

THE B.A.S.

The Boston Audio Society
P.O. Box 7
Boston, Mass. 02215

SPEAKER

December
1972

The B.A.S. does not endorse or criticize any product, dealer, or service. Opinions expressed herein reflect the views of their authors and are for the information of members.

November meeting. The next meeting of the B.A.S. will be Sunday, November 19 at 5:30 p.m. in room 314 of the George Sherman Union at BU, 775 Commonwealth Ave. (Enter by the basement entrance--on either the Commonwealth Avenue side or the Storrow Drive side of the building--and use the elevator at the rear of the basement corridor to reach the third floor.)

Unfortunately Roy Allison of Acoustic Research, Inc., will not be able to speak at the November meeting due to the press of his work. However, Victor Campos of KLH Research and Development Corp. has agreed to be the featured lecturer. This will give us all an opportunity to ask the questions we couldn't ask because we kept getting a busy signal at WBUR.

Tape Recorder Clinic -- December 3, 1972. Those of us blessed or cursed with open reel and cassette tape recorders are invited to attend a clinic to be held, Sunday December 3 at 1:30 p.m. in Room 314 of the George Sherman Union at BU.

The organizers hope to be able to give each member a measure of the frequency response, channel uniformity, signal to noise ratio, and wow characteristics of his machine. Obviously some of these tests are more appropriate to open reel than to cassette machines. Simply because the open reel machines are easier to test, they may be tested more thoroughly.

Each machine will be tested using the tape with which it is commonly operated (bring your own tape) at the speed normally used, with the eventual data running something like this: 1) cleaning and demagnetization (it is hoped that if your machine is in truly foul condition, you will have it professionally cleaned--the cleaning and demagnetization procedure could prove a bottleneck); 2) head alignment; 3) record/playback frequency response from high level inputs; 4) signal to noise ratio measurement (this is a possibility and depends on acquisition of appropriately sensitive instrumentation); 5) timing accuracy; 6) wow and possibly flutter.

By day's end, the volunteers should be very tired and the members totally dissatisfied with their tape equipment. Bear in mind that the tests to be made are not up to the quality of the National Bureau of Standards, or even -- heaven forbid -- the Institute of High Fidelity. What the clinic is designed to do is to spot existing problems so that members can have their machines professionally serviced, and in rare occasions, alleviate the anxiety of members who have machines that really are working properly.

Executive Committee Report

A Library for the B.A.S.? Inasmuch as the Society now has both members and a small bank account, the Executive Committee met and laid the groundwork for spending some of the funds in service of the membership. Perhaps top on the list of proposed services would be a library of books, magazines, owners' and/or service manuals, and other printed matter. Several members have files of magazines dating well back into the 1950's - some to the original issues of High Fidelity, and what is now Stereo Review -- and they have tentatively offered to make these available on a lending basis to members of the Society.

Owners' and service manuals would be of aid to B.A.S. members thinking of purchasing equipment. Since the list of owned equipment among the membership is broad, the B.A.S. should be able to give its members a chance to become much more familiar with the peculiarities of components before purchase through loan of such material. And of course, the technically inclined could profit in the dollars and cents sense from availability of service manuals.

The list of books in the library is an open question. Professional parts catalogs are a possibility. Volumes dealing with the basics of audio as well as more advanced material like the Audio Cyclopedia, and perhaps even some reprints of publications of the Audio Engineering Society could be placed in the library if the membership desires.

The Executive Committee would appreciate each member bringing in writing, to the forthcoming meeting a rough list, or at least a statement of preferences so that the B.A.S. can get the library underway.

It should be added that the Executive Committee is also thinking hard about a library of sound. This could be as small as a set of test records, or as large as 4 set of high quality recordings donated by members or perhaps purchased by the B.A.S. out of its limited funds.

One interesting benefit of such a library would be the potential availability of dubs of records now out of circulation. There are many fine performances now withdrawn which could be transferred to tape, and thus rejuvenated at least within our membership.

If there is enough interest in the idea, a special group could be formed to handle the audio library. There would, of course, be need for tape and disc storage space, but even more importantly, a high quality dubbing system -- a good cartridge with appropriate styli, a high quality phono preamp, and a tape recording capability which should include both two and four-track open reel machines of high quality as well as a top grade cassette machine such as the Advent 201A. Obviously all this equipment would not have to be the property of a single member, but would be the property of the various committee members.

