

THE B.A.S. SPEAKER

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In This Issue

The April meeting was the Canadian invasion, which covered a wide range of topics, among them the audibility of phase inversion, proper microphone technique, and the sound of turntable mats, so you won't want to miss the meeting summary. We also have several feature articles this month. John Sprague reports on the November IHF Show in New York, which included, by all accounts, some interesting exhibits. And David Whitney discusses a number of components, including the Leach electronics and the Rega Planar turntable, with an eye to assembling an excellent system on a budget.

Scott Kent is also back this month, to review some more records, and member Roger Ward, who sells every direct-disc you've ever heard of and then some by mail, offers BAS members a 10% discount on his wares. In this month's "Consumer Corner," you'll find praise for a Japanese discounter and complaints about Ercona Corporation's service and advertising claims. We also have short reviews of the new Hafler preamp, the Netronics turntable used with the SME Series III tone arm, and a low-cost short-wave receiver.

Speaker mavens should take a look at Carlos Bauza's follow-up to his April construction article, in which he recommends some good books and sources of drivers for home builders. And for those who own Acoustats, there's a modification from Charles Phillips that could turn an ear-burner into an ear-pleaser.

Author, Author

Last, but not least, there's the ever popular plea for contributions. In the course of preparing this issue, Old Mother Hubbard went to the cupboard and found it pretty bare. Remember, folks, this is your rag. Mail your words of wisdom to Box 7.

Blumlein Patent Almost Free

BAS member Jerry Bruck is offering for \$1 a facsimile copy of this 1933 landmark British patent detailing the basic principles of coincident stereo. This is really a seminal document; for details on the offer, see "Jerry Bruck on the BSO Mikes" elsewhere in this issue.

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.

Ads are free to members for their personal use. No commercial or non-hi-fi advertising will be accepted.

For Sale

- *Marantz 10B stereo FM tuner, recently aligned and put in excellent condition, complete with original walnut case (case never used), \$550. Call L. J. Pierce, (617) 659-4366.
- *New Dynavector DV-505 pickup arm, still in box, \$500; Dynaco SE-10 ten-band octave equalizer, \$235; Sony XL-55 moving-coil phono cartridge, used two hours for review, \$150; Stax SRX Mk. III headphones with SRD-7 step-up/coupling adaptor, \$225; Infinity ES-1 headphones with step-up/coupling adaptor, \$225; new Dynavector 20B (15BQ) high-output moving-coil cartridge, \$150. Phone (314) 522-3253.
- *Dyna PAM-1 preamp, Mark IV amp, and FM-1 tuner, tube mono system, with manuals, \$50 each or \$100 for all three; Harman/Kardon "Theme" AM/FM tube tuner, \$35; Harman/Kardon "Duet" T224 AM/FM tuner and A224 amp, matched pair, \$75. All UPS prepaid. Roger Ward, 2910G Greenville, Santa Ana, CA 92704, (714) 546-6870.
- *Dynavector 15BQ moving-coil cartridge (same as 20B), \$125; Shure V15-IIIG, \$50. Will consider offers on either. Wylie Williams, 7435 Cornell, St. Louis, MO 63130, (314) 863-2143 after 5.
- *Verion Triaxial Audio Cable, 2 meter, type MR (phono plugs to phono plugs), excellent condition, used one hour, \$30 postpaid in U.S. James Yount, 111 3rd Avenue, Apt. 13, New York, NY 10003, (212) 533-8477.
- *Eight copies of Hi-Fi Choice Turntables and Cartridges and two copies of Hi-Fi Choice Amplifiers, \$5 each, or \$6 by First Class mail. John M. Tooley, RD2, Box 120E, Milton, Delaware 19968.
- *Altec Lansing 820A Voice of the Theatre mahogany corner speaker with two 15" woofers, large multicellular horn, and crossover, circa 1950, best offer. (212) 365-9019 evenings.
- *Dyna PAS-3X preamp, good condition, with spare set of tubes, new plate and filament supply electrolytics, original manual, \$60. Byron Roscoe, (617) 756-6216, days, (617) 263-8296, evenings.
- *Soundcraftsmen RP-2212 equalizer (tape and main output equalization capabilities), mint condition, warranty card blank, with manufacturer's instruction book and test record, \$175; Dyna 400 power amplifier, factory assembled, little used, blank warranty (no meters, but with Dynaguard circuitry), \$375; Son of Ampzilla, early model, with meters, mint condition, \$350; AKG P8ES cartridge, 50-60 hours use, \$35; AKG P7E, 10-12 hours use, \$25; Ortofon MC-20, 8-10 hours use, \$40; Shure V15-HI, 25-30 hours use, \$20. Daniel Berkowitz, (617) 732-6286, 9 AM to 3 PM, or (617) 323-8623 after 8 PM.
- *Two Shure SME 3009/S2 tone arms, with extra shells, both in excellent condition, \$60 each. Randy Tomlinson, 180 Midway Road, Decatur, GA 30030, (404) 288-6875.

Direct-Disc Discount

Roger Ward, BAS member and proprietor of High Fidelity Consultants, is offering other members a 10% discount on records in his very comprehensive catalog of direct discs. The only provisions are that you must buy at least four and that you may not take advantage of his usual "buy ten, get one free" offer at the same time. Just write Roger Ward, High Fidelity Consultants, 2910G Greenville, Santa Ana, CA 92704, identify yourself as a BAS member, and ask for a catalog. The discount expires July 15th.

Consumer Corner

Japanese Discounter Recommended

Japan Audio Trading Company, Ltd., No. 210, Saiken Building, 4-33-21 Kamimeguro, Meguro-Ku, Tokyo, Japan, offers all Japanese cartridges, tone arms, transformers, and pre-

preamps at discounts beginning at 20-30% (usually more), including air freight. Some examples are the Denon 103S for \$110, the Denon 103D for \$147, the Supex SD-900E Super for \$118, and the Grace 707 for \$110.

Recently I bought a Dynavector DV505 tone arm from them. When it arrived, I had problems with it that two high-end dealers in the area diagnosed as defective bearings that needed replacement. I returned the arm to Japan, where the "problem" (a loose screw) was corrected. Without my asking, Japan Audio Trading credited my return postage of over \$20 towards a future purchase. Service is very prompt, and the president of the company, Mr. Akio Hashimoto, makes customer satisfaction his top priority. -- Fred Swaha (California)

Trouble with Ercona/PML

I would like to bring to the attention of BAS members recent problems I have had with Ercona Corporation, 2492 Merrick Road, Bellmore, NY 11710, and PML (Pearl), Sweden. In the fall of 1976, I decided to make a major investment in a pair of microphones, and after reading reviews and talking to friends, I decided that a pair of PML TC-4V's (reviewed by J. Gordon Holt, Stereophile, Winter 73/74, p. 12) were the most likely candidates. Because there were no local dealers, I contacted the importer, Ercona Corporation, directly. I received a prompt reply with descriptive literature from Mr. Charles Frank, and after reviewing their technical specifications with friends, I ordered a pair in November 1976. Unfortunately, when they arrived I discovered that their frequency response curves were not near the stated ± 2 dB from 30 Hz to 20 kHz, but were in fact +2, -10 dB (serial no. 64397) and +4, -8 dB (serial no. 64395) over the specified frequency range. I was not happy. After spending \$1040 for a pair, I expected them at least to meet Ercona's technical claims. And on a more practical level, the 12 dB drop from 8 kHz to 20 kHz was audible in recordings, especially of harpsichords. I immediately contacted Mr. Frank expressing my dissatisfaction and requested that Ercona either supply microphones up to specs or I would cancel the purchase. Mr. Frank's response was that "unfortunately in business typical curves are not always typical." This statement proved to be the closest Ercona has come to commenting on their claims. He then said he wanted to satisfy me, and it was decided that I would keep the present microphones until suitable replacements were found and he sent me curves of other samples for consideration.

I did wonder if perhaps the microphones I had received were typical and similar to those reviewed by Mr. Holt, so at the beginning of that December I contacted him on the matter. He told me that the microphones he reviewed had excellent responses, and he really did not understand why mine were different. This contact started a joint effort of many months either to get microphones that met specs or to get me my money back. Mr. Frank continued to send me curves (none of which met specs, the best being +4 dB) and started communicating with PML. Mr. Holt started an effort to determine why there were such variations in performance. In communications with Mr. Holt, Mr. Frank indicated that PML did not set the published specifications and therefore would not stand behind them. Apparently Ercona added the frequency response specifications, but unfortunately they felt no obligation to stand behind them either.

In any case, after several efforts on my part to cancel the purchase, with Mr. Frank responding that I should let him try something else, it came down to sending a pair of mikes back to PML in Sweden for "tweaking," but still with no guarantee of results. By this time I had had my fill of the whole business, so in May 1977 I cancelled my purchase and sent the microphones back. Ercona's response was to reject my request and to charge me rent for the time I had the original pair. This was the first time the subject of rent had come up. I was a bit surprised by their response, since at one point I had tried to cancel because the time element was becoming excessive, but Mr. Frank told me not to worry about it. There was no time limit. This "rent" amounted to about half the purchase price of the microphones. One is caught in a Catch-22 situation here. If one tries to cancel early on, Ercona resists because it has not had a chance to try other things. But if one cancels later on, Ercona resists because so much time has passed as it has been trying other things. I rejected their partial refund and their basic position. Since that time, neither my efforts nor Mr. Holt's have proved successful in getting a full refund. After threat of litigation, a compromise of an 84% return of my investment was worked out in January 1978. I simply did not have the resources to carry out a long distance legal action. But since I had to pay \$160 tuition, I think others should have the benefit of this lesson also.

I have found this experience to be disturbing for three reasons. One, neither Ercona Corporation nor Mr. Charles Frank feels any obligation to honor their own claims for a product or to honor statements to a customer. This is the first time I have come across such blatant misrepresentation (perhaps I have led a rather sheltered life). Two, when purchasing PML microphones, one can never be sure what one will receive, given their variable performance. And since neither Ercona nor PML will stand behind their products, a customer has little recourse if dissatisfied. And three, the very fact that there is such variability in production microphones suggests that PML's quality control leaves a bit to be desired. I should think that the above would be intolerable to the professional users comprising Ercona and PML's basic market.

I offer the above as an account of what a customer may expect dealing with Ercona Corporation. If you want PML mics or other products Ercona handles, I do strongly suggest that you move with great caution and that you be sure you get what you purchase.

-- Collins Beagle (Virginia)

(We sent a copy of Collins' letter to Ercona, for comment. Their reply follows. -- MR)

I certainly hope that Mr. Beagle's letter will not be published, as if you were to do so, it would be, in my opinion, an injustice.

I do appreciate that Mr. Beagle is upset, although it was my understanding that he was satisfied with the settlement arrived at by mutual agreement. The "typical" frequency response curves did differ from the actual curves of the microphones delivered. The performance of these microphones did match the performance of the pair that Mr. Holt had reviewed -- and which was the referenced performance that Mr. Beagle sought. In an effort to please Mr. Beagle, we did offer to send his microphones back to Sweden for modification and did inform Mr. Beagle that we were not establishing any time limit for these corrective measures. Many months later, when Mr. Beagle demanded refund and cancellation of his order, we refused and felt justified in asking for a rental fee, as we had, in the meanwhile, embarked upon a rental campaign.

Admittedly, we do not satisfy everybody. We are, however, proud to say that the percentage is heavily weighted in our favor by satisfied customers, and we can and will furnish documentation upon request. I think it pointless to make any attempt to refute Mr. Beagle's other statements.

A copy of this letter has been prepared and will be sent to Mr. Beagle, who I hope will withdraw his request to have you publish his letter. Surely, if he reviews the entire situation, he must agree that the payment made for the use of the microphones was neither unrealistic nor excessive. I must, however, dispute any claim of misrepresentation or substandard quality control.

We do regret that we have failed to add Mr. Beagle's name to a rather sizeable list of satisfied owners of our equipment. It is hoped, however, that on some future occasion we might have the opportunity of correcting his opinion.

