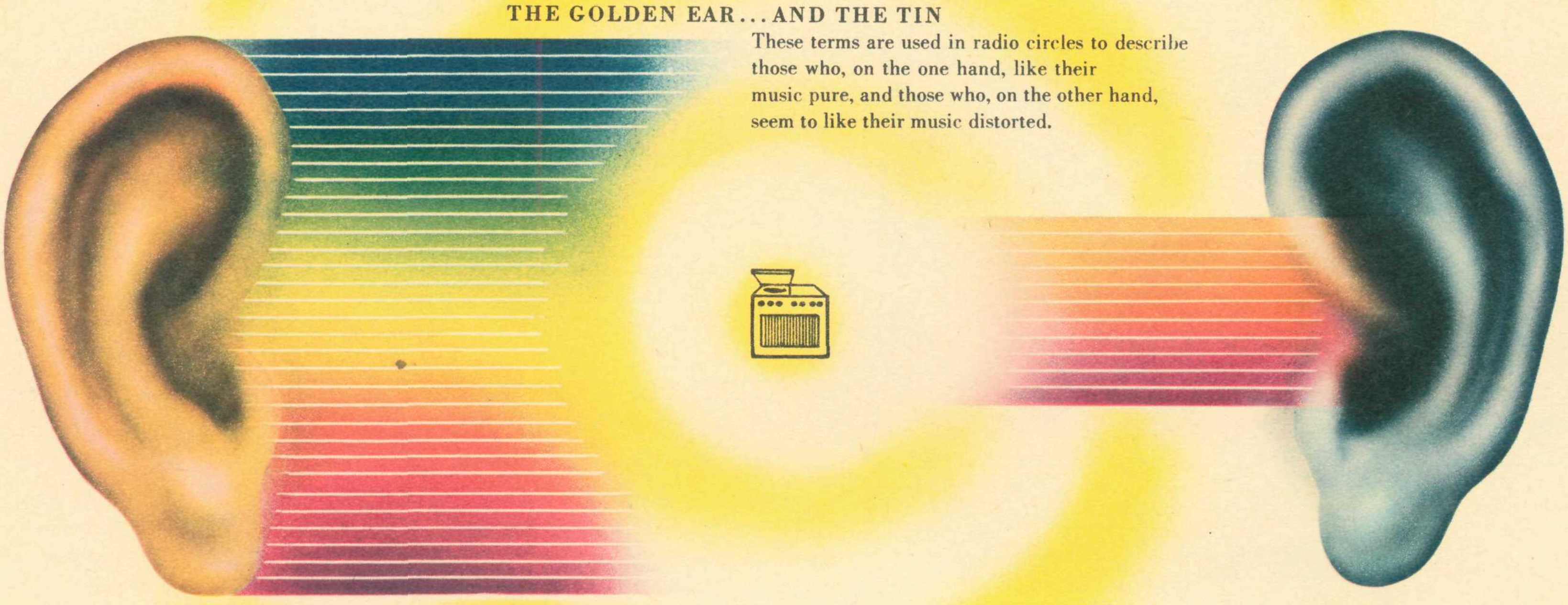


MUSIC FOR THE HOME

What's what with the radio-phonograph combination . . . which sometimes approaches high fidelity, but more often does not. The industry's theme: the public isn't interested.

The immense American musical public is getting a poor deal today in the line of musical reproduction. Millions of American homes have a radio-phonograph combination. It is a well-loved institution, but, as everyone knows, it often has its faults. Sometimes they are strictly technical. The automatic changer may chew Toscanini records to pieces with fearful snapping and crunching noises. The radio crackles like a brush fire with static. Tubes give out, motors stop, other mechanical details get out of whack. Obviously this little domestic temple of the muses, which offers so many different kinds of pleasure from Frank Sinatra to Johann Sebastian Bach, is also a very complex gadget with all the potentials of deterioration and disrepair that complex gadgetry is heir to. But much more important to the music addict is the fact that the quality of the instrument's music is often just not very good. Tones are weak or blurred or unintentionally strident. The bass booms like a jukebox, making an innocent string-bass section sound like a cave of the winds. The various elements of the music are far out of balance—hundreds of dollars of investment do not do very well by W. A. Mozart.

During the war there were many strange and wonderful rumors of a new era in household music. New processes, developed for the military, were about to revolutionize the situation. Tone was to be lovely and untrammeled. Recordings on paper tape would sell for a fraction of the cost of ordinary disks. Recordings on steel wire would eliminate the whole cumbersome business of phonograph records. Recordings on Celluloid film would make possible hours of music without a break.

The answer to all that is no. Few of the mechanisms touted in the wartime rumors have passed the laboratory stage or into civilian production. Most of them have very little to offer in the way of musical quality, and such quality as there is usually involves a good deal of practical inconvenience and expense. A dispassionate survey indicates that for years to come the radio-phonograph, with its huge, established catalogues of records, will be by far the best bet for music in the household. At least, from an economic standpoint, it will be the only one readily available to the 1947 shopper.

The live question, therefore, is just how good such reproduced music is—and can be. The radio networks seem self-satisfied as usual. The record and radio-phonograph manufacturers are advertising their postwar products with a swoon of words. But if one thing in the whole field is certain, it is that large elements in the industries mentioned are getting very fancy prices for very inferior musical reproduction.

