

# all about Stereo

BY JOHN CONLY



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### *A Personal Remark from the Author*

Let us be frank with one another at the beginning, so that this booklet may be of real use to you. It is true that I am being paid to write it. It is also true, though, whether you have ever realized it or not, that no reputable critic and commentator will falsify opinions or fake enthusiasm in any writing to which he signs his name. His reputation is far too valuable to him and, candidly, assignments are not that hard to get. I am honored to work with Bell Sound; it is an old house as this business goes, with a most enviable history of honesty and ingenuity. But if I speak strongly or warmly hereafter, it is not because Bell bade me to, it is because I feel that way. So:—

## Why Stereo . . . for You?

**S**TEREOPHONIC SOUND is the most important thing that has happened to home music since electrical recording began. It is far more revolutionary in its effect than was the vinyl micro-groove LP record. When well conveyed — from a good recording, through good equipment — in a living room, it is positively electrifying; there has never been anything like it! The musical performers, *and the hall they are playing in*, are often more truly with you than if you had taken yourself downtown to hear them in reality. Lately, still doubting this slightly, I drove 125 miles to make the comparison. I went to hear the Juilliard String Quartet in their auditorium at the famous Juilliard School of Music. Then

I drove back home and turned them on in my own living room. There was not even margin for a split decision. The living-room stereo won on every count, from the cello's most sullen shudder to the first fiddle's most angelic pianissimo. There is always something happenstance about actual concert listening. There is never anything happenstance about a good stereo recording or broadcast. Experts have made sure that you get the best seat in the house, and that the house acoustics are behaving well. Truly, when a good stereo performance begins, you have the feeling that you literally want to *face* the music. Nor need it be music. Recently I came upon a stereo recording of *Romeo and Juliet* and, I swear to you,

I saw the swords clash, and Tybalt kill Mercutio in the Veronese cobbled square. This is the gift of stereo; it excites the mind's eye through the ears, with a conviction too strong to be ignored, and too exciting to be forgotten, once you've heard it.

Now, as to why this should be so: Let us talk first about the holes in your head, and I am not trying to be funny. What looks sleepily back at you from the bathroom mirror each morning is one of the genuine wonders of the known universe. It is — underneath — an impressive dome of calcium phosphate. Inside it lives the fastest and canniest calculating machine ever discovered; it makes a UNIVAC look like a clacking idiot. It can make more than a billion evaluative connections in a second, while absorbing several hundred new perceptions at the same time. You know what I am talking about. Your brain. This, sir and madam, is why you are uncontested masters of this planet. I emphasize this because it seems to me that people do not ordinarily appreciate themselves as handiwork. It is important to us here, because what we have to do, in stereo, is use our brains to fool our brains. No other device would have a chance.

The clue is in the portals to this ivory palace — i.e., the holes in your head — of which there are several. We are only interested, however, in four, and mainly two. These are the ones through which the brain is fed two major impressions of the outside world — light and sound. And the interesting thing is that for each of these senses, the wonderfully sensitive receptive devices that capture the data are in pairs. *Two* eyes, *two* ears. Why?

It isn't merely so that you'll have a spare in case one gets damaged. The

twin eyes and the twin ears, too, are supposed to work together. There is something two can do that one alone could not.

Let's explain it by the eyes first. Your eyes are about 2½ inches apart, and accordingly, at reasonable distances, they do not see exactly the same thing. When you look at a tree trunk, say forty feet away, the right eye sees a little further around the right side of the bole than the left does, and vice versa. Further, the two eyes will have to converge just a trifle to bring the tree into single focus. All this information is flashed to the brain, and in an instant the tree trunk is known to be (1) round and (2) forty feet away. If it were a *flat* photo in perfect scale, four feet away, it would not for a moment fool the eyes and the brain. Or could it?



Almost! By using two cameras, with their lenses set apart just as the eyes are, and making two photographs, the illusion of distance and dimension can be reproduced. This is managed in the old fashioned stereoscope, and in the Viewmaster transparencies today's children enjoy. The illusion is not perfect, since a separating card must be put between the two joined photos, so that right eye shall not steal any of left eye's picture. In other words, the eyes

must connive a little to yield even a partial belief in the illusion.

Ears have been designed by nature to take up where the eyes fail — in the dark or in the deep woods. Remember that a million years ago the deep woods were full of (a) animals good to eat and (b) animals who thought *we* were good to eat. The ears had to be extremely acute and accurate instruments if we were to survive. We did survive, and the ears *are* extremely acute and accurate instruments. Just the same, they are a little easier to fool than the eyes (not completely, of course, but effortlessly enough so that it's pleasant). This is mainly because they are set further back on the head.

That is where they should be, to do their job properly. Your head acts as a sound-block, to cut off certain sounds which travel directly to the ears, mainly the high tones of music or of any noise. These high tones are directional; they travel like a beam and they don't echo very well. The low tones are much less directional and they do echo well. Thus when a sound is made somewhere to your left and in front of you — let's say it is an automobile horn — your two ears will sense it quite differently. Your left ear will get it full and direct. Your right ear will hear only its low-toned portion, and part of that as it is bounced off the building walls about you. This is quite enough to locate the approaching car and keep you from an untimely grave. But even more is accomplished, because the echoes and resonances will remind you that you are standing in a street seventy feet wide, bordered by high buildings, and with a cross street or alley fifty feet to your right. In other words, the separate hearings of your two ears can give you a sense of enclosure, or dimension. It

is upon this fact that the great satisfaction and easement of stereo is based.