-- Charles H. Frank, Ercona Corporation

Scott Kent on Records--VI

Image, depth, and ambience are interrelated factors. Even monophonic recordings have an image, in that everything is coming from the same location. For more than one or two instruments, this creates a problem akin to listening through an open window. Depth and width cannot be captured monophonically, and for that reason, even mono records may sound better played back through a stereo system. As long as the listener does not move to confuse the dual image, the synthesized width may be an improvement.

Ambience is the amount of indirect sound (or room sound), as opposed to direct sound, captured by the relative placement of a microphone or microphones. Ambience, or lack of it, is a factor even for a mono record. Sufficient ambience and the spacing of stereo playback speakers can convey a sense of depth, because the ear-brain system has some aural clues similar to those it would receive hearing the real event. With two information channels, it is theoretically possible to reproduce all of the aural clues received in reality. They can provide not only a sense of depth, but an image of the recorded geography, with correct stage width, relative spacing between

instruments, and instrument size. Perhaps even height can be resolved. (Gerzon, J. AES, Vol. 25, 1977, and others.)

Frequency response and dynamic range have received considerable attention since 1877. Ambience balance has been a debated issue since the advent of electrical recording in the 1920's. The record producer's concern, or lack of it, with accurately capturing image and depth is a more recent goal, and is complicated, because microphones are never perfect, precise placement is often not possible, and acoustics are rarely ideal. A producer or recording engineer requires not only musical common sense, but listener's judgment, when capturing, or, if necessary, creating, the ideal seat in the house. Too often the approach is to give up before starting, record the various direct sounds on separate tracks, and mix with a blend of synthetic room sound, creating a sonic casserole vaguely resembling the flavor of the score.

BACH, J.S. - The Sonatas and Partita for Unaccompanied Violin, Sergiu Luca, Nonesuch 73030 (3 records) (AVPL - 10) 2

Nonesuch consistently attains a level of quality a step above that of most releases from the "big three" of domestic classical records. This recent set of Bach BWV 1001-1006 is the first complete version performed on a baroque violin. The somewhat different approach to these works, and the warmer sound of the baroque instrument, make this set worth having in addition to one employing a modern instrument. A detailed booklet gives some insight to Luca's approach to the music and an explanation of how the baroque instrument and bow differ from the modern ones. The sonics and musical quality are enjoyable to listen to, something that cannot always be said about solo violin records. Ample room sound, a stable image, and cutting by Masterdisc give a realistic space between the listener and violinist. No detail is lost, yet the sound fills the room rather than boring into you as from a point source. The violin is appropriately sized, not over-large; the surfaces are both quiet and reasonably flat, with low distortion.

OLD POLISH ORGAN MUSIC Paul Bernard, EMI/Odeon C063-29049 (AVPL - 14) 2

Polish organ literature is less known than it might be. That all works performed on this record are taken from anonymous unpublished manuscripts from the period 1500 to 1650 continues this trend. Two of the three organs employed were created by unknown builders, as well, although the locations of the organs are known. The sound on this record is excellent. The cutting is very low in distortion, both in the low-frequency information and in the absence of IM products, which often destroy higher notes when a pedal note sounds. The microphone placement does a good job of catching the ambience of all three buildings, yet articulation is not at all lacking, perhaps because the organs employ tracker actions. Subsonic information appears to be limited only by the low-frequency characteristic of the cutting head, and despite the largest ranks being 16', the bass effects are more realistically floor-punching than most records' depictions of 32' information. Vertical information is moderately controlled, and the clarity of sound suggests a well placed figure-8 microphone pair. The 16' Gedackt on side 2 more than compensates for the somewhat baffling liner notes.

HAYDN, MICHAEL - Missa Sancti Aloysii and three shorter, secular pieces; Marton, Szokefalvi-Nagy, Nemuth, soloists; Sulyok, Sebastian, keyboards; Girl's Choir and Philharmonic Orchestra of Gyor, Miklos Szabo, conductor, Hungaroton 11678 (AVPL - 10) 2

Another group of Michael Haydn works with sound and musical quality equal to 11531 (reviewed in the March 1978 Speaker). The same musical and engineering personnel, except for two soloists and the keyboard players, suggest both recordings were made in the same building, perhaps in the same period of time. The comments on the quality of 11531 apply to this record as well.

RAMEAU - Works for Harpsichord, Kenneth Gilbert, DG 2710 020 (3 records) (AVPL - 12) 3

This new complete Rameau set replaces a recently deleted and stylistically dated set by Malcolm Hamilton on Argo. Gilbert has done some research and much excellent music-making to put down performances of the style Rameau intended. Three different harpsichords of the period were used. All appear to have been miked with ORTF technique. Ambience balance is satisfactory, and the sound is very detailed and clean. One instrument, the 1761 Hensch (recorded at a

different time or place, perhaps) sounds harsh and brittle. DG has recorded other Hemsch instruments (Hemsch 1754 and 1756 on DG 2533164, 6, the Bach English Suites) that sound far more pleasant. Perhaps 1761 was a bad year for Hemsch. This is not the quality of sound found on Seon 67009, but it's better than most. -- Scott Kent (Massachusetts)

Books and Sources for Speaker Builders

Here's some information that might be quite useful for those contemplating speaker construction in the home.

Good Places to Get Raw Drivers

McGee Radio Company
1901-07 McGee Street
Kansas City, MO 64108

(They have a wide variety of drivers from Philips, Panasonic, JVC, Peerless, Altec, CTS, etc. Prices and service are very good.)

Falcon Acoustics, Ltd.
Tabor House
Norwich Road
Mulbarton, Norwich
Norfolk NR 14 8JT, England

(They have KEF and other famous drivers, plus wide assortment of capacitors, coils, and resistors for brewing your own crossovers. They also sell many excellent plans for home construction and have ready-made crossovers for them. They also provide crossovers to some manufacturers, and their prices are hard to beat. Their crossover #23 is said to be similar to the LS 3/5A's, with instructions. Send \$1 for their catalog.)

Badger Sound Services, Ltd.
38a, St. Andrews Road South
St. Annes on Sea
Lytham St. Annes
Lancashire FY8 1PS, England

(They have most of what Falcon has, plus one transline project that might conceivably prove to be better than the B. J. Webb design. It's called the PRO 9 TL. The booklet alone is worth reading, even if you're not contemplating building it. Send \$2 for their catalog and the PRO 9 booklet.)

Helpful Books (Almost Essential)

Building Hi-Fi Speaker Systems by Philips-Norelco
Amperex Sales Corp.
230 Duffy Avenue
Hicksville, NY 11802 Tel. (516) 931-6200

(Very explicit instructions for cabinet construction and excellent explanations on the theory of some speaker designs and crossovers. Should not be missed. About \$3.)

Loudspeaker Design Cookbook
Speaker Research Associates
3959 S. E. Hawthorne
Portland, OR 97214

(Cookbook approach, formulas for deriving useful information, good for constructing all types of speaker designs. For the dedicated constructor.)

Basic Carpentry Illustrated
Bookshelves & Cabinets
Ideas for Storage

These three are by:
Sunset
Lane Magazine & Book Co.
Menlo Park, CA 94025

(They have enough information even if you're a stark novice. Contain ideas for system installation, etc. All three should be obtained, as they complement each other. About \$2 each. These are elegant booklets.)

Woods and Woodworking
by Baker & Yeager
Howard W. Sams & CO., Inc.
Indianapolis, IN 46268

(A very thorough book. Information on design, safety, tools, types of wood, the wood industry, etc.)

Each of the above books has something that the others do not have. They help you get a complete picture of woodworking, and make you feel secure in planning, organizing, and executing a project. I hated the idea of woodworking until the speaker-construction bug bit me. Now I like it very much, after two years at it almost by myself. You'll probably enjoy it too.

Another notion I've developed over these last two years is that the British are way ahead of the Americans in home speaker construction. -- Carlos E. Bauza (Puerto Rico)

Equipment Reports

Hafler DH-101 Preamp - Pro and Con

About a month ago I bought a Hafler DH-101 kit, primarily on the strength of Gordon Holt's rave and my respect for David Hafler. The kit went together with a minimum of trouble and was interesting to build. The instruction manual is, if anything, better than a Dynakit manual, and I would rate the kit easier to build than a PAT-4. The components are superior to Dyna's in some respects, but the volume control, bass and treble controls, and push buttons are typical Dynaco. Do not expect Nakamichi-type push buttons.

The sound? Well, the Hafler replaces a modified Dyna PAT-4 in my system, and the sound on both tuner and phono is a revelation to me, except that the DH-101 apparently is more susceptible to RFI in the phono mode than the PAT-4. I live about twenty blocks from the Empire State Building and had a slight RFI problem with the PAT-4, but not at any setting of the volume control I would ever use. With the Hafler, I start to get RFI (very slight) at 12 o'clock on the volume control. This means that using a Shure V15-III and KEF 104aB's a reasonably loud overall volume level on most program material gives me a very slight RFI problem on very pianissimo passages. I have had the unit checked out at a McIntosh amp clinic and by the Hafler service department, and both indicate a very low hum and noise level on the phono input, so there seems little doubt that my problem is RFI. So far, my attempts to lick the RFI problem have failed, so I would appreciate hearing from any Hafler owners with similar problems.

In sum, I would rate the DH-101 an excellent \$200 bargain, unless you are in a very bad RFI location. In that case, my recommendation would have to be conditional, at this point. The rest of my system consists of a Philips 202 turntable, a Dynaco Stereo 150, a Dynaco FM-5, and a Stax SR-3, plus an Audio Pulse _Model One, a Dynaco SCA-50, and Hegeman Model 1 speakers for the back channels.
-- James Yount (New York)

Netronics 350-F Turntable with SME III Arm

I am now using a Netronics 350-F turntable with the new SME Series III tone arm. The turntable is a three-speed (33, 45, and 78), direct-drive design incorporating Netronics' dual-resonant anti-feedback suspension. Netronics claim its wow and flutter are .02% and .04%, respectively, and spec the rumble at -60 dB by the RRL method. Drift (with the pitch lock on) is rated at .01%. The platter appears to be the same one used on the Kenwood KD-500, although the motors look different. It has strobe marks, but no neon indicator (a fluorescent light will do the job). A speed control allows variation of $\pm 5\%$, with a meter to indicate the exact setting. The 350-F is available only as a kit for \$130 plus shipping from Netronics, 333 Litchfield Road (Route 202), New Milford, CT 06776.

Julian Hirsch tested this unit for Popular Electronics about two years ago and essentially confirmed all its specifications. He also found its suspension system to be 20 to 40 dB less susceptible to acoustic feedback than that of any other turntable he had ever tested. His only gripe was that the platter took about sixteen seconds to come up to speed with the pitch lock on (no drift, though), and he concluded that it was a "state-of-the-art" turntable.

After I ordered mine, it took about a month and a half to arrive, during which time I began to fret considerably. Netronics does not acknowledge orders or answer letters. When it did arrive, I of course had to assemble it. This requires some wiring (including the PC board) and, if you don't buy an SME or Audio- Technica arm from Netronics, drilling of the mounting board.

My unit didn't work after I finished it. I had to return the PC board to the factory twice and the entire turntable once to have two wiring mistakes (mine) put right. Each round trip took two weeks (which is fast), and the service was free. I have no reason to believe anyone else will have my problems, but at least you can depend on good service if you do. It's a pleasant contrast to the experience of a friend of mine, who called JVC's toll-free line for information about servicing for his out-of-warranty cassette deck. The person on the other end of the line kept repeating "we can't do anything about it," etc., ad nauseam. I'd pick Netronics any day.

Only two other problems have cropped up. The pitch control on my unit doesn't work over the full $\pm 5\%$ range. And the friction of a Dust Bug on a record will drive the servo circuit out of its linear range, causing it to hunt. When this happens, the platter alternately accelerates and decelerates. Fortunately, the first problem is not really important, and the second one is easily solved. Just treat your records with Sound Guard, or put a counterweight on the Dust Bug.

Despite its little quirks, I like the Netronics. It has a Spartan elegance. The optional dust cover is of wood with a leather-like finish, which I like better than scratch-prone plastic. I think the turntable's operation is up to the best standards of performance, even if it is fussy about Dust Bugs. Factory service is quick, though strangely silent, and the \$130 price tag is so low it's hard to believe.

