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### The Cover

As befitted a first cover, Phil Geraci's photo this month is fraught with deep significance and symbolism.

Audio, like chess, is a challenging, stimulating and enjoyable pastime to those who've learned the ins and outs of the game. Those of you who know chess (as well as audio) may conceivably recognize specific chess men among the audio fiends on our chess board, and may even notice that this "game" is just getting under way.

As far as we're concerned, it is.

### As We See It

Don't Tell Your Friends!

We are always embarrassed and a little annoyed when a shopkeeper, rubbing his hands obsequiously, bids us tell all our friends about his little establishment. If we liked what he had to offer, we'd tell our friends anyway. If we didn't, we'd tell them not to patronize him, if the question should come up at all. But we have always felt that asking us to spread the good word was rather like asking a politician to vote for your favorite party. Your request won't make a whit of difference.

Now we find ourselves in the same position as the businessman of limited means, convinced that he has something of value to offer, but unable to afford the full-page advertisements in the Right Magazines to tell all about it.

Most of you who are now Stereophile subscribers received our announcement simply because your name was on a manufacturer's mailing list, and we thank you for your support. The response to our announcement was encouraging, but it was not so good as we thought it should be, considering that all the people we contacted were ones who have actually purchased high-fidelity components in recent years.

We know from our experience at the now-defunct Audiostream magazine that there are plenty of people who are seriously interested in high fidelity as a hobby. But it is evident either that our mailing list didn't include most of those people, or that many whom we contacted, would have been interested in the Stereophile, have just not gotten around to subscribing yet, either through human inertia or a wait-and-see-what-it-looks-like attitude.

Well, this is what it looks like. Heft it, notice the fine paper, try a page or two in a tossed salad if you wish. Read it, even. If you like it, we aren't going to ask you to tell your audio friends all about it; we know how it feels to have that sprung on us. Instead, we ask that you lend the thing around, so that anyone who might conceivably be interested in what we are trying to accomplish with The Stereophile can decide whether to subscribe.

There is a "rule" in publishing to the effect that one's readers should never be apprised as to the financial status of the publication. Business must always be Just Great. To ad-

mit otherwise is deemed negative thinking. Well, The Stereophile isn't a showcase for advertisers. It is the readers' own publication, and because of this, we feel obliged to keep readers informed about what's going on: business is good, but not great. We hope it will improve.

Now, to the topic we had originally scheduled for this editorial. If you read our announcement, you have a pretty good idea of what we stand for. Honesty, integrity, and all that. We said there were several things in dire need of some straight talk, but we didn't elucidate. We shall do so now.

Tapes and discs are the source material for more than 90 per cent of our listening, and as such, they determine at the outset the maximum fidelity we can ever achieve, regardless of how good our systems are. Yet those "hi-fi" tapes and discs are more often than not carefully tailored to offset the tonal deficiencies of the average low-fi boom box. The net result, of course, is that NARTB tape or RIAA disc equalization will not yield flat response from these recordings. Yet the record jackets still advise owners of high-fidelity equipment to "equalize to the RIAA curve." Some of the things that happen to recordings before we buy them would make a purist's hair stand up, which is why the hi-fi press in general has never had much to say about this monkey business. We'll have a great deal to say about it in the future.

Stereo created an intense demand for compactness in speakers and low cost in everything, and most manufacturers have been happy to co-operate. The past three years of corner-cutting have been fruitful, in that the average low- to medium-priced component is far better than it used to be. But the industry has been so preoccupied with the mass market that maximum quality standards, as set by the top-priced stuff, are not significantly higher today than in the late presterio years.

Other things that need looking into are the service problem, equipment testing standards, subjective criteria for evaluating fidelity, and the question of precisely what, if anything, high fidelity is supposed to be trying to achieve.
Considering the amount of careful research, cautious theorizing and wild speculation that have been lavished on the amplifier power question, we should expect to be considerably closer to the answer now than we were five years ago. This does not seem to be the case.

We have instruments for measuring sound pressure levels in the air, for measuring electrical power, and for analyzing distortion content to the third decimal place, and the literature is full of learned dissertations on the structure of musical sounds, their behavior in concert halls and living rooms, and the relationships between ears and the sounds around them. Yet one audio expert still maintains that 0.5 watts of amplifier power is all you ever need, while another says 50 watts is barely enough. Who is right?

As is often the case in such a diagonal disputation, both are partly right. One source of the widespread disagreement stems from the lack of any standardized criteria for judging power requirements. Thus, one expert may be stating how much power we need to produce a certain volume of sound during crescendos, while the other may be telling us how powerful an amplifier we must have before any further increase in available power ceases to yield any perceptible improvement in sound. On the other hand, another expert (the field is thick with them) might be figuring power requirements on the basis of a high-efficiency speaker system like the Klipschorn, while yet another expert may have decided that the only speakers worth listening to are low-efficiency types like the AR-1, so he bases his estimate on its power requirements.

All are legitimate approaches, but it is obvious that no one of them can supply a universal answer. Hence the compounded confusion.

Let's get one thing straight at the outset: "Need" has no bearing on the matter. It is senseless to ask how much power we need, because the answer is "none." We don't need high fidelity, when it comes right down to that. Nobody would die, no governments would collapse, no panics would ensue if, all of a sudden, high fidelity had never been.

All right, then, how much power should we have? Simply stated, we should have enough power to reproduce the desired sound at the desired level without exceeding a certain limit of distortion. This reads like a masterpiece of evasion, but it is a step in the right direction, for no expert will disagree with it.

But what level is the "desired" level? Background music level, foreground listening level, or the kind of ear-shattering level that a conductor might hear from his podium?

The hi-fi system owner who does not plan to use his rig for anything except background music can just forget all about power requirements. At very low listening levels, the ear's powers of discrimination are poor, so any amplifier that is sold under the guise of high fidelity will do. A cheap 5-watter will be adequate, and it isn't too important if its distortion is fairly high, because nobody really listens attentively because the higher the listening volume, the lower the amplifier's distortion must be in order to sound pleasant. And we all know that the harder we push an amplifier, the more distortion it generates.

So, for the purposes of this article, we are going to assume that you will, at least occasionally, play your system at foreground level. What about orchestra-in-the-room level? Although a popular advertising gambit, this is an absurd notion. To be mundane about it, there simply isn't room for a symphony orchestra in the average home, so even if it were possible to re-create the original volume of the orchestra as heard from the conductor's podium (which it is, but it takes scads of power and a highly efficient speaker), the effect could not be realistic. It would also be very unneighborly. A solo performer, or a chamber group, could be in your living room, and sounds very convincing when so
reproduced. But recording engineers realized long ago that orchestra patrons listen from out in the hall rather than from the podium, so they do their microphoning to convey as well as possible the illusion of listening from a mythical "best seat in the house." Their recordings sound best when reproduced to scale; higher volume levels make them sound overblown and unnatural.

As sound waves travel away from their source, their total acoustical power remains essentially the same, but as each wave spreads out over a wider area, it thins itself out. Thus, the actual intensity of a sound some distance from its source will be considerably lower than its intensity right at the source. For this reason, we measure sound intensities in a concert hall in terms of variations in air pressure (or the sound pressure), rather than in terms of watts of acoustical power. The original power at the source can then be computed, if desired, by a simple formula based on the fact that sound pressure weakens by a square root function as its distance from the source is doubled.

Sound pressure readings are made using a special microphone probe and a meter that resembles a tape recorder's VU meter but is calibrated in dynes/cm² of pressure or in decibels above the threshold of human hearing. The sound meter shares the same shortcoming as a VU meter in that its indicator needle, having some inertia, does not respond fully to transients, but gives an average (or rms) reading.

The rms level of sound during an orchestral crescendo, as heard from a fairly close seat in the concert hall (row C, for instance), measures about 100 db on a sound level meter. The acoustical power (not electrical, please note) needed to create this sound level, at a distance of 15 feet from a loudspeaker in a 10- by 15- by 20-ft. room, is on the order of 0.4 acoustic watts.

If we used a 100% efficient speaker (which is unlikely, because there's no such thing), we could recreate the rms power of the original sound with 0.4 watts of electrical power. To find the amplifier power required to get this acoustical power from a practical speaker, we simply multiply the reciprocal of the speaker's efficiency rating (in per cent) by 40. Thus, for a 10% efficient speaker, we have: 40 x 1/10, which works out to 4 watts. For a typical "low-efficiency" speaker of about 1/10 efficiency, we would need 40 watts of amplifier power to produce 0.4 acoustical watts.