Put this in terms of home music, music in your living room. For many years I lived happily with an ordinary high fidelity set of good quality. The sound came from a single expensive fifteen-inch coaxial (or tweeter-woofer) loudspeaker in a large, nicely polished, triangular wooden structure in the corner. It purveyed the highest and lowest notes I could hear, and with very little distortion in between — no boom, no screech. That's what has been meant by high fidelity. At their best in one dimension, then, I could enjoy the musical ideas of Messrs. Beethoven and Gershwin. At times I could almost persuade myself that I was hearing the music alive. But not quite; my ears were too smart for me. The sound was coming from a fifteen-inch porthole in the corner, and the resonances were those of an apartment living room seventeen feet long, thirteen feet wide, and eight feet high — not Carnegie Hall, exactly. If I tried making myself think it was Carnegie Hall, my ears put a warning into the signal, as engineers say. It is the ears' business to tell you where you are. They will go along with an illusion, if you will, but it's against their principles. The illusion has to be an almighty good one before they will relax and enjoy it. So I had to put up with the realization, always, that I was listening to a phonograph. This has been the experience of many a devoted listener. — Not that I have anything against good high fidelity phonographs. They have been a great boon to us who love music. But now, something drastically better has come along, to give music all its dimensions, and all the force it needs to seize and compel the attention. Stereo!

# A Short Question: How? ...and a Short Answer

THE PRINCIPLE of stereo has been understood for years. In 1935 Leopold Stokowski produced a marvelous stereo concert in Constitution Hall, Washington for the convening members of the National Academy of Sciences. He did it by high fidelity telephony, the source being a live concert in Philadelphia which was transmitted by wire to Washington. The reasons we have not had stereophony heretofore in our living rooms are purely prosaic. Until a few years ago, there simply wasn't material from which to make conventional home equipment that could play stereo. Stereo phonograph cartridges, for instance — the small packages that hold the needle — could not be made practical because the parts were too massive. A stereo stylus, or needle, must be movable up-and-down as well as from side to side, and all those that were tried wrecked the records. Today's elastic plastics were needed. Magnetic tape was better, but not convenient enough for everybody to want. So the technicians in their smocks went to work, and now they have concocted wonderful stereo sounds on tape and records. Applaud them, in your head, when first you hear this wonder they have wrought by hard work.

The stereo principle is, of course,

very simple. You know it already. Two microphones are positioned approximately as your loudspeakers will be positioned. They make two separate recordings. The whole channel of sound-reproduction is dual, from the mikes through your machinery to your loudspeakers. Your two ears are gratified. Now they are doing, happily, their full job. They are hearing *two* dimensions and *two* timings of sound differently, and they are alertly at ease. They know where the French horn is, and where the second fiddles are, and how big the hall is, and where you are in it. There is no more warning of deceit. You are in the presence of the music.

To answer a natural question invariably asked: No, it is not the same thing simply to have two loudspeakers and play regular monophonic records through them. This is a good way to listen, but it isn't stereo.

You really do have to have two of everything in your stereo music system — two amplifiers, two radio tuners, two loudspeakers. It's a quibble to say you don't need two tape recorders and two record players. In both of these devices the doubling is done inside the tone-cartridge. The tape head is not single, it is actually two heads stacked together. The phono-cartridge has two magnetic

coils in it, and its stylus picks up two sound tracks, one from each wall of the record groove. It's the *difference* between the two sound tracks, in all cases, that shapes the music "in the round," as the saying is.

Bear with me one little bit longer, before we get to the matter of picking equipment. I am trying to lend you, for your aid in judgment, part of my hard (and expensively) earned experience. The advertisements almost invariably try to sell you stereo by saying it will show you that the fiddles are on the left and the horns are on the right. That's what they call directionality. And, admittedly, sometimes it is valuable, especially if you are listening to a Bach chorus or a passage by Brubeck, where counter-melodies are being played by the different groups of performers; or to an opera or a musical comedy, where there is dialogue. Outside of such specifics, the main asset of stereo is not directionality. I for one do not care a hoot whether the fiddles are on the left or not. Leopold Stokowski used to put them way up against the backdrop, and people still paid to get in. The main asset is *space*. What stereo does, and in

the most fascinating way, is *add the whole space of the concert hall, or the theatre, to your living room*. And it does it by the simple trick of letting your ears do their whole job. You see, in a real concert hall, your ears are constantly hearing not only the music direct from instruments, but off the walls, on the bounce. And part of their million-year old job is to tell you the size and shape of the place you're in. If you command them to believe that you're in a concert hall, when both are hearing exactly the same sound from the same place — a single loud-speaker—they're not comfortable, and they keep warning you that some fakery is going on. They have to be hearing separately and differently.

Not long ago, I received for review a record of a song recital — a contralto and piano. It was a good recital, but my comment to my wife, who had put the record on, was: "Sounds like Town Hall in New York." She looked at the jacket notes and said: "It *is* Town Hall." That is a true story, and that is what I mean by the reproduction of space. It makes for easy, easy listening. It's stereo — for real!

## Stereo and High Fidelity

PEOPLE who can't think of anything else to say always ask whether there is any difference between stereo and high fidelity. O.K. Let's answer this: To be really convincing, stereo sound must be *good* sound. Low-fi stereo is, to my ears, more painful than single-channel low-fi. Whereby I mean: *don't* forget the principles of high fidelity just because you're going stereo. If you don't know these principles, they're pretty

simple. You want the full range of sound, from top treble to bottom bass, that your ears can hear. Without screech or rumble! Without distortion! Not at all sadly, I will concede that this is likely to cost more money, in duplicate, than did an old-style monophonic set. So what? A stereo high-fidelity array is just as important a musical adjunct to a home as a piano, and you would not expect to get a good piano for \$79.50.

Stereo will bring you the piano and — very much to our point — with Rubinstein or Casadesus at the keyboard. To be quite brutal about this: If you don't much care for music, I cannot think of a reason in the world for your investing in stereo, so skip it. Buy an outdoor barbecue grill or something. If you *do* care about music, and you almost must, and you surely will eventually, invest in stereo. But do it sensibly. Remember that what you are doing is furnishing your home with one of the

great arts, as important to the spirit as vitamins and antibiotics are to the body. Don't skimp, either on money or on planning. Let me add, reassuringly, that good high fidelity equipment lasts almost indefinitely, with the proper care and replacements. I bought a little Bell ten-watt Model 2122 amplifier in 1949, and it is still in service. All it has ever needed have been two new tubes. In the same stretch of time, I have gone through three automobiles.