SME advertise their Series III arm as a "precision pickup arm," which is the understatement of the year. It's a user-oriented design, made of excellent materials imaginatively engineered, in what SME must have intended as an all-out effort. The owner's manual is a masterpiece of clarity and usefulness, and the arm is itself much easier to use and to set up than its predecessors, even if it takes a little longer to get to know it. Low mass and non-resonance seem to be its forte. Attendant to this, SME has provided an internally damped, hard-finished carrier arm and have positioned the counterweight assembly so far forward that it rides almost coincident with the knife-edge bearings. Other aspects of the counterweight assembly bear witness to rather refined engineering thought; you may have to look several times to catch all of the significant design features. The little knobs, of course, help to optimize the arm/cartridge combination. And the arm will accept cartridges weighing from .1 gram to 13 grams.

The detachable carrier arm makes changing cartridges very easy, and you'll be tempted to experiment with setting the tracking angle. It's so ridiculously simple you'll die laughing when you see it working. Vertical azimuth is adjustable, also, which is important if you don't want to fuss with little wedges in the shell. (I've seen highly touted arms with azimuth error, but no adjustment for it.) Modifying the cartridge loading capacitance is also an easy task with this arm.

So how does the combination sound? Beautiful. I'm using a newly serviced Supex SD-901E Super, which I am just beginning to appreciate (as its importer said I would). This combination is utterly silent, uncolored, tight, and smooth, from a very low bottom to a vanishingly high top. And it is in the forefront of the Crusade Against Mud.

Most of my records now display more ambience and depth, but I have noted an especially dramatic improvement in the sound of my RCA Munch/BSO recording of Saint-Saens' Symphony No. 3. Up to now, the finale had sounded grand, but somehow homogeneous, without separation. My new setup cleans up the imaging markedly. Instrumental sections remain distinct and in a definite place "on stage." The perspective is distant, but some instruments sound farther away than others, and in the places the liner notes say they were recorded. In addition, I am hearing certain subterranean organ pedal notes for the first time, and they do not muddy up the rest of the orchestra.

All of the above indicates that the feedback rejection is excellent, that the arm's internal and external damping are working, and that the Supex is allowing all the music to pass through smoothly. (Of course, my Webb speakers help.) If you get the impression that this is a rave, you're right.
-- Carlos E. Bauza (Puerto Rico)

A Good, Cheap Short-Wave Radio

For years short-wave radios have been large, clumsy in electrical performance and hard to tune accurately. Only very expensive sets could be set to a definite frequency. In the past few years, this has changed, and there are now some very interesting radios available.

I bought a Sony ICF-5900W (\$112-\$140, depending on the store) because it is the smallest, lightest, and cheapest of the new short-wave radios. It is amazingly good. It receives AM/FM plus 3.9-10 and 11.7-29 MHz. Short wave is handled with dual conversion (two intermediate frequencies; the first is the IF stage for FM, causing the gap in short wave frequencies received, and the second is the AM IF stage), giving good selectivity and image rejection. A crystal oscillator generates marker signals for mechanically calibrating the tuning dial. As a result, this radio (and a similar Panasonic) can be accurately tuned, to plus or minus 5 kHz, something impossible to do with all other short-wave radios priced under \$250.

It isn't hi-fi. At best, it is like a mediocre AM radio; usually there is some interference or fading. On very weak stations it will take total concentration to make out the words. Reception depends on the frequency, time of day, month of year, sun spots, etc.

I use a quick and dirty antenna -- a fifteen-foot strip of aluminum foil taped to my kitchen wall. With this, fairly reliable reception is possible from most countries in Europe and Latin America, half a dozen African countries, Australia, and China. (On the east coast, Radio Peking is usually clearer from the relay transmitter in Albania than direct from Asia.) Generally Asia and Oceania should be best in the early morning, but I haven't gotten up early enough to check. Nearly everybody broadcasts in English for an hour or more a day.

The news and commentary programs on short wave range from excellent to awful. Nearly all provide information on events not covered by the American press, and even the most strident political harangue can give some insight into another country's media and attitudes. Short wave is indispensable for following African news.

Music is widely broadcast, from operas to a wide variety of ethnic music, much of it rarely heard in the U.S. If the transmitter is within two or three thousand miles, the music programs can be excellent listening; in the United States, the reception is usually too distorted, except from some Latin American stations.

The radio can be patched into a hi-fi system. Good tone controls, especially a graphic equalizer, can help intelligibility on some stations. Hi-fi noise-reduction devices are usually not drastic enough to help short wave, although a phonograph record scratch remover might be interesting to try. (The 1978 edition of the World Radio TV Handbook has a very good survey of short-wave receivers priced under \$450, including two with digital frequency readout.)

-- Cary Lu (Massachusetts)

Acoustat Modification

Those who own Acoustat full-range electrostatic loudspeakers should contact the factory about certain changes in components in the integral amplifiers. Recently, Jim Strickland, Frank Van Alstine, and others noted that replacing certain mylar capacitors (which may not be in your particular amplifier) with disc capacitors caused a high-frequency oscillation to clear. The net result, in an already good speaker, is an absolutely stunning increase in clarity, high-frequency cleanliness, dynamic range, and tightness of mid-bass. The sonic change is not a subtle one, but quite dramatic. Those who use the new IC chip (TL084) will particularly want to check this out with the factory. The parts are easily replaced in ones home or shop, there being five capacitors to be changed in each amplifier, or ten all told.

-- Charles W. Phillips (North Carolina)

Dust Covers

Waterproof rip-stop nylon makes a very effective and cheap dust cover for equipment (except record players, which require rigid covers). It comes in several colors and needs only some simple sewing to form corners. Edges do not need hemming. Large tape decks can be protected with an open back cover; Velcro will secure sides if desired. Most camping/hiking supply stores sell the material.

A cheap way to keep cassettes free of dust is to store them in a transparent plastic shoe box, sold in department stores.

-- Cary Lu (Massachusetts)

Carver Bought Out

"The President of Phase Linear Corporation, Donald E. Prewett, announced April 6 that an out-of-court settlement had been reached in a lawsuit between Phase Linear Corporation, Robert W. Carver, former President of the Company, and all other parties. As a part of this settlement, Phase Linear Corporation has purchased Carver's minority interest in the Company, Carver has resigned as a director, and Carver's employment with the Company has been terminated.

Steven M. Johnston, Phase Linear Vice President and one of the original founders of the Company, will devote additional time to expansion of the new product development program. Prewett stated that the Company will continue to concentrate its efforts on the design and manufacture of stereo equipment."

-- Press Release

Behind the Press Release

While President, Carver came under increasing criticism from other financial backers of Phase Linear. Apparently, they felt he devoted too much company expense and time to his private consulting contracts. They also accused Carver of inordinately delaying the introduction of its Series H products by insisting on certain design criteria.

A showdown was in order. The Board of Directors demoted Carver to engineer and appointed an acting President, Donald Prewett. Carver reacted by suing Phase Linear and the rest is history. Phase Linear and Carver settled. The company purchased Carver's remaining interest for \$1.2M. Rumor has it that Carver plans to start all over again by introducing a line of products within a few months. Meanwhile Phase Linear plans to introduce a new series of six speakers to complement the PLL III, \$1350, plus a digital, rack-mountable preamp-tuner. I hope their new speaker series sounds better than their Model III. In spite of what Julian Hirsch said, the PL III is not hi-fi.

Alvin Foster (Massachusetts)

Bose Wrings Bell

"A lawsuit brought by Bose Corporation in May, 1974, against The Music Box, Inc., Wellesley, Massachusetts, and its president, William H. Bell, culminated December 18, 1976, with the court ordering the defendants to refrain from disparaging Bose products.

"Judge Robert J. Donelan has now signed an order in Massachusetts Superior Court finding Bell and The Music Box in contempt of court for violating the 1976 judgement and directing them to pay attorneys' fees to Bose. The court order also directs The Music Box to conspicuously display the order, the 1976 judgement and a sign stating that Bell is the New England representative for Klipsch and requires its salesmen to invite customers to read the court documents before the salesmen can comment about Bose.

"The suit alleged that the Music Box and Bell made false and misleading representations disparaging the Bose 901 stereo speaker system."

-- Reprinted from the High Fidelity Trade News,
April 1978

Jerry Bruck on the BSO Mikes

It had been my intention to steer clear of the controversy surrounding the proposed switch of the microphones used for BSO broadcasts, until recent statements and attributions, both written and broadcast, came to involve both my name and that of Dr. Karl Schoeps, whose microphones I represent in North America. Unlike Earl Browder, whose only stated concern was that his name be spelled correctly, I rather like the facts to be correct as well. Since this is also the stated view of some of the other participants in what threatens to become a tempest in a teabag, perhaps I may offer some comments and opinions in the hope that the brew in Boston harbor will acquire taste as well as choler.

From the outset, it seemed to me that the proposal to simply replace the omnidirectional condenser microphones of one German manufacturer with those of another, without optimizing for the new set's electrical and acoustical characteristics in the specific environment, scarcely qualified as a judgment of Nurembergian certainty. The notion that a trial ought to precede a conviction underlay my offer, quoted by Michael Riggs in the BAS "Speaker," to loan the microphones under consideration for on-site evaluation with no strings attached save those required for the hanging. However interesting the result, I cannot but feel that far more satisfying results could be achieved, with substantially less outlay, by equipping the existing Neumanns with cardioid capsules and arranging them in one of the near-coincident arrays favored by European broadcasters (such as the ORTF) for distant symphonic pickup. The notion that spaced omni microphones constitute a suitable arrangement for simple stereophony would not be entertained by most professionals today, as Dr. Gerhart Bore, Neumann's chief engineer, points out in a recent monograph.

One suspects that the lack is not that of knowledge, but of willingness to accept the challenge of new or alternative ideas and techniques where the old have become entrenched and familiar. Certainly the arguments insisting that the BSO gets "the best sound anywhere" seem more "BS" than "O" to those of us not fortunate enough to quaff the heady waters of the Charles River. After all, a fund has been assembled solely through public contribution, for the purpose of improving the broadcast pickup of the BSO. Is it possible that investigations so profoundly concerned with the orchestra's sound at home and abroad present less risk to the Symphony Hall ceiling than to the similarly vaulted egos who criticize the continuing quest for better sound as "fooling around" and "fanaticism?"

The BSO's reputation outside Boston rests largely on its prowess as a performing organization, with accompanying regrets that its pickup is no match for that used by Los Angeles and St. Louis, both of whom employ coincident microphone techniques in their basic pickups. The comparison becomes truly ludicrous overseas, where the BBC's coincident-mike broadcasts of their local musical organizations regularly recreate the altogether convincing aura and perspective of a live concert.

Pity our naivete and, one might add, misplaced Trust. The tragedy of our predicament is that, with one of the world's finest orchestras and finest halls in rare conjunction, we are assured that what we have is good enough. Those deaf to such dumb pleas (but otherwise acute enough of hearing to suggest that the Emperor needs a new ear trumpet) are hustled along Mass. Avenue to swap bottle-caps in the playground on Huntington. Clearly, from all the uproar, someone is unhappy with things as they are, or are made to sound. And perhaps the time has come to ask how, in the heartland of an industry devoted to recreating the concert hall in the home, we can expend such vast efforts and resources on our reproducers, expunging the tiniest TIM, while primly playing Scrooge at the source. Here is humbug indeed.