The power figure derived by the above calculation represents the minimum amount of rms power needed to reproduce an orchestral crescendo at its original measured sound pressure. The figure will apply as a total power requirement for both channels of a stereo system, but it will not apply for a monophonic system, because mono sound of a certain measured pressure level does not sound as loud as the same level when the reproduction is stereophonic. This means that, in order to reproduce monophonic material at the subjective level encountered in the concert hall, we need more power than would be indicated on the basis of sound level meter computations. How much more is a moot point, because the disparity between stereo and mono power requirements varies with the program material, the way it was microphoned, and the acoustics of the listening room. It usually works out to about a 1- to 2-db difference, which seems negligible until we remember that it takes double the power to raise the listening level by a mere 3 db. To cope with a 2-db increase, we must up our original power estimate by a factor of about 1.6. Hence, if our original figure came out to 4 watts, we would have to multiply this by 1.6 to get our power requirement for monophonic listening, and this would come out to 6.4 watts for the 10% -efficient speaker.

The formula that we described for arriving at our minimum rms power figure assumed that the loudspeaker radiated its sound in all directions away from the source. In truth, some speakers don't. The best loudspeakers for small-room listening are direct-radiator types, simply because they do radiate the sound over a broad area. But horns, which usually behave best in very large rooms, tend to direct most of their output forward, so a higher proportion of the radiated sound goes directly toward the listener. This would tend to reduce the power requirement even more for a horn-loaded system, but the high efficiency of the average horn puts its power requirement so low to begin with that it is pointless to quibble over an extra watt or two, even though this may represent a doubling or halving of the computed figure.

An orchestral crescendo, or a full choral passage, contains transients that are fully 10 db higher than the average volume of the sound, as measured by a sound level meter. A 10-db increase in level represents a 100-fold increase in power, so how can we possibly hope to cope with this sort of thing? Fortunately, we don't have to. Recording studios and broadcast stations use peak limiters to keep these huge transients out of the received signal, and tape recorders have their own built-in limiting action. Transients are high-frequency phenomena, and tape will saturate instantly if a strong treble impulse is fed to it. The result is a shearing-off of the peak, and if the overload doesn't last too long, this won't cause any more audible disturbance than a good peak limiter.

Thus far, we have fairly well established the power that we must have in order to avoid outright overload when reproducing original orchestral level through a speaker of known efficiency. But it is not all the power we should have on hand, because there's more to fidelity than just reproducing sound at the proper volume.

Anyone who has perused an amplifier's power-versus-distortion curve will have noticed that distortion rises gradually with output until just below the overload point, beyond which the distortion skyrockets. This is one reason why a high-powered amplifier is likely to sound better than a low-powered one even at very low power levels. They may both be operating at well below their overload point, but the fact that the high-powered one is running at 1/10 of full power when the other is at 8/10 of full power will mean that the former is contributing less distortion at all times, and this will generally show up as cleaner, more "comfortable" sound.

There's a second reason why high-powered amplifiers should outperform low-powered ones, even at
low output levels. It is customary to equip an amplifier with an output transformer that is no larger than it has to be in order to yield full rated power in the middle range. The British are still making low-powered amplifiers with substantial output transformers, but the prevailing attitude in the US seems to be that the low-powered amplifier is sort of a stopgap component, to tide the buyer over until he can afford to purchase something good. There is rarely any attempt to design a really
good low-powered amplifier. As a result, the typical 10-watter, even though it may well meet its rated power at 1,000 cycles, is severely limited in power capability at both ends of the spectrum. The power loss is usually more severe at the low end, where there is often a great deal of energy in the audio signal, so the unit may only be able to deliver half, or less, of its rated power before the program material overloads it.

Even the biggest, costliest amplifiers exhibit this power loss at the frequency extremes, but in these, the losses don't usually start until well beyond the audible range.

Let's assume now that we have access to an amplifier's power response curve, and can see that it will deliver its full rated power to 20 cycles. Is this any guarantee that it will sound the same, at low levels, as a high-powered unit? It is not.

Power response curves show the power levels at which different frequencies will generate the same 2% distortion at which the midband power is usually rated. What they fail to show is distortion at less-than-maximum power levels. An amplifier that yields 2% distortion at full rated output may yield 0.2% at half power, or its distortion may never drop below 1% regardless of how little power we drive from it. And since we do most of our listening at power levels far below overload, the amplifier's minimum distortion, or "residual" distortion, is of considerable interest to us. Here, again, is where the typical low-powered job falls far short of its hefty ilk.

The light output transformer in most low-powered amplifiers is sus-
ceptible to core saturation at low frequencies, and even though this may be held low enough to meet overload limits down to, say, 20 cycles, it nonetheless imposes a severe limit on the amplifier's low-frequency residual. Thus, typically, the low end will exhibit increasing distortion with decreasing frequency, even at the very lowest output power levels. At 1 watt, where the midband is contributing only 0.3% or so distortion, there may be 1% distortion at 30 cycles.

Actually, it is a rare low-powered amplifier that will produce as little as 0.3% distortion at low levels, even through the midband. Most of them, sloppily designed as they are, have enough distortion in their earlier stages to hold their residual at about 0.75% no matter how good their output stage may be, so they can never sound as good as the more carefully designed high-powered units. The few exceptions to this rule are so costly that one might just as well buy a high-powered unit and be done with it.

There are extenuating circumstances occasionally, though. Loudspeakers and amplifiers that are designed specifically for one another should be used together regardless of the amplifier's power rating. Some speakers are fragile, and will burn out if hard-hit by a hefty amplifier. Fusing helps, but the series resistance in the line reduces the electrical damping applied to the speaker, inhibiting the amplifier's ability to prevent spurious cone vibrations. Consequently, if you must use such a speaker, it's advisable to bypass its fuse, and couple the speaker directly to an amplifier that won't be able to damage it.

High-power advocates have always claimed that one reason a high-powered amplifier sounds better than a top-notch low-powered job, even at low levels, is because the big one's reserve power gives it better control of the speaker's voice coil. It was reasoned that a large reserve of power, operating through a tight negative-feedback system, could bring more power to bear more rapidly for suppressing spurious vibrations of the speaker cone. This sounded plausible, until the first of the all-transistor amplifiers came along and befogged the issue.

Transistors just do not behave like tubes. Transistor amplifiers whose measured distortion is higher than that of the cheapest "hi-fi" amplifiers somehow manage to sound much better than they should, and the absence of an output transformer from most transistor amplifiers (the low-impedance transistors connect directly to the speaker) eliminates most of the annoyance value of marginal overload on peak passages. As a result, a transistor amplifier seems to produce far more clean power than a tube amplifier of the same rated output.

Even more significant, however, is the "transistor sound" at low output levels. Even the feeblest transistor amplifiers we have heard (a 3-watter, for instance) sound like high-powered amplifiers when operating at low levels. They are transparent, crisp, and have the same kind of bass solidity that high-power advocates have always attributed to the monster amplifier's reserve of speaker-controlling watts. So the superiority of the high-powered tube amplifier is not just a matter of reserve power. Just what it is a matter of is still open to question, but we may be in a better position to answer this when we get the opportunity of comparing high-powered transistor amplifiers with their beturled competitors. Tube amplifiers have foiled up the power question for years, because the low-powered ones so often suffered from shortcomings that had nothing to do with the simple fact that they were 10- or 12- or 15-watt amplifiers. Transistors may change the picture. So, where do we stand? For the nonce, let us say that computed power may be taken as the power we should have on hand if we use a transistor amplifier or a high-powered tube amplifier. In the lower-power categories, tube amplifiers in general will not produce the best sound that the average speaker can furnish. They may be adequate, and can nonetheless provide enjoyable listening, but they do leave room for improvement. Whether or not the improvement is worth an additional outlay of money to you is up to you. But it's there for the buying.
Antennas for Fringe-Area Multiplex

by Philip C. Geraci

To the fringe-area FM listener who has waited impatiently for his favorite station to go multiplex, the realization is often much less rewarding than the anticipation. This isn’t because of any inherent deficiency in the f of the stereo transmission, but because multiplex can often make the difference between adequate reception and hopelessly poor reception in fringe areas.

Satisfactory FM reception is simply a matter of getting enough signal to the tuner to hold its noise-gating system closed, and the amount of signal needed to do this depends on the tuner’s sensitivity. In a strong-signal location, near the transmitting antenna, practically any tuner will maintain full quieting from the signal picked up by a rudimentary dipole antenna. But as we get farther from the transmitter, we must increase either the antenna’s efficiency or the tuner’s sensitivity in order to retain full quieting. In the deepest fringe areas, approaching the limit of FM’s carrying capabilities, both the antenna and the tuner must be as sensitive as possible, and every precaution must be taken to see that as much as possible of the antenna’s pickup is delivered to the tuner.

FM radio propagation beyond line of sight is hopelessly unpredictable, so there is no way of telling in advance that a particular location will be an average fringe area, a deep fringe, or a dead area. The only thing that can be stated with some certainty is that if a particular antenna setup is marginally satisfactory for monophonic FM, it will not be satisfactory for multiplex.