## Why Components?

**I**N many an American home, let us face it, the lady of the house is boss. In any such home, the musical apparatus (unless Father for once rears up on his hind legs) is going to be housed in a sightly cabinet, styled in French Provincial or Colonial maple, or something of the sort. I have to say I think this is taking a real risk with stereo reproduction. I have heard some single-cabineted stereo that sounded good, but most of it didn't. This is not because it was single-cabineted, but because the single cabinet, when brought into the living room, was put where it *looked* best, without much regard to where it would *sound* best. Almost always, where it would sound best is cat-a-cornered in a corner, and it is a very rare wife who will permit any such positioning. In fact, a wife who'd consent to this probably also would go along with separate audio components, so the situation wouldn't be likely to arise.

I favor movable loudspeakers. They let you experiment. Further, in this day and age, flexible loudspeaker placement is not likely to constitute a sin against

sightliness. There is on the market a considerable variety of so-called "compact" loudspeaker systems, adequate in the bass range and not big enough to disturb any living room's decor. They can be easily recessed in a bookshelf. Some, I know, have even been built into a wall. Then there is always the conventional kind which stand on the floor.

This same factor of sightliness is apropos when we consider electronic components — amplifiers, radio tuners, and so forth. Time was when they looked rather hellish. Their bottom parts were all painted grim battleship gray. From their tops protruded large glassy tubes which glowed purple in the dark. From their rears and flanks streamed dreadful clusters of braided cable, sometimes adorned with little multi-colored resistors and blobs of solder. The whole effect was that of a mad scientist's den in a B-movie. Small wonder that the tortured housewife did not want this on display in her living room, however loud and clear it may have sounded.

Those days have gone. Today's am-



plifier, or tuner, is discreetly finished off in handsome leatherette or brushed gold. It is sleek and flat, easily conforming to placement in a bookshelf. Or right out in the open, if you prefer. It looks quite as sedate and elegant as your unabridged Webster dictionary, which you wouldn't think of hiding. Its wires emerge secretly from behind and can be led behind the bookshelf or under the carpet. Furthermore, you can do your tuning, sound-balancing, and so forth, at a listenable distance from the loudspeakers, so it need only be done once. No more loping back and forth between the console and the middle of the room.

I'll concede that a record turntable or changer still looks kind of mechanical. This is a self-solving problem. A changer or turntable ought to be in an enclosure with a lid, unless you live in the country. Otherwise it is going to collect dust and grit, and these are going to cut your records' life in half. So, this item is not on view.

The other — perhaps the main — point in favor of individual components for your stereo high fidelity system is flexibility. I will give you one instance. Stereo is now being broadcast by good-music stations in many a big city every evening through the week. The same station broadcasts two sound-channels — one on AM and one on FM. I have listened to a lot of these broadcasts and they are very satisfactory, especially when the source is live music played in the studio. The FM is, of course, higher in fi than the AM, which is subject to interference and does not have the tone-range of the FM. Still, good. And there is going to be more and more stereo broadcasting as the stations receive stereo discs from

the recording companies. So it makes sense to have independently operable AM and FM tuners. That's for now. Within the next two years, the situation is going to change. The Federal Communications Commission is going to license a broadcasting technique called Multiplex. Using Multiplex, a station can broadcast two or more FM signals on the same wave-band. In other words, dual FM stereo from the same station will become a fact. At that juncture, you will want to do something about replacing your tuner or, more likely, adding to it a Multiplex adapter, which will cost about the same as a UHF adapter for TV. If you have a ready-made console set, this may cause you trouble. There may not be room for the Multiplex adapter, and, if you dispose of your old tuner for a whole new one, it probably won't fit the existing hole in your cabinet. You'd undoubtedly be better off if the whole array were lying free on a bookshelf, so you could substitute any new component for an old one with nothing more than a screwdriver to detach wires. See what I mean by flexibility?

One more caution to the person who wants to buy his stereo high fidelity all in a single cabinet. This is a little technical (not very), so pay attention. Loudspeakers have to be firmly attached to the walls of the enclosure through which they project their sound. And in projecting their sound, they shake a lot of air, don't forget that. And when they shake that air — to shake your eardrums, and give you sound — they also shake the enclosure, unless it's made of brick or concrete. Touch a loudspeaker enclosure at work. Your fingers can feel the vibration. Herein lies a danger if your record player is mounted in the same cabinet with the

loudspeakers. The phonograph pickup also works by vibrations. Ideally, the only vibrations it gets are those fed to its stylus by the wavers in the record grooves as the disc turns, but if other vibrations come its way it will reproduce them as well. In other words, if the speaker shakes the cabinet during loud passages, and the cabinet shakes the record turntable, the stylus will pick up the shakes just as faithfully as if Brahms had written them. It will then send them on to the amplifier, which will magnify them and send them back to the speaker, where they came from in the first place. The speaker, being just as stupid as the pickup, now will produce them in double strength and send them back through the cabinet to the pickup, and then . . . well, I could repeat this all day. The point is, it is something that really does happen, and

something to be avoided. To keep the speaker vibrations from feeding back to the pickup, a very, very good spring suspension for the record-player is a necessity. Never buy a single-cabinet sound system without testing it first for this bothersome phenomenon, which is technically referred to as *acoustic feedback*. If you want to be absolutely safe from it, don't have a sound system in which the loudspeakers and the record player inhabit the same cabinet. I've done it, but I won't say I got good results until I had incorporated rather a lot of home-made improvements. Stereo has made the acoustic feedback problem more acute than it used to be. In the old monophonic set-ups, only side-to-side vibrations were sensed by the pickup stylus. In stereo, up-and-down vibrations are sensed as well, which doubles the hazard. Be warned.

## What Components?

Now I address mainly the people who intend to get component stereo high fidelity. Readers who are still intent on ready-cabineted sets may as well stay with us, though, since the components we will discuss are the same as may go into a console.

I will not here try to tell you what components to start with, if you intend to build your stereo array bit by bit. I will simply describe the devices that bring you music, beginning at the source and ending with what is propelled to your ears.

### FOR STEREO ON RECORDS

Probably most people will think first of records as their prime source of stereophonic music. I know I would. Records give you a choice of what you want to

hear when you want to hear it. They are reasonably inexpensive. They are easy to handle, and they are familiar.