Development of the library should be a topic for discussion at the forthcoming meeting. Some volunteers should be forthcoming too....

Should the Society become a backer of the Boston Symphony Orchestra? Since the B.A.S. has its foundation in the enjoyment of good music, well performed, the Executive Committee would like the membership to consider the B.A.S. offering a contribution to the Boston Symphony Orchestra. The BSO is, after all, at the hub of the musical life of Boston, and an organization founded because of a love of music should appropriately contribute to it. The Friends of the Boston Symphony Orchestra is now rather far along in its drive for funds, and the Executive Committee feels their effort is worthy of the attention of the B.A.S.

Consider whether the Society should contribute at all, and if you agree with your Executive Committee, consider the following amounts:

Contributor	\$15 or more
Donor	\$50 or more
Sponsor	\$100 or more

While the level of Sponsor may be too great for the B.A.S. treasury at present, the Executive Committee would like the membership to consider seriously some form of contribution.

Reports and Reviews

October meeting. About 50 members attended the meeting on Oct. 15. The British demo record "What is Good Recorded Sound?" was delivered to those who had ordered it. A copy was reserved for the B.A.S. library for loan to members.

An experiment was conducted to demonstrate the effect of circuit capacitance on the high-frequency response of phono cartridges. With a Shure M91E (note: all Shure cartridges respond similarly to cable capacitance), an effect due to switching from 250 to 500 pf was audible, especially on the female singing voice. With the ADC VU-1 (and the XLM would be the same), no difference was heard, indicating that Audio magazine was incorrect in concluding that its response deteriorates with capacitances above 200 pf. Bill Shelton has found that adding 6 feet of cable to his phono leads (thus adding 180 pf) clearly improved the sound of the Shure Supertrack. Since the meeting, Dennis Boyer and Alan Pike have also added 6-foot cables to their Shure Supertrack and M91E cartridges, and report that the resulting sound is more open and natural with better definition and smoother highs. On the other hand, the B&O SP-12 is known to sound best with relatively low capacitance.

Andrew Petite of Advent gave an illuminating talk on microphones. He defined performance goals of mikes for consumer use as follows. A mike should (1) capture the entire range of music (implicit in this is wide and smooth frequency response with low distortion); (2) be rugged, reliable, and consistent from unit to unit; (3) be versatile (usable with success in a wide variety of recording situations); (4) be inexpensive.

Requirement (3) relates primarily to the directivity pattern of the mike. When recording music in the presence of an audience, a directive (cardioid) mike is wanted to capture the music and reject audience noise. Many cheap cardioids, however, are directive only at middle and high frequencies and become omni-directional in the bass; uniform directivity at all frequencies is preferable.

The electret condenser mikes which have lately become available at \$10 to \$100 each can do very nicely with items (1) and (4) but cannot be counted on to fulfill (2) satisfactorily. There is sometimes unit-to-unit variability, occasional loss of electret charge with time, and greater susceptibility to damage from careless handling than dynamic mikes. Also the preamp built into all condenser mikes may limit the dynamic range (though not all preamps do).

These considerations have led Advent to market dynamic cardioid mikes made by Boyer in Germany, sold as matched pairs for stereo use at \$90/pair.

Andy also discussed the value of balanced mike lines (using three-conductor cable: signal hot, signal ground, shield) rather than the unbalanced lines commonly found in consumer equipment (simple shielded cable with the signal hot lead in the center and with the cable shield carrying the signal ground path). Unbalanced lines are much more susceptible to hum pickup and radio interference.

Andy's demonstration, with live recordings of Bach cantatas, showed the desirability of placing the mikes fairly close to the performers (under 10 feet) in a "live" environment. The dramatic change in sound character caused by a change of a few feet in mike placement was obvious. The excellent results obtainable with an "X-Y" array (mikes mounted together, angled toward each other with noses almost touching) were evident. Perhaps the most impressive facet of the demonstration was the impression that with the compact and convenient Advent 201 cassette deck plus Advent mikes and preamp, at a total cost of under \$400, one can make recordings competitive with the best records (at least on soloists and small ensembles).