Modulation levels in a stereocast are barely half those of a mono transmission, and this accounts for a 6-db loss of signal-to-noise ratio at the outset. But the biggest problem in long-distance multiplex is the added complexity of the signal, whose piggy-back subcarrier makes it particularly prone to self-cancellation when multi-path reflections introduce phasing differences. This is why a distant station’s conversion to multiplex can put it out of reach of a fringe-area listener who had little trouble receiving it before.

There is no way of accurately determining your antenna needs on the basis of distance or topography or any other measurable, because of the capricious behavior of FM signals over long distances. But two things are certain: first, a TV antenna, or a so-called broadband antenna, will not do for fringe-area FM, because the response of such an antenna to the FM band is relatively poor; and second, don’t even bother trying to use a low-sensitivity tuner in a fringe area, because it won’t be adequate. The extra cost of a tuner rated at 3.5 microvolts or better sensitivity will be far less than what you’ll end up putting into antenna equipment to compensate for a cheap tuner.

There is a simple way of checking the fringiness of your receiving location. Equip your tuner with a simple dipole antenna made from 300-ohm twin lead, tack the antenna to a long T-shaped piece of wood, and stick the T out of the highest window of your house. Hold the cross piece horizontal and at right angles to the direction of your distant station, and see what the tuner picks up. If you can get the desired station at all, even through a haze of hiss or fading, you’re in a good receiving location, so a moderately sensitive antenna is all you’ll need. If the station doesn’t come in at all, you’re probably going to need all the antenna pickup you can get, so you might as well face the possibility of spending quite a bit of money for your installation.

The simplest, least expensive, and least efficient antenna — the dipole — has a broad bidirectional pickup pattern. Its field of pickup comprises two fat lobes, one at each side of the dipole, so any strong station that isn’t actually in line with the dipole will be received. There is little that can be done to increase the antenna’s total sensitivity, but its efficiency can be drastically increased by directing its total pickup into a focused beam.

Adding a reflector element to one side of the dipole kills its response from that side, but effectively doubles its pickup from the other side by directing both lobes in the same direction. Adding extra elements in front of the dipole narrows the beam, and draws it out farther. Thus, the more sensitive the antenna, the more accurately it must be aimed at the desired station.

These multielement ‘Yagi’ antennas come in two more or less standard categories: 5-, 6-, and 7-element Yagis, for average fringe areas, and the 10- to 12-element models, for the deep fringes. Your choice will depend on the outcome of your preliminary test with the dipole.

If yours is an average fringe area, a 5-7-element job will do fine, and although its beam is quite nar-
row, you may not even need a rotator for it. If all the desired stations are off in about the same direction, one position of the antenna will do for all of them. But if you're ringed by stations, you'd better order a rotator when you get the antenna, because you'll need it.

The 10-12-element Yagi, for deep fringe areas, has extraordinary reaching-out capabilities and a concomitantly narrow beam, so unless you intend to do all your listening to one station, you'll probably have to use a rotator with it.

Install the antenna on a 6- to 10-foot mast on the roof, bracing it firmly with guy wires. Use outdoor-type 300-ohm lead-in wire, rather than the higher-loss 72-ohm coaxial cable. (Low-loss 72-ohm cable is available, but its losses are still greater than those of 300-ohm twinlead, so it shouldn't be used unless interference from nearby stations or passing automobiles proves to be a problem. Shielded 300-ohm cable is not recommended, as its signal losses are very severe.)

Make the lead-in run as direct as possible, twist the cable about one turn for every two feet of its length, and pass it through stand-off insulators to hold it away from signal-sapping wall and roof surfaces. Nearby metal objects like gutters and down pipes should be avoided as much as possible, and extra-long stand-offs should be used whenever the lead-in crosses them. Never run the cable parallel to a nearby metal surface, as this will cause severe signal losses.

An antenna mast is a prime target for lightning, so make sure the mast is properly grounded through a stout cable and a metal stake driven several feet into the ground. Additional protection is afforded by a low-loss lightning arrester, installed at the point where the lead-in enters the house, and grounded to the same metal stake.

If you don't plan to use a rotator, aim the antenna by trial and error rather than by the compass, stationing an assistant back at the tuner to notify you of developments as you swing the antenna around a few degrees at a time.

Now, what do you do if your distant station still fails to come in satisfactorily? Well, first you might have your tuner carefully aligned by a qualified audio service agency or at the factory. Next, you might try adding a 10-foot extension to your mast (bracing it firmly), or try moving the antenna to a different spot on the roof. If this doesn't help appreciably, your next step should be to add a second, identical antenna to the mast, using one of the special stacking kits that are sold by the antenna manufacturer for that purpose.

Any further improvements beyond this point are going to cost you a lot of money, so this is the time to decide whether or not you're licked. If your station is still but a faint blob of hiss on the dial, chances are it's a lost cause. But if it comes through well enough to allow you to tell what's going on, or varies between poor and almost tolerable quality with changes in the weather, you're on your way. All you have to do is decide whether it is worth an additional outlay of $60 to $500 to pull in that station.

Two things remain to be done: adding an antenna booster preamplifier, and getting the antenna high in the air, on a tower. The booster is the least costly, so it is advisable to try that first.

The booster must be of the type that mounts right on the antenna mast, where it will amplify the signal before it starts down the lead-in. Table-top models, that go at the receiver end of the lead-in, are of negligible value for use with a good tuner, because their noise level is often higher than that of the tuner's own input stage, and they will amplify interference signals picked up in the lead-in cable just as much as they amplify the desired signal. Choose your booster carefully, though. Most of them are not very good, causing more problems (like whistles and spurious images) than they solve, and few are adequately weather-proofed.

Most antenna preamps have a 300-ohm output, and this should be used unless excessive automobile ignition interference indicates that the shielding of a 72-ohm coaxial cable is needed. The preamp will more than offset the higher losses of the coax.

If all else fails, a high antenna tower is the last resort. Towers of 30 to 100 feet in height cost from $60 to $500, depending on their complexity and strength, but if they won't bring in your distant station, nothing will. The largest towers are too heavy for roof mounting, so they may have to be located some distance from the house. When this is the case, a mast-mounted booster will almost certainly be needed, to offset the signal losses in the long run of lead-in cable. Nine-foot wooden poles, each topped with a standoff insulator and spaced 20 feet apart, will serve to carry the cable from the tower to the house.

If this arrangement doesn't do the trick, then the whole operation has just been one whale of a costly experiment. You can always sell the stuff at close to its purchase price, but in the deepest fringe areas, you never know whether FM multiplex is receivable unless you know of someone near you who is receiving it, or barring this, try it yourself.
How to Write an Ad
by Lucius Wordburger*

Everyone knows that advertising people make more money than ordinary people, but many assume that the high pay is because ad writing is so difficult. This is not true. Low-income people can write advertisements, too, so just in case somebody should accost you on the street and ask you to write an advertisement, here is how you may go about it.

There are three basic points every ad writer should bear in mind. First, no advertisement may tell a lie. Lying in ads is dishonest. It is also illegal, so don't. Second, if you have a really good product, tell the truth about it, in tedious detail. And third, if you're trying to peddle a third-rate product, be as persuasive as you can without actually committing yourself to anything. Remember these points.

The purpose of an advertisement is to sell something. To do this, you must convince the prospective buyer that he needs your product more than he needs any other product, even if he doesn't. This is the secret of advertising.

The Display Ad

Before writing the ad, you must first decide what kind of an ad to write. The most common these days is the display advertisement, which is a picture of something interesting, accompanied by as few words as possible. The picture must accomplish two things: It must catch the eye, which is why sleek female models are used in so many display ads. And it must also create the desired impression. It is not good practice to show Fidel Castro using your product, even if you have five unsolicited endorsements from him in your files. Endorsements are In, but Castro is Out.

The words in a display ad are important. They must be carefully chosen because there are so few of them that they have no place to hide. They must be appropriate, succinct, and short. Four-letter words are useful, but watch the ones you use. Looser words are fine, too, if you know how to cope with them.

Words that have stood the test of time are "luxe," "outstanding," "rich," "silky," "superb," "delicious," and "hifi" (often hyphenated in print, but never pronounced that way). Always make sure you use the right word. Automobiles are not delicious. Neither are most phonographs hifi, but it is all right to call a phonograph hifi because, to the average ad reader, a phonograph is a Hifi, just as a vacuum cleaner is a Hoover. One very important word is the manufacturer's brand name. Make sure you include it.

The Text Ad

The other kind of ad is the text ad, which is verbiage with a message. The text ad is much more fun to do than the display ad, because words offer far more opportunity for ambiguity than do pictures. (Regardless of what the FCC had to say about TV advertising.) A text ad sometimes has a picture, too, but it is smaller, and it doesn't have to mean much of anything, just as long as it is eye-catching and creates the intended impression. Remember, though, that the intended impression need not necessarily be the right impression. This depends on whether or not you can be frank about the product you're advertising.