The trade term for high-quality reproduction is "high fidelity." It means just what it suggests—high faithfulness to the music being reproduced. The tone range, from high to low, is wide. Trebles and basses are cleanly defined and balanced in the proper musical proportion, so that the intricate warp and woof of that fabric can be fully appreciated. High fidelity does not mean a mellowing distortion of the treble to dim the luster of the high instruments—violins, trumpets, flutes—or the booming distortion of the bass, so popular in jukebox circles, which makes a lightly plucked cello sound like the thump of doom.

Music addicts who want high fidelity (and there are those, we shall see, who don't) will get precious little of it from the average radio-phonograph combination. That is only partly the instrument's fault—although the instrument may have plenty to answer for. It is also partly the fault of what the instrument receives through the air or on the phonograph record. Between the original music in the studio and the sound produced in the living room, perverse alchemies are at work, transmuting golden tones into baser, less pleasurable sounds.

The logical candidate for villain might seem to be technology. But actually it is not. Here, as often in other fields, the engineers are ready to do remarkable things. High fidelity is perfectly available; a richly rewarding degree of it can even be bought—if you know where to go (see page 190). But there is in general a great reluctance of networks and manufacturers to put fidelity into the air, onto the wax, or into the reproducing instruments. To understand the impasse, the layman must make quite a journey into affairs both technical and psychological. The journey may be difficult. But the reward can be superb music in the home.

From studio to home: tonal loss

It all begins with the music making. A pianist sits down to Chopin. He strikes a key and a taut steel wire makes the surrounding air vibrate anywhere from 27 to 4,186 times a second —depending on the pitch of the tone. The vibrations develop overtones that shiver from two to eight or more times as fast, bounce off the string and sounding board, and strike your eardrum. What you hear is pure and crystal clear. But when you put a radio system between the piano and your ear, the tone and the overtones undergo a series of electrical translations and may be markedly distorted.

Here it is necessary to consider the electromagnetic spectrum—radio or light waves scaled according to the frequencies at which they vibrate. If the spectrum is likened to a foot rule, visible light may be said to occur at approximately the seven-inch mark. Somewhere about the one-inch line are the slower standard broadcast waves. The so-called short-wave bands—faster-vibrating FM (frequency modulation), facsimile, television, and radar—fall at the two-inch mark. Radio's job is, essentially, to mount the electrical pattern of audible sound on radio waves of one kind or another to be carried for hundreds or thousands of miles.

In the microphone, audible sound waves set in motion a diaphragm, which, as it quivers back and forth, increases and decreases current in an electric circuit. The now fluctuating current, pulsing in the pattern of the original tones, is then piped to a transmitter. Here, its characteristic vibrations—as many as 15,000 a second, including the overtones—are loaded onto a much faster, more penetrating wave. From the transmitter tower the vibrations, riding piggyback on the carrier wave (see box on next page), are hurled into the atmosphere. But not all; some are kept back by technical barriers.

Actually, the main obstacle is as much economic as technical. If radio stations broadcast at just one frequency (rate of vibration), you would hear one never varying tone—as from a tuning fork. For varying sound a *band* of frequencies (an area of the spectrum, not just a line on it) is necessary. Preferably, the range of frequencies over which the band extends should correspond to the range of human hearing. Because individuals differ in aural sensitivity as much as they do in height, these limits are somewhat vague. For practical purposes, however, they may be said to be the tones pitched or vibrating at 16 to 16,000 times a second—roughly equivalent to the lowest fundamental of the organ and the highest audible overtone of the oboe.

Ideally, the process of imposing sound on carrier waves should not affect the extent of the frequency range; it should merely translate mechanical sound waves into radio waves of similar pattern. But standard broadcasting is now concentrated within a relatively narrow radio-frequency range (500,000 to 1,600,000 cycles a second, 500 to 1,600 kilocycles). Into this small segment of the spectrum about 1,000 stations are crowded, interference being combated by channel assignments made and rigidly policed by the Federal Communications Commission. Each channel is 10,000 cycles wide (as against the 16-to-16,000-cycle range of mechanical frequencies that the human ear can hear). In transmitting, stations beam their carrier waves down the channel centers, obliged by law to keep the frequency range below 5,000 cycles on either side. In other words, radio conditions now *legally* preclude broadcast of such overtones as give all instruments and the human voice their characteristic timbre or quality of tone.* Without overtones, music loses its "third dimension" or lifelike quality.

The only practical escape from the limitations of standard broadcasting lies further "upstairs," in the ultra-short-wave region of the spectrum. Here there is plenty of room—billions of cycles—and here is where Major Edwin H. Armstrong and his co-workers have pioneered in frequency modulation (see box). True, if it moved to this vast region, standard AM (amplitude modulation) broadcasting could use wider frequency ranges to burst quite as far out of its present limits as FM does. But FM is, in addition, blessed with certain constitutional advantages:

1) It is free of static; natural and man-made electrical disturbances, having the same wave characteristics as AM, cannot cause noise.

2) With as little as twice as much power it can blank out a signal interfering with its channel; an AM station would have to increase its strength thirty or forty times.

3) FM permits volumes a dozen times or more as loud as would literally wreck a comparable AM transmitter—volumes approaching the dynamic range of the living performance.

FM makes possible a very high degree of fidelity. FM stations broadcast over practically the entire range of human hearing. The process has been a workable reality since 1935, but most major networks still persist in deprecating its great merits—possibly because of bottlenecks in developing radio-type network relays to replace wire circuits.