Recording seminar. On Oct. 14 nine members of the B.A.S. participated in an interesting seminar on live recording techniques at the newly refurbished B.U. SFA concert hall, which has rather "live" acoustics in the absence of an audience. Al Southwick brought an impressively professional portable (barely!) studio, including Dolby type A. Laurie Cote played the Steinway, and baritone Dennis Boyer sang and played guitar. We experimented with a wide range of mike placements, spacings, and aimings. It was illuminating to see how much the sound can be varied by moving the mikes, and also to see how easily the deficiencies of many commercial records (such as dull or brittle piano tone) can be imitated by poor mike placement. Lest you be discouraged, the converse of that is how delightful it is to find that with a consumer-grade recorder and a pair of inexpensive mikes (\$10 to \$70 each), you can easily make live recordings which equal or surpass many commercial records -- at least on soloists and small ensembles.

Mike setups were also soon to involve subjective preference (which is a major cause of the differences among commercial records). Those of us who hear pianos mainly at concerts preferred relatively distant mike-placement to get a piano sound surrounded by a frame of hall ambience, while those accustomed to hearing pianos in their own living rooms preferred very close placement to pick up only the piano sound uncontaminated by hall echo.

Following are some accumulated hints on live recording. Since live sound has greater peak-to-average ratio than records or broadcasts, use your fastest tape speed and the lowest-noise tape that your machine is biased for. Use a lower average recording level than you usually do in order to leave headroom for the uncompressed peaks. Tape hiss may then be

more obtrusive; a recorder which has adequate dynamic range for records and broadcasts, may need help from a Dolby or DBX on uncompressed live sound (unless your hiss is due to a noisy mike preamp, a common problem). If recording in an empty hall or studio, either cardioid or omni-directional mikes are suitable; some folks feel that omnis sound more natural on a greater variety of sounds. But in the presence of an audience, cardioids are essential. The best way to optimize mike placement is by trial and error before the performance. A performer-to-mike distance of 1/20 the length of the room or hall is a good trial distance. In an unfamiliar hall, it's better to be too close rather than too far away, so that you at least capture the music rather than echoes and audience. With small ensembles a very convenient technique that gives fine results (especially with ambience recovery in playback) is to mount two cardioid mikes on one stand (less work!), angled toward each other with their noses almost touching.

If you haven't done live recording, try it! You'll like it.

A.R. Tour. On Wednesday morning, October 18, at 9:00 a.m., a group of hardy, dedicated B.A.S. members gathered at 24 Thorndike Street, Cambridge, for a tour of the AR factory.

The tour began with the speaker division -- sub-assembly to finished product. Rather than taking a bunch of speakers and cramming them into a box and testing the end result to see if it makes a noise, AR tests each driver several times before it gets to the cabinet. The assembled speaker is then tested with electronic equipment and by ear before packaging.

The electronics division was just as impressive, with two quality control stations for the assembled amplifiers, tuners and receivers. In the turntable division, the drive belt is hand fitted for each particular unit to insure maximum performance. The tone arms are rack mounted, and the damping carefully checked for uniformity and defects by means of a revolving rod which pushes the arms up and allows them to fall freely.

At the end of the tour we met Roy Allison in a listening room where he demonstrated four speakers that AR considers representative in their price classes. They were the AR3a, the AR6, the AR7, and the AR LST. Everyone was particularly impressed with the outstanding performance of the LST and the AR7, the highest and lowest priced speakers in the AR line. We all wish to thank AR and Roy Allison for an interesting and informative tour.

Gluttony? I'm sure we all recall the fine old English woodcuts which would steer us far from the dangerous path of gluttony -- that way lie excess acidity, fat, and gout. Unfortunately, the kitty -- conveniently placed near the goodies to receive your freewill donations -- is starving. The effect of an underfed kitty is to slowly, or not so slowly, depending on how quickly the Society and the average member's hunger quotient grow, erode the treasury. We could literally eat ourselves out of a Society unless members start putting in enough money to offset what they carry away in their stomachs.

So far everybody has trusted everyone else for two meetings and we may soon have a dead cat on our hands. So don't forget to contribute your "fair share."

Recommended records. Following we continue publishing the brief lists of records notable for outstanding performance or sound (or both) as recommended by members.