The Top-Notch Product

For instance, if your product is indisputably better than anybody else's, you can probably prove its superiority without too much trouble, so this is the thing to do. Publish hard, cold facts, including all the technical data you can lay your hands on. Show charts, graphs, and photos of your product doing its stuff, and then sit back and wait for the orders to roll in. This is the easiest kind of ad writing, because all you have to do is to tell the truth. Of course, nobody will believe you, because who's to know if your competitors aren't telling the truth when they publish their specs?

Spec Stretching

A time-honored technique for making a product seem better than it really is is the simple expedient of stretching your specifications. Spec stretching can be done in several ways. You can pull a few dozen units off the assembly line, test them all, and publish the best measurements you get. Or, you can pick an outstandingly good production unit, have it carefully peaked for top performance in your design lab, and publish its performance specs.

If you really want to get an edge on the competition, you can devise your own set of test procedures, using measuring techniques and reference standards that are much less stringent than those used by your competitors. If you do this, however, do not list your test conditions. Just omit them, and publish only the measurements.

It is not usually wise to invent specifications, except in those cases where it would be difficult for anyone to disprove them.

The Calculated Omission

If the product you are advertising is really quite good in most respects, but has a few less attractive features, play up its positive qualities to the exclusion of everything else. It is bad practice to try and explain that the aspects in which it is inferior aren't really important, because this will only draw attention to the fact that competing products are better in these respects. Publish a factual-looking spec sheet, but omit the specs that wouldn't look too good on paper. This isn't lying about the product. It is just being evasive, and there's nothing dishonest about that.

The Mediocre Product

Advertising the product that isn't really any better than the competition demands a certain dexterity with words. To claim for it things that simply aren't true is illegal. Yet to be truthful about it would defeat the purpose of the ad. So, you must endeavor to give the impression that you are making certain claims for the product, while actually avoiding any outright statement that could be proven false.

The safest course of action here is to lean heavily on opinions—assertions which, if questioned, can be passed off as somebody's honest opinion. Most adjectives, like "high-quality," "deluxe," and "hifi" are safe to use as opinion words.

(Continued on page 17)
The FORUM This is a column of controversy, wherein anyone with a legitimate point to make can
do so as he sees fit. The STEREOPHILE refuses to assume any responsibility for anything
said in the “Forum,” for it is the writer’s privilege to say what he wants. We offer him this freedom in
the hope that his views will inspire discussion, comment, and a rebuttal from anyone who feels like taking
issue with him. Continuing exchanges between contributors will be welcomed until we feel the subject
has been resolved or, unresolved, has been beaten to death.

Farewell to the Paper Cone
by Irving M. Fried

Irving M. Fried (as in Siegfried), a Harvard
law school grad and practicing “part-time”
lawyer, owns and operates Lectronics of City
Line Center, in peripheral Philadelphia.
Besides importing British audio components
and selling custom installations, Mr. Fried
also finds time to write numerous articles for
the hi-fi magazines and, more recently, for his
own Lectronics Newsletter.

Mr. Fried confesses to at least partial
responsibility for the development of the
Klipsch and Lowther horns and the AR-Jansen
combination, and for the introduction of the Janssen electrostatic tweeter. He was
the first U.S. importer of the Quad full-range
electrostatic, and is currently doing consulting
work in the development of new loudspeakers
in Great Britain.

Ever since the first electrical loud-
speaker—a glorified headphone
with a horn on it—was outmoded
by the balanced-armature cone spea-
k—paper has been the standard
diaphragm material for speakers re-
producing low frequencies. The
Rice-Kellogg moving-coil transducer
replaced the balanced-armature driv-
ing system in 1925, but the paper cone
remained. And although many im-
provements have since been made,
there were no more major changes in loud-
speaker design for over 30 years!

Paper was cheap and readily
available, and when properly ballasted
in a large horn or bass-reflex enclo-
sure, to minimize its excursions (by
maintaining efficient coupling to the
air) and damp out its bass resonance,
the paper cone seemed to be the ideal
woofer diaphragm. But this was
only because it had never been com-
pared with anything better.

When Britain’s Peter Walker
demonstrated the first full-range
electrostatic speaker system in 1955,
the paper-cone systems sounded so
muddy by comparison that dynamic-
speaker designers scurried back to
their labs to try to build dynamics
that sounded like electrostatics.

They might very well have had
success, too, had not stereo created a
demand for compactness in speakers.
The small enclosure aggrivated every
problem that had existed in large
enclosures, so instead of being able to
improve the dynamic-speaker sound of
the big systems, designers were hard
put to equal it from a small box.

The effectiveness of the mov-
ing-coil loudspeaker depends on its
diaphragm’s ability to follow the
motions of its voice coil. The ideal
diaphragm behaves like a piston,
whose surface moves as a unified
plane in accordance with the voice
coil’s movements. Any cone mo-
tions that do not coincide with voice
coil motions represent distortion,
and this is paper’s major weakness.

A paper cone is inherently
flexible, so the only part of it that
follows precisely the motions of the
voice coil is that immediately sur-
ronding the voice coil. Beyond this
small area, flexure of the cone ab-

breakup occurs at various frequencies
throughout the speaker’s entire range,
and becomes worse as vibration
amplitudes increase. It is particu-
larly severe at low frequencies, where
the cone must travel appreciable
distances.

This is why small enclosures
cause so much trouble. Without the
efficient bass coupling of a more ideal
enclosure, the speaker must be made
to yield increasing excursions with
diminishing frequency, to retain full
bass response. This means its ex-
cursions in the bass range must be at
least twice as great as they would
otherwise be, and this in itself ag-
gravates the normal flexing of the
paper.

Some manufacturers, ques-
tioned about the boxiness, bass
deficiency and lack of clarity in their
small speaker systems, tried to talk
themselves out of the dilemma,
claiming that those little problems
really weren’t problems at all—
stereo would restore the lost clarity
and bass, and the boxiness was just a
matter of personal opinion. Others,
hoping to retain at least some of the
quality standards that had been set
by the mammoth horns and reflex
systems, had to make some drastic
changes in their speaker designs.

Various stuffing materials were
used to eliminate the boxy sound of
the small enclosure, but these caused
some problems of their own, by
absorbing certain frequencies more
dreadly than others.

In attempting to ameliorate the
cone breakup problem, designers
tried stiffer cones, made of heavier
paper, but these reduced the system’s
efficiency as well as the woofer’s
upper frequency response. The
choice then was between ignoring
the resulting midrange hole, or try-
ing to design a crossover system to
work in the region where their design
problems are greatest (the 400- to
2,000-cycle range).

Variable-density cones—
heavy and rigid near the voice coil,
and tapering to thin and light at the

(Continued on page 16)
This is the "column for the tape recordist" that was promised you in the birth announcement of The Stereophile. I've been looking forward to doing something like this for a long time, for although I've written many articles on tape recording, the restricted length of a one-shot piece forces one to leave many important things unsaid. In a regular column, they can always be said next month. Also, a column may become the medium for answering questions, and that can work both ways: you may be able to answer some of mine, too. I am, therefore, happy to be occupying this space.

Since The Stereophile is being published under the banner of honesty, I must hasten to tell you that I don't know all there is to know about tape. In fact, compared with some of the people I have heard about, I know very little. And when I read some of the claims of advertisers in the hi-fi magazines, I realize sadly what a poor, ignorant man I am for not knowing, for instance, that Telefunken "invented" tape recording! My remarks about that phase of tape recorder advertising will be reserved for a subsequent column.

If you are expected to read what I write, and to place some credence in it, you should know at least something about my personal history.

I have been experimenting and working in radio and audio since 1917, when, like countless other kids, I made myself a crystal set and listened to police reports and phonograph records broadcast by "The Voice of Amrod," in Medford Hills, Mass.—about 10 miles from my Boston home. I had saved up my pennies for almost a year to buy the crystal detector, which was imported from Germany in a little plush-lined box, and for which I paid $5. The week after I bought it, crystals were found in Michigan, and I could buy them in chunks for a dime.

In between the time that I spent building receivers for myself and my friends, I did go to school. I graduated from Boston Latin school in 1923 and found work in, of course, radio. As "wireman" with Wireless Specialty Apparatus Manufacturing Company (who made the first RCA superhets, Faradon condensers, and receivers for other manufacturers), we experimented with, among other things, an early printed-circuit technique. We wired a receiver with silk thread, doused the thread in melted rosin, and dipped the whole mess in hot solder. It didn't work.

I was fired from my job at Wireless Specialty for making an unauthorized change in the wiring of the power pack for the superhet—that we called "the tomcat." (The receiver was called "the catacomb," because all the parts and wiring were buried in hot wax when completed.) I later found that my unauthorized change was retained. It had improved "the tomcat."