At present, when radio programs originating in one city are relayed by wire circuits to others for simultaneous broadcasting, the electric wave enters a financial straitjacket from which even FM at present cannot free it. Station-to-station wire circuits, which the radio chains lease from A.T. & T., normally allow for a mere 5,000 cycles; an 8,000-cycle channel costs one-third again as much. Even wider channels will be available, but

**The fact that stations on adjoining channels are usually hundreds or thousands of miles apart encourages many local broadcasters to overflow their channels and utilize 10,000 or 12,000 cycles on either side. The FCC winks at this practice where it causes no interference—an argument that standard broadcasters use to reconcile their practice with high fidelity. But network broadcasts have no such benefits.*

at greater cost. The jacket can be loosened only if the networks are willing to spend money to provide added quality—or if they replace wire altogether with wide-band radio relays.

From antenna to ear: more punishment

The fidelity problem moves with the speed of radio waves from the broadcasting station to the home. The home receiver is the other large, and exceedingly intricate, factor in the problem. In effect it removes the original musical shivers from the carrier waves. In the process whatever fidelity has reached the machine may largely and easily slip over the side. Excepting the intrinsic advantages of FM already mentioned, both AM and FM receivers can catch the music substantially as it comes through the air. Once beyond the catching apparatus, however, the music bumps into a variety of potential bugaboos.

The most annoying and the most persistent of all bugaboos is cross or intermodulation distortion, recognizable by its screechy tones. It is found at every stage of the reproductive process where inefficient apparatus is employed. It is especially common in the amplifying system (which builds up the radio signal's strength while passing it on to the loudspeaker). Ideally, the ratio of power of any two frequencies leaving the amplifier should be the same as it was when they entered. Otherwise one is distorted in relation to the other and produces a distorted tone. Intermodulation occurs in some of the best receivers now manufactured and can be eliminated only by careful design and construction—which may or may not mean more tubes.

Because much of the amplifier distortion occurs near the maximum power level, good design dictates reserves of power substantially beyond that necessary to maintain a normal listening level. Usually a 3 or 4-watt volume will have a comfortable sound, but generally speaking the more power in reserve, the less distortion.

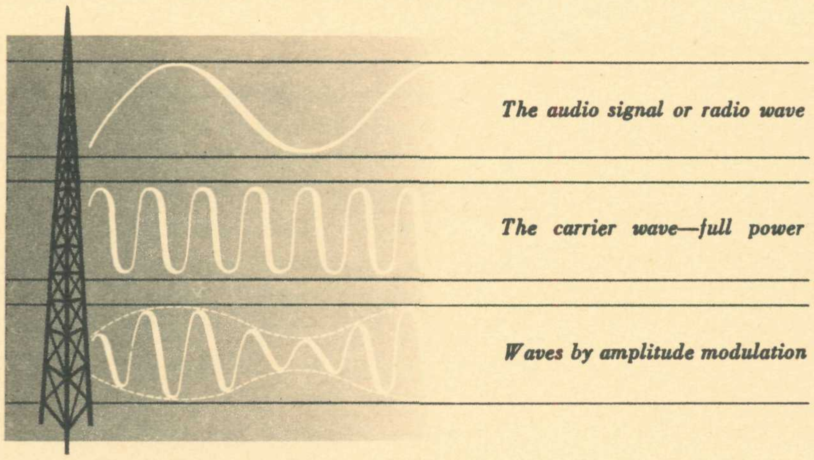
The loudspeaker is by far the weakest link in the fidelity chain. Its staggering job is to reproduce with a few pieces of parchment the vibrations created by scores of musical instruments. In the speaker, these vibrations, already emaciated by transmission, now get still more punishment. First, the cone vibrates differently in different places—faster at the center, slower near the perimeter. The different sound waves so created, working on one another, produce the same effect noted in the whistles of approaching trains—a shift to a slightly different pitch. A uniform shift of, say, ten cycles will destroy the simple numerical ratio between a tone and its harmonic. For instance, a fundamental of 500 cycles a second would have a second harmonic of 1,000 cycles; a shift of ten would make the ratio 510 to 1,010, which is noise, not music. To reduce these shifts, high-quality instruments isolate high tones from low with two or even three separate speakers—a small "tweeter" for the highs, a big "woofer" for the lows, and, perhaps, a third for the middle frequencies. Such a multiplicity allows use of greater power to bolster the higher frequencies and may also help to increase the frequency range. Normally, greater diameter in a speaker means a broader range. But there are limits. No one speaker can vibrate both 30 and 15,000 times a second simultaneously. Frequently tweeters are mounted within the woofer cone to form a compound "coaxial" speaker. When the tweeter consists of a cluster of cell-like boxes, which is called a multicellular horn, it helps to make the speaker multidirectional.

A common radio-phonograph distortion is the echo or poor definition that occurs when weak speaker magnets permit cones to resonate after the signal has stopped. A three-to-five-pound magnet will grip the tone tightly and preserve each tone's separate identity. Lighter magnets simply may not have the strength to damp the "hangover." In poorly designed cabinets echoes are created when sound bounces off front panels and reverberates behind the cone. These echoes can be damped by lining the chamber with sound-absorbing material or by using similar material to seal off the space behind the cone. A solidly built cabinet will forestall vibrations and resonance with the speaker.