Richard Akell (Topnotch sound and performance in each of these)
Bartok: Concerto for Orchestra. Leinsdorf, Boston Sym. RCA LSC 2643.
Rachmaninoff: Piano Concerto #2. Paganini Rhapsody. Anievas, Atzman, New Philharmonia Orch. Seraphim 60091.
Prokofiev: Sym.#5. von Karajan, Berlin Philharmonic. DGG 139040.
Beethoven: Egmont incidental music: Szell, Vienna Phil. London CS 6675.
Handel: Concerti Grossi Op-3- Murriner, St. Martin's Acad. 2-Argo ZRG5400.
Kodaly: Hary Janos/Prokofiev: Lt. Kije. Szell, Cleveland Orch. Col. 7408.

Cammann Newberry

Bizet-Shchedrin: "Carmen" ballet. Rozhdestvensky, Bolshoi Theater Orch. Melodiya-Angel SR 40067.
Copland: Rodeo, Billy the Kid. Johanos, Dallas Sym. Turnabout 34169.
Brahms: Clarinet Quintet in b. Amadeus Quartet. DGG 139354.
Gershwin: Piano Con, in F, Rhapsody in Blue, Haas, de Waart, Monte Carlo Opera Orch., Philips SAL 6500 118.
"My Favorite Encores," Van Cliburn. RCA LSC 3185.
"Puccini Spectacular - Opera for Orchestra," Camerata, Kingsway Symphony Orchestra. London Phase 4 SPC 21019.

Anonymous (Good ambience recovery with each of these)

Bartok: String Quartets. Juilliard Qt. 3-Col. D35-717 or 3-Col. M31196/98.
Janacek: Sinfonietta, Taras Bulba. Kubelik, Bavarian Radio Orch. DG 2530075.
Mahler: Symphony #1. Horenstein, London Sym. Nonesuch 71240.
Monteverdi: II Combattimento di Tancredi a Clorinda, Kehr, Mainz Chamber Orch. Turnabout 34018.

Anonymous

Beethoven: Piano Con. #5. Giesecking, Galliera, Philharmonia. Seraphim 60069.
Beethoven: 5 Cello & Piano Sonatas, Starker, Sebok. MHS 596/597.
Gilles: Te Deum. Musical Heritage Society MHS 554.
Mozart: String Quintets. Graf, Heutling Quartet, 3-Seraphim 6028.
Orff: Carmina Burana, Ozawa, Boston Sym, RCA LSC 3161.

Anonymous

Bach: Brandenburg Concertos. Murriner, St. Martin's Acad. 2-Phil. 6998002.
Stravinsky: Pulcinella Suite, Apollo. Murriner, St. Martin's. Argo ZRG 575.
Berlioz: Requiem. Davis, London Symphony. 2-Philips 6700 019.
Beethoven: Mass in C. Kegel, Leipzig Gewandhaus. Telefunken S-22512.
Brahms: Double Concerto. DGG 138753 (discontinued).
Manuel Cano: "Flamenco Themes in Concert." Musical Heritage MHS 1191.

William Shelton

Bach: Passacaglia & Fugue in c, Toccata & Fugue in d, Toccata & Fugue in F, etc. Wunderlich, Nonesuch 71252 (Masterworks for Organ Vol. 9).
John Coltrane: "Giant Steps." Atlantic 1311.
Charlie Parker and Dizzy Gillespie: "Bird and Diz." Verve 68006.
Freddy Hubbard: "Red Clay," CTI 6001.
Beatles: "Sgt. Pepper's Lonely Hearts Club Band." Capitol SMAS 2653.
Eric Dolphy: "Eric Dolphy." 2-Prestige 24008.

Equipment listings:

Included is the first monthly list of audio and test equipment for sale by members of the Society. While all transactions will be conducted between the members, the Society is offering this space in the newsletter as a convenience -- What you see is what you get, therefore take a good look, because the Society's precarious finances will not allow it to assume any liability in these dealings. (That is a pro forma disclaimer; actually we expect B.A.S. members to be quite honest about these matters -- although most of us are Yankees...)

Members with equipment to sell should list it with the Society by writing to the B.A.S. at Post Office Box 7, Kenmore Square Station, Boston 02215. This wishing to buy equipment should see Joel Sandberg at the B.A.S. meetings or call him (244-2357). He has undertaken to manage this enterprise on a volunteer basis and deserves a vote of thanks.