A few years after that episode, I found my métier: I became a trouble-shooter and repairman, at first for Kolster Radio. At that time, (about 1927) I wrote my first article on radio. In it were a few sentences condemning some manufacturing practices that resulted in frequent breakdown of radio receivers. Among these practices, as I recall, was that of securing coil ends with a piece of medical adhesive tape. The adhesive soon corroded the wire under it, which then shorted turn-to-turn, causing noise and, ultimately, a complete burnout. The magazine that printed my piece deleted these few sentences, which probably would have offended some of their advertisers. And many manufacturers continued taking production "short cuts," that would show up in the radio repairman's shop some months later as a burnt-out coil or any one of a multitude of other readily avoidable defects. Some of those manufacturers made money and stayed in business in spite of their mistakes. Several went out of business when the number of defective receivers returning to the factory exceeded the number of new ones being shipped out.

During World War II, when the services were looking for radio men, I tried several times to enlist in Officer's Training School, but was rejected for malocclusion (crooked teeth). I had not anticipated having to bite the enemy. Right after this, I went to work for CBS, and, after four years (in 1946), I got the job of editing magnetic wire for the Norman Corwin series of broadcasts, "We Went Back."

When tape, and the first Brush recorders, became available, I recorded and edited tape. It was on a Brush recorder (that I had remolded) that I edited the first of Edward R. Murrow's "I Can Hear It Now!" albums (Columbia LP ML-4095). It was also on a Brush recorder that I edited and aired what I think was the first live-and-taped network news program: CBS's "The British Crisis," in 1947.

I became increasingly interested in tape recording and began to study it intensively. I also evolved some tape-editing techniques, based on procedures described in a series of articles on "The Art of Tape Recording" in Audio Engineering magazine in 1950. It was also in 1950 that I improved upon the first crude tape-splicing blocks I had made (the very first of which was for me in 1947 by a CBS engineer, Victor Piliero), and ended up taking out a patent on the EdiTall Block.

In 1951, I began researching a book on magnetic recording. Seven years later, the book was published by The Macmillan Company under the title "Techniques of Magnetic Recording." In 1951-52, I taught a few classes in the elements of tape recording and editing at NYU's Radio Workshop, and in the years since, I have kept busy writing articles for magazines, working at CBS, selling EdiTall Blocks in my spare time, and wondering if people will ever learn that they can't get something for nothing, especially where fidelity of sound reproduction is concerned.

Now that you know this much about me, I hope you will frame any questions you may address to me with this in mind: this fellow Tall is basically an experimenter of the old school, who knows little of AC math, but has been through the mill and remembers what has been knocked into his head. If he cannot answer your questions from his own experience, he will find an answer (Continued on page 18.)
Pyramid Points

What ever happened to the "pyramid point" stylus that I used to see advertised? I've tried to get one for my Shure M3D, but nobody seems to sell them.

We don't know what happened to it, but we presume it didn't prove practical.

Our own feeling was that, although this looked like the ultimate answer to the groove-tracing problem, it failed to consider the significant variations in groove shape from disc to disc. We would also guess that the requirements for stylus alignment with respect to the groove were so stringent as to make the thing impractical for installation by the average user. But why not get your answer from the source? Write to Fideli-tone, Chicago 26, Ill.

Microphone Standards

What, if any, professional standards exist for plugs and connectors for low-impedance microphones?

There are no official standards for either, but unofficial standards based on common usage are as follows:

Mike line impedance is 200-250 ohms, and the line is run through two-conductor shielded cable. The shield is at system ground potential, and both sides of the line are isolated from this up to the preamp input. At the preamp, any line connections to ground will be determined by the input circuitry.

Nearly all professional equipment today uses Cannon XL-series connectors or interchangeable equivalents. The connectors with pin contacts go at the output ends of all cables, while connectors with receptacles go at the input ends of the circuit. (The designation "male" or "female" is ambiguous with these connectors, for the one containing sockets fits into the one containing plugs. The former would, however, be correctly classed as female, the latter, male.)

Pin 1 of each plug is the shield connection, pin 2 carries the black inner conductor, and pin 3 carries the white or red inner conductor.

The first plug in the line, nearest the microphone, is phased so that inward movement of the diaphragm (positive sound pressure) yields a positive impulse at pin 3. Connections to the preamp's input transformer or transistor are phased in any manner, so long as all in-phase inputs yield in-phase outputs.

To check the polarity of an individual mike, connect its output leads to a sensitive oscilloscope, pronounce the consonant "p" at a distance of about 4 in. from the mike, and note the displacement of the scope trace. If the trace moves upward, the mike lead that is now on the scope's HOT terminal should go to pin 3 of the mike plug. If the trace moves downward, the mike lead that is now on the scope's GND terminal should go to pin 3.

Distorted Records

My pickup plays some of my stereo discs cleanly, but most of them sound horribly distorted during loud passages, particularly in inner grooves. Is this because most modern records are overcut?

Note. It's because your pickup is (1) overloading the preamplifier, (2) in need of redamping or a stylus replacement, or (3) no good to start with. It is also conceivable that excess amplifier distortion or a peaky tweeter is emphasizing groove distortion out of all proportion to its actual severity.

There are very few stereo discs that will not reproduce cleanly on a top-notch system, but there are only about three pickups that can cope with the loudest material being recorded on some current stereo discs.

Compatibility

What makes some components incompatible with others? I thought all components were supposed to be pretty much interchangeable.

In theory, all similar components should be interchangeable, but many actually are not. Some of the reasons are obvious. Many preamps designed for use with very low-output pickup cartridges will overload if used with a high-output cartridge. Others do not have enough gain to function properly with very low-output cartridges. Some amplifiers provide too high or too low a damping factor for certain loudspeakers, while some power amplifiers have too much noise in their latter stages to provide low-noise performance from high-efficiency speaker systems.

Less obvious incompatibilities include the cumulative effect of transducers that introduce the same kind of coloration to the sound. For instance, a pickup with a slightly rising high end will sound fine with a speaker that rolls off at the upper end, but it will sound miserable if coupled to a speaker that also has a rising high-end response. These com-
Stereophile Reports on Equipment are primarily subjective reports, based on actual use of components in the home. Instrument tests will be employed where these are easily duplicated by the average buyer, but we will rely mainly on subjective evaluations because components that measure identically do not necessarily sound similar, and because audio equipment is, after all, designed to be used and listened to.

Components are taken from dealers' stock or, when not available locally, are obtained from the manufacturer, and only one sample is tested unless indications are that that sample may be defective. If a retest is necessary, our experience with both samples will be reported. The manufacturer is sent a copy of the report prior to publication, and may if he wishes append a comment. He cannot however demand that the report be changed or that it not be published.

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Weathers PS-11 Professional Stereo Pickup System

SPECIFICATIONS (furnished by manufacturer): Type: Amplified bridge, ceramic capacitor. Frequency response: ±1 db, 20-30,000 cps; ±3 db, 10 to 40,000 cps. Separation: 40 to 35 db, 20,15,000 cps. Output (1 kc at 7 cm/sec, velocity): 8 mv at constant velocity, 1.0 v RIAA-equalized. Hum and noise: 60 db below 7 cm/sec. Channel balance: Within 1 db. Compliance: 20 x 10^-4 cm/dyne. Dynamic mass: 0.6 mg. Tracking force: 0.75 to 1 gram. Price: $129.90; conversion kit for all Weathers viscous-damped arms, $91. Manufacturer: Weathers Industries, Division of Teleprompter Corp., Box 215, Fellowship Rd., Cherry Hill, N. J.

The writer of this report (JGH) was employed by Weathers Industries during the time when the product in question was undergoing development, so in view of this past association, and the doubt it may cast upon the writer's impartiality, this report probably should not be published, even though the writer left Weathers Industries over a year ago and is not bound by any obligations thereto.

The product is not new, and has been written up in several other hi-fi publications, but perhaps because Weathers is only one of several advertising pickup manufacturers, the reports were not as forthright as they might have been. The pickup is one that deserves to be brought to the attention of audio perfectionists, so despite the lack of association between the reporter and the product, we are printing the report anyway.

When Paul Weathers finally released his professional stereo pickup system late in 1960, the attendant publicity made it clear that this was not a stereo version of the well-known Weathers FM pickup, but it wasn't very explicit about what this new pickup was. It was described as an "amplified bridge" system, using "ceramic capacitor" elements in an arrangement that was likened to a condenser microphone.

Well, the principle is not new, but the application is. The "ceramic capacitor" elements in this pickup are strain-sensitive; they emit voltage signals when physically stressed. But unlike the familiar ceramic pickup, this one does not bend its elements. The low compliance and the high dynamic mass of the typical ceramic pickup are due to the rigid coupling between its stylus and its relatively stiff, massive elements. This tight coupling is needed to bend the elements in accordance with the stylus movements, in order to get enough output from them to drive a high-level input. Weathers simply gave up high output for tracing ability.