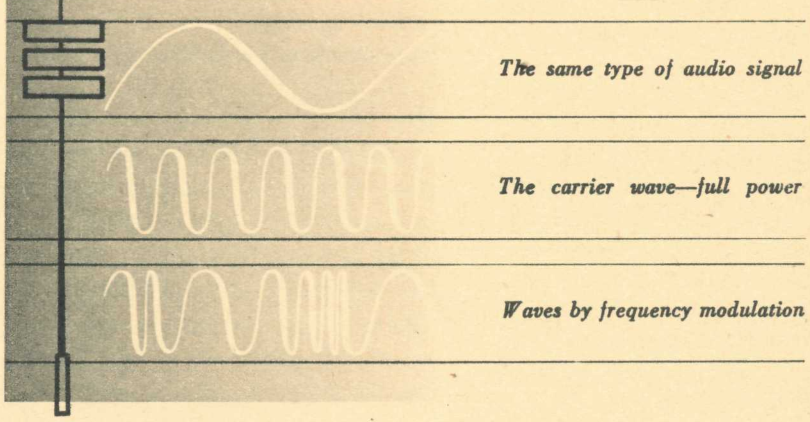
The phonograph's headaches

The phonograph, like the radio, faces its own problems in the realm of fidelity. In making records, the microphone imparts its shivers to a needle that cuts them into a revolving disk. Though the process is mechanical, the fine equipment used manages to avoid creating noise. But this does not hold true for the playback. Home phonographs rarely compare in precision with professional studio equipment. The needle vibrates. So does the turntable. In addition other vibrations are created by the needle's movement across the disk's surface.* These frequencies are nonmusical and, when caught by the pickup, manifest themselves as noise. Most noise vibrations occur in the region above 5,000

**The filler content of ordinary records acts as an abrasive to shape the steel needle point to fit the grooves: it is also responsible for considerable noise. New Vinylite disks, being abrasive-free, are quieter but require lightweight pickups to avoid excessive wear.*



AM, FOR AMPLITUDE MODULATION, is the conventional system of radiobroadcasting. The amplitude, or power, of a wave is the distance between crest and trough. Regular broadcasting imposes sound on carrier waves by *varying the power* of the signal, keeping frequency constant.



FM, FOR FREQUENCY MODULATION, is the high-fidelity radio system. The frequency of a wave is the number of times a second it rises and falls, measured by the distance between waves. FM broadcasting keeps amplitude constant, and mounts sound on carrier waves by *varying the frequency*.

THERE IS NOTHING WRONG WITH MUSIC AS IT IS MADE Broadcasters and record makers have access to the finest in music—classical masterpieces, conductors like Arturo Toscanini, orchestras like the N.B.C. Symphony.

cycles. For broadcast purposes, records and transcriptions with ceilings that go as high as 12,000 cycles are made. For the retail trade, however, recording engineers usually cut off all frequencies above 8,000, feeling that above this level their cutting equipment will add its bit and make the total amount of noise intolerable.

The less expensive phonographs, however, do not approach even this restricted level. Furthermore their greater rattle and scratch mean more noise over a wider range. To eliminate as much of it as possible, pickups like Zenith's highly touted Cobra Arm achieve freedom from noise by ignoring frequencies higher than 4,000 to 5,000 cycles. In doing so, they beg the question of high fidelity. Where speakers with ranges above 5,000 cycles are available, only extremely light, jewel-pointed pickups will go to 10,000 or 12,000 cycles, and they alone will do the speakers —and fine records—justice.

Generally pickups fall into four classes. In each, the mechanical vibrations developed by the needle in tracking create or vary a current. In one they generate current by wiggling a crystal; in another the needle moves a coil or a bit of iron in a magnetic field; in the third the needle twists and untwists a wire, changing its resistance; in the fourth, the electronic type, the needle modulates amplifier tube current by more or less direct contact. Though pickups vary greatly in performance—depending on their weight on the record, on how closely they follow the groove, and on their sensitivity to a wide frequency range—the type, in and of itself, makes little difference.

Trying to improve quality, recording engineers sometimes purposely introduce distortions of their own. They compensate for the tendency of cheap speakers to exaggerate or understate bass and treble tones. But records so made, when played through superior speakers, are a nuisance: the lows are weak, the highs are shrill, and tone controls must be adjusted differently for every side that is played. Another kind of deliberate distortion, called pre-emphasis, is wholly beneficial—in fact, it can raise the effective record ceiling by several thousand cycles. Pre-emphasis goes beyond mere compensation. High-frequency tones are recorded at exaggerated loudness. In the playback, or de-emphasizing, the highs are brought back to normal volume relationship, and surface noise is eliminated with the volume

GOLDEN EAR OF THE RICHEST SHEEN: T. R. KENNEDY JR.

cut out in de-emphasizing. Because de-emphasizing units would add appreciably to the cost of the radio-phonograph, pre-emphasized records are used almost entirely for broadcasting.

Even with the best equipment, absolute or perfect fidelity obviously can never be reached. Perfect fidelity would mean that the radio-phonograph transported the listener to a point near the actual sound source—say, eighth row center at Carnegie Hall. Even assuming that transmitter, receiver, and speaker functioned to perfection, the volume of the live orchestra would not be necessary in the home. Nor could any living room handle it acoustically. To approach absolute fidelity you may have to redecorate your home a little, removing unwanted resonance and providing a proper acoustical setting for the speaker. But the point is that absolute fidelity is by no means necessary for superb musical reproduction and its consequent pleasures. High fidelity —say the delivery of 8,000 to 10,000 cycles without any of the avoidable distortions—provides reproduction of breathtaking clarity and richness. Yet there are those, including many devout musicophiles, who do not want it. Before the buyer looks over the new radio-phonograph combinations he should hear the arguments on both sides.

