first revealed at last fall's Japan Audio Fair (January 1977 Speaker), will be in the stores next fall, a year earlier than was previously expected. It will sell for about \$1500 (in addition to the \$1300 Betamax deck). Its digital conversion circuits are being made here in Massachusetts. The adapter accepts stereo audio signals and formats them into a single 32-bit pulse code (12 bits per channel, plus 8 bits reserved for dropout correction), to be recorded on the video track of the Betamax at a rate of 1.76 megabits/second. Preliminary specifications include a frequency response flat from DC to 20 kHz  $\pm 0.25$  dB, harmonic distortion of 0.03% and S/N ratio of 85 dB.  
-- Peter Mitchell (Massachusetts)

## Zerostat

I finally broke down and purchased a Zerostat and am surprised (and pleased) to report that not only does it work, but it seems to help cut down noise on records. I purchased mine by mail from Sound Affair, 364 Mission Ct. , St. Louis, MO 63130. If you decide to purchase it from Sound Affair, mention the BAS.  
-- Bob Sellman (New Jersey)

## Beyer DT-48 Headphones

Some time ago I purchased a used pair of Beyer DT-48 headphones. Although I felt they sounded much smoother and more detailed than my Koss Pro 4AA, they had no bass because they had hard rubber ear cushions, which didn't seal at all around the ears. I sent them to Beyer

(Revox) for checking and for replacement foam ear cushions and am happy to report that not only did Beyer check them and give me new foam ear cushions at no charge, but with the foam ear cushions and the good seal they provide the bass is no longer missing. The sound is now very, very good. If anyone has Beyer DT-48's with the old hard rubber cushions, I strongly recommend that he purchase a set of the foam cushions. My Pro 4AA's are now gathering dust.

-- Bob Sellman (New Jersey)

## Yamaha vs. Advent

I spent about one-half hour at a local dealer's salon comparing the preamp section of the Advent receiver to the preamp section of the Yamaha CA-800. They did not sound similar, and the various differences were not what I expected from reading preamp reports in the Speaker. The Advent had virtually no sibilance on "Sweet Baby James, " from James Taylor's album of the same name. The Yamaha had quite a bit. On Maynard Ferguson's "Give It One, " from MF Horn 2, the Yamaha had more zzzzz on trumpets, but also noticeably more ambience, particularly on the alto sax solo. The Advent sounded smoother and somewhat less "live." On the basis of the Ferguson, I would have called the Yamaha "excellent, " assuming the trumpet zzzzz to be actually on the disc, and the Advent "good. " But on the Taylor I would have said the Advent was "good" or "excellent," and the Yamaha "edgy." Yamaha's blurb shows a pronounced rise in THD at low input levels to the phono preamp. Perhaps this factor is responsible for the anomalies I heard, and the Holman square wave, white noise and cartridge interaction tests don't define all the obvious audible differences. Associated equipment was the Audio-Technica 11, BIC turntable (I think), the Advent power amp and double Advents. Comments?

-- Crawford Best (Louisiana)

## The SAE Pop Suppressor: Not What We've Been Waiting For

In the last few weeks I have tried out some new equipment, including the SAE impulse noise suppressor. I obtained a sample from the first shipment of these, with a serial number around 1200. I connected it to my system and played a very static-laden RCA record through it, first using the "invert" mode for calibration, then the "normal" mode for normal operation. The total effect was remarkable. Not a single tick or pop was removed. Only musical peaks were affected, with what sounded like sandpaper being spliced in in place of the transient information on the record. This was true at any setting of the external controls on the unit and for any reasonable signal level in or out of the box, although the degree of garbage contributed by the SAE device could be varied with the primary adjustment lever on the front.

Because it seemed to go about its task in a fundamentally lame way, I took the unit back for a replacement. The replacement sample behaved identically. It appears to freeze the signal level for several milliseconds whenever it thinks it sees a click, but you could skip the technical analysis and just listen to any harpsichord recording through the device. Considering the massive advertising campaign it is being given, and the relatively affordable price, it may well poison the reputation of SAE for a long time to come (assuming that the two samples I had were representative). Given that the worst-case behavior of the unit was astoundingly bad, I should hasten to point out that I found no musical material of any nature with which the unit made any discernible improvement in the sound without also causing very disturbing side effects.

-- David Satz (Massachusetts)

According to SAE's advertisements, this new \$200 product eliminates "clicks and pops caused by scratches, static and imperfections" on records, "with no adverse effect on the quality of the recorded material." There should be a large market for such an accessory. My recent experience with two of these units, however, was disappointing, particularly in view of the advertising build-up.

As I recall the description in the owner's manual, the circuitry detects phase and transient signals characteristic of imperfections such as scratches, momentarily interrupts the signal to eliminate the scratch sound, and, by detecting the musical signals immediately preceding and following the offending signal, recreates the musical portion of the signal eliminated in the pro-

cess. The unit includes a front panel control to adjust the threshold of the detecting circuits. I leave it to members more expert than I to explain the electronic theory underlying the concept.

The dealer demonstrated the unit by playing a record with a single, and clearly visible, scratch engraved on the surface with a key. I understand that SAE has been using the same demonstration in persuading their dealers to carry the product. The demonstration is convincing, and I purchased a unit and installed it in my system, as recommended, through the tape monitor circuits.

Two fundamental problems became apparent almost immediately and continued over several days of auditioning with various sensitivity settings. First, though the system effectively removes widely spaced scratches, when the record presents the system with the multiple, fairly closely spaced scratches typical of older records, the unit's electronics apparently are unable to recover quickly enough between scratches. Under those circumstances, closely sequenced scratches are reproduced as mild thumps, creating a curious, non-rhythmical accompaniment to the music.

Second, when the sensitivity is set high enough to eliminate scratch sounds, the system distorts amplitude peaks to the point of making the recording unlistenable. The circuitry apparently senses the peaks as scratches and tries to eliminate them.

Suspecting (hoping) that my unit was defective, I returned it to the dealer for another. The new unit exhibited the same problems and was returned to the dealer for a refund.

I believe that both units were from SAE's early production, and perhaps SAE will resolve the problems in later production samples. I suspect, however, that elimination of the defects will require at least some changes in the electronic design. I would caution prospective purchasers to await a refined product from SAE or from other manufacturers, such as Phase Linear, reputed to be developing systems with a similar purpose. Given my experience with the SAE units, any such product should be purchased under a clear understanding with the dealer that the unit, if unsatisfactory, may be returned for refund.

-- Ward Stevenson (Connecticut)

## Ariston RD-11S Turntable

The first impression one has of this turntable is that it looks very much like the legendary Linn Sondek LP 12. According to [Hi-Fi News](#) this is because Mr. Hamish Robertson was involved in the design of both units. The Ariston is very similar to the Linn in operation and features. The one big difference is that the Ariston offers both 33 rpm and 45 rpm speeds.

The RD-11S is very well constructed. The two-piece platter appears to be aluminum and, according to their literature, is precision ground and balanced and weighs 9 1/2 pounds. The unit does not have the usual rubber or composition mat, but rather, two rubber rings inserted in grooves in the platter, so as to support 7-inch or 12-inch records near their edges.

The platter and arm are mounted on a subassembly suspended on springs below the main chassis, as in the Linn Sondek. This arrangement seems to give excellent isolation to feedback in my system.

The motor is a 24-pole hysteresis motor mounted to the main chassis with rubber dampers to further suppress vibration. The pulley assembly is driven through a slip clutch. This allows the platter to be stopped without having the belt slip, thus preventing damage to the belt. Speeds are changed by removing the outer portion of the platter and moving the drive belt from one pulley to the other, as on the AR turntable. The speeds on my unit appear to be exact.

The main bearing is a ball bearing setting on a teflon plate, upon which the main shaft rests. The shaft and bearing assembly appear well machined and are well fitted. There is no sign of play in the bearing assembly of my unit. The manufacturer states that wow and flutter are 0.03% and rumble is -74 dB weighted, although which weighting is not specified.

The unit can be obtained either without an arm, with the SME or with a Grace (which model is not specified) arm. The unit is supplied with a teak base and a plexiglas cover, which has friction hinges, so a prop is not needed to hold the cover open.

What very little assembly is needed is very easy. The only problem I found is that with my Formula 4 arm I had to leave the bottom off the turntable, as there is not enough depth for arms having a heavy lead coming straight down from the tube.

I bought the Ariston to replace my Technics SL-120, because I had been reading and hearing about problems caused by the subsonic rumble direct-drive turntables generate, especially with moving-coil cartridges, such as the Denon 103S I use. The difference when going to the Ariston was not only visible on my scope, but also very audible. The bass is tighter, the midrange more defined and the imaging better.