There are two mechanisms with which you can play stereo discs. One is a record changer. The other is a combination of a precision, single-play turntable and a custom tone-arm. In both cases, of course, a stereo pickup cartridge must be used. A stereo cartridge will play all, or nearly all, of your regular high fidelity LPs quite satisfactorily. The converse is not true: a regular monophonic tone cartridge will *not* play stereo discs very well, and it may ruin them. Its stylus-tip is too big for their grooves.

I'm a little in favor of plain turntables over changers. Some changers



Record changer . . .



or Record player?

are very good, but they have one weakness in common. The tone arm, as it moves in towards the label and the last few grooves, has to push a trigger that will start the changing mechanism. This didn't matter terribly with monophonic discs, but on a stereo disc one sound channel is engraved on one side of the record groove and the other on the other. Thus, if the tone-arm is hampered in its inward movement, you are going to hear all your finale from one loudspeaker only, a disappointing way to end a piece of music. Good and well-conditioned changers don't do this, but some do. A single-play turntable won't. Furthermore, I willingly plead that I do not see the use of changers today. Maybe I am not typical, but I do not care to hear the first movement of the Mendelssohn Violin Concerto, and then the first movement of the *Unfinished Symphony*, and then three waltzes by Strauss, and then the first half of *Destry Rides Again*. I'd rather

hear the whole thing through, be it Schubert or *Destry* (a wonderful record, by the way, the best and funniest musical-comedy stereo I've heard), and this means that when Side 1 comes to an end, after a half-hour's sitting and listening, I get up, turn the disc over, and play Side 2. I don't feel that this strains my athletic abilities unduly. It is only eighteen feet from the sofa to the turntable. Of course, I do not give bridge parties, so I have small use for background music, meaning music to which one does not really listen. Some people use both a changer and a precision turntable, one for Mantovani and card parties, the other for Bach and Beethoven. Not a bad idea.

Addendum: I did not, when I went stereo, throw away my old cartridge that plays standard LPs and 78s. My tone arm has easily detachable heads, in one of which I installed the old cartridge. Thus I have not wasted the \$30 I spent on diamond points for the older records. And I am giving extra life to my stereo diamond. Stereo styli have smaller points than the old LP players had, and accordingly they wear out a little more quickly. (Yes, I am stingy.)

Last word: Watch out for rumble, whether you are buying a changer or a single-play turntable. Make the salesman demonstrate the machine, and ask him to turn the treble all the way down and the bass all the way up. Also, ask him to play several records. If you hear a profound bass rumble synchronized with the turn of the turntable, put your foot down and say no. Rumble is not only ugly to hear, it uses up more than half the power of your amplifier, trying to produce inaudible bass sounds, so that the power left over for your music will be inadequate, and you will get woeful distortion.

## RADIO TUNERS

If you live in a metropolitan area where there is a so-called good music station, it will send you stereo via FM and AM simultaneously, which I have already described. Accordingly it makes sense to buy an FM-AM tuner with *separate tuning facilities*. By this I mean, you should be able to tune in AM and FM programs separately and at the same time. You can use the halves of the dual tuner individually, too, of course — the



Radio tuner connects to stereo amplifier. Separate AM and FM bring you stereo broadcasts.

FM to furnish a subdued *Nutcracker Suite* while the children's denims are being mended, the AM to bring you Floyd Patterson's defense of his title when the TV coverage is cut off. Be sure that the FM tuner is equipped for hook-up to a Multiplex adapter when the FCC finally OK's Multiplex. By this process, a station can broadcast FM on two channels at the same time. (That may be the most vivid stereo of all.)

I am reminded that the word "tuner" is not self-explanatory to everyone. A tuner is simply half a radio receiver. It can pick up and organize radio signals, but not make them into sound. You hook it into your amplifier, just as you would do with a record player.

If you happen to live in some remote fastness where there is no FM, to be frank, I wouldn't buy a radio tuner at all; I'd buy a tabletop AM radio. Most

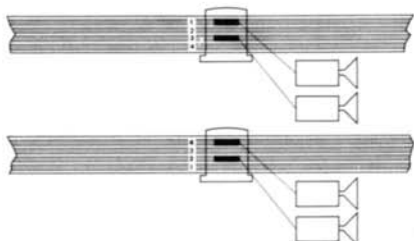
AM radio transmission is not good enough to merit high-fidelity reproduction. And anyway, I do not know that AM tuners, without amplifiers, are being manufactured, at least in this country.



This is what father likes: the reel-to-reel stereo tape transport, whereby he can make his own stereo recordings.

## STEREO ON TAPE

Stereo for the home began on tape — two-track tape traveling at  $7\frac{1}{2}$  inches per second. It was very good but it was awfully expensive. A Beethoven symphony cost nearly \$20! Then came stereo discs, selling the same minutes of music for 75% less, and the floor fell out from under the tape market. The tape makers have achieved a comeback. They have done this mostly by making *four-track recorded stereo tape*. One pair of tracks travels one way, to give you the equivalent of one side of the record, then you turn the thing over and the other pair of tracks plays you Side 2. For people who are all thumbs when it comes to changing tape, the



How four-track stereo tape works: in one tape direction, tracks 1 and 3 furnish your pair of stereo sounds. Turn the tape over to play in the other direction — and you get 2 and 4.



Women and children first? Revolutionary new cartridge tape is actually easier to play than discs. You just slip it in and flick the switch.

tireless manufacturers now have come out with tape-loading cartridges. These work like home-movie reels. They don't need threading, you just shove them into the machine and they play themselves. They spin at a  $3\frac{3}{4}$  inches per second, and it must be admitted that their fi is not so hi as that of the  $7\frac{1}{2}$  ips reel-to-reel tape. (There is very little initial difference in fidelity between discs and  $7\frac{1}{2}$  ips tape; the tape's main advantage is that it doesn't wear out.

Prices also are competitive, tape usually running slightly higher than discs.)

A use I put my own recorder to, incidentally, is record saving. When I get a new record I am especially taken with — especially if it is a loud one, and looks as if it would wear out quickly — I make a tape-copy of it, and then stack the disc away after one playing. When I've heard the performance to satiation, I use the tape again for my next favorite. In the same way, you can copy your favorite stars' broadcasts off the air.