As for the Fund itself, I have a personal ax to grind. C. Victor Campos has maintained that Schoeps and Studer microphones are not the same, and in this regard he is correct if in no other. Studer microphones were created by exchanging metal microphone sleeves marked "Schoeps" for others marked "Studer," a switch narrowly surpassing in subtlety that suggested by Mr. Campos. The contention that Studer microphones are "selected" was commented upon by Schoeps' chief engineer, Jorg Wuttke, who said simply: "If someone is eager to use the term 'selected,' you could say that all microphones which leave our house are selections." And so they are, even as they were five years ago. Subsequently, Studer discovered that, in their enthusiasm for a fine product, they had stocked a near-lifetime supply, and so to move their inventory, they have kept their original prices. Schoeps' prices, which were exactly the same as Studer's five years ago, have since reflected the erosion of the dollar and increased factory costs. Today, Studer's SKM 52 U, at \$320 list, might be compared with its modern equivalent, the Schoeps CMC 52 U, which costs \$473.28 in Germany, with an additional 7.5% duty plus shipping when delivered to the United States. When the Fund was started, my price for the same Schoeps microphone was \$410 delivered anywhere in the United States, so that four of them should have cost the Fund \$1640 (not \$2000 as Peter Mitchell has claimed); that, to use the old Yankee expression, was the "asking price." But nobody asked. There came no call from C. Victor Campos, no letter from the Fund pointing out that money was being raised by public subscription for such a purpose, that some reasonable scrap of publicity might accrue to the presence of Schoeps microphones in Symphony Hall; no reference to the general worthiness of the idea of improving the broadcast sound of one of this country's finest musical organizations. Had any inquiry been made, Campos and company would have discovered that Schoeps' American representation is not only soft of head (I offer my longstanding membership in the Boston Audio Society in support of that statement), but harbors a heart of putty marbled with a touch of business acumen just sufficient to suggest the wisdom of providing microphones of current manufacture at cost to such a project. That would have made any contribution by the BAS to the Fund unnecessary.

Of course, someone may still insist that microphones bearing the legend "Studer" be used -- I do not deny that many find it easier to pronounce than "Schoeps" -- so I will extend the terms of my offer. Thus far, the Fund seems to be paying \$20 over Studer's listed prices for these microphones. (I must find out how this is done.) I, on the other hand, can obtain the identical microphones, five years of age, gray of plumage, answering to the name of "Studer," for about \$84 less, and I will gladly include all modification data suitable for retrofitting by an enthusiastic BAS member with a hot soldering iron and a couple of hours to spare, in order to bring the microphones to a closer approximation of Schoeps' current production (most notably with regard to the suppression of infrasonic disturbances). In any case, it does seem to be a pity to pay more for less.

And lastly, a nearly free offer to all BAS members in good standing, of whatever camp: a facsimile copy of the original 1933 landmark British patent of Alan Blumlein, setting out in detail the basic precepts of coincident stereophony. It, too, is available at cost, in this case, \$1 (including postage and fondling). Just don't leave your copy lying around Symphony Hall.

-- Jerry Bruck, B.A.S., A.E.S., M-S, X-Y,
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New York, NY 10009

In the Literature

Audio, May 1978

- *Audio ETC: Canby raves about the \$2000-plus Scheiber Spatial Decoder, the state of the art in SC) decoding and ambience recovery from stereo discs (p. 8).
- *Behind the Scenes: Bert Whyte notes that lots of stereo equipment is excellent these days, but that records remain highly variable in both mike technique and pressing quality (p. 18).
- *Letters: Marshall Leach preamp -- problems and praise (p. 22).
- *The FCC's 4-Channel Listening Tests: Some of the procedures and results (p. 24).
- *Phonograph Reproduction 1978: Engineers from Shure discuss the ideas underlying the development of the V15-IV cartridge, and in the process, they provide a thorough and enormously valuable review of the facts of life all phono system designers should be paying attention to (p. 32).
- *Equipment Reviews: B&O M70 speaker (pretty good, but its linear-phase design seems not to have produced the expected benefits), Kenwood 1030 three-head cassette deck (excellent, with a superbly executed arrangement for user-adjustment of bias), Cerwin Vega PR-1 preamp (excellent) (p. 64).
- *Build a Dolby-B Noise Reducer: A very detailed exposition of how the Dolby-B circuit works, leading up to a \$125 kit version employing the new National 1011A Dolby IC (p. 78).
- *Headphones -- History and Measurement: Essential reading for headphone fanciers, background on how various designs work and the very serious difficulties in performing valid measurements of headphone performance (p. 89).
- *VTR-ing: Notes on the forthcoming adapters for using videocassette decks as digital audio recorders (p. 101).

Audio Forum, Vol. 1, Nos. 4-5

- *An editorial defending Stereophile's new advertising policy (p. 3).
- *A credit to the Speaker for Roy Cizek's "Speaker Wire: What Size is Sufficient?" and some kind words for the BAS (p. 4).
- *Letters (p. 4).
- *A Treatise on Spatial Coherence and the TFET-Valve Amplification Process: Noise intermodulation (NIM) is postulated as the true cause of sonic differences between audio amplifiers (which, the author calmly asserts, we all know exist). NIM is alleged to reduce "time stability," causing loss of spatial coherence. A new amplifying device with better transconductance linearity (the TFET valve) is proposed as a solution (p. 7).
- *Transient Distortion Measurement: The president of Analog Engineering Associates describes how they measure the dynamic performance of amplifiers (p. 26).
- *Design Notes: Technics describes its new Class A Plus amplifier, SME discusses its new Series III arm, and John Curl relates his measurements of moving-coil cartridges, which show sporadic, but substantial output in the 100 to 200 kHz region, even though no such information is in the groove. But the best items are by Lynn Olsen of Audionics, who writes intelligently on speaker design and placement (p. 30).
- *Report on the Winter CES (p. 36).

Audio Times, April 1, 1978

- *News Items: Prices will rise again this summer, as the dollar is now worth only 235 yen (versus 290 a year and a half ago). Saul Marantz, who retired a decade ago after selling the original Marantz Co. to Superscope and then came back to get Dahlquist off the ground, is now retiring permanently. Meanwhile, Dahlquist, whose production has nearly tripled in the past year, is looking for a larger factory (and is now using mylar capacitors instead of electrolytics in the crossover). House-brand speakers are coming back again. The founders of Audioanalyst are splitting up. Dual's 939 cassette deck is such a success, they are going to add two more models at lower prices. The new Panasonic 8520 FM/cassette car stereo unit has a digital tuning display and a scanner to tune down the dial automatically, for \$400. Plus some April-Fool's Day jokes: Billy Carter's new line of speakers for pickup trucks, with aluminum cones made of recycled beer cans; notes on the class N power amp, nuclear-powered with a breeder-reactor power supply in a lead casing at the back of the amp; and a note that the next IHF show will be hosted by Idi Amin in Entebbe.

Audio Times, April 15, 1978

*News Items: Assorted manufacturers are leaking advance word of new products to be officially introduced at the Atlanta IHF show (May 20) and the CES in Chicago (June 10): eight Technics receivers at lower prices than present models, four JVC receivers with DC amplifiers, a 120-Watt JVC power amp with switching-mode power supply, the Barcus-Berry AudioPlate glass tweeter (to be sold for \$200/pair including crossover parts for add-on use), updated Marantz cassette decks, the Cizek Model 3 speaker, the Advent 1 speaker (a slightly cut-down version of the New Advent, slated to replace the old Smaller Advent), the DB Systems DB-6 power amp, the Advent car speaker with integral equalizer and booster amp, and assorted car stereos with digital frequency displays and electronic scanner tuning. A new line of super-fi records from Mobile Fidelity -- not direct discs, but tape masters carefully cut (at half-speed) and pressed in Japan, featuring well known artists (Fleetwood Mac, Neil Diamond, Zubin Mehta and the Los Angeles Philharmonic).

High Fidelity, May 1978

*Equipment Reports: Apt Holman preamplifier ("outstanding ... one of those products against which others will be measured"), Keith Monks M9BA Mk. 3 tone arm (installation is a headache, but sonic performance is extraordinary), Kenwood 1030 three-head cassette deck (fine performance, bias adjustment feature very effective, but Dolby calibration controls omitted), Tandberg 2075 receiver (expensive and unconventional, but a super-receiver), Marantz 940 speaker (okay for rock), Radio Shack Lab 400 turntable (specs good, but suspension poor and arm resonance too low in frequency) (p. 47). Note that High Fidelity no longer prints square-wave photos in its reviews, a victory for common sense. (Regrettably, they have also stopped printing phono and tuner frequency response curves. -- MR)

*Keep Your Stereo Sounding Like New: A basic guide to annual maintenance and problem diagnosis (p. 68).

*New Math vs. Old Myth: On the proposed new IHF amplifier testing standards and the changes High Fidelity will make in its test reports (p. 74).

HiFi Stereophonie (Germany), April 1978

*Which One Schubert: The metamorphosis of Schubert's image from the spontaneous songwriter to the early member of the Vienna classical school (p. 406).

*Schubert's String Quartets: An analysis of their originality and contribution (p. 414).

*Eroticism and Sexuality in Rock Music: Assessed as a revolution without any progress (p. 428).

*Test Reports: The Wega ADC-2 time-delay unit and 2x30W power amplifier (very versatile and useful), the Sharp Optonica ST-1515 tuner and SM-1515 amplifier, the Sansui TU-717 tuner and AU-517 and AU-717 amplifiers, the Grundig RPC-600TP compact system (all fair), the Castle Acoustics (England) Howard, Conway, Kendal, and Richmond speaker systems (unduly colored in the middle range) (p. 488).

Modern Recording, April 1978

*Modern Recording wins the booby prize as the most carelessly edited of the major audio magazines; nearly every recent issue has had glaring cases of misinformation, especially in the reader advice columns. This month's examples include a wrong diagram on how to do phantom powering for microphones and the "fact" that the Marantz 7 is not a preamplifier. On the whole, Recording Engineer/Producer is a far better guide for the beginning recordist.

*Ambient Sound: A clear and correct discussion of tape recording bias, standards, etc. (p. 60).

*Reviews: Audioarts 1500 tunable notch filter (excellent), Marshall 5002 Time Modulator (a marvelously versatile and clean-sounding delay and special effects generator), Garrard M RM-101 (good as a phono preamp, effective as a scratch suppressor).

Modern Recording, May 1978

*A Word About Grounding Problems: A thorough discussion (p. 36).

*Echo, Reverb, and Delay: A basic introduction (p. 55).

*Ambient Sound: Notes on the new IHF amplifier test standards (p. 64).

*Reviews: Russound OT-1 patchboard/switchbox (a rave review), Celestion 66 speaker (very good, with high power-handling capacity), Fisher 5120 three-head cassette deck (mediocre).

Popular Electronics, May 1978

- *Stereo Scene: A favorable comment on the DiscTraker tone arm damper and a cautiously favorable one on the Osawa DISK SE22 platter damping pad (p. 18).
- *Loudspeaker Efficiency and Amplifier Power: A comment that you need lots of one or the other (p. 26). But efficiency ratings are not standardized in any useful fashion, making choices difficult.
- *Reviews: JBL 110 speaker (efficient, unusually flat response for a JBL, but optimum settings of its balance controls are not well identified), Philips 673 tuner (fairly good FM, superb AM), Dynaco Stereo 416 power amp with C-100 add-on power-supply capacitors (fine performance, superb speaker-protection features) (p. 27).
- *What's New: More new equipment shown at the Winter CES display (p. 49).

Radio Electronics, May 1978

- *Graphic Equalizer Project: Part 1 of a series on a pretty good \$100 twelve-band stereo equalizer kit (p. 37).
- *Noise Interference: Getting rid of ignition static and other noise problems in cars (p. 47).
- *Reviews: Rotel 803 receiver (quite good), Garrard MRM-101 (satisfactory as a phono preamp, reasonably effective as a scratch suppressor) (p. 65).

Record Review, April 1978

This year-old, bimonthly magazine is devoted almost entirely to just what its name implies, a short audio column notwithstanding. The April issue contains sixty-three unattractively laid-out and printed pages of text and about three of advertising. It begins with rock and works its way through classical to jazz. Although many of the reviews stand alone, the editorial emphasis seems to be on engaging and informative perspectives on groups of related discs. Apparently classical editor Derrick Henry is an audiophile; in this issue, he reviews records by Sheffield, Mark Levinson, Crystal Clear, and Telarc. He covers both the sound and the performances with unusual thoroughness, expressing mostly pleasure with the former and fairly consistent disappointment with the latter. Conclusion: "Technology quickly becomes outdated; great art is timeless."

Newsstand price is \$1.25. Subscriptions are \$7.50 per year from Ashley Communications, P.O. Box 91878, Los Angeles, CA 90009.