The Ariston RD-11S is an excellent turntable which I highly recommend. In view of the very audible differences I found between this belt-drive turntable and the direct-drive turntable I had been using, I think every serious audiophile should think twice before purchasing a direct-drive turntable. -- J. J. Thompson (New York)

## In Search of the KEF Corelli

Within the past few months, the Music Center Hi-Fi House, Charlottesville, Virginia, has taken on the KEF line, so I have had the opportunity to hear the 104 and the 103. The first speaker they received was the 104, to which I had mixed reactions. On the positive side, the speaker was open, had good depth imaging and definition and handled transients well. But its mid and upper bass were quite bloated. I assume that this problem could be resolved by proper placement off of the floor and away from walls. (I heard them on their short stands at least three feet away from any wall. Though most people I have talked to here who have heard them feel that the bass is a problem, the KEF rep apparently insists that the supplied stands place them at a proper height above the floor.) I have heard them on a wall shelf at least four feet above the floor; the problem was reduced but still evident. The other flaw I have found with the speakers is that there is a slightly muted quality about the upper frequencies. It is as if there were a steep filter cutting off some place in the upper treble region. I do not see how this problem can be resolved without equalization. My overall impression, due to the 104's definition, dynamics and excellent handling of transients, is that it would make a good rock speaker, as a compromise between a dynamic but very colored speaker, such as a JBL, and a more natural though more sedate speaker, such as a Magnepan or a Dahlquist.

In time, the model 103 appeared, and I had hopes that it might serve as a portable monitoring speaker for which I had been looking. Unfortunately, they were a good deal more colored than the 104's. They were boxy sounding, lacking the 104's openness and depth. They did not seem to have the 104's bloated bass, but they did not have the 104's definition and punch either. (I should add that I heard the 103's on a shelf, against a wall, at least four feet above the floor.) Their high end did not have the muted quality of the 104's, but worse, they were a bit hot, tending to the brittle side. Overall, the 103 was a disappointing speaker, especially considering the ridiculous price KEF is asking for them (recently raised to \$275 a piece, I have been told).

By this time, I had concluded that though KEF made excellent drivers for other people's speakers (IMF/IMFried and the BBC), they were not so successful at creating a complete speaker system for themselves. But one day I entered the store to discover that there was a KEF speaker smaller than the 103 -- the Corelli. After about a week of pestering the store, I was permitted to hook them up. I was quite overwhelmed by such a splendid sound from such a small speaker. It was open, had good depth, imaging, apparently a good tonal balance and very good bass. By comparison, the 103's seemed brighter but not open, colored in the lower register, boxy and two-dimensional. The 104's were similar to the Corelli's in terms of openness and depth, and at their midranges were about identical, but the 104's bass was bloated and too warm. (The Corelli's were sitting on top of the 104's at the time and thus were away from the floor and walls, giving the Corelli's an advantage here.) Surprisingly, the slightly muted quality of the 104's in the high end was nonexistent in the Corelli's, though they both use the same tweeter. For the first

time I had found a speaker I liked whose price (\$185 each) fell between those of two personal favorites for their prices, the large Advents and the Magnepans, so I decided to compare the Corelli's to them. The Advents, in comparison, sounded muffled and veiled, not open in the high end and otherwise inferior. The comparison with the Magnepans was more complex and less conclusive. The Corelli's seemed to have a more neutral tonal balance throughout the frequency range. The Magnepan's hot spot in the lower treble area really stood out by comparison (even though recent Maggies have less of this problem than earlier ones). The Magnepan's rolloff in the extreme highs was evident, giving the Maggies a mute, muffled sound compared to the Corelli's openness. I assume that tonal balance irregularities also account for the fact that female singers sounded almost nasal on the Maggies, while on the Corelli's they seemed more natural and defined. The Magnepans did seem more detailed and perhaps more open in the midrange. Surprisingly to me, there was a greater sense of depth with the Corelli's. Finally, the Corelli's bass response seemed more natural and better defined. My overall conclusion is that the Corelli's tonal balance is its main advantage over the Maggies, though the Maggies are probably capable of providing a more spacious sound and of handling high volumes with less strain. As you perhaps can guess, I was very impressed with the Corelli's, and, after trying them at home for a while, I purchased a pair to serve as a reserve and portable speaker.

I was perplexed that KEF seemed to be competing with itself. There was the "Reference Series" of speakers, the 103's, 104's, and, I assume, the 105's. Then there was the "C Series," of which the Corelli is the bottom of the line (the others being the Calinda and the Cantata). And to my ears the Corelli was certainly superior to the 103 and to a lesser degree to the 104. By implication the C Series must be a group of superior performance speakers which should "do in" the Reference Series in the marketplace. Why was KEF doing this? I contacted the KEF rep and was informed that the two series were designed for different markets. The Reference Series is for those who want high volume levels. The C Series is for those who need less volume and want (by implication in the conversation) superior definition and basic performance. The main apparent design difference between at least the 103 and 104 versus the Corelli and the Calinda is in the nature of the B200 midrange/woofer used. The 103 and 104 use the B200/SP1039, which has a large magnet and voice coil (the larger coil permitting higher power levels). The Corelli and Calinda use the B200/SP1022, which has the same large magnet but a smaller voice coil (this is the same driver used by I M Fried in the H's woofer). This seems to result in a more accurate driver with superior definition. (The B200 sold as a separate driver for speaker kit projects is the B200/SP1014, which has a small voice coil and a small magnet.) Whatever else is different, I certainly prefer the C Series.

All of the above statements are based on general impressions of all the speakers at the Music Center, Charlottesville, Virginia (a very cordial store whose staff was very obliging in letting me make lengthy comparisons between their products on my own). After I had lived with the Corelli's for a few weeks, I did discover certain limitations in their performance (as I am sure I would have if I had lived with the others). As the KEF representative suggested, the Corelli's are limited in the volumes they can generate; they sound strained if driven above about 90-95 dB, especially with complex orchestral passages. And they generate a more restricted sound field than speakers such as the Dayton Wrights. But they do have extraordinary bass response for their size, being one of the best mid and upper bass speakers with which I am familiar (this is the characteristic that most impresses people who listen to them).

As is to be expected, the speakers are sensitive to placement. All of my descriptions have been of the speakers away from the floor and walls. If placed on the floor, the bass becomes bloated, making the midrange seem restricted. If put on book shelves the sound becomes less open and more two-dimensional.

They do seem to have a compatibility problem with tube electronics. I took them over to the home of a friend, who has a modified Dyna PAS preamp and a modified Dyna Stereo 70 amp, to compare them to FMI 80's. Though the Corelli's definitely had superior response in the bass region and extreme highs, strange things happened in the midrange and lower treble. A saxophone which had been a full-bodied presence with the 80's became a shadow on the Corelli's. But more surprisingly, the Corelli's took on a silvery quality especially noticeable with female voices. If anything I would have expected the Corelli's to sound dull with tubes. We found the results perplexing. I have tried the Corelli's with various solid state electronics -- Dayton Wright SPL preamp and SAE 2500 amp, Crown IC150A preamp and DC300A amp, Yamaha CA-800 integrated

amp, Advent 300 receiver (my portable electronics for the speaker) -- with good results. My only somewhat negative results with solid state equipment have come with a DB preamp and Phase Linear 400 amp, where the 400's metallic tendencies gave the speaker a somewhat harsh, steely quality.

All in all, I have found the Corelli to be an exceptional speaker (especially in view of its size and cost). Considering that it is at the bottom of the C Series line, the rest of the speakers hold great promise. I am looking forward to hearing the Calinda and the Cantata.

-- Collins Beagle (Virginia)

## **Impressions of Two Sony Cassette Recorders**

### Model TC-152 SD

The report on the Sony TC 152 was interesting. Based on my experience and on that of a friend with his 152, I am not very impressed with it. It has poor high-frequency response (you must use chrome to get anything above about 10 kHz from it) and rapidly saturates the high frequencies into distortion. But wow and flutter are very low as is noise. The NiCad battery pack must be used if you want any assurance that you are not getting speed variations from cassette irregularities. It drains other batteries at an alarming rate. The internal method of adjusting bias by rewiring parallel capacitors is awkward, to say the least. I also feel that the unit is too big, but until recently there was nothing smaller on the market that was worthy of mention. I expect to be purchasing a Nakamichi 350 soon and will report my impressions after using it.