If you intend to do any home recording — which is fun, and you can get a pair of ribbon-type microphones quite cheaply — you probably will want a reel-to-reel machine that can record two-track as well as four-track. That is so you can edit, with a pair of nail scissors. Editing four-track is a fiendish proposition, since something you don't want will be side by side, on the same stretch of tape, with something you do want. Making home stereo recordings is, incidentally, a fascinating occupation. I have some invaluable tapes of my wife reciting poetry, my neighbor's children singing songs they made up, a witty friend telling jokes, and gay colleagues gossiping at a cocktail party. (I tried to get the cat purring, but he has mike-fright.)



New tape-cartridge components play the tape you never have to touch, provide up to an hour of stereo music on easy-load tape cartridges. So easy, a child can do it — and this picture proves it.





simplest part of a high fidelity stereo system to deal with. The amplifier is what takes the tiny electrical impulses from the record-player, tape-player, or tuner, and beefs them up enough to vibrate and control loudspeakers. The qualifications for amplifiers are two: (1) power, and (2) freedom from distortion. The power you need is dictated by the size of your listening room and the kind of speakers you use. If you use an efficient speaker (and efficient doesn't invariably mean either good or bad) and have a small living room, 15 or 20 watts per channel are surely enough for you. The ordinary recording won't use but a fifth of their power (though, like horsepower, it is good to have the rest in reserve). There are, however, some loudspeakers very popular today which use sealed air pressure behind the speaker, in the enclosure. Loudspeakers move a lot of air — to excite your eardrums — and take a lot of pushing — real power; sometimes as much as 30 watts per speaker. Don't worry if you don't know what a watt is; just remember the figures. Some speakers, which come in their own sealed cabinets, are deceptively small, and look as if they

would need only moderate-powered amplifiers to drive them properly. It isn't so. Shop with a wise and honest dealer, who knows what he's talking about, and buy your amplifiers and loudspeakers together and according to his recommendations, so that you will be sure they fit each other in performance.

#### LOUDSPEAKERS

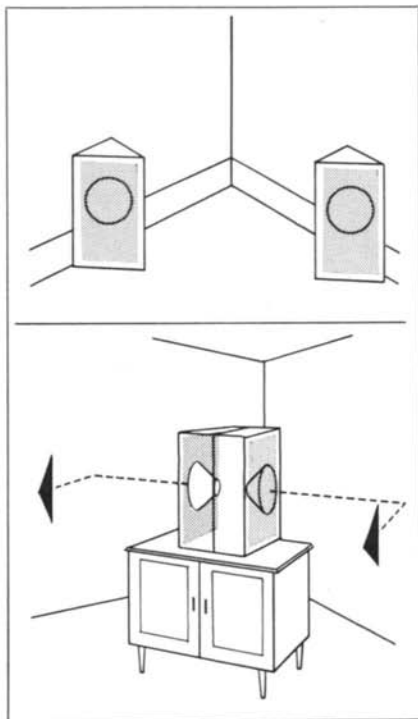
Now the rehearsal is over, and we are ready for the performance. And, as is commonly the case in such crucial undertakings, you are on your own. The way to choose loudspeakers is: listen to them. Whatever engineers say to the contrary, loudspeakers have personalities. Some please you and some don't. Some fit some rooms and others don't. Here your intuition must come into play, and it has a complicated problem in its way. The loudspeaker is part of the acoustics of your room; it must fit the room, and together the two must fit your taste. When they do, they will furnish an everlasting delight. Accordingly, you do not buy loudspeakers in a hurry (unless they, or your room itself, are not going to be part of your environment for very long).

I have nothing against midget loudspeakers, of which there are a great many. They are a temporary expedient, but their phoniness (in the bass range, particularly) is a sort of brave and honest phoniness; it will yield a stereo conviction until the time comes to change.

In what we call the intermediate price range, as regards loudspeakers, I am an ultraconservative. By the intermediate price range, I mean between \$50 and \$85 per speaker. There are in this range a number of small two-way loudspeaker systems, incorporating tiny

tweeters for treble and larger woofers for bass, with a condenser rigged between so the little tweeter doesn't tear itself apart trying to reproduce big, slow, deep bass notes. Some of these are quite good, and they all come ready-cabineted. However, my inclination is to get instead one of the least expensive of a really fine line of speakers, be it only an 8-inch single-cone affair, costing \$30 or so. Have made for it (or do-it-yourself, as the saying goes) a really solid and firm bass-reflex enclosure (bass-reflex means that a frontal port, of approximately the same area as the speaker's face, is cut into the cabinet just below the speaker's own vent) and let this superbly crafted cone handle all the tones that come its way. I'll wager it can. American manufacturers may declare this heresy, but I have a little English cone here that will frighten them off the property. And there are American units of the same high capacity. There is no real substitute for craftsmanship.

Let us consider the placement of loudspeakers. In stereo positioning, a pretty good rule is to avoid symmetry. Don't put the speakers with their backs against the exact center portion of any wall of a rectangular room. Get a little bit off center. Myself, I use a corner for my two systems. The speaker cabinets are triangular, seen from the top, just as if each were a single corner enclosure. However, each has been pushed out of the corner (the same corner) about four feet along the adjacent walls, so that their speaker ports look out in parallel across the room like the headlights of a very wide Cadillac. In the little cubby hole this leaves behind and between them, you can easily put a record cabinet, or your dictionary stand, or something like that.



And the sound is fine. Moreover, corners lend themselves somehow to the illusion that you can see Cio-cio-San, or Bruno Walter, or Erroll Garner, back there somewhere, and this is helpful in stereo listening. There's another corner trick I've discovered, if you want to use ready-cabineted compact loudspeakers. Put them back to back, and on some kind of stand (again, a record cabinet will do) and pull them *straight* out from the corner. Now the loudspeakers will be pointing at the walls, so their beams of sound will hit at 45° angles and be reflected straight out towards you. True, this way you get reflected sound, but if your loudspeakers are inexpensive ones, with an inclination to screech a bit, this is a boon. The screech is lost in the reflection, and the double-dispersion of sound gives very convincing



stereo indeed. Part of the whole reason for stereo is to make you unconscious of loudspeakers; never forget that. From the standpoint of illusion, the worst stereo setup I've encountered was that of a man who had his two speakers flanking the fireplace. It didn't really sound bad, but I kept seeing poor Arthur Fiedler in the middle, being incinerated, like Joan of Arc. You have to give your imagination a little kindly help.