The SLAS Newsletter, February 1978

The house organ of the St. Louis Audio Society, this issue runs thirteen pages and looks not unlike early issues of the Speaker. The main feature is a group of brief, subjective equipment reviews by "The Audio Cryptic," Len Hupp. Items covered are the DB preamp, GAS Thoebe, the Van Alstine Model One preamp, the Denon AU-320 step-up transformer, the Linn/Naim Nag 20 pre-preamplifier, the Verion Mk. I transformer, the ADC LX-II (QLM-36 Mk. HI) cartridge, the Dynavector 15BQ (20B) moving-coil cartridge, the Entre EC-1 moving-coil cartridge, the Grado G1+, the Micro-Acoustics 2002e, the Ortofon MC-20 moving-coil cartridge with MCA-76 pre-preamp, the Pickering XSV-3000, the Shure V15-III and V15-IIIG, the Supex SD-909 (SD-900E Super), and the Dynavector DV-505 and Hadcock GH-228 tone arms.

The SLAS Newsletter, March 1978

A shorter issue with two articles: one on the requirements for scientifically valid listening tests, the other a subjective review of the new Kenwood L-series electronics.

For information on the St. Louis Audio Society, send a stamped, self-addressed envelope to SLAS, 7435 Cornell, St. Louis, MO 63130.

Stereo Review, May 1978

- *Letters: BAS member Harry Zwicker clarifies a point about digital tape recording (p. 8).
- *New Products: Note the national directory of classical music FM broadcasts (p. 18).
- *Audio Q&A: On DC amplifiers, visible woofer cone motion, and other worries (p. 28).
- *How Much Power Do You Need?: A clear discussion of why the question has no good answer (p. 36).

- *Tape Talk: Sources of accurate Dolby-level calibration tapes, plus other good advice (p. 38).
- *The Testing of Turntables: How Julian Hirsch does it, what problems arise in making meaningful measurements, and what the data mean (p. 42).
- *Reviews: Burwen TNE 7000 impulse noise suppressor (superbly effective at eliminating normal ticks and pops, as distinct from the gross knife scratches other suppressors work best on), Shure V-15 Type IV phono cartridge (outstanding tracking, especially of warped discs, effective infrasonic damping, flat frequency response), Dynaco 416 power amp with C-100 add-on power-supply capacitors ("first-rate amplifier" with superb speaker-protection facilities), Wharfedale E-70 speaker (very efficient, with a hot high end), Teac A-103 cassette deck (quite good) (p. 46).
- *Receivers: Everything the confused novice buyer needs to know (p. 68).
 -- Peter Mitchell, Jiri Burdych, and Michael Riggs

April BAS Meeting

The April BAS meeting was held on the 16th at the GTE-Sylvania facility in Waltham. Various items were offered for sale, including some remaindered wooden cabinets for AR receivers. Peter Mitchell displayed the pink noise generator from West Side Electronics, which is a great bargain at \$10, \$14, and \$20 for card, kit, and assembled versions respectively. Also recommended most highly were the programs being produced at 2 o'clock on the first and third Saturdays of each month for WBUR by BAS member Peter Storkerson. These feature playbacks of master tapes, mostly two-track with dbx noise reduction, and careful use of WBUR's studio and transmitting facilities to keep noise and distortion low. The result is a signal that rivals (some say outdoes) what comes to us on WGBH during Adventures in Sound. Peter will be playing some of the Apple Hill Chamber Players early music series, as well as the Cambridge Chamber Players, the Boston Brass Quintet, and the Albert Fuller Brandenburg Concerti with original instruments.

First Meeting Feature - Paul Young and Stanley Lipshitz

The evening's principal guests are both from Waterloo University in Waterloo, Ontario. (It was this fact that caused the meeting to be billed as "The Canadian Invasion.") Stanley Lipshitz is a professor of applied mathematics, and Paul Young is a Ph.D. student in systems design, currently working on a thesis in psychoacoustics.

Mr. Young was on his way to becoming an engineer, but his interest in high-end hi-fi turned him from his original path. His work lies in an area that, unlike most of modern physics, is being regularly discussed in the popular prints -- specifically, in the family of hi-fi magazines referred to as "subjectivist," or "golden-ear" publications: The Stereophile, The Absolute Sound, The Audio Critic, Sound Advice, et al. When Young addresses the audiophile community, therefore, he is forced to spend time responding to the subjectivists, whose work is already familiar to his audience, and who as a group are known more for their self-confidence than for their agreement with each other. Also, unlike the rest of us self-styled experts, Young must defend the particulars of his thesis against the challenges of the members of his department at Waterloo University in order to obtain his doctorate, a process that may make the piranhas of the BAS look like goldfish in comparison. One crucial quality Young's experiments must have in order to meet accepted scientific standards is repeatability. It is the lack of repeatability in the reports of the subjectivists that forms the basis for Young's criticism of them, and he outlined several possible problem areas that might help explain the inconsistencies.

Young vs. the Subjectivists

Young said that while there may be a correspondence between subjectivist test reports and reality, the pattern of this correspondence is so complex that it is often hard to detect. He assumes that their comments have real correlates, so that when a reviewer says that a component has a hard-sounding midrange, there is something in the component itself that is being talked about. That these comments show inconsistencies from reviewer to reviewer he attributed to the following things:

1) Frequency Response Errors. Components are rarely measured for frequency response in the test situation, that is, while interconnected with other components in the chain. What gets overlooked here are small variations that may affect a large portion of the frequency range. An error of 1/4 dB, if it extends over an octave or more, is audible, although it doesn't always get identified as a frequency response error. For two systems to be compared without this sort of error creeping in they should be identical in frequency response within 0.1 dB from 20 Hz to 20 kHz. (He also feels that the infra- and ultra-sonic ranges are important because of the possibility of increased distortion in the audible range.) Before Young does a comparison between two components, he checks their frequency responses in situ. If there are measurable differences, he does not consider that a valid comparison can be done. Most problems of this sort arise from impedance mismatches between components; power amps, which often have input impedances of 10 kOhms or less, are especially troublesome.

2) Absolute Polarity. There is data that suggests that changing the polarity of a reproduced signal produces audible differences. The effect is subtle and easily masked by other distortions. The experiments that demonstrate the audibility of polarity changes were done on full-range electrostatic speakers (Quads or early Dayton-Wrights) with subjects who had had many hours of listening practice and specific instruction from the experimenters about what to listen for. Once this had been done, the subjects were able to identify polarity switches with 95% correctness. For this effect to be audible, the waveform must of course be asymmetrical. This means strong even harmonics. Voice is quite asymmetrical, and some transient sounds serve well also. (There is an Archive recording, #2533184, entitled "Golden Dance Hits of 1600," which contains hand-claps that are supposed to be very revealing of polarity reversal.) This problem makes it difficult to compare components (e.g., the Quad 405 vs. the Dyna 400 power amps) when one component inverts the signal and the other doesn't, or when (as in the Nagra and Revox tape recorders) the tape and the direct outputs have opposite polarity.

3) The Use of Music as a Test Signal. Music is too complex to be a good test signal, Young says. As an aid to what he called "bookkeeping," which means trying to keep track of everything that is going on during the playback of music, he introduced the idea of using abstract multidimensional spaces to represent the signal, the perceptions of the observer, and the observer. The postulate is that it is possible to create a kind of graph that is similar in concept to a frequency response plot, but which is able to represent any signal by a single point. A frequency response graph has two perpendicular axes, one for frequency and one for level. To construct a signal space, or S-space, one might start with these two axes, but many more axes, all mutually perpendicular, would be needed to specify all the parameters needed to describe a signal completely. This necessitates the imaginative leap to a geometry with more dimensions than the three (or is it four?) we inhabit. (For an entertaining introduction to this idea, read Flatland, by Edwin Abbott, reprinted in 1963 by Barnes & Noble, also available in a Dover paperback. -- EBM)

Having constructed the S-space, we then construct a perception, or P-space, and an observer, or O-space, and examine the transfer functions, or maps, that connect points in the different spaces with each other. For instance, there is a strong (but not absolute) correlation between the S-space parameter of frequency and the P-space parameter of pitch, or between intensity (S-space) and loudness (P-space). There is a parameter in P-space called "depth," but the parameters in S-space that produce it are still largely unknown.

As for the observer space, most dimensions in O-space are the same as the ones in P-space, but not all. Observers have memories, for example, so that recently heard material (such as a loud crescendo) can alter their responses to what follows. One of the most important parameters that exists only in O-space is enjoyment, which is affected by many things, not all of which are related to the signal or to ones perception of it. And it is here that we run into trouble when we use music as a test signal. Music tends to draw the observer into another world, especially if the performance is inspired and if the playback system is not doing too many nasty things at the moment. This other world tends to be filled with feelings, which in their flow and change may be exciting and enjoyable, but tend to destroy the repeatability of experiments. Young suggested that someone in the BAS design a small box that can generate appropriate test signals (ideally the signals would be digitally derived, for greatest consistency) and carry the box around from system to system to do comparative testing. A non-musical repetitive test signal moves the observer around less in O-space and therefore should increase repeatability of the results.

4) Threshold Phenomena. Many characteristics of hi-fi equipment that turn out to be important are just barely detectable much of the time. When Young uses as a subject someone with a reputation as a golden ear, the subject tends to silence himself when the change being displayed is near the threshold of perception, not venturing to speak until the stimulus is increased to a level that is obvious. The subjectivist writers realize this about themselves and allow for it by keeping a piece of equipment for months before they write about it. (I suspect that this also allows them to average the effects of movements in O-space over time and makes the use of music as a test signal more valid thereby. -- EBM)

In response to questions from the audience, and in subsequent telephone conversations, Young expounded further on his basic philosophy. He sees audiophiles divided into two camps -- listeners to equipment and listeners to music -- and maintains places for himself in both camps. He acknowledges that the satisfying reproduction of music is one of his primary goals. He feels that the high-end magazines are moving in that direction and that they provide a useful service to us all, but that they could make much more rapid progress by paying closer attention to effects that can be measured scientifically. If one fails to do this, one can easily be led down long and non-productive byways. According to Young, there definitely are audible things that cannot now be measured. He did an experiment that involved removing the 10 kOhm resistor to ground at the output of a Dyna PAT-5 and substituting a 4.7 kOhm resistor going to the negative power-supply rail. This pulls the final stage into pure class-A operation. After some practice, he was able to tell with 95% confidence level whether the resistor was connected to the negative supply or to ground. The difference involved what sounded like "a mild case of mistracking-type splatter" audible mostly in the upper midrange. The preamp was tested in the two configurations for frequency response, SMPTE IM distortion, THD, twin-tone 1M, noise level, and more. The only difference that showed up in any of the tests was in the narrow-band spectrum analysis of the harmonic distortion products: the third harmonic went from -89 dB to -92 dB when the resistor was tied to the negative rail. (This means that the third harmonic went from 0.0035% to 0.0025%, a difference one would not expect to hear. -- EBM)

For those interested in pursuing further the subject of human perception of acoustic phenomena, Young has two books to recommend. The first is Information Theory and Aesthetic Perception, by Abraham Moles, University of Illinois Press, 1968. The second is Psychophysics, Method and Theory, by George A. Gescheider, published by Lawrence Erlbaum, of Hillsdale, New Jersey, and distributed by Wiley & Sons. Gescheider is especially valuable for those interested in getting scientifically valid results from listening tests.

Lipshitz on Recording

Next on the evening's agenda was a presentation by Stanley Lipshitz arguing the advantages of coincident recording techniques. Professor Lipshitz began by paying homage to Blumlein's original treatise on stereophony, which was published in 1931, saying that virtually everything we know about the process is stated or suggested in that paper. For those interested in reading this seminal work, excerpts may be found in the Journal of the Acoustical Society of America, April, 1958, Vol. 6, No. 2. (See also "Jerry Bruck on BSO Mikes" elsewhere in this issue.)

Our perception of the directionality of sound depends on three kinds of differences: intensity, time, and spectral content (the third is really a subdivision of the first). Time differences (or, to put it another way, phase differences) are used by the brain below about 1 kHz, in the part of the spectrum where the wavelengths are comparable to, or larger than, the 0.7 foot distance between our ears. Above 1 kHz, the head begins to be large enough compared to the wavelength of the sound to act as a barrier, creating "shadows" for sounds coming from off center, and in this region the brain uses differences in intensity and frequency response to derive positional information. (This information is all derived from the first arrival of the sound, whether in a hall or in a room with speakers.)