### Model TC-177 SD

I have owned a Sony TC-177SD, their top-of-the-line, three-head cassette deck, for over a year and feel some comments are in order. Overall, it is a very good deck with extremely good sound, but it has some strange deficiencies considering its pretensions to being the best. The good points: an excellent, solenoid operated, dual capstan tape drive; low noise; good frequency response (but no match for a Nakamichi 600, 700 or 1000); low wow and flutter (inaudible); easy to use. It has a built-in Dolby calibration oscillator and calibration adjustments accessible from the top. Tapes made on it sound very good. Apparently it retains phase relationships between frequencies reasonably accurately. (I once set up a Dokorder MK 50 for a friend and got almost ruler flat response to 15 kHz, but found that tapes recorded on it sounded terrible, apparently because of large phase shifts between different frequencies.)

Then there are the bad points. Despite a plethora of internal adjustments, some very basic ones are missing. There is no method of adjusting the record-head azimuth without using an external oscillator, but because of the three-head design, this must be done for each side of each cassette. Sony ignored this requirement and did not build a 10 kHz oscillator and record-head azimuth adjustment knob into the 177. You must hook up an external oscillator, set to about -15 dB (or lower), and adjust the record-head azimuth (from the top, with the cover on, using a small screwdriver) for a maximum reading on the unit's VU meters. This isn't so bad at home if you have an oscillator and an easy way of switching it in and out of the network (which I do), but not everyone is so equipped. And suppose you use the 177 for live recording? The first side of the first cassette can be set up at home, but after that you must use the chancy method of adjusting by ear for loudest hiss.

If you look at the 177, you may be very impressed by its three-position bias switch and three-position equalization switch (normal, FeCr, CrO<sub>2</sub>). Don't be. There is one, and only one, bias adjustment pot per channel, accessible from the top with the top cover off. Each of the three positions on the bias switch selects a fixed resistor, meaning you adjust for one tape and take your chances with the rest. Far more serious, however, is the equalization. There is absolutely no way of adjusting it. (Believe me, I have repeatedly checked the service manual and the circuit diagram in disbelief, but that's the way it is.) Each switch position has a certain fixed record equalization. This severely impairs the performance of the 177, as the bias must be adjusted away from the optimum value to get reasonably flat frequency response. You must, therefore, bias for higher distortion, more noise, and poorer high-frequency response than could be obtained

if record equalization were adjustable. (Incidentally, my earlier comments on performance were based on using the 177 as it is, not as it might be if it had the proper adjustments.) If I ever get the courage, I may try to modify the equalization to make it variable and to add an internal azimuth adjustment oscillator. Personally, I'd rather swap for a Nakamichi 700 in decent condition.

With the 177 I use iron oxide tape exclusively, because the high-frequency response is as good as with chrome (or FeCr), and I prefer the better overload characteristics of iron oxide tapes. Frequency response with XHE or similar tape goes to about 15-16 kHz before dropping off to oblivion, but with all tapes there is a rise of about 2-3 dB in the 3-10 kHz region, probably because of the incredible bias/eq setup.

I like the Sony 177 but am very disappointed that Sony didn't include the adjustments for record azimuth and equalization that could change the 177 from a very fine machine into an excellent one. And don't bother writing to Sony for advice. I did, and their only answer was that "no modifications are authorized and any modifications void the guarantee." -- Bob Sellman (New Jersey)

## **A Biamp Suggestion**

I have spent many hours listening to my biamped system and adjusting its frequency response. It consisted first of Janszen 130's and Advents, and then of the 130's plus the Audio Amateur transmission lines with the Norelco 8" woofer #8065. I was able to get flatter response in my 8x13x27 foot living room with the TL's. Two other things were particularly notable: (1) the TL's sounded much more like the 130's than did the Advents; and (2) the pitch of electric bass was much more easily discernible on the TL's. The TL's were a little bit of trouble to build but are clearly worth it to my ear. The Norelcos cost \$10 each from McGee Radio in Kansas City, and cost of the other materials was about \$40 per speaker. -- Crawford Best (Louisiana)

## **A Wire Guide to Cure Hi-Fi Rats Nests**

One of the problems that goes along with hi-fi components is making their installation presentable in a living room. I've found an easy, low-cost way to hide the connecting wires. Across the back of my stand I thumb-tacked a piece of white felt I got at a fabric store and then made slits with a razor for the wires to go through. This approach has several nice features. The white color is a pretty close approximation of the usual apartment wall color. Other colors are available and it's easy to change wire routings. As I recall, six dollars will buy more fabric than you'll need. It's not as elegant as February's "Installation of the Month" in Stereo Review, but it is cheap, effective and very portable. -- Al Fulton (South Carolina)

## **In the Literature**

### Audio, March 1977

- \*Simple Pink Noise Filter: Uses three 741 op-amps. BAS's may be superior. (p. 36)
- \*Birth of a Spec?: Phono Cartridge Noise: National Semiconductor engineer claims phono preamp noise specs are inadequate. (p. 40)
- \*Test reports on the Realistic STA -2000 receiver, Sony TAE -5450 preamp, and Marantz 510M power amp. (p. 62)

### AES Journal, December 1976

- \*A History of High-Quality Studio Microphones: By Harry Olson. (p. 798)
- \*Theory of Tracing Distortion and Its Correction in Carrier Quadraphonic Disc Records: JVC engineer and John Eargle detail the latest improvements in CD-4. (p. 808)
- \*A Versatile Memory System for Console Automation. (p. 821)
- \*The Practice of Fully Programmable Mixdown and Development of a Third-Generation Console. (p. 824)
- \*More About Electroacoustic Transducers and High Polymer Films: By Pioneer engineer. (p. 829)
- \*Air-Cored Inductors for Audio - A Postscript: By A. N. Thiele. (p. 830)

### AES Journal, January/February 1977

- \*Impulse Testing and Peak Clipping: An interesting article by BAS member Douglas Preis of the Gordon McKay Laboratory at Harvard. (p. 2)
- \*Analysis of Decoupled-Cone Loudspeakers: By James Kates of Acoustic Research. (p. 15)
- \*Acoustical Impedance, and the Theory of Horns and of the Phonograph: Reprint of a pioneering paper first published in 1919. (p. 24)
- \*Ambience-Related Transmission System: A new five-speaker system claims better reproduction than common quadraphonic systems. (p. 29)

### db, February 1977

- \*Broadcast Sound column is on RF tuned circuits and audio. (p. 8)
- \*The Making of the Ampex ATR-100, Part 2: By Larry Zide. (p. 36)
- \*A Homebrew Multi-Media Show. (p. 39)

### Electronic Design, February 1.5, 1977

- \*Focus on Linear-IC Amplifiers: Good article about op-amps and specs. (p. 72)

### FM Guide, February 1977

- \*Record Care & Problems. (p. 6)
- \*Eisenberg's Notebook: Review of the Altec 19 speaker. (p. 10)
- \*Profiles in High Fidelity: The Epicure Story. (p. 22)
- \*Feldman Lab Reports on the Rec-O-Ton Clean Sound Record Cleaning System, Sony PS-4300 turntable, and Philips GA-406 turntable. (p. 28)

### FM Guide, March 1977

- \*Profiles in High Fidelity: The Koss Story and The Bozak Story. (p. 6)
- \*Walco Replacement Styli: Replacements That Work: Favorable report by Len Feldman. (p. 10)
- \*Eisenberg's Notebook: Review of the Celestion 66 speaker. (p. 22)
- \*Feldman Lab Reports on the Ariston RDII turntable, Thorens TD-126C turntable, and Nikko Alpha I and Beta I preamp and power amp. (p. 40)

### The Gramophone, September 1976

Test reports on the Tannoy Berkeley Loudspeaker, Ortofon SL-15E Mk II Cartridge (pronounced by John Wright to be about the most musically revealing cartridge that he has ever tested), Ortofon MCA-76 moving coil head amp and the J. D. Rogers JR 149 loudspeaker.

### High Fidelity, March 1977

- \*Schwann has been bought by ABC, the company that owns HF. (p. 4)
- \*Test reports on the Micro Seiki DDX-1000 turntable, Advent 300 receiver, Stax SR-44 headphones, Yamaha C-2 preamp, Paradox TA-12 speaker, Realistic STA-2000 receiver, Dual CS-704 turntable, Dynaco Stereo 300 power amp, Stereopillow listening system, and B&O Beomas - ter 1900 receiver. (p. 51)
- \*Boston: Hub City of American Audio: BAS editor Mike Riggs details why Boston is the spindle of American audio. (p. 79)

### Hi-Fi News & Record Review, December 1976

Reviews of three speakers -- the Leak 3080, the Lentek Monitor and the Chartwell PM400 -- and of four cartridges -- the Grace F9E, the Goldring G900 SE, the Sonus Blue and Green Labels, and the Empire 2000E/III. This issue contains the first two of a series of articles on problems of equipment matching, the first on the amplifier to speaker interface, the second on the treacherous connection of pickup to preamp. For home-brewers, there are three loudspeaker designs.