ADC 26 cartridge, almost new.
Dual 1218 turntable, brand new never used.
Dual 1209 turntable with base & cover.
Dual 1019 turntable.
Garrard SL 95 turntable with base.
Garrard SL 95B turntable with base.
P.E. 2020 turntable with base.
P.E. turntable with Telefunken nameplate (model uncertain).
Uher 7000D tape deck, brand new with warranty card.
Uher Variocord 63 tape recorder, brand new with warranty card.
Ampex 122 tape deck.
Ampex micro 32 cassette recorder with am-fm radio.
Tektronix 317 oscilloscope.
RCA professional ribbon mike on Atlas stand, boom and casters.
Many Sony and Marantz service manuals.
Rectilinear 3 speakers, one pair.

Publications of the Boston Audio Society

It shall be the ongoing policy of the B.A.S. to provide its members with papers on topics of interest to the membership; one of these is enclosed with this issue of the newsletter. While the topics will be widely varied, ranging from record quality, through detailed papers on music appreciation, psychoacoustics, and the psychiatric aspects of audio, all will be presented in laymen's terms and will hopefully form a valuable file of information for B.A.S. members. We encourage you to contribute both topics and papers of your own where you feel qualified. The Executive Committee will act as a editorial review board for these publications and feels that they eventually could become a collection worth far more than the membership fee.

RECORDINGS: HOW HI THE FI ?

Peter W. Mitchell

Record review magazines are popular with people who want answers to two questions about a new record before they buy it: (1) what is its musical quality? and (2) what is its sonic quality? This article is about how the second of these questions is answered.

Actually, as our playback systems improve and as we gain experience with both live and recorded musical sound, it becomes annoyingly evident that most record reviews do not provide reliable (or, indeed, any useful) guidance to the technical quality of recordings. The members of the B.A.S, can meet that problem by relying upon each other - and especially upon those of us with extensive collections -- for recommendations. But for this to be useful we should establish mutually-understood evaluation criteria.

How, then, would the ideal record critics among us evaluate the sonic quality of a recording? We would ask ourselves whether the recording, played through a wide-range low-distortion system, presents a sonic image similar to that which might be heard at some location in a concert hall* with decent acoustics. In other words, can a listener, who has attended enough concerts to be familiar with the sound of live music in various acoustical environments, close his eyes and reasonably imagine himself somewhere with real musicians? To put it most succinctly, does the recording successfully create the illusion of listening through the playback system to live music? Or is there something distinctly unreal about the sound, so that it sounds like a record rather than like musicians? In this regard, check for five specific requirements; "canned" sound is usually associated with a failure in one or more of these five areas.

(1) Wide and uniform frequency response. Common failures in this area include: thin bass, so that the orchestra lacks a solid foundation; peaked highs, which lend a hard steely edge to violins and voice; boomy midbass hiding a lack of true deep bass (which should extend down to the partially felt sounds of double basses, organ pedal, and bass drum): emphasized ("forward") midrange, which robs the cello of its warmth and causes the human voice to be unnaturally projected toward the listener. Most recordings suffer from one or more of these defects, and some records are afflicted with all of them. The most common failure is peaky treble combined with rolled-off deep bass.

One good way to learn to recognize peaked highs is to buy a ticket to a live concert by a good orchestra in a good hall, then close your eyes and concentrate on the violin sound. When a passage comes along featuring the violins in the middle of their range without too much sonic interference from other instruments, just try to imagine

*(or in the appropriate acoustical environment, in the case of non-symphonic music)