Golden ears

Thomas R. Kennedy Jr. of New York is a radio engineer whose avocation is fine music well performed. A "golden ear" of the richest sheen, he is one of that small band who have dedicated a good part of their lives to extending the range of reproduced sounds to the limits of human hearing. Merely reproducing the highs and lows to which most prewar instruments are deaf will not satisfy Tom Kennedy or any other golden ear. A purist, he insists that the tones be noise-free and undistorted, sharp, clear, and full from treble to bass. The only damper his enthusiasm

HIGH FIDELITY CAN BE A COMPLICATED PASTIME

Kennedy's equipment overflows one room and almost fills another. The control panel (left) is taller than he is. Next to it is a three-unit speaker: a deep "woofer" for bass, a smaller unit for middle frequencies above it, and on top a tiny "tweeter" for treble. Note the hygrometer on the control panel. Below, Kennedy checks the groove depth while recording a "live" FM show.

seems to know—so far not very effective—is the fact that when fidelity even approaches the degree achieved in his laboratory, the cost graph rises like a helicopter.

Kennedy has gone to fantastic lengths. His receiver is well designed and, of course, has an FM circuit. His main amplifier was built at the Bell Telephone Laboratories. His speaker has three units. To forestall phonograph vibration, the motor is mounted separately, while a dental-machine belt carries the rotary motion to a turntable anchored in 600 pounds of sand. The pickup arm sports a feather-light sapphire needle, kept at even temperature and humidity in an airtight container until just before it is used. Kennedy makes his own superior recordings of broadcast music. As a result, his parlor concerts are unsurpassed for fidelity. He has been accused of making a fetish of it, of listening to tone rather than to music. "Listen!" he says. "Compare music from my equipment with what the average combination gives. You'll go home and throw rocks at your set."

Tin ears

On the other side of the argument are many radio-phonograph manufacturers, whose standards of fidelity are years behind practicable levels. They are known as "tin ears" in high-fidelity circles. Their position is understandable enough—if not exactly admirable. They have heavy investments in plants, patents, and franchises. High fidelity threatens the value of many of these commitments. Cagily, they have moved out of the defensive position with an attack on what they term "unreasonable" high fidelity. Their thesis is simple: the public neither wants nor likes wide-range reception or wide-range instruments.

They will admit that in a concert hall most listeners enjoy the wide range. But, they add, there is a reason. The "live" orchestra, spread across the stage, is a diffuse sound source. The listener has a chance to use his ears as a kind of quality control, turning them toward pleasant sounds and away from the raucous. In the parlor, while the listener may not be aware of it, the situation is different. Here the source is concentrated in the loudspeaker, and no amount of twisting will avoid unpleasant tones. The tin ears make much of this fact, pointing out that extreme highs and lows can inflict positive pain on sensitive auditory nerves. Indeed, they go so far as to claim that, by restricting the ranges the transmitter and receiver are capable of handling, they are actually doing the listening public a favor.

The tin-ear documentation is extensive. In one test,* audiences chose standard broadcasts (up to 5,000 cycles) over wide-range programs (up to 10,000) by more than two to one. Broken down, the figures are even more plausible. Owners of FM sets, presumably with highly developed tastes, rejected the wider ranges by more than four to one. Professional musicians, surprisingly, voted fifteen to one against wide ranges and thus, apparently, against high fidelity.

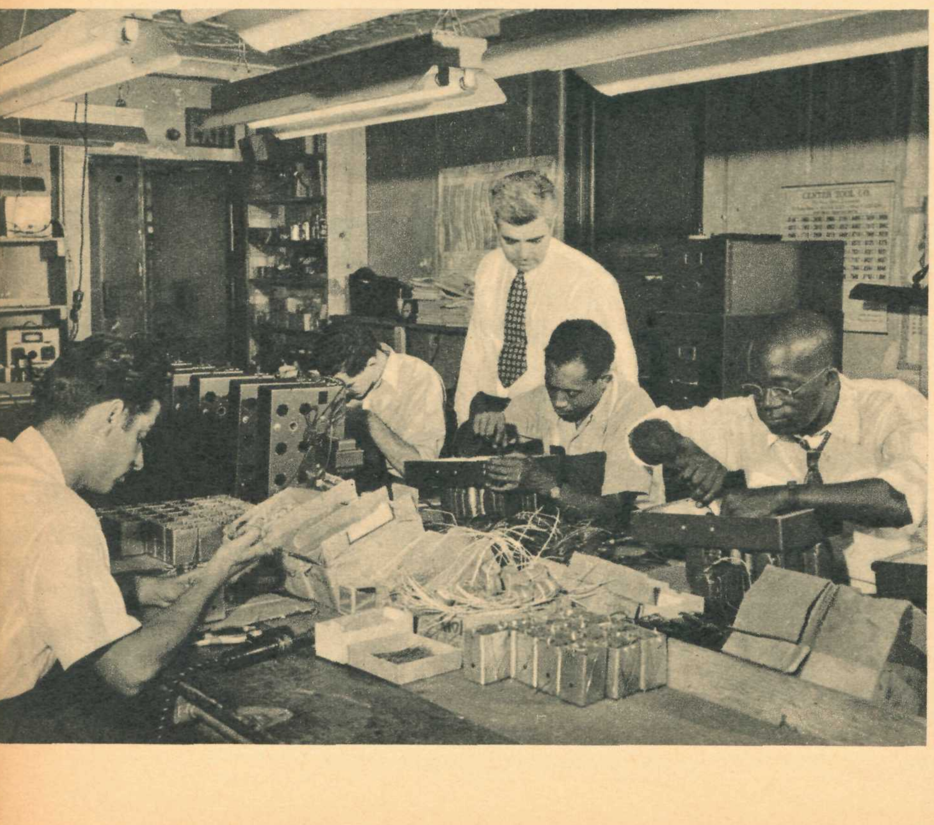
That the average audience should reject high fidelity is not altogether surprising. Listening is a matter of habit, of adjusting to the kind of music customarily heard. Unfortunately, present radio and recording standards have made the musical diet of most listeners rich in boomy basses and mellow trebles and deficient in tonal clarity. As a result, poor quality has become the norm by which all performance is measured. Even musicians have been trained to prefer absence of bow scrape and other orchestral noise to a full frequency range. Some people don't even like what they hear in a concert hall. The real thing, they say, is too bright and too loud. The musical public, however,