### HiFi-STEREOPHONIE, January 1977

- \*Test reports on Crown IC-150, Marantz 3800, and Sansui CA-3000 preamps.
- \*Test report on Neal 103 cassette recorder, which is a British-made unit based on the familiar Wollensak transport.
- \*Advertisements for Braun cassette decks and for a new line of Thorens turntables.
- \*Promised for next issue: reviews of twenty newer cartridges (from AKG, Empire, Ortofon, Picker, Satin, Shure, Sonus, Stanton, and Ultimo), as well as of the Sony TC-510-2, the portable stereo open-reel recorder.

### Popular Electronics, March 1977

- \*Stereo Scene column on the latest changes to the Avery Fisher Hall. (p. 20)
- \*Julian Hirsch on measuring and interpreting turntable rumble. (p. 24)
- \*Test reports on the Empire 698 turntable and Sherwood S-7910 receiver. (p. 26)
- \*Classes of Audio Amplifiers: Len Feldman discusses A, B, AB, C, D and G. (p. 74)

### Radio-Electronics, March 1977

- \*Binaural/Biphonic Sound: Len Feldman describes the new JVC headphone/microphone combination. (p. 37)
- \*Tomorrow's Hi-Fi Gear: Feldman goes to the Tokyo and New York conventions. (p. 40)
- \*Getting Rid of RFI: Feldman again -- article includes troubleshooting chart. (p. 43)
- \*Test reports by LF on the Garrard GT-55 turntable and Nakamichi 610 preamp. (p. 49)
- \*New for Cassettes, Automatic Program Search: Sharp Electronics circuit explained. (p. 52)
- \*Analog Voltmeters, Part III. (p. 69)

### Recording Engineer-Producer, December 1976

- \*Report on the state of the classical record market in the US: A "letter" from an ABC producer reports an upswing in classical sales in the US, from 2% of the market a few years ago to 5% today. The increase is a result of purchases of "New Music" and odd-ball repertoire among other things, claims the writer. (p. 8-9)
- \*Standing waves in rooms: Short tutorial with emphasis on microphone placement and room interactions. (p. 32-35)
- \*A new Peavey amplifier produces 400W (RMS) per channel for \$650. Sound quality unknown. (p. 52, advertisement)

\*Non-linear distortion in audio amplifiers: Covers both static (e.g. , clipping) and dynamic (e.g. , TIM). (pp. 41-43)

\*Letter on p. 45, entitled "Phase and Sound Quality, " actually discusses inherent distortion in the ear. -- Dana Craig, Mike Riggs, Harry Zwicker, David Satz, and Mark Uhryk

Much ado is made about the power of the monthly slick magazines vis a vis the small, consumer-oriented "quarterlies. " One may wonder about the relative circulations of the various periodicals. Fortunately, under the United States Code 39 USC 3685 every magazine must furnish annually to the Postal Service and publish in an issue certain information, contained in the Statement of Ownership, Management, and Circulation. The following data was culled from such reports. Unfortunately, no data could be found on The Stereophile or The Absolute Sound , or db or the AES Journal. As can be seen, Ziff-Davis, publisher of SR, PE and many other magazines is doing very well. The magazines are ranked by total circulation.

<u>Magazine</u>	<u>Issue Data</u> <u>Published</u>	<u>Paid Circulation</u>					
		<u>12-Month Average</u>			<u>Latest Single Issue</u>		
		<u>Counter +</u> <u>Sales</u>	<u>Mail</u> <u>Subscriptions</u>	<u>= Total</u>	<u>Counter +</u> <u>Sales</u>	<u>Mail</u> <u>Subscriptions</u>	<u>= Total</u>
<u>Stereo Review</u>	Jan. , p.132	44,971	382,682	427,653	52,458	397,200	449,658
<u>Popular Electronics</u>	Jan.,p.103	80,464	322,418	402,882	82,975	342,530	425,505
<u>High Fidelity</u>	Nov. , p.128	36,947	251,712	288,659	37,298	252,478	289,776
<u>Radio-Electronics</u>	Jan.,p.100	60,500	106,911	167,411	65,189	110,633	175,822
<u>Audio</u>	Dec.,p.123	23,292	92,292	115,584	25,271	100,817	126,088
<u>Audio Amateur</u>	#4,1976, p.55	---	5,998	5,998		5,394	5,394

## Meeting Summary

In spite of blinding snow, which fell until exactly 6:00, a modest crowd of a hundred zealots attended the February meeting at GTE Laboratories, Waltham. Jim Brinton appropriately delayed the business portion of the meeting and began with a request for members' articles to be published in The Speaker. Particularly appropriate are equipment reviews (with or without measured data) and notes on suggested source material (records, cassettes and open-reel tapes). If you own a piece of equipment which has not been discussed in these pages, please jot down a few comments and send to Box 7. Equipment need not be state-of-the-art to be interesting; good receivers or small speakers which members can audit and recommend to beginners are worth knowing about. And reliability or quality control comments from store operators or repair shop owners are invaluable.

The new SAE-5000 pulse-noise suppressor was mentioned briefly, as this unit has received much attention since Victor Campos first described it on Shop Talk. One member's comments will be published soon, but, in short, the unit seems sufficiently far from perfect that members are advised to hold off their purchases. The unit works very well on extremely bad scratches -- such as those caused by scraping a nail across a record surface -- but the threshold adjustment is sensitive and the unit does not seem to remove run-of-the-mill record defects.

Alvin Foster stressed that no further Sheffield purchases would be made through the Society after the previously announced February deadline. If anyone is interested in purchases of the Sheffield classical piano disc, an organizer is needed, and Al is willing to order the records through his company name. The cost would be \$6.75 each. [The BAS will capitalize purchase of any limited-distribution disc worth the effort. Contact the treasurer. --Ed.]

Use of the GTE Hall required payment of \$80 rent for the first time in BAS history. If anyone in the Boston area works at a place which has a hall to offer (members seem to prefer western suburban locations to the downtown BU or MIT spots) please let any officer know. (The local computer society uses Mitre's cafeteria at no cost, so please inquire where you work to see if arrangements can be made. It is not impossible.

Eliot Berger of E. A. R. Inc. then took the floor for two topics. He had brought, for free distribution to members, two cases of his company's hearing protectors. These are simple-looking cylindrical sponges about 5/16" in diameter and 5/8" long which, inserted into the ear, reduce sound levels above about 120 Hz by 30 dB. To use, roll the cylinder between two fingers until it is fully compressed and slide gently into the ear canal. The plug will expand slowly (30 seconds) until the ear is sealed against high frequency sound. About 20% of the plug should extend past the pinna. Unless carefully rolled into a smooth cylinder before insertion, creases will form after expansion resulting in an inferior air seal. Although the plugs are meant to be disposable, they can be re-used, particularly if they are handled with clean fingers and washed occasionally. To wash, do not immerse in soapy water but rather roll them clean between moistened fingers. Ivory soap is recommended. (The plugs will not expand well in water, as does a large-cell sponge, thus the suggested procedure.) The reasons for use while mowing the lawn, working with power tools, or riding the subway are obvious, unless you don't value your ear's high-frequency response. In two FAA surveys the E.A.R. plug was rated most effective. At a retail price of 40-80¢ per pair the protection is cheap. Industrial prices are 15¢ per pair, if you can find them. (Ecology Controls in Waltham sells them at \$4.00 for 10 pair, and Berger will bring more to another meeting if there is demand.)

Berger also had a few samples of a new elastomer vibration isolator, which he supplied to interested members with turntable problems. He noted that like all "rubber" vibration isolator/dampers, it is important that the correct loading (fifty pounds of weight per square inch of elastomer) be applied to allow the lowest possible resonant frequency without permanently deforming the product. Materials with a natural resonance below 20 Hz are rare, and such resonances below 6 Hz are unknown. Any member with experience is invited to comment. Berger's company has plans to repackage and market the isolators.

Final events of the business meeting included reorganization of the BAS non-professional recording group. Anyone interested in taping live Boston area groups, for no fee beyond the price of tapes provided to the musicians, please drop your name to P.O. Box 7 or give it to Cary Lu, the new chairman. Volunteers are needed for the next "Speaker-Fulfillment" (read "Speaker-Stuffing") party, held the Saturday after each BAS meeting. These are fun, and you get your Speaker before anyone else in the Society. Finally, for all meetings held away from BU, those driving through town are asked to stop by BU to pick up riders. This is a good way to meet fellow members. Contact Al Foster for arrangements.