Instead of trying to bend the ceramic capacitor elements, he evolved a pickup that barely "ticked" its elements. The only coupling between the cartridge's stylus assembly and its transducing elements is a tiny rubber block at the base of the armature. This holds the stylus just rigidly enough to prevent it from folding up, and movements of the stylus are transmitted through this block to the elements as minute stresses. The elements are not bent perceptibly — stress forces are all that are needed to generate the pickup's low output — and because of the very loose coupling, the stiffness and mass of the entire moving system should be barely more than those of the stylus and armature alone.

Like the FM cartridge, this one will fit only a Weathers tone arm, and must be used in conjunction with a small "black box" (gold, actually). This is a small AC-powered "polarizing supply," containing two transistorized modules which provide equalization and some measure of pre-amplification for the pickup. The "amplified bridge" circuit referred to in Weathers' data sheets is an arrangement whereby the very high-impedance outputs from the cartridge are matched to the inherently low-impedance transistor inputs, by inverting the signal into a feedback loop around the transistors. Both sides of the incoming signal circuits are above ground, and are carried through separate wires inside a tiny shielded cable from the tone arm to the supply.

Two sets of outputs on the supply provide a 1.0-v signal with RIAA equalization, for feeding a TUNER or AUX input, and a 8-mv signal at constant velocity, for feeding a magnetic phono input. There are no adjustments on the supply, and there's nothing to get out of adjustment. The only adjustment in the whole system is the stylus force, and since this is controlled by a counter-weight, it is likely to stay put.

The tone arm's vertical pivots
are displaced a small distance behind the axis of the horizontal pivot tube, so that while the vertical balance is thrown toward the cartridge (to provide tracking force), lateral balance is maintained, to reduce the arm's susceptibility to jarring.

Recommended tracking force is between 0.75 and 1 gram. We found that it would indeed trace many records cleanly at 0.75 grams, and most records cleanly at 1 gram. But we also found that setting the force at a shade under 1.5 grams gave an added margin of tracing ability that cleaned up most of the de's that were only marginally clean at 1 gram. The extra force also reduced the tendency for the stylus to "hang up" on accumulations of the waxy substance that appears to be present in all vinyl record grooves. We have been using one of these pickups for over a year at 1.5 grams, and have yet to detect any audible wear of any of our discs (some of which have been played very frequently). And at that force, the stylus should last at least 5 years.

Performance claims like those for this pickup are difficult to verify, because they exceed the limits of most available test media. The separation figures, for instance, are better than those claimed by Westrex Corp. for their 1-A separation test record, few frequency test discs go out to 20,000 cycles, and of those that do, their response varies by much more than 1 db from one disc to another. Yet by using a band-pass filter to suppress rumble and surface noise, we did nonetheless manage to better Westrex's own 25-db figure by over 5 db from 1 to 15 kc, and a visual estimate of crosstalk from a Pacific Transducer 60-to-15,000-cps sweep disc did nothing to verify or refute Westher's claims.

Response checks using the Westrex 1-A and London's stereo test disc showed a slightly rising top — up about 0.5 db at 10 kc and 3 db at 15 kc. Both channels of two samples were within their rated 1 db limit of output imbalance. Total unweighted noise measured 56 db below a 7 cm/sec 1 kc signal, which is completely inaudible, and since there are no inductive elements in the cartridge, it is not susceptible to hum interference from poorly shielded phono motors. The transistors in the polarizing supply will, however, start making thunderous grumbling noises if the supply is placed where other components can heat it up. So keep this in a cool place.

It is on listening tests, though, where this pickup really shows its capabilities. Separation, on widely-miked discs, is so close to complete that we have never been aware of separation as a consideration. The sound is as vast and spacious as that from two-track tapes, there is no instrument wander, and cross-channel splatter on "ping-pong" discs — where one channel speaks while the other goes dead — is as low as we have heard.

The high-end rise is not severe enough to cause spitting or sizzling colorations, and is in fact not even perceptible on most loudspeaker systems. But when the speaker is flat or slightly rising in response above 10 kc, the rise is audible as a subtle extra string sheen and brass bite. A rolloff of 3 db at 15 kc, from a treble control or a simple R/C filter, will take care of it. (We will describe one of these filters in a future issue of THE STEREOPHILE, Ed.)

More important than niceties of frequency response (which are, after all, easily equalized out) is a pickup's tracing ability, and this is where the PS-11 excels. At 1.5 grams force, this pickup will track, without audible distortion, discs that throw even other currently available cartridge for a loop. The small (0.4-mil radius) stylus causes some trouble on early mono LPs with rounded groove bottoms, and we did find a few stereo records that won't trace cleanly on any pickup we have encountered to date. But the pickup's freedom from sharp high-end peaks holds the resulting distortion at a tolerably low annoyance value, instead of exaggerating the distortion and adding "spikes" to it. And if you happen to own a number of old mono discs that give trouble, a 1-mil cartridge is available from the factory on special order, as is a 3-mil model for 78-rpm discs.

We must admit that our PS-11s did not perform this well as received. The tone arm in two samples had too much damping action in their vertical pivots, resulting in variations in tracking cleanness with each revolution of a warped disc. We understand the factory has been taking measures to remedy this problem, and will adjust any arms that are sent to them with excessive damping, but the user can do the job easily himself by adding one or two drops of Weathers turnable lubricant to the vertical pivots until the arm, when dropped from a height of 5 in. (onto a soft surface), takes about 1 sec. to touch down.

Like most good pickups, the Weathers is rather fragile, and while its stylus will retract into the case when overloaded, to avert utter destruction, the driving system may still be displaced enough to cause tracking problems. With the tone arm lightly damped, stylus damage through dropping is not beyond the realm of possibility, so it's advisable to cement a small wooden strip to the motor board in such a position that, regardless of where the arm hits it, it will support the rear of the cartridge, holding the stylus above the motor board. If you drop the thing onto a disc, and then start noticing distortion, you'd better return it to the factory for a checkup.

The PS-11 also shares with other pickups a tendency toward long-time deterioration of its damping elements. The symptoms of this are very much like those of a worn stylus — distortion, rough-sounding highs — and often prompt pickup owners to discard perfectly good styli when all the stylus needs is redamping. So if this, or any other pickup that you own, starts sounding less clean than you remember it as having been, send it back to the factory for redamping. It's cheaper than a new stylus.

There are several pickups — some of them more rugged than the Weathers — that will play most stereo discs without severe tracking problems, and there are probably some whose overall coloration will

(Continued on page 18)
for two flutes and strings (10:13).

The Philadelphia Orchestra, Eugene Ormandy, conductor. Columbia disc MS-6342. $5.98.

As the unending chain of Scheherazade, Pathetiques, and stylistically inept programs of Johann Strauss and the "pop" repertory continues to be forged, the serious record collector must face the fact that the world's most beautiful orchestra is being wasted on the proliferation of hackneyed masterpieces and on music unworthy of its talents.

So it was that I approached this new Columbia disc—devoted to three wonderful scores by sons of the great Johann Sebastian—with mixed feelings of apprehension and hope. But they fare little better than their father has in the past. As usual, what we have here is magnificent orchestral playing, constrained by an interpretive style which I will charitably call inappropriate, and tipped off by a recording that is almost a travesty of fidelity.

I often wonder what record buyers living outside of Philadelphia must think when they hear the orchestra in person for the first time, for any resemblance between the Philadelphia orchestra on records and in the Academy of Music is, as they say, purely coincidental.

Not only are the first violins shrill and zippy, but as usual with Columbia, one is always conscious of the violins coming from a single point source rather than from an area to one side of center. Instrumental balances are fine during orchestral tuttis, but whenever a solo woodwind passage comes along, someone felt the necessity for "spot-lighting" them by turning up their own microphone, so they rush to the front for their moment of glory, and then recede into the background again.

There is ample spaciousness in this recording—too much, in fact, to suit the music, but perfect for the ludicrously large forces employed by the conductor.

It is fortunate that the musical values of this disc are negligible. I would hate to see this kind of technical mayhem committed on a worthwhile performance. J. W. K.

BERLIOZ: Symphonie fantastique (48:40)

Boston Symphony Orchestra, Charles Munch, conductor. RCA Victor disc LSC-2608. $5.98.

It is easy to forget that the hi-fi movements—the "March to the Scaffold" and the "Dream of a Witches' Sabbath"—comprise barely a third of the music in the Symphonie fantastique, yet when we listen to most of the available versions of this, we can understand why the first three movements are usually passed up by the record listener. Two are slow and brooding, one is a zippy sort of waltz, and all three require a certain combination of flowing gentleness and grotesquerie that few orchestras and fewer conductors can carry off. It is in these first three movements where most readings of Berlioz' best-known work fall flat.

Either they are too sweetly pastoral or too episodic and choppy, or they degenerate into unrelied dullness.

Here, these three movements are less torturously-sounding than the intent of the music would seem to require, but they flow with a subdued languor that does seem to make a certain degree of sense and is probably a valid interpretation.