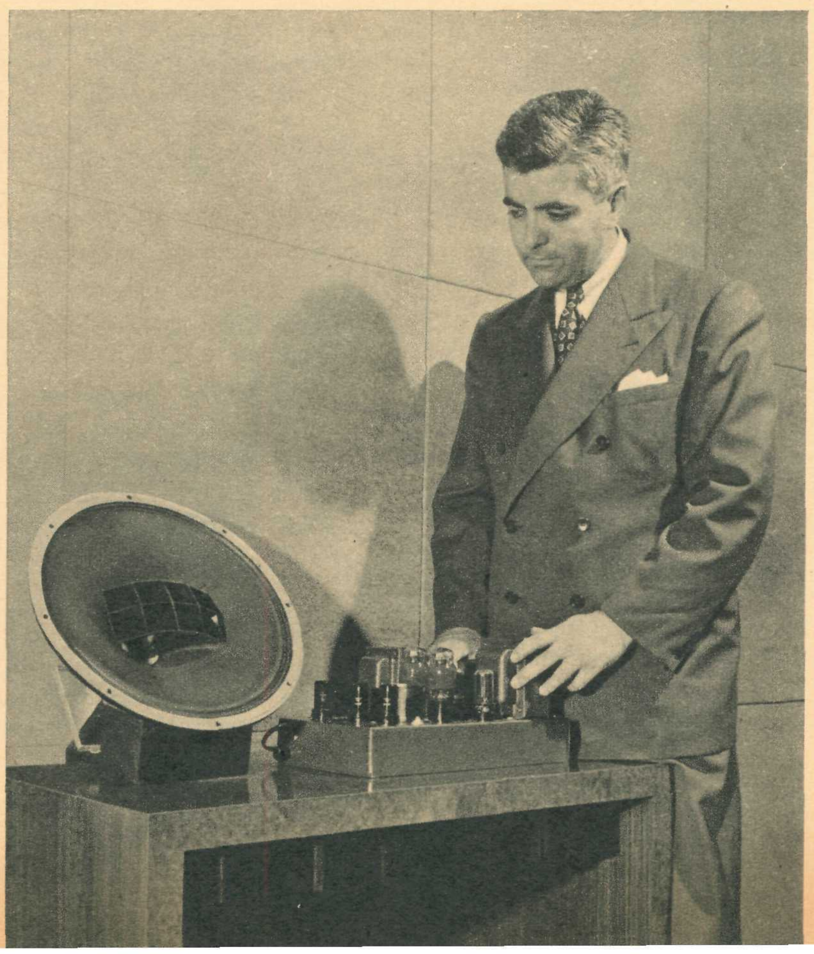
[*Text continued on page 190. Next two pages: a fidelity chart*]

*Tonal-Range and Sound-Intensity Preferences of Broadcast Listeners, *by Howard A. Chinn and Philip Eisenberg of the Columbia Broadcasting System.*

AVERY FISHER MAKES FINE SETS FOR THE FINICKY

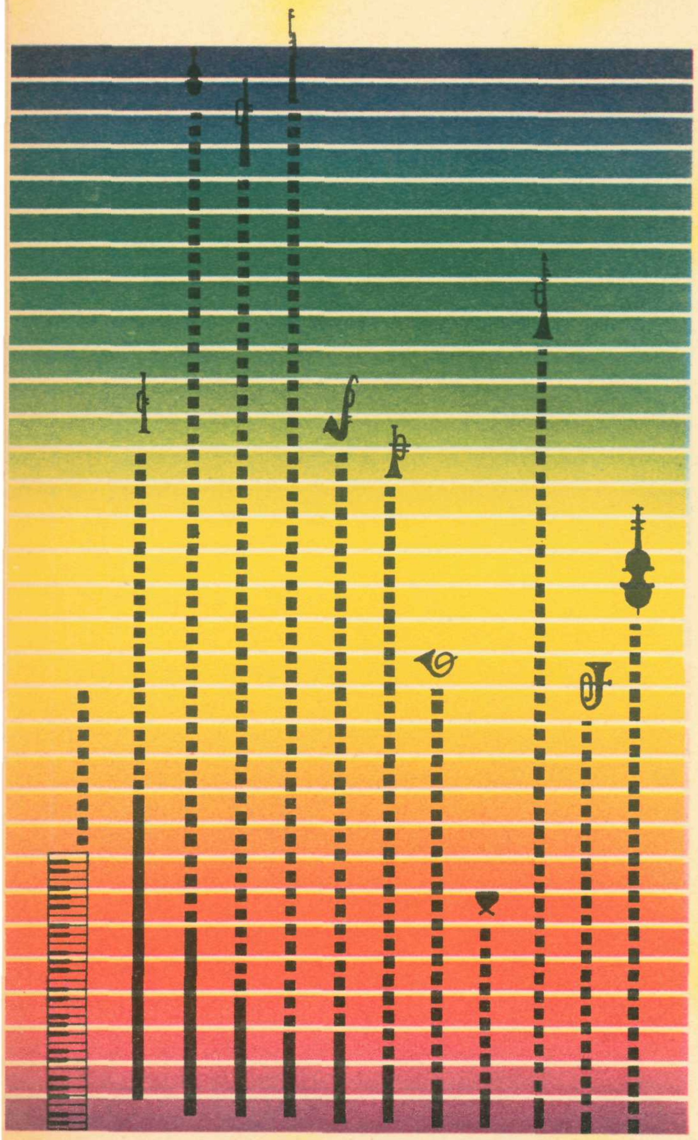
The price for quality in a radio-phonograph is high, the demand low, so Fisher's plant (below) is relatively small. All work is done by hand; assembly-line methods cannot be applied because volume is not big enough to justify heavy outlay and overhead for the necessary equipment. These men are working on amplifier chassis. At right, Fisher examines a specially designed amplifier and speaker, collectively the "guts" of a high-fidelity set and usually the key to fine performance. The speaker is of the multicellular-horn-coaxial type; it has eight cells, as against six in competitive sets. The nine-tube amplifier alone is larger than the AM-FM-amplifier chassis of most combinations on the market. Together, speaker and amplifier can reproduce tones that span the complete range of human hearing.