#### Meeting Feature: (Dr.) Bruce Meier, Discwasher, etc.

Before introducing the guest speaker, Jim Brinton offered thanks to the Boston area's newest high-line audio emporium, Natural Sound of Framingham. Their crew of three brought not only Dr. Meier but also all equipment to be used for demonstrations during the meeting, including the not lightweight Lentek Monitors (see below).

Dr. Meier is, by formal training, a micro-biologist with excellent academic credentials. (Those unaware of the impact of biology and chemistry on our phonograph records should read Dr. Meier's short article in the July 1975 issue of The Speaker.) After work in cancer research, Meier entered the hi-fi field with a hobby company making those fuzzy walnut blocks which have risen over the bodies of many dead Preeners. He now operates a number of companies, including not only Discwasher but also American Audioport, International Audio Sales, Creative Audio, and even Mid-America Air Charter. Tall and lanky, intelligent and articulate, fond of colorful speech, and demanding of non-stop audience attention, Meier covered primarily his disc-related audio offerings in a conversational talk session in the BAS "den of vipers."

Meier discovered the need for the Discwasher, his first product, after a canoe trip during which his Watt's fluid had supported an active growth of fungus. Worried about the possibility of similar growth on his precious record collection, Meier began a scientific investigation of "car-

nivorous" fungi on vinyl. The original Discwasher fluid was intended to reduce such growth, as described here July 1975.

Another product, aimed at a related problem and again at the high-line audiophile, is the soon to be released Pro-Disc Environment. This product is outwardly similar to the Ball Brothers Sound Guard, about which Meier has many reservations. Meier agreed with comments in The Speaker of August/September 1976, in which the thickness of the Sound Guard coating was discussed. His product is claimed to be thinner (only one Angstrom, or less than half the thickness of Sound Guard) in addition to possessing a significantly different surface chemistry.

The first problem with the Ball Brothers product is its method of application, which Meier compared with pouring paint on a floor and returning hours later to spread it around, hoping for an even coating. The Pro-Disc formulation is not simply an aerosol spray but requires use of the "Environment." This is a flat rectangular chamber which holds the disc to be treated while a fog is introduced by metered sprays into the four corners of the plastic box. The spray is never directed immediately onto the record. Nozzles to produce a well-dispersed mist required extensive development, as did the chemical formulation.

The chemical is designed not only to form a single "mono-molecular-layer" on the record surface (a coating only one molecular diameter thick), but also to produce a thin, soft, adaptive layer of small molecules which will do the intended job -- and all of this without using any toxic material or ozone depleting propellant. Meier claimed in no uncertain terms that the components of Sound Guard did not meet these requirements, particularly with respect to atmospheric contamination. Meier was specific in his chemical terms (claiming that any molecule containing fluorine and chlorine and no hydrogen would be a villain) and claimed that the Freon 112/113 used in Sound Guard was under indictment in Washington. Finding a chemistry for Pro-Disc which does not lead to these problems has caused great delay in releasing the final product.

Other problems with the competitor include the method by which the film binds itself to the surface of the disc. In Sound Guard, a vinyl chloride component does the binding, but only after temporarily softening the surface of the disc and "melting" into place after a 15-minute delay recommended by Ball Brothers. Pro-Disc will not possess this flaw and will bind directly to the vinyl.

As to the function the coating is to perform, Meier again found room for disagreement. Although both materials do lower the friction between the stylus and the vinyl, this is not important at low (audiophile) tracking forces. More important is (1) the sealing of the surface against contamination, again thinking of those fungi, which grow on organic residue from fingers and from room air; and (2) overcoming a subtle thermal effect.

The roughly 16 tons of pressure per square inch beneath the stylus causes tremendous local heating in the record surface for a distance of 1 to 4 thousandths of an inch below the stylus. The heat dispersing qualities of the Pro-Disc coating reduce this thermal shock, or "trauma," by a factor of four, thus reducing the minimum time between disc playings and cutting down on this form of "wear." Note that friction at the disc is not the problem, and adding lubrication between the stylus and the vinyl in no way reduces heating caused by pressure. The validity of data to the contrary, as printed by Ball Brothers was strongly disputed.

The Pro-Disc coating is claimed to be permanent and non-removable either by wear or by chemicals. To prevent accidental re-application, the system "marks" the disc to indicate that the chamber and the chemical have been used. Toxicity data are now being taken prior to public release, and hopefully no further problems with the formula will be found. The cost of the system is to be \$24, and replacement sprays (to coat 80 sides) will be \$6. Asked about the feasibility of application at the pressing plant, Dr. Meier responded that manufacturers are generally too cheap and that he has no intentions of marketing this product other than to audiophiles. Even his own Cleveland Orchestra direct-to-disc record (see below) will not be treated. Meier also noted that DGG discs, which are fogged with silicone, are not compatible with Pro-Disc. It seemed that the formula balls up on the surface rather than dispersing properly. Note this if you buy the unit.

Throughout his description of the product Meier referred to laboratory data, holograms and electron microscope photographs which he had taken in developing Pro-Disc. Although no data

were offered at the meeting, his comments seemed sincere and not based on scientific hype. The product seems to be a case of high technology in a previously ignored area of consumer products.

In response to a question about the static-removal properties of Pro-Disc, Meier claimed none for the permanent layer but did state that the new D3 Discwasher fluid reduces problems with static shortly after application. The new fluid contains a few parts per billion of a non-adhesive additive which does this job, in addition to others, even better than the previous D2. The fluid has been re-compounded partly in response to an increase in the consumption of pork and vitamins by the American population, thus causing a change in the variety of lipids, or fats, left on discs by human fingers. An additional feature of D3 is "pH" control on the record surface. It seems that a high pH (bases) encourages damage by "shearing" of vinyl. Keeping the surface near the pH of water (~7) reduces this form of damage. A buffer in D3 holds the pH at 6.8-6.9 even in the presence of tobacco smoke and ash, which would normally react with water vapor to form a base and thus encourage "shear." Also strongly condemned was the use of "Windex with ammonia-D" for disc cleaning for just this reason of high pH and resulting damage.

Other improvements in D3 include a lower dry weight, or residue content, and a thinner film left on the disc surface. The D3 solution also does not leach the lead or other stearates (i.e. , wax) from the vinyl as do both alcohol and detergents. These stearates are added in roughly 1% quantities to the disc vinyl for lubrication during removal from the hot pressing unit (see Meier's July 1975 note or Discwasher's booklet). This material remains at the surface of the disc long after pressing and was at one time seen as a contaminant to be removed by the application of alcohol. However, this stearate lubricant also prevents oxidation, and thus hardening of the vinyl, in the presence of heat. Meier claims that because great local heat is generated by the pressure of the stylus, the material must not be removed, or damage will be done by oxidation of the disc each time it is played. Although no lubricant is added by the D3 fluid, it at least does not attack the innate lubricants as do some other fluids, e. g. , the fluid originally sold with the Keith Monks record cleaning machine. (D3 is now widely used in this device. )

A final comment with regard to the Discwasher concerned a forthcoming base for holding the unit between plays. Although Meier did not seem concerned that the somewhat awkward cleaner is often left in room air without a cover, members who own this device obviously do see a problem which the Watts cleaner has solved, and the Discwasher has not. Mentioned only briefly was the stylus cleaner, which now will come with a more powerful magnifying lens and a small mirror for looking under the headshell. A final record care product, the D-Stat antistatic mat, has now been replaced by a grey unit with better mechanical quality and a lower (\$8) price.

#### Direct from Cleveland

The science behind Meier's record care products proved amazingly interesting for such trivial-seeming items, but the direct-disc recording proved even more exciting. Recorded on two lathes in two days by Maezel and the Cleveland Orchestra in the city's Masonic Temple, this disc will be announced at presstime of this issue of The Speaker. Recorded material includes the Dances from the Three Cornered Hat, the Hungarian March from the Faust Berlioz, Serenade for Strings of Tchaikovsky, and the Farandole Dance of Bizet. A German company did the metal-work for the stampers, although the disc-pressing plant has yet to be selected. Meier seemed to favor a Japanese company, but the decision was up in the air. About 200,000 discs will be pulled as "best quality" discs, and over 500,000 records are expected to be sold. Meier was enthusiastic not only about the quality of the expected pressings and the sound but also about the performance. Icing on the cake is to be a special mailer for those discs purchased directly from the company. The even better news was a proposed "four per year" effort in direct-master discs. The future material will likely not be all classical, but the type of jazz or pop which will be recorded was not stated.

Test pressings of the discs were demonstrated later in the evening, and the material was obviously unlimited and seemed to have no wayward gain riding. As with all demonstrations in the big GTE hall, however, sensible conclusions were impossible. The disc will likely be made available for sales to BAS members through the Society, probably for less than the \$15 list price, and a large mass purchase will certainly be made if it is offered.