Another bit of advice. Why this should be so, I don't really know; but in stereo speaker placement, for true conviction, it is very important to have the speakers at ear level (sitting-down ear-level, I mean). Fierce audiophiles will tell you that you should have them

at floor level, or screwed to the wall at ceiling level, because thus you will get bass-reinforcement from the floor or the ceiling, as the case may be. Well, the devil take that. Stereo makes sound so real that it can stir conflict in your imagination. If you think Jascha Heifetz needs bass reinforcement, get another set of loudspeakers. But don't hang the poor man from the ceiling like a chandelier, or make him work out of the floor just ahead of your Christmas morocco lounging slippers. Put him where he's believable, standing at the end of the room between the loudspeakers. Stereo comes so far towards making your listening effortless that it would be plain foolish of you not to help it the rest of the way.





## Stereo Conversion

I AM sorry to have left my fellow experimenters till last, but not quite, since they are probably away ahead of me anyway. If you already have a high fidelity rig, what you want to do is duplicate it, if this is at all feasible: Another loudspeaker system that sounds like the one you have already. A stereo cartridge for your tone-arm. Another amplifier as much as possible like the one you own. If what you own already is a console set, the thing to do is see a serviceman and find out if the record-playing apparatus is usable for stereo (not all are). Then go shopping for a second amplifier and speaker combination which sound companionable to the set you have. Bring them home on trial if possible. If you can't find anything that sounds akin to your present set, consider the possibility of using its cabinet to house a new stereo amplifier and of buying a similar matching speaker system, which can be set elsewhere in the room.

You can use two amplifiers sepa-

rately, if you don't mind the work of adjusting their volumes one against the other. However, you can ease your task by buying a stereo-adaptor. Several companies make these. You simply plug your record player, tape or tuner inputs into the adaptor, and connect the adaptor into the two amplifiers. It isn't hard. Thereafter, you can control your volume, channel balance, and so forth, through one set of knobs instead of two. Alternatively, you can make Bell Sound very happy, and probably save yourself some time and cerebral strain, by selling your valiant little single amplifier to some deserving college freshman, and for yourself buying a single-chassis dual amplifier, or perhaps even one that incorporates an FM-AM radio tuner as well. It is surprising how compactly and handsomely the makers have been able to assemble this combination of (really) four separate electronic instruments — they take up no more room than a Madison Avenue salesman's briefcase.

# Starting from Scratch

THERE will undoubtedly be a number of people who will make their first high-fidelity venture with stereo purchases, meanwhile turning over their valiant little table-top phonograph to the youngsters, who will dedicate it to the greater glory of Tommy Sands, or maybe even Elvis. So, for your own delectation, and without too vast an expenditure, what do you do?

It depends in some degree on where you live. As I've implied, if you live in a progressive metropolitan area, there probably are good-music stations that broadcast monophonic Cesar Franck by day and stereo Tchaikovsky by night. If you're happy with their choice of listening material, start with a stereo FM-AM tuner and stereo amplifier and speakers. This is the cheapest approach to stereo, by far. Later you can add a record player or a tape recorder or a Multiplex adapter.

Partly, it's a matter of you. I lived several years in New York City, home of the oldest good-music station, WQXR. I loved that outfit, but not always. Sometimes when I really had a reasonless hunger for Bach's Italian Concerto, they would play instead the suite from the ballet *Sylvia*, by Delibes, which left nothing for me to do but go into the kitchen and get another beer.

Therefore, personally, if I were starting from scratch, I would get a record player, a stereo amplifier, and speakers, and let radio fend for itself until I had enough savings for a tuner. I would not skimp on the turntable and tone-arm

and pickup. Without these you have nothing. Get the best. As for amplifiers, they do not have to be tremendously powerful, so long as their production is clean. The loudspeakers can be modest to begin with. A good amplifier driving a modest loudspeaker will sound good. A cheap amplifier driving a high-priced loudspeaker will sound terrible, since all its flaws will be delivered to you with vicious accuracy. Don't buy weird bargain amplifiers made by someone you never heard of. Anyone who makes a good amplifier is going to charge you what it's worth, if only as a matter of pride. A good amplifier is a work of art. I have one made for me together by David Sarser, NBC violinist and sound man for the Toscanini household, and Ralph Ellison, audio enthusiast and author of *The Invisible Man*, both friends. All the wires are laid in parallel and bent, when they need to bend, at right angles. Looked at from the bottom it is really a beautiful thing, and it gives me some of the loveliest music I ever heard. Labor like this is more than labor, it is craftsmanship with pride built in, and it is worth paying for. The high fidelity industry, to my observation, still is populated largely by workmen who have this kind of pride, and their bosses take pride in the pride. It is a very pleasant industry. Excuse this sentimental detour, but once in a while, it seems to me, a certain credit should be extended to people who do things right simply because they should be done right.



Where to put it: — This one's shelved in a den. It has the built-in look without the built-in cost. Second loudspeaker is at right, out of sight.

## Where to Put Everything

Now I have posed a question to which I have no ready answer. This I will say. I am against so-called recreation corners when it comes to music. For stereophonic music, use all the space you have. The stereo effect will add to this, but you must do your part. A symphony cannot properly be cramped into a nook. If you treat it so, it shows simply that you have no idea of what symphonies are for, and that probably you'd be doing yourself much

more good if you went out bowling. Not that there's anything disgraceful about bowling; it's a wonderful sport. My point is simply that either you take music seriously, as something that can seize, drive, and mellow your emotions, or you don't. If you don't, don't bother about stereo or high fidelity. If you do, go at the thing in a big way; it can almost transform you.