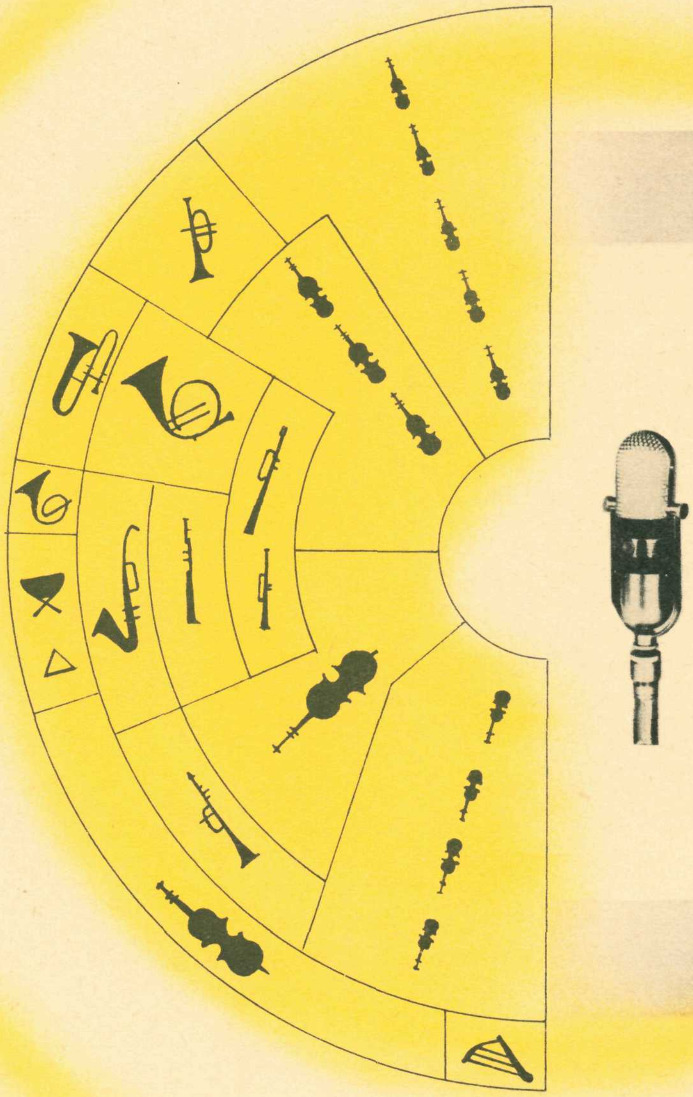


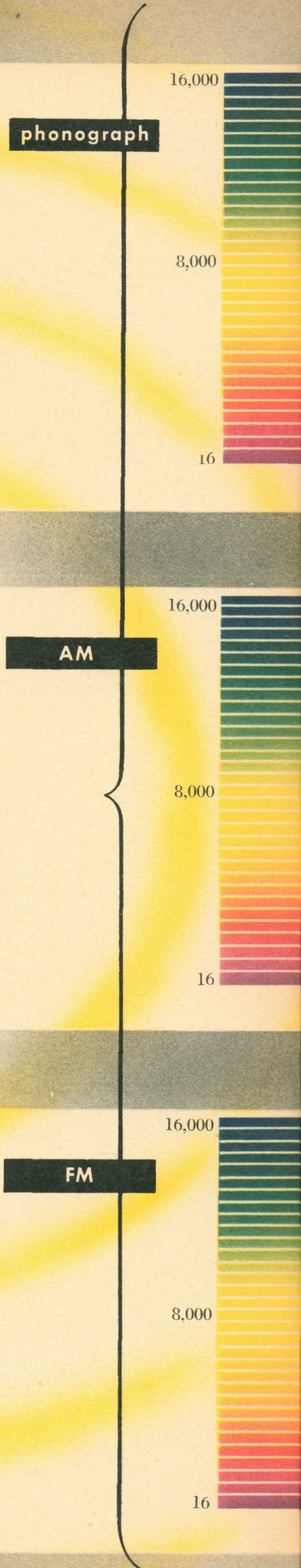


MUSIC HEARD AND UNHEARD

The quality of music heard on a radio-phonograph depends heavily on the width of the frequency range, as indicated in the charts on the right. In general, the wider the range, the more realistic the tone. The charts below show the concert-hall range of a full concert orchestra — fundamental tones in black lines, all important overtones in dotted — and the arrangement of the instruments before a microphone.