## Damping at the Shell

The final highlight of the evening was the introduction of a really practical add-on tone arm damping accessory, the Discracker. The device consists of an air piston damper (a dashpot) which is mounted atop the headshell using the cartridge mounting screws. The dashpot consists of a 0.2 inch diameter carbon block which rides within a pyrex cylinder. The sealed base of this cylinder is rounded and, through a cloth pad, contacts the disc surface to the inside of the stylus contact point. The assembly thus resembles an outrigger, with the stylus tip and the damper riding together over the disc. A small hole in the carbon piston allows a controlled rate of air leakage from the sealed, bottom portion of the cylinder to the upper, semi-sealed portion. This "dashpot" can move with little resistance at low rates, but if the cylinder is rapidly pushed upward, the resistance to motion is very high. This "velocity dependent" resistance to motion is exactly what is required of a damping mechanism. The degree of damping (the value of " $\zeta$ " in the Phoenix article) is determined by the size of the hole. The value for the Discracker will be fixed at a value chosen to optimize normal lightweight cartridges in normal, low-mass arms. (The value was specified as "1500 dynes-force" at an unspecified velocity, while natural stylus damping was listed as about 250 dynes.)

In operation over a warp, the function of the damper is to prevent the stylus from being pushed out of contact with the disc and to eliminate infrasonic output from the cartridge. At the beginning of a warp, in an undamped arm/cartridge combination, the highly compliant (i.e., easily moved) stylus will be forced towards the body of the cartridge (thus producing a massive output signal), and the arm will, after a time lag, be forced out of contact with the disc. With the damper, however, the dashpot will be stiff at the warp frequencies and force the entire arm to rise with the warp before the stylus has been pushed very far into the cartridge body. The undesired audio output will therefore be low and the arm rather than the stylus will be tracking the record surface. This is exactly what is desired for frequencies below 20 Hz. Further technical discussion is left to a forthcoming tutorial by Meier, to be sent on bingo-card request from the glossies, and to the original Phoenix article. We do note, however, that the device weighs about 1 gram, all of which is right at the end of the arm. But because the infrasonic output is overdamped, the rise at "resonance" is nil and the exact placement of the resonant frequency (if out of the audio range) is relatively unimportant. (See Phoenix's curves for  $\zeta \sim 1$ . Meier will be supplying to the BAS a series of laboratory resonance curves both for arms equipped with his device and for a number of high quality arms and cartridges without damping. These will be published when available.)

A demonstration with a badly warped disc illustrated well the proper action of the device. With the dashpot attached there was no audible effect from tracking the warp, and visible woofer motion was small. With the Discracker disabled the arm fully left the groove and the woofer was violently pulsed at the warp.

Although the role of damping is most easily described in terms of improved trackability over a warp, the more important effect is cleaner sound in deep-bass passages. Meier claimed to have measured a decrease in low frequency distortion by a factor of 1/2 with the device attached, which is (based on BAS work) fully believable for damped versus undamped tone arms.

When the Discracker is attached to an arm the stylus tracking force should be increased by 0.5 gram with no change in the anti-scatting. Life of the cloth pad is at least 1000 hours, and a replacement treatment is included with the original purchase price. The device has even improved the performance of a Dual arm with a decoupling resonator (when used with the heavy Supex cartridge), which illustrates, first, that this arm is not ideally damped (at least for high mass cartridges and, second, that two damping systems may be better than one. The Discracker also solves some longitudinal resonance problems in extremely weak or thin arms and seems to stabilize the tracking of some cartridges over "horns" left on the disc surface during cutting of the master. It seems that cartridges which use a very short nude diamond can, when they collect gunk off the disc surface, snag on these rough cutting ridges and cause unexpected mistracking. The Discracker helps stabilize the arm, thus minimizing these problems.

Although Meier did not severely attack the Phoenix/Graham system, he did feel that arm damping should be applied as near the stylus as possible, rather than at the end of the arm. Most

likely the major problem with the BAS system is not with its design, but rather with the need for a liquid lubricant in an open container, plus the fact that the device must be made by hand and cannot be purchased. Mathematically, the criticism seems unjustified unless the resonance problem is down the length of the arm rather than in the stylus/arm system. One possible criticism of the Meier product is that, for small defects in the disc (dimples and bumps), the tracker rides over a different portion of the disc than the stylus and cannot respond with perfect accuracy, at least not for both up and down portions of the bump. In light of its small price (less than \$30), the ease of mounting on almost any arm, and the probable improvement in bass response over the good surface of a disc, the Discracker is fully worthy of examination by the BAS when samples become available.

Meier closed discussion of the Discracker with the comment that an international-standard headshell must be designed, and that such a shell with an integral Discracker is a natural product and will be in the offing at the proper time.

Nearly forgotten through the evening was the array of Audioport equipment, which was used for the demonstrations. The system included a pair of Lentek Monitors (KEF woofer and other drivers), STAX DA 80 amplifiers, STAX SRA-12S preamplifier and driver for STAX Earspeakers, the less expensive SRD-7 Earspeakers with energizer, a Luxman turntable equipped with the STAX UA-7 arm and a new "Entre" moving-coil cartridge imported from Japan and used with the Denon transformer. The Entre, at 5.8 grams, is claimed to be the lightest moving coil cartridge on the market and sells for \$200. A description will soon be available from the Discwasher Group. A \$50-60 head amplifier is also in the works, but no time was specified.

Final comments included a new recipe for use of the Zerostat: squeeze in and out at three locations on the disc, then squeeze in at the center and remove the Zerostat from the record before releasing the trigger. Black magic, yes, but this will de-static at least 30,000 sides before the crystal wears out.

Neither Meier nor the members in attendance were worn out by the end of the meeting, and another three hours would have been delightful. With his barrage of small but important products, Dr. Meier both entertained and educated his audience, and his presentation was warmly received.

- Harry Zwicker

The Boston Audio Society does not endorse or criticize products, dealers, or services. Opinions expressed herein reflect the views of their authors and are for the information of the members.

## A B.A.S. User's Report

### The Audio Research SP-4 Preamp

Collins Beagle

Several months ago, I began replacing my former electronics, a Dayton Wright SPL preamp and an SAE 2500 amp, with the new solid-state products of Audio Research, the SP-4 preamp and D-100 amp. As a result, I have had the opportunity not only to listen to the above two ARC products but to do extensive comparisons of the SP-4 with the preamp section of the Advent 300 receiver, the db preamp, and three versions of the Trevor Lees unit.

I received the D-100 last October, and I have been very impressed with it. Though I am not able to do A/B comparisons of amps, I can offer my long-term listening impressions of it. It is the most open, airy, detailed amp, especially in the upper frequencies, that I have heard. It also has extraordinary depth, of an order with which I was not before familiar. Bass response is a bit lean compared to that of the best "bass amps" (such as the Phase Linear 400) but acceptable given its very high bass definition. The D-100 is the finest amp with which I am familiar (but I have not heard the expensive Class-A amps and am not familiar enough with the ARC D-150).

Unfortunately, it took until January for the SP-4 to arrive. During the interval (I had sold my earlier electronics) I used the preamp section of an Advent 300 in my system. After the SP-4 arrived and was hooked up in my system, my initial impression was negative. It seemed as if the system had lost some of its airiness, openness and definition, and the bass seemed rolled off, I felt that the SP-4 had in many ways erased those qualities I had gained with the D-100. To say the least, I was disappointed and somewhat confused.

I thought that perhaps my memory was playing tricks on me, so I decided to hook the two preamps into a system we had used in the past to do A/B comparisons of preamps. The source was a Denon 103c cartridge mounted in a DKL modified Rabco SL8E arm going through a Denon AU 320 transformer into a Sony SB 300 tape deck selector box. The SP-4 was placed in the tape #1 loop; the preamp being compared with it was placed in loop #2. The four sets of cables used for connecting the preamps to the SB 300 were identical. The output was fed to the D-100 amp, which fed a Crown OC-150, which fed the speakers, either KEF Corelli's (my Dayton Wrights have been at the factory for the past few months being updated), borrowed Rogers LS3/5A mini-monitors (an IMFried H derived woofer could be and usually was hooked in with either speaker using a M&K X<sub>22</sub> crossover) or Stax SRX Mk. III electrostatic headphones. To set levels, I borrowed from a friend a signal generator based on the B. A. S. project. This device was connected to tape position #3 on the SB 300 and could be fed to both preamps to set levels exactly equal in an objective manner using the OC-150's VU meters. I (and no one else here) can think of interface problems that this setup could cause, except that the cartridge (via its transformer) sees both preamp sections, which apparently will roll off bass response a bit. But this should have no effect on the comparison, as the cartridge feeds the same signal to both preamps. The above setup allows instantaneous switching between the two preamps under consideration.