As a parting word: manage to place all your components — the record

player, the amplifier, and the tuner, high enough so you needn't crouch to use them. I know of no more disagreeable sensation than trying to find the right band for "It Ain't Necessarily So", in *Porgy and Bess*, while hunkered down and probing in half-light. It wearies guests, too. Use the lower portion of your equipment cabinet, if you use one, to store records, and keep a footstool nearby, so you may sit while you search. Music is supposed to be a pleasure.



Most high fidelity components are designed for quick simple mounting into any space that will hold them. Just cut opening in panel, remove component cover and slide in.



Where to put it? A room divider is often ideal, separating the living area from the play room.



Where to put it? An equipment cabinet does nicely, makes a hit with the lady of the house.



Where to put it? A basement adult game-room may suit well — if no ping-pong goes on there.

## How to plan a component high fidelity stereo system, with your needs, brains, and budget as your guides . . .

Model and Price



Stereo Amplifier

Obviously you need a dual stereo amplifier to begin with. Otherwise, no sound . . . read on!



Speakers

Plainly, too, you need a pair of loudspeakers. Their size may depend on your room . . .



Stereo Tuner or Stereo  
Amplifier-Tuner Combination

Now the yes-or-no, now-or-later business begins. But if you want radio-stereo first, add a stereo FM-AM tuner to your amplifier-speaker array . . . or buy the tuner ready-mounted along with your amplifier, and save space . . .



Record Changer or Custom Turntable

Or you may be out of stereo-radio range, so you'd prefer to start with records. Leave out the tuner, substitute either an automatic record changer or a custom single-play turntable with a precision tone-arm . . .



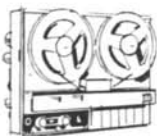
Stereo Phono Cartridge

For either changer or turntable-and-arm, you need a stereo phono cartridge, with a diamond tip. Old-style cartridges won't play stereo records . . .



Stereo Tape Cartridge Player

How about a four-track, easily operated tape cartridge player? It will work through your amplifier just as does a disc changer, and tape and disc recordings cost about the same. There's more musical variety on discs — today — but tape doesn't wear out . . .



Stereo Tape Transport

If you'd like to do some recording of your own, want the highest possible fidelity, and maybe even (sshhh!) think of copying stereo programs off radio or borrowed discs, you may want a two-speed, four-track, reel-to-reel tape deck; little brother to what recording engineers use. There's quite a large variety of music on ready recorded tape, by the way . . .

TOTAL

This page has been put together to help you argue with yourself, your wife, your teenage son, and your neighbor from next door who knows all about stereo high fidelity. The blank column on the right is so that you can list prices of necessary and optional components, add them at the bottom and compare them. It will make you a smarter shopper.

# Now that you know "All About Stereo"

*Wouldn't you like to enjoy  
it in your home?*

WHAT MORE CAN WE SAY about stereo that will make you want to enjoy it in your home? This book, which we asked John Conly to write for us, tells you the most important things you need to know about it. Stereo, after all, is good music reproduced for you with a realism that is difficult to describe — even in a book like this. To enjoy it best, you must listen to it first.

Until now, very little has been known about this wonderful new way to reproduce music in the home. The electronic components, for example, which bring stereo to your home, have been shrouded in a veil of mysterious terms, confused by gadgets and knobs and hidden behind a tangle of connecting cables.

Is it any wonder that so many of our customers are amazed when they finally discover how easy it is to enjoy fine music with Bell stereo components . . . how economical they are to own . . . how simple to operate . . . and how wonderfully they reproduce good music in the home.

Stereo is really quite simple. This book, we hope, has proved it to you. And if, after reading it, you want to investigate further, we hope you will consider Bell stereo components first of all. There are many other brands, too. But, we believe you'll find Bell offers you more of everything you want in a fine stereo system for your home music center.

How will you know which to buy? Before you decide, look for components that are easy to operate; ones that are fun for the whole family to enjoy. Now, try to imagine how they will look in your home. This makes a big difference, too! Finally, sit back, relax, and listen. That's when I am sure you will decide a Bell is best for you.

Here, to help you plan a Bell stereo system for your home, is some additional information . . .

*All about the  
products we make . . .*



## New Bell Stereo Amplifiers

*heart of your music system*

Take your choice of three models: Each distinguished by features, power and price. All play *every* stereo program source—records, radio tuner and tape.

Only three major controls to simplify operation. Bell Model 2440 (above) has the most "professional" features, a big 44 watts for stereo. \$179.95.



**Bell Model 2420** has power rating of 34 watts for stereo, fewer "professional" features, and costs a little less. \$129.95.



**Bell Model 2418** is lowest cost 30 watt stereo amplifier. A remarkable value. Easiest of all to operate. The perfect stereo "starter" set. \$109.95.

*All prices shown are slightly higher west of Rockies.*





## Matching Bell Stereo Tuners

*make your stereo system complete*

With a stereo tuner to bring in your favorite radio program, you can have an unlimited supply of fine music — on FM, AM and through stereo radio programs broadcast on FM-AM simultaneously. The Bell tuner you select is styled to match your Bell Stereo Amplifier. It has a Multiplex output for future adaption to all-FM stereo, when it becomes available.

FM sensitivity of the **Bell Model 2441** (above) at 1.2 uv means you can bring in distant stations *without distortion*. Signal strength tuning meters and

Automatic Frequency Control (AFC) make tuning easy. \$179.95.



**Bell Model 2421** is a lower cost stereo tuner, has sensitive FM section of 1.5 uv; all the basic features you need to enjoy quality reception of radio broadcasts. \$129.95.



A complete music system in one easy-to-use stereo component

## New Bell Stereo Tuner-Amplifier Combinations (all-in-one!)

- Plays AM and FM stereo broadcasts.
- Add record player and Bell stereo tape transport any time.

To begin to listen to fine FM-AM radio music *now*, simply use this new Bell component with speakers of your choice. The **Bell Model 2445** (above) combines a radio tuner and amplifier in one compact component. Power rating of the amplifier is 22 watts each channel. Tuner sensitivity (1.2 uv for 20 db quieting) means you can bring in distant stations without distortion . . . and there are meters for easy tuning. Styling is distinguished by walnut-grain vinyl-clad steel cover, easily removed for panel mounting. Only five major controls, all on one center panel, makes this Bell component easy for anybody

to play. All the professional controls are there, too — for you to use when you want! \$329.95.