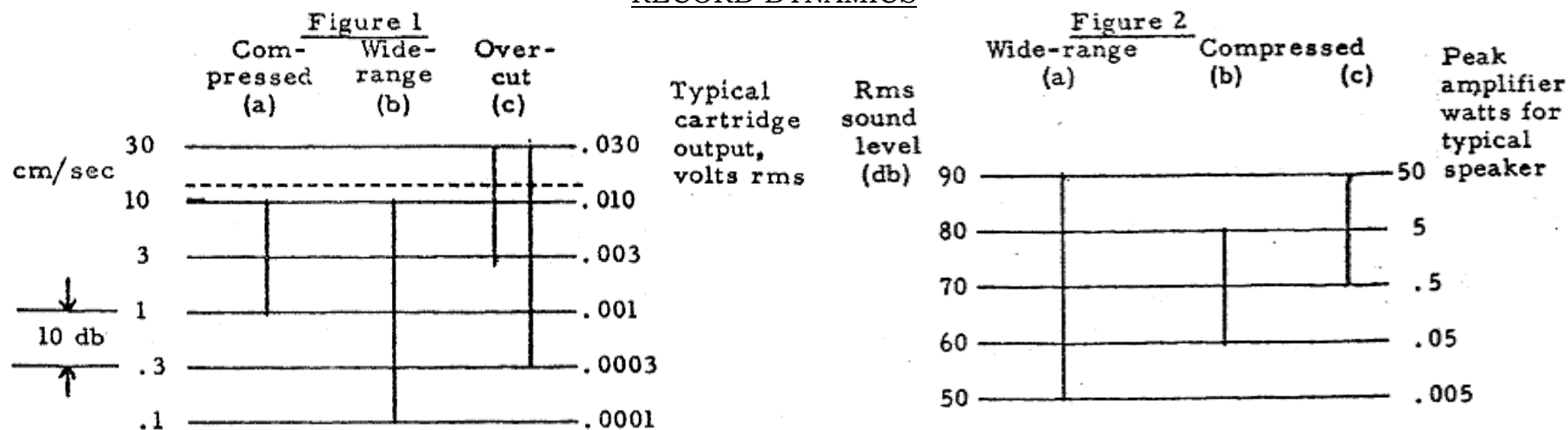
that sound coming out of your speakers at home. It is a depressing experience, and one which fixes the sound of live violins in the mind for a while. Rolled-off bass is also easy to recognize: in many recordings, cellos and double basses become thinner and weaker as they play a descending scale of notes, but in real life properly played cellos and bass fiddles gain in body and resonance as they go down the scale. When a reviewer describes a record as having "brilliant" or "bright" sound, this is often a tip-off to peaked-up treble. In such a recording violins will sound steel-stringed rather than resinous and trumpet sound will have a hard-edged clarity which a real-life trumpet does not normally have.

(2) True dynamic range. Ideally the recording should transmit the full dynamic (soft-loud) range of the music. In fact some compromise is necessary on large-scale orchestral works, but not on chamber music or small-scale symphonies. Since most recordings and radio broadcasts undergo severe compression of dynamic range, such compression may not readily be recognized by listeners unaccustomed to the range of live music. Often we hear recordings which, despite good frequency response, a good stereo image, and so forth, still sound "canned" rather than real. Commonly the reason is that the dynamic range has been so compressed that everything comes through at about the same loudness level, and apparently we subconsciously recognize the artificiality of a solo oboe or cello sounding as loud as the full orchestral forte. Unfortunately there are strong commercial motivations for dynamic compression: compressed recordings are easier to manufacture, they sell better because they sound better on mediocre phonographs, and they sound better to people who want background music rather than concert-hall realism. See the box on the next page for further discussion of dynamics.

(3) Low distortion. Low distortion equals clear and "transparent" sound, the sense of hearing through the playback system. The subtler forms of distortion often cause a loss of clarity without producing obviously "distorted" sound. One reason many companies make recordings with peaked-up treble is to recover artificially the sense of clarity in the sound which is lost through distortion. Of course the better thing to do is to minimize the distortion at its source. A principal cause of recorded distortion is the common practice of making records and tapes from third- or fourth-generation copies instead of from the original master tape: every copying step adds distortion and noise. Use of the Dolby system helps, but minimizing the number of copying and editing processes helps more.

In addition to recorded distortion we must consider playback distortion. The primary problem with records is mistracking, the inability of the stylus to remain in good contact with the wildly undulating groove. Severe mistracking usually sounds like harshness or fuzziness in loud passages. Of course the amount and seriousness of mistracking depend on the quality of the cartridge, but in judging a record we must ask whether it contains groove modulation levels

RECORD DYNAMICS



Figures 1a and 1b indicate the groove modulation velocity range (in cm/sec) for two recordings, one of 20db (compressed) dynamic range and one of 40db (natural) range. The maximum modulation on both discs is set by the low-distortion tracking capabilities of current phono cartridges, indicated by the dotted line. On the wide range disc a pianissimo passage is so low a signal (a ten-thousandth of a volt) that it competes with surface noise, tape hiss, turntable rumble, and amplifier hum and noise. So the maker of the wide-range record must devote extra attention to careful disc pressing, and the buyer of the record must have a quiet room, a rumble-free turntable, and an amp with high gain and high signal-to-noise ratio if he is to hear the faint portions of the music clearly. To give records a better apparent S/N ratio, some manufacturers raise the overall modulation level as in Fig. 1c, but most cartridges cannot play such records without mistracking--which adds distortion and wear.