Fine, but what about the last two movements, the window-rattlers that many hi-fi enthusiasts will buy the record solely for anyway? The performances of these noisy tour de force can best be described as inspired or, rather, maniacally possessed. This is some of the most thrilling playing I have heard, under Mr. Munch or anybody else for that matter. The closing section is a real hair-raiser, that makes you want to stand up and shout Bravo, not only for Mr. Munch, but for everyone.
else who had a hand in this production, for it is quite possibly the finest stereo disc of an orchestra that has been made in the U. S. Thanks to an almost complete absence of technical gimmickry, strings for once sound like strings, brasses are round and biting, and the whole sound has the kind of richness and solidity I haven’t heard from a disc since London abandoned the RIAA curve in 1959.

The low end is deep and tightly controlled, and the highs are sweet and extended, with that rare combination of silky sheen and guttiness that can only be reproduced through real top-end response. If there is appreciable dynamic-range limiting on this, I was not aware of it, so overwhelming was the whole effect. Surfaces were so quiet and groove tracing so clean that it was easy for me to forget that I was listening to a disc.

This is one the record industry in general might do well to look to as a new standard of excellence by which future orchestral stereo discs can be judged. J. G. H.

MOZART: Requiem in D minor, K. 626 (24:16).

Berlin Philharmonic Orchestra, Vienna Singverein, Herbert von Karajan, conductor; Wilma Lipp, soprano; Hilde Roesll-Majdan, contralto; Anton Dermota, tenor; Walter Berry, bass. Deutsche Grammophon disc SLPM-138767. $6.98.

Herbert von Karajan and Eugene Ormandy are both superb orchestral technicians, and each is chief conductor of one of the world’s finest orchestras. But while it might seem unduly harsh to characterize each as a first-rate conductor of second-rate music, it is nonetheless true, I feel, that Mr. von Karajan is more successful in Alte sprach Zarathustra than in the Brahms First Symphony, and Mr. Ormandy more successful in the Rachmaninoff Symphonic Dances than in the Eroica.

It is a pleasure, then, for me to be able to greet this new recording of the Mozart Requiem with more than anticipated enthusiasm. And while I feel that there are other conductors who have spoken more eloquently in some sections of the score, I find Mr. von Karajan’s reading deeply moving in its dignity and superb in total effect, even though I have heard from him performances of greater excitement and tension. He has at his disposal his own great orchestra, the Viennese choir rises notably to the challenge (although we wish the basses were a bit stronger), and the soloists, while not uniformly of the quality set by Mr. Dermota, are at least adequate. However, Miss Lipp’s troubles with pitch, particularly at her first entrance, are not easily overlooked.

This recording does a remarkable job of capturing the massive spread of sound provided by the orchestra and chorus, and the soloists are for once in proper perspective; they are neither too close to the listener, nor are they buried within the ensemble. The directionality of the choral pickup approximates what one might hear in the concert hall, but although an organ is listed among the performing forces, it is very nearly inaudible, and I miss its underlining of the harmonies. All other aspects of this production are praiseworthy. Surfaces are quiet, and inner groove distortion is virtually non-existent, even though side 2 runs to over 26 minutes. Low frequencies are firm and strong and have recognizable pitch. J. W. K.

LEONYTNE PRICE: Swing Low Sweet Chariot. Fourteen Spirituals (41:42).

Leontyne Price, soprano; Orchestra and Chorus directed by Leonard de Pau. RCA Victor disc LSC-2600. $5.98.

This collection of fourteen spirituals is a moving testimonial to the superb artistry of Leontyne Price, and at the same time a disturbing documentation of some of the tasteless practices that are so characteristic of the recording business today.

I find nothing that Miss Price has yet committed to records superior to this. But how an artist of her stature and obvious sensitivity can condone the rank commercialism of such orchestral-choral backgrounds as these is beyond my ken. The persuasive power of the RCA Victor promotion department must be very strong. Don’t, however, let this dissuade you from acquiring this disc. As far as I’m concerned, it is definitive, despite the arrangements.

Technically, the recording is well accomplished. Miss Price is placed in the ensemble with just enough prominence to highlight her position as soloist, although there is no sense of stereo spaciousness surrounding her voice. Orchestra and chorus, however, are recorded in such a way that we do know we’re listening to a stereo disc, and also that the chorus is not very good. But what they have to do is not important anyway, so it matters little.

RCA Victor’s surfaces, while not the best in the business, are quiet, and inner groove tracking problems are minimal. J. W. K.

SZELL CONDUCTS WAGNER

Tristan und Isolde: Prelude and Love Death (16:55); Die Meistersinger: Prelude to Act 1 (9:30); Tannhauser: Overture (13:20).

The Cleveland Orchestra, George Szell, conductor. Epic disc BC-1245 $5.98.

As I listened to this new Wagner collection I was again made aware that the only reason for an orchestra’s and a conductor’s existence is to serve the composer, and that whenever the listener is made more aware of the performers than of the music, he and the composer are being sold short. I have heard more overly passionate performances of the Tristan music than this one, and weightier ones of the Meistersinger and Tannhauser excerpts, but never have I heard anything in which I was more conscious of the greatness of the composer, the beauty of the scoring, the warmth and humanity of the music and, last, as it should be, the sovereign integrity of the performers.

I wish I could be as enthusiastic about Epic’s recording, but this Columbia product exhibits several of the failings I have noticed in other Columbia releases. The dynamic range is limited, with no true pianissimos, there is inner-groove distortion in the Tannhauser Overture, and the emphasis placed on the upper strings is a misrepresentation of the orchestra’s true sound. Low frequencies are not clearly defined, which results in muddiness in the tympani and low strings.

On the credit side, I found the directionality to be effective, without undue emphasis of right and left, and the over-all mixing was tasteful and unobtrusive. There is little spaciousness, though, and little sensation of depth to the orchestra, except for the excellent perspective given the brass and percussion at the rear of the orchestra. J. W. K.

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highly enthusiastic about the new speakers, but the "official" U.S. reaction has been more tentatively favorable, perhaps because our audio press doesn't understand just what the new cone material does for the dynamic speaker.

All the designers are working with the same material: some form of expanded polystyrene. It is available in a wide variety of densities and textures, it does not absorb water in damp weather (as does paper), it does not dry out and become brittle, and it is chemically very stable. It can be molded, turned, or formed into practically any shape, and it can be chemically treated during manufacture to provide virtually any frequency or damping characteristic. But its most attractive feature is that it can be made far more rigid than the same weight of paper. Hence, it can be both lightweight and stiff, to yield much better piston action than the best of the paper cones.

Let's look at some of its currently available forms. Electro-Voice's 30-in. woofer has the standard cone shape. The Jensen POLYTEC woofer uses a hollow "cantilever" plug, with a shallow conical rear and a flat front surface that is driven from around its edge. Jensen's tweeter has a POLYTEC cone of fairly conventional shape, while the super tweeter has a convex dome-shaped diaphragm that is driven from its outer edge. The British IMF styrene woofer's radiator is conical at the rear, convex and dome-shaped in front, and of solid foam all the way through. The Leak "sandwich" is conventional in shape, but its cone is of 3/8-in.-thick styrene foam covered with duraluminum foil. The British KEF woofer (soon to be available here), and the GE-GO Orthophase speaker are "sandwich" systems — flat on both sides, and driven over their entire front surface by a system of duraluminum ribbons.

All polystyrenes do not sound alike, but they do share a certain clarity and freedom from the turgid, mushy coloration of the small-box wide-range paper-cone systems. Indeed, they sound much more like electrostatics than do conventional dynamics, and have a quality of crispness that we used to associate only with the large horn or reflex-loaded systems. The reason is obvious: the electrical energy is being used for sound production, rather than for cone flexing.

An A-B comparison with a paper-cone speaker reveals another interesting difference: the polystyrene's superior rigidity and lower mass allow it to reproduce more of the program's dynamic range, because so much less of the voice coil's movement is lost in flexure of the polystyrene cone.

Are polystyrenes here? Definitely. However, as is true of electrostatics, the good ones are expensive. There are still some design and production problems that must be ironed out before they can be made well and cheaply, but as the techniques are perfected, we can safely predict that all high-quality loudspeakers will eventually abandon the venerable, obsolete paper cone.

The Forum (from page 9) rim — were tried in an effort to combine the advantages of lightness and stiffness, but they suffered from the disadvantages of both. Their upper-range response was poor, and they, too, failed to operate like the ideal piston radiator.

Polymerized paper, light in weight but stiffened with a plastic impregnation, was a step in the right direction, but it tended to ring at certain frequencies, coloring the sound.

Impregnated linen cones with corrugations or spiral compliance rings, cambric cones with "dimples" on them, and thin metal foil cones all showed some promise, particularly the metal foil design, but the best of them were prohibitively expensive.