When earphones are used, the apparent location of a source can be shifted to one side by causing the sound to arrive earlier in that side or by making the sound louder on that side. These two effects offset each other to a certain degree, so that a sound that has been shifted to the left by delaying the right side by 1 millisecond can be centered again by increasing the intensity on the right by about 5 dB. When using speakers, however, this trick doesn't work, because both ears hear both speakers. The original experiments at Bell Labs with stereophonic sound involved

the use of a wall of microphones and a wall of speakers to reproduce spatial effects. But when the number is reduced to two there is trouble. If the microphones are many feet apart, phase information for midrange and highs will be lost; where difference in arrival time at the two mikes is several cycles, there is no longer any correlation between time differences and intensity differences. Subjectively, this method of recording frequently results in a hole-in-the-middle effect, requiring a third channel to fill it. (Using a center-fill microphone added to both channels helps this problem a great deal without the need for a center channel in the playback. -- EBM)

At this juncture, Mark Davis arose to point out that Lipshitz, in saying that small time differences aren't reproduced with speakers because both speakers feed both ears, was ignoring the Haas effect. According to this principle, each ear localizes using the very first arrival of any sound and ignores subsequent arrivals. Thus, for sounds whose angular distance off center is smaller than the angular distance of the loudspeaker, the first arrival at each ear will be from its corresponding speaker, and the brain will ignore the subsequent arrival from the opposite speaker. Lipshitz agreed with this analysis and pointed out that it assumes that the microphones are eight inches apart (or less), so that the argument does not apply to widely spaced omnidirectional mikes. Using omnis eight inches apart would produce a recording whose directional effects would be totally dependent on the Haas effect, he said. Using cardioid mikes, facing outward, makes a recording in which there are both time and intensity differences. Coincident techniques, which he prefers, preserve intensity but not time differences, so that (at least up to 1 kHz) the intensity differences are provided by the speakers and the time differences by the listener's head. For sounds above 1 kHz, the directional patterns and angles of the microphones must be chosen very carefully to keep the intensity differences correct. The two combinations that seem to work best are figure-eight mikes angled 90 degrees apart and cardioids at 120 degrees. (I understand that coincident hypercardioids at 90 degrees subtended angle also work. -- EBM)

Lipshitz stressed that for any of these systems to work well it is very important that the directional pattern of the microphone be independent of frequency. This is a problem with commercial condenser microphones, particularly the ones with large (one-inch or more) diaphragms. He says that the available figure-eight mikes are better in this regard than the cardioids, which is one reason he favors figure-eights. Another reason is that the reverberation has a more spacious sound with figure-eights. The reverberant sound blends well with the direct sound when this system is used, and monaural compatibility is good. A correlate of this is that, because the low frequencies are recorded monaurally, discs made from the tape will be free of large, troublesome vertical excursions.

Lipshitz said that the anomalies of spaced-omni recordings become more annoying as his equipment improves and ended his pitch by urging his listeners to try coincident recording for themselves. For those interested in doing so, he offered a few caveats. First, the microphones must be truly coincident; the diaphragms must be as close as possible, and in any case less than an inch apart. (Obviously, this can only be true horizontally, but vertical separation should be kept to a minimum.) The microphones must be placed so that all the instruments are between their pattern axes. This constraint may dictate poor overall balance in a bad hall. Lipshitz brought some tapes, which he played after his presentation. There was the usual nearly impossible listening situation so it was hard to judge the recordings, but the placement of the instruments in the stereo spread did seem extremely stable, without the phenomenon that often occurs on spaced-omni recordings of little bits of upper-overtone material migrating across to the opposite channel and smearing the image.

It should be said as part of this discussion that all of the above treatment of microphone techniques, both theoretical and experiential, rests on one rather large assumption: that the listener's head is located on the line equidistant from the two speakers. With any of these techniques, moving one's head from the center line has the effect of pulling the central instruments over to the nearer speaker. Many British audiophiles, Angus McKenzie among them, according to our spies, are careful to center themselves between the speakers at all times. (If one is listening with friends, this results in what I call the choo-choo train configuration. -- EBM) When asked what all of this meant to those of us who were not willing to restrict our movements this way while listening, Lipshitz replied that in his view this was a playback problem, not a recording problem, and that theoretically one should make a speaker with cardioid or bidirectional characteristics and aim the speaker pair inward so that the two axes intersect ahead of the listening position. Then, when the listener moves off center, the earlier arrival from the near speaker will be partially

offset by the increased intensity from the opposite speaker, to whose axis the listener is now closer. In practice this is what Lipshitz attempts to do with his Quad electrostatics, but the gambit is only partially successful, because real-life speakers have directionality that increases with increasing frequency.

Platter Pads, et al.

After the break, Messrs. Lipshitz and Young returned to discuss record-playing equipment. They have done some experiments that suggest, among other things, that the Platter Pad may indeed be a useful accessory.

Those of you who use a Dust Bug may have noticed that when the stylus is between bands or in a silent groove the Dust Bug's groove-tracking noises are audible, both through the air from the record surface and, if the gain is high, through the cartridge itself. The signal coming through the system gets into the cartridge because of the principle described in Newton's second law of motion, which in this situation dictates that the grooves cannot vibrate the bristles of the Dust Bug's nylon brush without the bristles vibrating the record. This vibration travels through the vinyl and is picked up by the stylus. This suggests also that the stylus is doing the same thing -- setting up vibration in the disc that can reverberate around and be picked up by the stylus again. Lipshitz and Young used a test record with a highly modulated 300 Hz tone and a band of silent grooves on the same side, putting a Dust Bug in the band with the tone and the stylus in the quiet groove. They found that how the record is supported strongly affects the audibility of the tone in this test. The worst way to hold the record is with a turntable mat with ridges under the label and the outer edge, with no support under the grooves. A Rabco mat that supports the grooves but not the label and a Sony mat that has little discs that can flex slightly to conform to warped records attenuated the signal quite a bit relative to the worst mat. The viscous-filled mat from the Sony PS-7 turntable was excellent, reducing the 300 Hz tone almost to inaudibility, and the Platter Pad was the best of all. The Sony PS-7 mat could be made to equal the performance of the Platter Pad by placing a hollow, cylindrical 9-ounce weight on the label. This weight should have a thin layer of rubber or other resilient material on the bottom to make proper contact with the disc. As for the subjective effect of a good record mat on the sound of music, Lipshitz said that he seemed to notice a difference on the Sheffield disc, "The King James Version," which he described as having better sound on the high-hat cymbal, better overall definition, a more clinical sound, and less of what might be called "depth" or "ambience around the instruments," when the good mat was in use. He acknowledged that not all of these changes would necessarily be thought desirable by all listeners, but felt that the good pads gave truer reproduction.

The presentation concluded with a few more tidbits about record reproduction. They too have noticed the RIAA equalization error in the Levinson JC-2. In fact, they have found relatively few preamps that do not exhibit errors. Preamps with accurate RIAA curves include the Advent receiver, the Quad 33, and the Apt (praise for which was acknowledged with a modest "I know" from a tallish, mysterious stranger in the audience.) Slew rate measurements performed on records revealed worst-case results of 6 mV/microsecond at the cartridge output and 56 mV/microsecond at the preamp output (35 dB gain), which suggests that 0.25 V/microsecond is plenty. (There are those who argue for the need for more headroom than that. -- EBM) (These figures substantially corroborate BAS member Mark Davis's findings, published in the last issue of The Audio Amateur. -- MR) An ancillary discovery made during these tests is that the Sonus Blue Label cartridge shows faster rise times than the Shure V15-III (referred to output at 1 kHz), perhaps indicating that the Sonus accelerates faster. (Differing high-frequency bandwidth and resonance characteristics could cause the same result, but Lipshitz seemed to feel they were fairly similar in this case. -- MR)

Lipshitz spoke briefly about tone arm geometry. His approach to getting the correct setup is to measure the offset of the arm in inches, which is equal to the effective arm length times the sine of the offset angle. It turns out that this figure should always be 3.68 inches for any length arm, so that a quick check of this dimension will reveal whether an arm is properly designed. (Most aren't.) With the cartridge rotated in the headshell to produce 3.68" linear offset and the arm moved until the cartridge is tangent to the groove at 2.60" radius, the setup will be optimal. (Checking Mitch Cotter's graphs of arm length vs. offset angle against Lipshitz's criterion for 3.68" linear offset reveals that the two are indeed recommending the same geometry. -- EBM)

Additional Meeting Feature - Keith Monks/KMAL

Keith Monks, the British manufacturer of the KMAL tone arm and the Keith Monks record cleaning machine, flew to America the day of the meeting. Although somewhat short on sleep and jocularly apprehensive about the Society's reputation for asking tough questions, he agreed to address the meeting for a few minutes just before the break. He announced the latest product of his firm, a separate arm with a conductive brush to remove static electricity from the record during play. He also discussed his tone arm and the record cleaning machine.

The latest tone arm, the KMAL M9BA Mk. 3 Improved (with a name like that, it has to be British -- EBM), has an effective mass that according to Monks is 4 1/2 grams, down from 8 1/2 in his previous design. (The reviews I have seen indicate an effective mass of 10 grams for the previous version. This may vary according to the counterweight used. -- MR) This arm was reviewed in the May 1978 issue of High Fidelity, and Monks said he agrees with most of this review, including the complaints about difficult set-up. He also agrees with negative responses to the KMAL cuing lever, although he did not promise he would change it, he did suggest destroying it. When questioned about the lack of adjustability of the anti-skating compensation of the KMAL arm, he replied that except for moving-coil cartridges, which might be tracked more heavily than moving-magnet designs, the fixed anti-skate was adequate. He recommended wiping the contact pins on the arm every two weeks or so, especially if a moving-coil cartridge of low output is used, but stated that most problems with contact resistance come from contamination of the mercury by the silicone damping fluid. This occurs when the arm is removed too rapidly from the base assembly and can be prevented simply by holding the arm just off the support for a few seconds to allow the damping fluid to flow back into its little cup. He feels that the mercury in the arm base is not dangerous, since it is in a covered container, but cautioned against spilling it and advised keeping children away from it. The mercury should probably be changed about every two years to keep it clean, and he recommends triple-distilled mercury.

The Keith Monks record cleaning machine is a large box containing a Lenco turntable, tanks with cleaning fluid, a brush (from the Watts Parastat) that applies the fluid and scrubs the grooves, and an arm with a suction device on the end that moves outward over the spinning disc picking up the fluid at the end of the cleaning process. The vacuum nozzle actually rests on a nylon thread, which is slowly and continuously drawn past the opening from a spool inside the cabinet. The cleaning fluid is a mixture of wood alcohol and distilled water, which Monks says absolutely will not harm vinyl records (it cannot be used for antique shellac discs).

The record cleaner does not seem to have caught on in the United States yet; of 5750 machines in existence, only 72 are in this country. They are highly regarded overseas (the BBC uses them to clean classical records before air play) and have been enthusiastically reviewed over here as well. They have been known to clean up records that had previously been given up for lost. One of these machines is in use locally, at Eardrum, which is located on Route 3A about three miles north of Route 128 in Burlington. They charge 50¢ per disc for up to twenty-five records, 35¢ per disc for twenty-six or more. If you have many records to clean, it is best to call them before going over to make sure they are not too busy. The above prices include cleaning of both sides of the disc and a new plastic sleeve, recommended by the manufacturer.

-- Brad Meyer

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A Publication of the BAS

Impressions of the 1977 New York Hi-Fi Stereo Music Show

John F. Sprague

This show seemed bigger than the last one (1974), and if so, I don't know why, because this time it was not a rehearsal for a subsequent Boston show. There was less evidence of strikingly new technology to make potential customers consider expanding, upgrading, or replacing their equipment. And, at least in the New York area, a number of stores have gone out of business, although some new ones have started since 1974. Most of the exhibits were on the second floor of the Statler Hilton, where it was possible to become temporarily disoriented, if not actually lost, in the maze of corridors.