I hooked up the Advent for the comparison (initially with the Roger's speakers and H woofer, later with the other possibilities), and at first the two seemed to be very similar. But upon further listening I decided that the SP-4 was more open, airy and detailed in the extreme highs but that the Advent seemed fuller in the bass region. The SP-4 at times had a touch more depth and perhaps more inner detail during complex orchestral passages, but the SP-4 also was both soft in the midrange (seeming to round transients, such as those of a piano, and slurring detailing, such as the rosin quality of a bowed cello) and perhaps a touch edgy (on voices). The puzzling

aspect of this comparison concerned their bass response. Listening to the Corelli's or the Roger's alone, or to the Stax headphones, the SP-4 seemed fuller in the bass region, but when I listened to either speaker with the H woofer the Advent seemed fuller. It would appear that relative to the Advent, the SP-4 has a midbass hump and then rolls off in the deep bass region. On balance, primarily because of the soft midrange of the SP-4, I preferred the Advent. I still did not really trust myself. How could the Advent be better than the SP-4? So, over the ten days or so that I had this comparison set up, I invited several friends over, and they also drew similar conclusions. At least in terms of these two specific samples, the preamp section of a \$270 receiver was on balance superior to an \$895 preamp.

When we had done similar comparisons many months ago, a friend's db preamp emerged as my favorite, so I borrowed the unit for a day and did similar comparisons (this time using only the Roger's speakers with H woofer and the Stax headphones). (Actually the comparison with the db took place before the ones with the Advent.) At first the db sounded quite impressive, with a finely detailed sound, though the SP-4 had greater depth, and a more open, airy high end. But as I listened I became aware of a slight hump in the lower treble or upper midrange which glamorized the db's sound a bit. Female voices were projected more, and the db acquired perhaps an added air of presence and preciseness. In the end, I decided that though perhaps these effects were euphonic, they were colorations. The one irritating aspect of the db, which became more and more evident, was a certain ragged, edgy quality (on trumpets and female voices). The SP-4's relative smoothness here caused me to prefer it overall. But though I liked the SP-4 better, the db did make the SP-4 seem a bit soft and bass-shy.

When one friend came over to hear the SP-4/Advent comparison, he brought along a variation on the Trevor Lees preamp he had just completed. The main differences between his Trevor Lees and a stock one were that he had corrected what he considered mistakes in the original circuit, one of which led to a slight bass roll-off in the original, and had used a regulated power supply instead of the stock one. He reported that his Trevor Lees sounded smoother and warmer than a stock one but at times not as "real." This comparison was a relatively short one, with my friend's records, so my conclusions are more tentative than in the above cases. My reaction (though not my friend's) was that his Lees unit softened transients a touch compared to the SP-4. We both agreed, though, that his Trevor Lees was smoother and warmer sounding. The SP-4 sounded edgy and slightly veiled compared to Lees in reproducing solo clarinet and female voice. The SP-4 just did not create the same sense of the solidity of the sound source. His Lees was perhaps too warm sounding, but seductively so.

I contacted a representative of the factory and described local reactions to the SP-4. He really did not believe that we preferred other equipment to the SP-4: something had to be wrong somewhere (with us or the associated equipment, or even with that specific SP-4). He was going to travel to The Sound Shop in Norfolk, Virginia, where I bought the unit, so he asked me to send my SP-4 there. He and the store manager listened first to an Advent, then to my SP-4 and then to the store's demonstrator SP-4 (with an ARC D-100 amp and Tympani 1d speakers). They both felt that though the Advent was good, it was not equal to either SP-4. The two SP-4's seemed to differ a bit. The demonstrator sounded fuller in the bass region, but neither person was sure that there was a real difference. They decided to send the demonstrator to me for examination.

It does appear that the second SP-4 (serial number 76402001 -- the first unit was serial number 96402024) is different sonically. After its arrival I again hooked up the comparison with the Advent, using the KEF Corelli's with the H woofer, but this time, because I no longer had the signal generator, I set levels by ear. (During the earlier efforts setting levels by ear seemed to be as suitable as setting levels with the generator.) This SP-4 was even closer in sound quality to the Advent (the closest two I compared), but there were differences. In certain areas the SP-4 had lost ground. It was now less airy in the high end and did not have appreciably greater depth or inner detail. But it also did not seem edgier and now had greater detailing and definition in the midrange. The bass responses of the two units were very close, the Advent seeming to have a fuller deep bass but the SP-4 having superior bass definition. The SP-4 did seem at times to be a shade more fatiguing, though (perhaps it was too accurately reproducing problems in an aging Penon cartridge), but on balance I would rate this second SP-4 as being better than the Advent because of its superior definition and detailing.

I am less sure of my analysis in this case than in earlier ones because the two units are so

close. Several friends have come over to listen to this comparison, and some (even experienced listeners) have had trouble telling them apart. Those who did detect a difference fairly uniformly felt that the SP-4 was a bit better defined, with perhaps more detail and airiness. Of those who heard this comparison, four of us had heard the original SP-4, and we all agreed that the two SP-4's did differ. This raises questions about the unit-to-unit consistency of production SP-4's. I do not believe that the original SP-4 was measurably faulty, or it would have exhibited greater difficulties. The dealer has been using it as a demonstrator, apparently without problems.

One of my friends who listened to this second comparison brought over his stock Lees preamp with both standard Telefunken tubes and special production run Telefunken tubes (friends of his had suggested they were superior to standard tubes). We first hooked up his Trevor Lees with the special tubes to compare it to the SP-4. The Lees had a fat, slightly amorphous sound. The SP-4 had greater depth, much sharper focus, better definition, and was generally cleaner throughout. There was no sense of air about the musical sources with the Lees, as there was with the SP-4. The Lees was fatter in the bass region, with the SP-4 having superior bass definition. My friend's reaction was somewhat different, as he was used to the Lees. He did think the SP-4 had better definition and was cleaner and airier, but he would use the words "full" and "fuller" where I have used "fat" and "fatter."

Then he replaced the special Telefunken tubes with the standard ones, and the performance of the Lees improved. The two preamps were much closer, with less pronounced differences in depth and focus, but the Lees was still a bit fat in the bass region, and the SP-4 was still better defined and airier. Again, my friend would find the Lees fuller in general and smoother in the midrange, but he did consider the SP-4 to be better defined and airier. After all I had heard about the Trevor Lees preamp, I was disappointed in its performance. Perhaps the above performance reflects more the ability of my friend to build the unit than the basic performance of the design itself.

After all of these comparisons, I feel that the SP-4 is not worth the \$895 Audio Research is asking for it. But at least in the case of the second SP-4, because of its very good performance, superb construction and flexibility, I would pay the original price of \$695 for it. The SP-4 is not the ultimate, state-of-the-art device described by Audio Research, but it is a very good preamp. Perhaps the biggest effect locally of this series of comparisons has been to increase our appreciation of the job Tom Holman has done in designing the preamp section of the Advent 300. It appears to be a state-of-the-art contender at a very modest price.

Postscript: The above sort of subjective review reflects a different point of view than is usually seen in these pages, so I would like to present a statement for a philosophy which I and many others in the audiophile community hold. I would like to suggest that in comparing preamps matters are not as simple as Al Foster's work would suggest (see pp. 1-9 at the end of the June 1976 issue of the Speaker). Though his tests and the data he has supplied provide interesting and useful information on a gross level, I believe there are too many performance parameters and trade-offs involved to make simple divisions into "excellent, good, and edgy" categories. Contrary to what Foster seems to suggest, not all desirable performance characteristics (i.e., high definition and detailing, openness and airiness, depth, smoothness, etc.) go hand in hand in the same device. In the above comparison the db had excellent definition and detailing but was somewhat two-dimensional and edgy. By reputation, though the Levinson JC-2 is excellent in most respects, it is even more two-dimensional than the db. My friend's modified Trevor Lees seemed the most three-dimensional and least veiled and edgy of the group compared, yet it ranked poorly in terms of definition. Similarly, by reputation the ARC SP-3a-1 has a most three-dimensional midrange, despite its other shortcomings. The first SP-4 had conflicting qualities, with a superbly defined and detailed upper frequency range but a soft midrange. So preamps can differ in terms of performance characteristics, depending on the part of the frequency range to which one is listening. Except for the standard Trevor Lees unit, I would consider all the preamps I compared to be very good units which would probably fall into Al Foster's "excellent" category, yet they all differed. In fact, neither I nor any of my friends (as far as I know) has ever heard two preamps which sounded exactly alike, and we have heard quite a few.