One of the most successful papercone variants was the brainchild of Arthur Janszen, who needed a woofer to complement his electrostatic tweeter. Instead of thickening the cone paper, he reinforced it with a large conical "plug" of light, rigid polyurethane plastic. The woofer came closer to matching the electrostatic's clarity than had anything before it, and is still used with Janszen-designed electrostatic tweeters in systems made by Neshaminy Electronic Co.

Another engineer named Paul DeMars attached a foam plastic extension to a standard paper-cone woofer, to yield a 30-in. job whose main shortcoming was its lack of consumer enthusiasm.

Research into the full possibilities of other cone materials was not, however, the kind of project that the average speaker manufacturer could undertake. Most of them had been buying their cones and magnets ready-made for assembly, from the few suppliers of such items in the U.S.A. and Great Britain. So the initial research into new cone materials was done by the large speaker manufacturing outfits.

By late 1961, Electro-Voice was ready to announce a 30-in. woofer incorporating a radically new cone material: polystyrene foam. Almost simultaneously, Jensen unveiled their POLYTEC speakers, also with expanded (foam) polystyrene cones. Meanwhile, two British firms were announcing the fruits of their efforts along similar lines. Leak with a "sandwich" speaker, and ROLA CELESTION with their "Colauido" speaker. Other designs followed.

In England, reviewers were
Out-of-Town Address

Sirs:

Why are you publishing The Stereophile out of Wallingford, Pa., when the center of the hi-fi business is New York?

H. C. Maynard New York, N. Y.

Because we live here, and because we think New York is a wonderful place to visit, particularly during one week in October.

Positive Feedback . . .

Sirs:

I need another magazine like I need seven toes on each foot. Your announcement, however, is irresistible, and I am compelled to send my check — very reluctantly, you understand — for enrollment as a charter subscriber.


Sirs:

It is about time we had an independent publication, free of advertiser pressures, which can publish the truth concerning hi-fi equipment and thus enable the tyro in the game to avoid purchasing some of the junk that now floods the market.

Here's wishing you the best of luck with your publication.

Prentice E. Edrington Washington, D. C.

Our thanks to the above and to the others whose support, tangible and moral, is helping to get this operation off the ground.

. . . And Negative

Sirs:

You are out of your minds. Your magazine is a failure before it starts, and I'll tell you why. First, everyone knows the hi-fi fad is dead. The do-it-yourselfers who used to sustain hobby magazines like AudioCraft have turned to other, newer ways of wasting time and money. The only people buying hi-fi now are music lovers, and they don't care a hang about tubes or volts or decibels.

Second, you should know it is not possible for a magazine to exist without advertisers. Even the Reader's Digest, with its millions of readers, was finally forced to take advertising, so what makes you think you won't have to?

And finally, the last thing this business needs right now is a publication that is going to criticize what the manufacturers do. The hi-fi industry is supposed to be in trouble already. Your condemnations of it can only worsen an already bad situation.

R. Johnson Newark, N. J.

You forgot to enclose your check.

Technological Regression

Sirs:

I had an early copy of the London disc of Britten's Young Person's Guide to the Orchestra that I played to death because of its rich, warm sound, so I was happy when London re-released the thing on their Richmond label. But when I played the new disc, I felt sick. London's engineers have thinned out the bass and added a horrible shrillness to the treble on the remastered disc, so it sounds worse than my old, beat-up copy. Is this an advancement of the audio art, or does someone at London records have a perverse sense of humor?

William Barnes Houston, Tex.

This is known as tonal enhancement, which is another way of saying that the disc will sound better than most on most of today's low-fi phonographs. See the editorial on page 2.

Why Not?

Sirs:

Why can't someone devise a satisfactory way of producing pre-recorded tapes, so we can listen to some of today's finer singers without an accompaniment of distortion? I'm sure, for example, that RCA Victor's master tape of Turandot doesn't sound as poor as the four-track copy I purchased.

I noticed with amusement a recent audio advertisement that asked: "Are you being cheated?" In my opinion, we sure are.

Lt. John H. Westerbeke, Jr.
New York, N. Y.

There's nothing wrong with the tape duplicating process, but it is harder to maintain the same quality control with tapes as with discs, because they cannot be visually inspected for flaws. Bounce your Turandot, or any other defective tapes, back to the manufacturers for replacement.

How to Write (from page 8)

Nouns are risky, as there are dictionary definitions of most of them, and the courts are happy to supply definitions where none already exist.

The Endorsement

The fact that some celebrity owns and purports to like your product will be highly persuasive to people who can't make up their own mind, but unsolicited endorsements come few and far between for the maker of the mediocre. There's a way around this, though. Some celebrities can be bought, if you can meet their price. Most, however, are leary about endorsing products they've never heard of. But if you would care to donate one of your products to them, they won't be adverse to posing in a picture with it and allowing you to state that they own the product, which indeed they do.

The Junk Product

You may never be faced with the problem of advertising a truly worthless product, but it happens occasionally to every practicing ad writer, so you should know how to cope with it when it comes along.

The secret of this kind of ad is: The worse the product, the more flamboyant the ad must be. Flamboyant ads will repel intelligent people, but they won't buy the product anyway, so to heck with them. Aim your ad at the clod mentality.

The clod can read, but he swore off it ever since high-school English class. So don't give him text ads. Give him the loudest display ad you can dream up. Use a gaudy picture — preferably in several colors including red — and use vibrating circus-billboard type to get across your message.

A little market research will help here, to clue you in on your prospective buyer's most pressing needs and desires of the moment. These are known as appeals. Some effective appeals are those pertaining to money (Save, save, SAVE!), prestige (The finest homes have . . .), comfort or pleasure (Satirate your sensibilities!), and the herd instinct (You gotta have it 'coz everybody else's got it!). Appeals sell products, so be appealing.

Finally, a word about evaluating your work. Anyone can write an ad, but a good ad is more effective than a bad ad. How can we tell whether or not an ad is a good one? This is easy. If it sells the product, it's a good ad. It's that simple.
Phasing Stereo Headphones

It seems reasonable to assume that if a stereo headset is purchased with plugs already installed, and is connected with the plug barrel grounded, the phones will be connected in-phase. A reasonable assumption, but not a safe one, because a number of the stereo headsets in use and on dealers' shelves are out of phase.

When stereo phones are correctly phased, monophonic signals, and the center components of stereo signals, are heard as coming from right inside the head, on a straight line between the two ears. When the phones are out of phase, this inside-the-head illusion disappears, and all sounds appear to come from beyond the phones themselves. The difference is readily detectable when the phasing is switched in and out, but not every system is equipped with a phasing switch, and besides, there's an easier way to check headphone phasing.

If both of the phones are placed like loudspeakers, side by side and facing in the same direction, any electrical impulse will move both diaphragms in the same direction, in synchronism. But since headphones are normally oriented face to face, this correct-phasing condition will cause the diaphragms to move in opposite directions — toward or away from one another, depending on the polarity of the impulse.

When the head is removed from a headset, and the phones placed against one another, the reciprocal movements of in-phase diaphragms will change the spacing between them, compressing and rarefying the intervening air, and forcing sound waves from the gap between the phones. If the phones are out of phase, the diaphragms will just vibrate back and forth in synchronism, pushing the air between them from side to side without disturbing its pressure. This is how we can check phone phasing without reversing phase.

With a monophonic signal feeding one phone at moderate volume, hold both phones face to face, with a nickel stuck between their rims to provide a small air gap. Place the gap as close to your ear as you can get it, and then connect the other phone to the signal source. If they are in-phase, the sound issuing from the gap will get slightly louder. If they are out of phase, the sound will diminish noticeably in volume when the second phone is connected.

To change the phasing of phones that have separate plugs, just reverse the connections at one plug or at one phone. If the phones have a three-circuit cable and plug, the reversal will have to be done right at one phone. And if one of the phones has three wires connected to it, make the reversal at the other phone, to avoid confusion.

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Tinnitus for Tin Ears

Do your ears ring? Persistent tinnitus, or ringing in the ears, is sometimes a sign of impending ear trouble, and should be investigated.

A checkup by an otologist or a good ear-nose-and-throat specialist may prevent permanent impairment of the final link in your hi-fi system.

Huzzah?

The Stereophile is the only audio publication that carries no advance information about the New York Audio Show. This sort of thing is straight news reporting, and the other publications do it so thoroughly that we see no need to devote any of our space to it.

We will, of course, be at the show, with eyes and ears peeled, and will report our reactions to the exhibits in the next issue.

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In the Next Issue:
The IMF Synergy loud-speaker system and the B & O stereo microphone.
Reactance vs. Frequency

To determine the resonant frequency of an LC combination, or the reactance of an inductor or capacitor at any frequency, locate the intersection of the lines for the two known values, and read the unknown value from either of the other two lines passing through that point.

(Courtesy of Bell Telephone Laboratories)