Many visitors probably didn't even visit the eighteenth floor, with its disco lounge, small but interesting historical exhibit, and a few products for sale. The Technics turntables shown did not include their newest, softly suspended one. Sam Goody (a chain that started long ago in Manhattan) made it possible to buy a record and have its jacket autographed by the featured lead. BIC's new FM antenna in a box, The Beam Box, was on sale, as were some Discwasher products (but not their attractive D3 air mattress). The historical exhibit, unfortunately static rather than operating, included Edison's 1877 tinfoil cylinder phonograph (on loan from the Edison National Historic Site in Orange, New Jersey) looking less new than the reproduction pictured on the December cover of Audio magazine. Unfortunately, it was the only evidence of a centennial celebration. Out by the elevators set a baby grand piano, as if forlornly awaiting its chance to return to the expropriated ballroom -- a sad commentary on the place of live music at this show, as though comparisons were not invited. Several computers were in use in various capacities, but the one on 18 provided printouts of video portraits, a curious analogy to the difference between illusion and reality, but otherwise unrelated to the rest of the show.

With the crowd on the second floor, I managed to visit, however briefly, all but four equipment exhibits. Three of these had scheduled programs with long waiting lines (Audio/Pulse, Bose, and JBL), and I ran out of time without getting to Garrard.

Unlike 1974, when nobody at the New York show seemed to have heard of the BAS, I found many exhibitors acquainted with it. The Speaker is now respected, if not feared. Among the people I met were Saul Marantz, Peter Aczel (The Audio Critic), and Mr. Nakamichi. Mr. Nakamichi looked about 18 or a very well preserved 25, so I had to ask after he walked away whether he was not very young to have done all this. Quite so, I was told: he is the son. It was nonetheless an honor to meet the young man who will probably someday not so much own or be in charge of the company as be responsible to and for it.

I overheard someone ask Mr. Aczel what he had heard, to which his reply was bad sound everywhere. This later reminded me of an exhibitor's remark that the tragedy of these shows was that some people would decide what to buy based on what they heard at them. As I recall, the number of exhibits trying to play classical music at reasonable sound levels could be counted on the fingers of one hand. At many, the level was enough to cause rapid desensitization of hearing acuity. Obviously not the place for prolonged critical comparison and deliberate judgment, the show lets you see more than any store, with lots of free literature, occasional special prices, and a chance to ask the designers some pointed questions, all without pushy salesmen.

There did not seem to be any one brand of equipment in widespread use, but two records kept reappearing. One, Crystal Clear's milky white disc of Charlie Byrd, had apparently been deliberately spread around, as signs telling where to buy that brand were prevalent. The other was much more nearly familiar music -- Star Wars. This was not the two-disc soundtrack set, but Meco's disco version on the Millenium label with, I'm told, similar non-film music on the flip side. Complete with R2D2 bleeps, it lacks dynamic range but is good fun, or perhaps funk. For a classical purist who doesn't want to seem narrow-minded, this would seem to be the one disco record to have in the collection, unless, of course, you saw Star Wars and either didn't like the score or liked it so much you couldn't abide a reworked version. Unfortunately, as far as I know, none of the recorded versions offer the deep bass roar of spaceships blasting through the soundless vacuum, or the quadraphonic effect achieved in theaters by time delay equipment.

At the first stop I saw Roy Allison's ten-minute scheduled demonstration of his Black Box, intended to show that a woofer facing sideways next to the floor gives better mid-bass than one facing front and up on a stand a foot or so. As I'd never used stands or turned my speakers upside down, I was surprised how much difference there was. It even showed on pink noise using a real-time spectrum analyzer for a visual display. The bottom three octaves were not affected (as shown by the display), but psychoacoustically the greater or weaker strength of their low harmonics made it sound as if they were. In their other room, Allison had a dummy mockup of a stereo active equalizer to flatten the low end down to 20 Hz with an 18 dB per octave rolloff below that. The unit has four pair of tape monitor jacks and continuous and switched knobs on the front. It is, of course, a triangular prism, setting on its widest side, about a foot long and several inches high. It requires AC power and is expected to sell for \$200 to \$250.

Allison speakers were being used by Setton International to demonstrate their electronics line: receivers, amplifiers, preamp, and tuner. All of their receivers include AM as well as FM. They also make a very modernistic control center and a "front access" turntable with a two-piece cover that slides rather than lifts.

Bozak has a new speaker, the LS-200, using a woofer and a tweeter, both with aluminum cones, in a bass reflex enclosure, a considerable departure from their traditional designs.

IMF's literature had some interesting cutaway drawings showing their speakers' internal construction and the grain orientation of their stuffing, far from the usual wall-only treatment or total glass-wool fill.

Fried speakers were in another room, with literature showing a diverging design philosophy in their Model M.

Lux Audio were showing their Laboratory Reference Series, all solid state. At least one other exhibitor was using their tube equipment.

BAS contributor Tomlinson Holman's new Apt Corporation expects to have his preamp available for just under \$450 a month after the show.

TDK informed me that their D tape now comes in an improved version, which says on the box insert, "Precision Cassette Mechanism" and "Low Noise -- High Output." It still offers the only 180-minute cassette available. AD replaces ED. The old D is being replaced by the Maverick line.

SME's new arm should be available by the time you read this. It lists for \$290. The damping fluid takes an hour to load, it is that stiff. Patience.

Koss's Pro 4AA is going to be phased out gradually now that the AAA is being made to list for only \$10 more. For those still concerned about what the AA's impedance really is, there is also a 600 Ohm version. The AAA is 220 Ohms. They were also showing three new speaker systems at \$195, \$295, and \$395 each.

Dahlquist will now make you a mirror-image pair at the factory on special order for \$50 extra. Concerning the Audio Dimensions kit for improving the crossover, I was told that an audible improvement will result from the replacement of any electronic part by another that either costs

twice as much or is unavailable (preferably the latter). This is really a corollary of the old rule of thumb that dates back approximately to the first show, that to obtain an audible improvement you must spend twice as much on either the individual component or the entire system.

Fulton Musical Industries had a pair of J-Modulars in a room far too small to demonstrate them advantageously. Their most recent addition to the line is the Nuance I, using a 10-inch woofer and listing for \$315 each. Their literature describes a new E-Modular system and E sub-woofer, smaller brother of the J. The J now claims 13 Hz all the way out to 52 kHz (using three special tweeters). They must be special indeed.

Optonica was showing a speaker at \$800 a pair that uses a ribbon tweeter with a mini-horn, flared in one dimension. It purportedly goes to 50 kHz, rather beyond the usual electrostatics, if not beyond the piezo-electrics. The world is ever full of more and more exotic tweeters, and the only known principle I have yet to see employed for music reproduction is magnetostriction, used industrially to about 200 kHz. But, after all, 50 kHz should satisfy even your pet bat.

Fans of omnidirectional sound now have the option of using any woofer of choice, preferably crossing over at about 300 Hz or higher. Mr. Johnson, a new company in the Bronx, makes an add-on that looks something like an overgrown pentaprism from a single-lens reflex camera. Each side has an extended midrange unit and a tweeter. These will be sold for about \$250 each. The workmanship in assembling a cabinet with so many unusual angles can only be admired. Personally, I feel that almost any shape is preferable aesthetically to the usual rectangular box, and acoustically can be preferable to avoid internal standing waves. Yes, this applies to listening rooms also, and auditoriums and studios. Mr. Johnson also makes a bass unit using four 8-inch speakers in pairs on angled front panels in a bass reflex enclosure, also to list for about \$250 each, in case you don't have something you prefer. He uses Philips drivers with only capacitors to keep the lows out of the high end.

I finally had a chance to hear DCM's Time Windows, made in my alma mater's home town (Ann Arbor). They were also showing their newer QED model. Their literature is interesting and, as with my first impression of Allison's, leaves me feeling that if they are right, everyone else is wrong. Unfortunately, the bass module (not theirs), which bore a sign saying it was off, got turned on at some point, purportedly at some visitor's request, so I was unable to tell how well the DCM's do at this by themselves (their woofers are rather small, hence the question). They now recommend 3-Amp flat-blow fuses, double what they did three years ago. They suggest 10 Watts minimum, 100 maximum, per channel. They recommend placement away from walls, one meter from the wall behind to the center of the enclosure and half meter multiples from the side walls, starting at one meter. Then rotate the enclosure to achieve the desired image placement and balance of direct and reflected sound. This could be worth trying with other speakers as well. Audio General's AGI 511 preamp shared this room, which had the most attractive computer display, if not the most informative, because of the use of a CRT color graphic display.

If AR's simplified (two-dimensional) computer graphics display of room acoustics is correct, the above may be very right or very wrong, depending on the size of your room. Their choice of various programs also provided the option of a printout and would compute, among other things, the volume, surface area, reverberation time, and amplifier power requirement of any rectangular room (simplified case, with adjustment for wall material but not furnishings) and also give the ratio of direct to reflected sound at the listener's position. Their idea on speaker and listener placement is to avoid the nodal areas of the room's standing waves, which includes essentially one fourth and one half the distance along any room dimension and especially the crossing points of any two or three of these. Asymmetry is the thing, and if you don't have it in your room shape you need it in your setup. This seems to overlook the point that the greatest number of room resonances is excited by corner placement of the speaker(s). However, a greater number may be preferable to a smaller number, blending if well spaced rather than coincident. Better still is having no parallel surfaces to generate standing waves. AR's speakers are now up to number 18, and their new stands are black finish welded steel at \$40 a pair.

Nakamichi (along with Philips) seems to have one of the most complete product lines around, making virtually everything in the chain, from microphones to headphones and loudspeakers. They were showing the usual, plus their speaker, 1000 II cassette system, and new Black Box series: subsonic filter, line amp, bridging adaptor (stereo to mono for their 420 and 620 amps), moving

coil booster amp, electronic crossover, and microphone mixer, of which up to six can be powered by another Black Box, the power supply. Even though I made it clear that their equipment was out of my price range for the foreseeable future, they went out of their way to hunt up a special packet of technical brochures and even gave me one on their Sound Research Center, with the usual beautiful photography and the picture captions all in Japanese. They assured me that they no longer make Nakamichi cassette tape mechanisms for sale under any other name. The tech bulletins are on the 550, IM suppression in the 600, playback equalization, their EX U tape, ferrite vs. other heads, their amp, and their preamp.

Revox were showing their new turntable, direct drive with a straight-line tracking servo arm accepting any standard half-inch mount cartridge and having a four-digit LED speed readout. It should be out next spring and list for \$650 to \$700.

Cerwin-Vega, having established their reputation for loud, were playing tame this time. Their new S-1 model lists for \$350 each.

Phase Linear's speaker has been all changed on the inside. While I was there, they blew a 4-Amp fuse in one of the speaker lines.

Controphase Systems, a new New Jersey company, makes speaker systems designed by Analogue Systems, Inc. (of N. J.), with drivers made in Japan. These are intended to be better than the usual house brand or brand X types. It was refreshing to meet someone with the candor to admit the product is not trying to be the world's best or state of the art. You can pick them up at the Budd Lake factory for \$179, \$289, and \$359 a pair, plus 5% sales tax, or for not much more from stores handling the line. The bass commodes are acoustic suspension types, with glass wool stuffing. Their midrange and tweeter units are in a separate box. Hopefully they are not turkeys. Analogue Systems' own line will be \$100, \$160, and \$180 each, all acoustic suspension types, and also bass reflex, horn, and mixed systems for \$100, \$160, \$280, and \$400 each. Analogue's new \$79 headphone should be in the stores after the show, and their new speakers should be out in June.

Shahinian Acoustics were showing their rather diminutive Obelisk speakers, which were playing surprisingly loudly and with a lot of bass. They have a grille-cloth top in a low pyramidal peak, housing a four-foot transmission line with an 8-inch woofer and a 10-inch passive radiator.

KEF were showing their line of three speaker systems, and their drivers were in the enclosures of other makes as well.

Inter-EGO Systems has three speakers and a slogan: "The sound is alive inside you." They were playing loud enough to make sure you would experience this.