**Bell Model 2425** Tuner-Amplifier Combination is easiest to operate . . . medium priced . . . has all the basic features needed for stereo. Power rating is 15 watts each channel. Tuner sensitivity (1.5 uv for 20 db quieting) is finest in its price range. \$229.95.



## Bell Carillon Stereo Components

*for professionals only*

Someone among our readers is sure to belong to the very select group of high fidelity "professionals" who insist that a high fidelity component perform to laboratory standards, and are willing to pay for it! For him (perhaps for you), nothing will satisfy except a Bell Carillon Stereo Amplifier, pictured above. Here, in one superb component is power to spare—a full 60-watts for stereo—and an array of knobs, controls and switches that will bring delight to your hours of listening enjoyment. \$219.95

As a matching component, Bell offers the Carillon Stereo Tuner with

an FM section whose sensitivity provides brilliant reception of distant stations without distortion. \$219.95.



If you already own a component system, perhaps you're ready to graduate to the Carillon class. If not, this is something you can look forward to.



## Bell Stereo Tape Players and Recorders

*wonderful way to play and record fine stereo music*

### **Bell Stereo Tape Transport**

With this professional component for your stereo system, you can enjoy music with new fidelity on two-track and four-track stereo tapes . . . record stereo off-the-air . . . make your own library of stereo music from other stereo tapes and discs. Outstanding features include Record Level Meters . . . Auto-Stop Switch . . . Three Heavy-Duty Four-Pole Motors . . . Matching Stereo Pre-Amplifier. Mounts anywhere . . . Plays in any position. Take your choice of seven models to make your stereo system really complete! From \$129.95 to \$369.95.

### **Bell Stereo Tape Cartridge Players and Recorders**

Wonderful way for the whole family to enjoy stereo . . . with the tape you never have to touch. Flip . . . it's in, Flick . . . it's on! Loads in two seconds. Plays



up to a full hour of stereo music on four-track stereo tape cartridges. Handles easier than a record. Hundreds of musical selections available. Your choice of table models . . . portables with matching stereo speakers . . . add-on units to play through your present music system. Models that record, too, on inexpensive blank tape cartridges. Six models from \$99.95 to \$319.95.

**Only Bell gives you this choice of stereo tape equipment . . . because only Bell has BOTH.**



## Bell Stereophonic Component-Consoles

*the Sound of Stereo . . . in fine furniture to suite your taste*

Stereophonic sound, as you can see, comes in many forms. You can hear stereo on tape, on records and by the use of FM-AM radio. The really wonderful thing about stereo components is that they bring you a *choice*: You can design a system any way you want it. With or without tape . . . with a radio tuner you can have now — or add later . . . with separate speakers you can ideally select to sound best to you. Together, the components you select will be the most economical way to enjoy fine stereo in your home.

If you would like to have your Bell stereo components already assembled

for you in fine furniture (and have space for it) you can buy a complete Bell Stereo Console in which all Bell Stereo Components have been integrated for you with Bell speaker systems. They play monaural and stereo records, stereo tapes, FM, AM, and stereophonic broadcasts. And they are available to you in many fine furniture styles: French Provincial, Danish Modern, Contemporary, Early American. The Bell Chalet (pictured) is styled in lustrous walnut with hand-rubbed oiled finish. Nine other models to fit any home decor, from \$430 to \$1050.

# All About Bell

**B**ELL SOUND was founded almost twenty-nine years ago, in February 1932. The Company's first products were auto radio sets and quartz crystals for controlling frequency of radio transmitting stations. Later, a line of public address equipment was added.

Today, Bell manufactures a full line of stereophonic components, tape cartridge players and stereophonic component-consoles. It is still engaged, exclusively, in the manufacture of electronic products for home entertainment.

As a division of Thompson Ramo Wooldridge Inc., Bell is today associated with a company whose scientific, engineering and manufacturing talents are already pre-eminent in the field of electronics, missiles and nuclear energy. Through the application of advanced research, development and production in electronics for home entertainment, the combined resources of Bell *and* TRW assure that the Bell Stereo Music System you select for your home is the very finest available to you anywhere.

# Bell

*Sign of progress in electronics  
for home entertainment*



Bell stereo components are sold by leading music and department stores, camera, appliance and high fidelity dealers, all of whom will be glad to give you a demonstration of the components you have in mind. Your Bell dealer will gladly recommend the Bell stereo system which meets all your requirements. To help you make a choice, ask him for complete descriptive literature. Or, write us!

**BELL SOUND DIVISION**, Thompson Ramo Wooldridge Inc.  
**Columbus 7, Ohio**



# All About John Conly...

**J**OHAN M. CONLY, who happens to be writing this himself, is a stickler on one point only, and that is his amateur status. He has never had even the slightest formal training in either music or audio engineering. What he knows about the subject he learned by himself, in a thirty-year labor that was no labor at all, since it led to delight. He studied history and, indeed, he taught it for a year at the University of Rochester. Thereafter he became a newspaperman. He was a police reporter, freshly out of the Army, on the *Washington Evening Star*, when the atom bomb went off. Because of an inexplicable lifelong curiosity, he knew what a neutron was; no one else in the newsroom did. So he became an atomic energy reporter. Soon he was lured away by a news magazine as a Science Editor. Meanwhile he was spending more and more of his own time at record collecting and tinkering with high fidelity equipment, an avocation born before the war. He began to write articles on these matters, and, by a process too technical (as they say) to describe here, he found himself shortly the Music Editor of *Atlantic Monthly* and editor of *High Fidelity Magazine*. The latter job he gave up two years ago, though he is still a senior consultant to the publication. In addition to his *Atlantic* editorship, which he still holds, he is a panelist for the Society of Great Music, run jointly by RCA Victor and the Book-of-the-Month Club. He lives in the Massachusetts Berkshire Hills with a wife, who is a singer, and a yellow cat (Rufus), who is an eater-and-sleeper. He says he has no hobbies, because his hobby now is his business.