Comparing preamps can be further complicated by the differences between the people doing the evaluating, independently of the true sonic differences and similarities between the preamps. First, people's hearing differs. For example, I have a more extended upper frequency hearing

range than most of my friends, yet I have relatively poor deep bass hearing. This will affect my evaluation of the performance of components. Perhaps relatedly, people also differ in what areas of performance they react to most strongly. Again for example, I react more quickly to mid and upper bass fatness and upper frequency problems than most of my friends, while they react more quickly to midrange problems or edginess. (These differences may also be influenced by the sonic characteristics of the system one lives with.) The above differences in perception combine to affect what aspects of performance one reacts to and the degree to which one reacts to them. So two people listening to two preamps may differ in their responses. One may consider the two units to be about identical while the other considers them to be different, because one person's hearing pattern stresses the area where the preamps differ while the other's de-emphasizes it. Both people have drawn valid subjective conclusions.

But even if two people hear the same differences with similar intensity, they still may differ in aesthetics, in the trade-offs they are willing to accept. One person may value high definition over the absence of edginess, while another person might have the opposite inclination. I prefer the SP-4 to the Levinson JC-2, because I value more highly the SP-4's three-dimensionality than the Levinson's bass response. I am sure others would make the opposite choice. So even if we agree on what we hear, we may disagree about the relative merits of the units.

Eventually tests which deal with all these factors may be developed -- tests which correlate sufficiently with subjective listening experiences to be decisive -- but until that time the ear has to be the final arbitrator of performance in audio products.

A Publication of The B.A.S.

### Listening With Your Eyes: Hi-Fi Specifications

Alvin Foster

It is by now a commonplace to divide audiophiles into two broad categories: those whose primary interest is music and who have little, if any, interest in audio equipment, and those whose interest in such equipment is as intense as their interest in music. What is not generally observed is that members of the former group are usually far more content as audiophiles than are members of the latter. Consider the following contrast between two extreme types: the Non-Technical and the Techno-Freak.

#### The Non-Technical

This person is the happier of the two. Often he owns a record player or tape recorder which may be decidedly worse than average. The Non-Technical does not worry about this because the idea that better sound is possible or desirable does not concern him.

The Non-Technical has accepted the fact that no assemblage of hi-fi gear recreates a musical experience indistinguishable from the source. He doesn't worry about specifications which might tell him how far he may be from the original. He maintains that the musical experience is personal and private. Why let a fact sheet come between him and Beethoven, anyway?

#### The Techno-Freak

This person is more concerned with the specification sheet than with what he hears. He is easily spotted by eager hi-fi salesmen out to make their quotas. The Techno-Freak rarely asks for equipment to be demonstrated: specifications are what is important. This is just fine with the salesman. He doesn't have to go through the tedious tasks of patching line cords or matching playback levels. He simply presents the "fact" sheet, stands back and waits for the fish to take the bait. The salesman is happy with his money, but the Techno-Freak's delight is usually short-lived. Soon after he installs his new gear, he begins to wonder if he purchased wisely. The "let-down blues" set in.

The Techno-Freak has accepted the uncomfortable notion that sound is something like a photograph. The picture cannot carry the original scene to the viewer; some features will be de-emphasized, while others will be highlighted. These distortions in the playback of his "musical scene" spoil the listening experience for him. To minimize his anxiety, the Techno-Freak pours over specification sheets. The anxiety returns however, when he notices little, if any, sonic differences between his new "super-spec" unit and his old Zenith.

The Techno-Freak's "let-down blues" stem in part from the fact that most hi-fi specification sheets are misleading. Such sheets list numerous measurements which often do not correlate with what one actually hears.

#### Hi-Fi Specifications

High-fidelity manufacturers have long been involved in the battle of specifications. The amount of data presented to the consumer is often overwhelming and requires the use of expensive, specialized instruments to verify. The arduous testing procedures necessary to arrive at the figures are often long and time consuming. Despite all these technical fireworks, one fact remains: most specifications are of no use in selecting hi-fi equipment. To see why this is so

Copyright 1977 Alvin Foster

we must first look at a basic unit of hi-fi specifications -- the decibel.

### The Decibel

The decibel (dB) has been defined as the smallest change in volume (sound level) the average human ear can detect. Some authorities have gone so far as to claim that only a trained ear can discern a one decibel change. The ability to hear level changes decreases rapidly at low volumes. One can easily hear a level change of 10 dB when listening to music at a comfortable playback level of 75 dB. However, if the music is being produced at 40 dB (background noise level for most homes) and is then lowered to 30 dB, the difference may not be perceptible.

### Distortion

Only two characteristics of distortion are meaningful: type and amplitude. The type, or nature, of the distortion indicates what harmonics or intermodulation products are added to or removed from the program source. This particular delineation of distortion rarely appears on manufacturers' specification sheets. But knowing the nature of the distortion is important because laboratory tests have confirmed that some distortions are inaudible primarily because they are easily masked by the harmonic structure of the music.

The second characteristic of distortion is amplitude. The amplitude of the distortion tells us how high the level of the distortion products is relative to the level of fundamental tone. For example, if the fundamental of a horn is 200 Hz it is important to know how much the amplifier is likely to add to the horn's second harmonic, 400 Hz. If the amplifier adds too much to the second harmonic the tone character of the horn will be decidedly altered.

### Audibility of Distortion

The habit of buying specification sheets rather than trusting one's ears has forced its own distortion into the hi-fi market. It has pushed the hi-fi manufacturers into promoting generally meaningless facts and figures in order to peddle their wares. To build amplifiers with ultra-low distortion, manufacturers must spend money your money. THD (total harmonic distortion) figures on the order of .001% (100 dB below audibility) are now obtainable in amplifiers. Is this really necessary when studies published in Stereo Review and in Hitachi's Research Laboratory Journal and other studies (my own included) indicate that harmonic distortion in musical material must be as high as 2-5% before audibility? Couple this with the fact that the lowest IM (intermodulation) distortion I have ever measured on a record at a realistic playback level is 1%. Disc manufacturers in general try not to exceed the industry norm, which, according to the Audio Encyclopedia, is that intermodulation distortion which at 3.5 cm/sec for each channel will not be more than 3.5-4.0% for a groove diameter of 11 inches. As the diameter decreases toward the end of the record, the distortion will rise to about 5-6%.

Records are the most popular and least expensive playback medium in the hi-fi community. They also yield the worst distortion figures in the reproduction chain. In the disc playback system the greatest distortion factor is tracing distortion, which is created by the improper angling of the stylus to the surface of the disc. The Techno-Freak believes that the reproduction chain should be distortionless, i.e., less than .001% (-100 dB). Fortunately, even for the Techno-Freaks, this extremely difficult requirement does not have to be satisfied. The background noise level in most homes is the equivalent of about 1% distortion; a typical tape recorder generates the noise equivalent of about .05% distortion. Background noise does an excellent job of masking distortion. (Masking occurs when a sound is so dominated by another as to be inaudible.)

Distortion may be inaudible for other reasons: it often blends or mixes well with musical overtones and few musical instruments produce a pure tone output of only one frequency. Most musical sounds are made up of a complex arrangement of sinewaves, or tones, which give an instrument its unique character. Distortion is much more difficult to detect in complex tones than in simple ones.

### The "Ideal" System

The specifications of an ideal system are not easy to state. Most of the listener's tastes and

his reactions to concert-hall sound are conditioned by his experiences and are too complex to be classified in any complete manner. It is not even certain whether an installation designed in strict conformity with distortionless specifications will give the most satisfactory reproduction of music. In other words, it cannot be stated as a certainty that a reproduction that fully satisfies the most critical listener will conform to the most carefully established objective technical specifications.

This theory of the relativity of fidelity is supported by a number of arguments. One is that the tones produced by most musical instruments are not only dictated but also limited by the instrument's construction. Although we are used to these tones, it is not impossible that if they were altered in a certain way, they would be considered even more beautiful and thus more satisfactory.

The second argument is that we do know that when the response curve of a sound reproducing chain is not absolutely flat, the result is sometimes more satisfying and subjectively more realistic. It is interesting that when artificial reverberation was first tried in a concert hall at The Hague, the expressed opinion of the larger part of the public was not that the acoustics had been improved but that the orchestra played better than before.

The Techno-Freak who listens with his eyes inevitably winds up spending a lot of money on performance of dubious value. Perhaps he is not truly interested in "natural" reproduction but only in reducing anxieties that have nothing to do with music. The result of his "specification anxiety" is higher prices, but not necessarily better reproduction.