Audio Technica's Signet Division has a variety of special cantilever materials for spherical, elliptical, and Shibata diamonds, available in very limited quantities on special order. Besides the usual aluminum (including a 2.5 mil for 78 rpm), they have carbon fiber, beryllium, and titanium.

Spectro-Acoustics were showing their "straight line" preamp, model 217.

Avid had an interesting sheet on stacking their speakers, either a pair of 103's or a 102 and a 103.

SpeakerKit showed their varied line, which lets buyers build their own enclosures (plans are supplied with the drivers, or for fifty cents separately) or buy ready made. Two models use Electro-Voice drivers; the rest use Philips.

Translinear Designs Co., a Manhattan firm, showed their Model One, a tall transmission line using three KEF drivers and a piezo-electric tweeter, for \$800 each. The midrange is also transmission-line loaded.

Another Manhattan firm, KM/USA/Inc., is a new contender in the servo field, apparently

importing from Korn & Macway Labs in Brussels, Belgium. Write to them at Suite 1006, 575 Madison Avenue, New York, NY 10022 for a copy of Dr. Thadeus Korn's paper, "Acoustical Multi-Path Intermodulation and Binaural Hearing." Systems including amplifiers list from \$500 to \$1350.

Dynaco gave out red, white, and blue buttons saying "LET'S MAKE IT dynakit." In addition to their older electronics, they showed the BI-FET version of the PAT-5, the Stereo 416 + C-100 (Double Dyna), the Mark VI, and a number of new or revised speakers: the A-25 Mark II, D-20XL, A-30XL, the Laboratory Monitor Series (LMS) with five models, and Phase 3 series with three models.

Emanation Sound have six speaker systems in their line, of which four are considered residential and two commercial. One of each type is acoustic suspension; the rest are bass reflex types. List prices range from \$84 to \$650 each.

Ultralinear's loudspeaker line includes nine models, all having circuit breaker rather than fuse protection. They must be reset manually if tripped. Their top model is rather similar in outline to Dyna's Phase 3 series, with the top of the grille sloping rearward.

For the audiophile who has everything else, there were some things of interest in unexpected places. A discount coupon allowed a dollar off the price of a Decca record cleaning brush, which has the most sensuous bristles imaginable. Shure won't sell you one of their monogrammed director's chairs, but Avid will. What you read about as Soundwire in the third issue of Audio Forum is now called SoundCable, with twenty feet selling regularly for \$45 and twenty-eight feet for about \$53, from Polk Audio. This is specially stranded, in contrast to Fulton's, which is merely very thick, or Kenwood's, which is thick (possibly stranded) and very short (about three feet). All are for use between amplifier and loudspeaker. For interconnecting components other than amps and speakers, Verion Audio showed triaxial cables from \$30 (1 meter) to \$50 (3 meters). That's each, not a pair, including 1.5 and 2 meter lengths. Chalk up the price to the ten-year limited warranty, the longest I've ever heard of in this business. (Quintessence has, or had, a lifetime warranty. -- Ed.) Their literature had not a word on capacitance for cartridge matching (29 pF per foot. -- Ed.), but for \$2.50 they'll send you a technical brochure. Write them at 75 Haven Avenue, Mount Vernon, NY 10553.

Neosonic had two sizes of ten-inch high floor stands on spherical plastic casters, which would be very useful for raised, away-from-the-wall operation and at-the-wall storage. They hold up to 150 pounds and list for \$57.50 and \$65. Neosonic handles Lenco turntables and has small speakers using part of the old R-J enclosure design. Finally, Ster-a-mote has small wood boxes with colored square pushbuttons, working a black box by cable, to do more functions than you might have thought possible by remote control.

Last, but not least, my final stop was with another Roy, found unexpectedly at Harvey's room. I'd first met him two weeks before at their store. Mr. Cizek is a great admirer of the old AR sound, especially the early 2ax, but also the 1, 3, and 4, and tries to achieve it in his speakers. He also had reprints of his article from Audio Forum #3 on the effects of speaker wire and fuses on damping factor. We had another good chat about the old days.

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A BAS Test Report

Quality Hi-Fi on a Budget

David H. Whitney

My quest to achieve accurate reproduction of acoustic instruments on a student's budget has led me to incorporate the Leach power amplifier, preamplifier, and pre-preamplifier, the Rega Planar Z turntable, and the Supex SD-909 moving-coil cartridge into my system during the past year. I also use the Transline Sound Company's Compact II/sub-woofer speaker system (at \$311 in kit form, similar to, but significantly superior to the IM Fried H). The Leach electronics have been presented as construction projects in the February issues of Audio over the past three years. Both the amp (1976) and preamp (1977) have been updated several times.

I completed the amp and preamp at about the same time (June, 1977). Both projects were relatively easy to build (I am not a virtuoso with a soldering iron or a drill, but I have built speakers and several Dynakits). When finished, I had a preamp of DB-like dimensions and features, and a "functional" looking amp similar to a Dyna 150 in steady-state output capability.

The preamp is as quiet as a DB (I used metal-film resistors), has more than enough gain for any moving magnet cartridge, and, I think, sounds better than the phono section of my old Advent receiver (the lousy output section of the Advent preamp did not enter into this comparison). I am more confident of the superiority of the Leach power amp compared to my Dyna 150. After I had ceased swapping amps, my wife thought it would be a nice trick to do it once more without my knowledge. Assuming the Leach to be connected, I came home one evening and put on the Strauss Oboe Concerto in D (Philips) only to find Mr. Holliger's oboe to be vaguely out of focus and somewhat annoying. I went so far as to check my cartridge alignment before discovering the "problem." In a way, I was as surprised at my acuity as my wife. I am not immune to the Siren songs of Foster et al; I am forever in fear that I am chasing audio mirages.

In summary, I find the Leach preamp/power amp combination to be more detailed and less fatiguing than my old equipment, with the differences being most evident at the frequency extremes. The power amp has been reviewed by Audiogram, which found it to be "a contender for top honors."

For a long time, I have felt the turntable/arm/cartridge/preamp system to be the most difficult area for the audiophile on a budget to handle. Regardless of the relative merits of a moving coil vis-a-vis a properly loaded moving magnet, I have often wished I could afford to finesse the problem of optimal loading by purchasing a moving coil and a pre-preamp with foolproof input and output impedances. (The Micro-Acoustics cartridges seem to be a move in the right direction, but their sound is such that I was not very sad when my 2002e was stolen.) My wish was granted with the appearance of the Japan Audio Trading Company and the Leach pre-preamp article. The latter strikes me as an incredibly ingenious device that provides about 25 dB of gain (varies inversely with cartridge impedance), very low noise, and no audible nasties that I have been able to detect. It was absolutely trivial to build and cost less than \$20!

The Japan Audio Trading Company (JAT) sells cartridges and tone arms direct from Japan. They are very fast, very cheap, and seem to be honest. I sent a \$112 draft to JAT to cover the cost of a Supex SD-909. Now, most of the items they list carry model numbers identical to those used in the U.S., but in this case, they noted that the 909 was identical to the U.S. 900E Super. However when the cartridge arrived (in nine days), they enclosed a new price list, which, aside from higher prices, stated that the 909 was a deluxe version of the 900E Super, with a metal body. Metal it was, and the frequency plot enclosed was admirably flat. Whether the cartridge is truly a deluxe version I won't know until I find someone who can translate the brochure. In any case, I found the sound to be cleaner and more detailed than that of any of my old moving fields

(ADC VLM, XLMI/II, Promethean). If you are interested in getting an exotic Japanese cartridge or tone arm, check these guys out (sample at-your-doorstep prices: Denon 103C, \$83; Entre-1, \$122; Dynavector tone arm, \$248).

The main reasons I had for buying the Supex were that I had heard it and liked it, that many British reviewers hold it in high esteem, and, finally, that the importer of Rega turntables had told me that the designers optimized the tables for use with the Supex and the Coral 777 cartridges (this latter being another Japanese moving coil highly regarded in Britain, but not as yet imported into this country, now available from JAP for \$80). When first assembled, I was extremely pleased with my Marantz 6300/Formula 4/ADC XLM record playing combination (shortly following the appearance of the Formula 4 in [Audio](#) classifieds). But, even as I read the accolades heaped on the Formula 4 thereafter, I became increasingly vexed with the fussiness of the arm, its poor inner-groove tracking ability, and the mounting evidence of the sonic inferiority of most direct-drive turntables. I wanted out, but could see nothing on the horizon that my system could be traded-in on for about even money. Then, in about the space of two weeks, I saw three references to the British Rega Planar tables as being top-quality, low-priced units. [Hi-Fi News & Record Review](#) and [Hi-Fi Answers](#) (U.K.) and [Audiogram](#) (U.S.) all characterized them as being the "next-best-thing to the Linn/Grace 707."

There are two tables in the Rega line, both available with or without arm. They are essentially similar, with the Rega Planar 3 having subtle (sonically and physically) refinements, including a heavier base and platter and tweaked platter and arm bearings, that separate it from the Planar 2. Prices at the time I ordered mine in February, were \$225 with arm, \$180 without for the 2 and \$315 with arm, \$240 without for the 3. I chose the 2 with arm and was possibly the last person to get it at the bargain price of \$225, as all models were scheduled for an immediate 25% increase (a local dealer might still have some at old prices).

The Planar 2 consists of a modified Acos-Lustre arm (a nicely finished Japanese unit with magnetic anti-skate, smooth cueing, and effective mass less than that of, say, a Stax, but not really low -- a good match for the Supex and Coral which are of medium to low compliance) rigidly mounted to a slim wood base. The base, in turn, is rigidly coupled to the platter bearing and the glass platter. This system is isolated from the motor by a belt and "rubber bands," and from the room by the base's feet.

Aside from changes in speakers, the insertion of this table into my system (using any cartridge I've tried, but especially with the Supex) made the most dramatic change in sound I've observed in my home. This was the case even though the old turntable was in a room separate from the speakers and the Rega was not. The sound has greater impact and more detail and is more revealing of certain program material characteristics (location of mikes in particular). Tracking with all tested cartridges is excellent (the Supex easily conquers the Shure record), and fatigue is markedly reduced. The only flaw I've noticed is that some solo instruments seem subtly less solid in their localization. (I wasn't very confident of this effect until I tried the Liszt Hungarian Rhapsodies recommended by Scott Kent. Arm damping?) As a bonus to this improvement on almost all fronts, it is also a visual standout -- rather understated oak-on-black, with the slim proportions the Danes have brought back in vogue.

If any of the above components interests you, read on for sources.

Leach Components: A commercial version of the power amp is available for about \$450 (see [Audio](#) classifieds; a local high-end shop sells it for \$585). It should be similar to mine, though probably suffering somewhat from the addition of output protection circuitry and the absence of my power supply mods (bigger electrolytics, tantalum bypass caps). A new set of circuit boards will soon be advertised in [Audio](#) by Components (P.O. Box 33193, Decatur, GA 30033). They will offer the potential for higher output (125 Watts) and a more sophisticated input stage. I intend to build two Leach amps with these using independent power supplies for each of the four channels. (Anyone out there interested in my current version for \$300?) These should cost about \$200 for the pair.

Components also offers the latest word on circuit changes, circuit boards (\$5 each), and matched pairs of transistors (\$1.50/pair) for the pre-preamp and preamp, as well as pre-wired circuit boards for the preamp (\$25 to \$35) and a kit for the pre-preamp (\$70). I regard the cir-

cuit boards, the transistors, and the pre-wired power supply board for the preamp as bargains. Using these, you can easily build the preamp and pre-preamp for less than \$100.

Quality parts for the projects are easily obtainable from parts dealers who advertise in Audio Amateur and Audio (see especially Delta, Meeshna, and Digi-Key). The exceptions to this rule are the transistors used in the pre-driver, driver, and output stages of the power amp. You won't find these in surplus catalogues. Perhaps the best bet for getting them is to order all of them from Newark Electronics in Chicago. This place is expensive, they aren't thrilled with small orders, but they are fast.

Cartridges and Tone Arms: Japan Audio Trading Company, No. 210, Saekaen Bldg., 4-33-21, Kamineguro, Meguro-Ku, Tokyo.

Rega Turntables: Impex (U. S. importer), 34 N. Gore Avenue, St. Louis, MO 63119.