Figures 2a and 2b illustrate the playback of wide-range and compressed recordings assuming that the volume control is set to obtain the same average loudness level of 70 db.* With the compressed recording (2b) the peaks are weak, without impact; all the music comes through at about the same loudness. If both records are played with the volume control set for the same peak level (Figs 2a and 2c), then on the compressed record the peaks sound OK but the pianissimi are unnaturally loud. So natural dynamic range is an important part of the difference between canned sound and realistic musical reproduction. A good dynamic range expander, to compensate for the compression of most records and broadcasts, is a valuable playback system element.

* The background ("quiet") noise level in the average home is 30 to 40 db; a level of 130 db is painful; and the loudest orchestral climaxes have rms levels of 90-110 db depending on the music, the concert hall, and the hearer's location. A soft musical passage is typically about 50 db sound level, so the loud/soft range of a symphony is typically 100db - 50db, or 50 db. But with momentary peak levels of 110 db and a background level of 35 db in the hall, a total sonic dynamic range of 75 db may be involved in the experience of a symphony.

which will induce mistracking with most of the better cartridges. If so, peaks will sound strained rather than impressive, and the music will be annoying (or, in subtler cases, wearying). The practice of peaking up the treble exacerbates this problem since the high-frequency wiggles are hardest for the stylus to follow. In the case of prerecorded tapes, overmodulation causes high-frequency saturation, resulting in a dense sound on peaks.

(4) Low noise and mechanical defects. Music sounds canned rather than real if accompanied by hiss, hum, surface noise, recording lathe rumble, etc. Of course the desire for a high signal-to-noise ratio conflicts with the desire for low distortion and wide dynamic range: the point is that the lower the noise level is, the wider the dynamic range can be without involving overmodulation. In rating recordings we praise those makers who solve this conflict best: they who have the least noise and do not overmodulate. Under this heading consider also physical defects: wow and flutter inherent in the disc or tape; warpage, pops, ticks and scratches; pre-echo and post-echo; in cassettes, the quality of tape and cassette used. Use of Dolby noise reduction is also important.

(5) Good stereo imagery. The criteria discussed above apply to all recordings and do not involve subjective preference very much. But concerning the spatial image presented by a recording, there are two preferential tendencies: naturalistic and manipulative,

As indicated in the opening paragraphs of this article, a naturalistic record attempts to create an image which will make it seem that the listener is hearing live musicians in a real hall. Some specific things to look for in such a recording are a subtle sense of "air" around the performers, a sense of the acoustical character of the hall, and an appropriate sense of the breadth, depth, and location of the instruments or ensemble. If the apparent sound source is close-up (as for a listener seated at the front of the audience), then the stereo image should be wide, well-focused with individual performers firmly localized, without a hole in the middle, and with some sense of stage depth. If the miking is relatively distant (simulating a listener farther back in the hall or in a balcony), then the stereo image should have less left-right separation but a strong sense of the depth and acoustical character of the hall, and the orchestral sound should be cohesive and well-blended, not sounding like a disparate collection of individual instruments. If the recording has good spatial imagery it will create the illusion that the walls of your listening room have moved away or disappeared; the musicians will appear to fill the space between and beyond the front speakers in the case of close miking and will appear to be situated well beyond the speakers with distant miking. Simple ambience recovery circuits are particularly effective with naturalistically miked recordings. Four channel recordings, if naturalistic, will have hall ambience in the rear channels, not half of the orchestra.

In recording chamber music the producer may reasonably try to place the performers in your listening room rather than transport you to the concert hall. In this case the sense of spaciousness around the sound and the pickup of hall resonance are

minimized. (Mono is relatively successful with chamber music.) In playback a soloist or small ensemble should appear sufficiently well-focused between the speakers that you could close your eyes and point at the performers with no difficulty; they may appear close-up (slightly nearer than the speakers) or moderately distant (perhaps twice as far away as the speakers). Chamber musicians should not be miked so distantly that they appear to be playing alone in a huge empty hall. Nor should they be miked so close-up that the music is dominated by gut-scraping or instrument mechanical noises.

The manipulative tendency, particularly in recording large-scale works, is deliberately to sacrifice concert-hall realism in favor of, for example, using extra mikes to spotlight individual instrumental lines in complex passages, lines which might get lost in the sonic mass even in a live performance. Thus the record producer attempts to clarify the composer's intent in the context of a listening ambience not directly related to the concert hall.

This approach is a legitimate alternative to the naturalistic recording philosophy, but it makes judgment of a performance more complex since the record producer shares the interpretive responsibility of the conductor and performers. With a naturalistic recording one can make a fairly objective evaluation of the quality of the reproduction with respect to the criteria in the preceding pages. Then, having established the accuracy with which the recording transmits the sound of the performance, the critic can make a separate judgement of the musicality of the performance on the basis of the appropriate criteria (intonation, dynamics, tempos, rhythmic accuracy, instrumental balances, conformance to the score and to relevant performance practices, judgments of taste, and the critic's emotional response).

With a manipulated recording, on the other hand, the musicality of the performance depends to some extent on the producer's (engineer's) dial-twiddling as well as on the conductor's control of the orchestra. So an evaluation of the technical quality of such a recording involves an implied judgment of the musical taste the producer or engineer; the listener cannot determine whether an improper instrumental balance is the fault of the musicians, the conductor, or the recordist. In evaluating records and tapes, a manipulated recording is not downrated if the departures from naturalness serve the music well. It is a fact of musical life that in the present state of the art, some compositions benefit from some help in the recording process.

We have discussed recording as if it were purely naturalistic or entirely manipulated, but in fact the records on the market cover a continuous spectrum from simplest and most naturalistic to the most complex multi-track recording techniques. Most recordings fall between the two extremes, and there are excellent productions in both halves of the spectrum. For example, Turnabout's Dallas Symphony discs and most Philips, Telefunken, and Connoisseur Society recordings lean toward the naturalistic philosophy. Many London and Stereo Treasury classical records, as well as most pop and rock records, have benefited from electro-acoustical manipulation and make no pretense of representing concert-hall realism in the pure sense.

So there you have it: frequency response, dynamic range, distortion (transparency), noise and physical defects, spatial imagery. Most records fall down in at least one of these areas. Of the 15,000 classical records on the market, perhaps 1000 (under 10%) score high on all counts. Probably the percentage of excellent prerecorded tapes is similar, and in non-classical music the fraction is even smaller. But don't arbitrarily limit yourself to buying only recordings rated tops in sound; you would miss a great deal of beautiful music in superb performances. Many of my most treasured recordings would win no prizes for sound, but the performances are unequalled or the music is unique, so I would not part with them. Record ratings should be used as a guide in selecting purchases only when musical values do not dictate a unique choice. Which brings us back to the first question which record reviewers try to answer.

APPENDIX: PROPOSAL FOR A RATING SYSTEM

It would be valuable to include, in every listing of recommended recordings in the B.A.S. newsletter, a concise indication of both the excellence of the performance and the technical quality of the disc. I suggest that we adopt a ratings code based upon the system used by the British magazine Hi Fi News and Record Review. The categories may be defined as follows.

Performance

- 1* Outstanding! Definitive. (A rare commendation.)
- 1 Excellent; virtuosic where required, and communicates fully the composer's ideas.
- 2 Good; highly skilled, but perhaps not inspired.
- 3 Fair; competent but not inspired or virtuosic, or not fully in tune with the composer's intent.
- 4 Mediocre; lacking in major respects; musically incompetent (e.g., out of tune, rhythmically sloppy, stylistically wrong).

Sound:

- A* State-of-the-art; appropriate for showing off a top-notch playback system; revelatory.
- A Excellent; no significant deficiencies in any respect.
- B Good; average contemporary quality among current recordings; neither outstanding nor seriously deficient.
- C Adequate; not noteworthy for sound, but the recording doesn't seriously interfere with the music.
- D Poor; the recording significantly inhibits appreciation of the music.
- H Historic; recorded long ago, and the sound should be considered irrelevant in view of the performance.

In order to minimize the amount of arbitrary guesswork in assigning a sound rating, it is useful to separately rate the recording for its success in each of the five major areas described above: frequency response, dynamic range, distortion (transparency), noise and physical defects, spatial imagery. Then average the five ratings. Indeed where space permits it would be useful to list the entire five-part rating, as for example ACBAB/1, instead of the summary B/1.