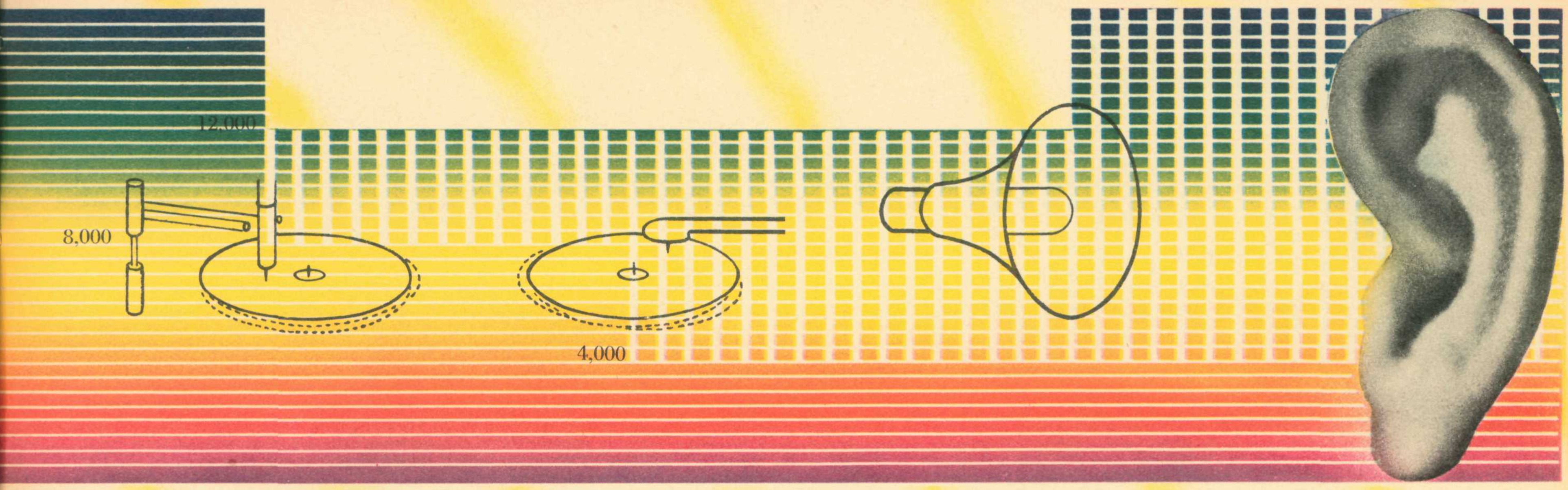




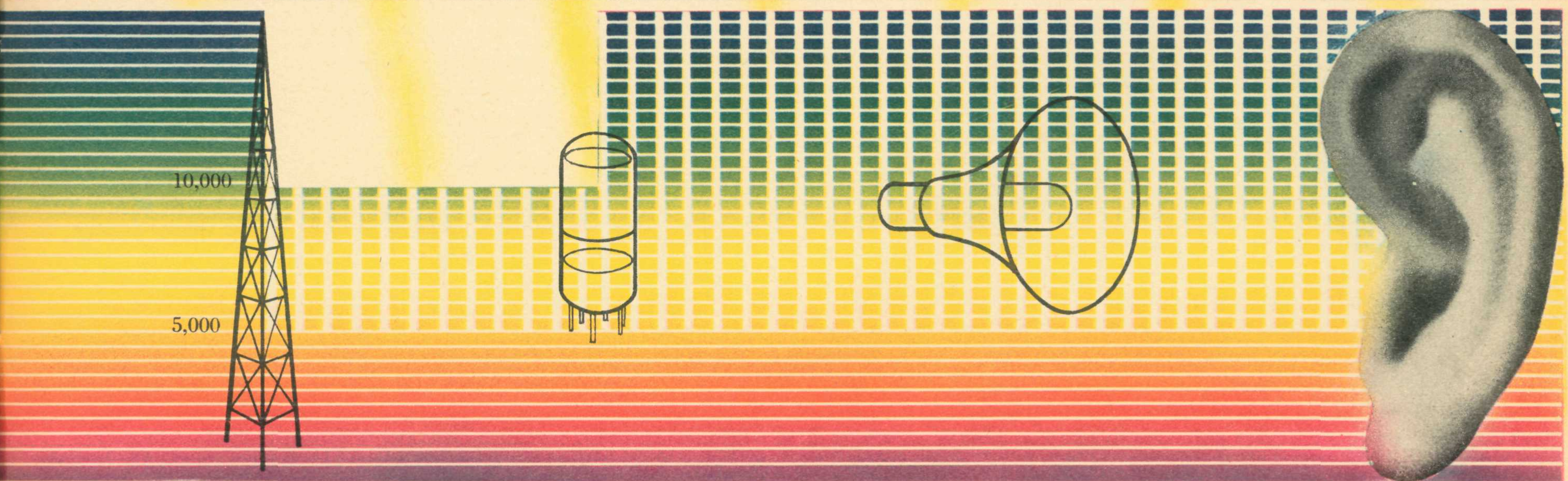


KEY	TO THE THREE CHARTS ON THE RIGHT
Solid Color Bands	The frequencies your ear receives from standard broadcasts and average radio-phonographs.
Broken Color Bands	The frequencies you may hear from available high-fidelity equipment and special home sets.
Uncolored Area	The frequencies that cannot be reproduced from studio to home with existing knowledge and equipment.

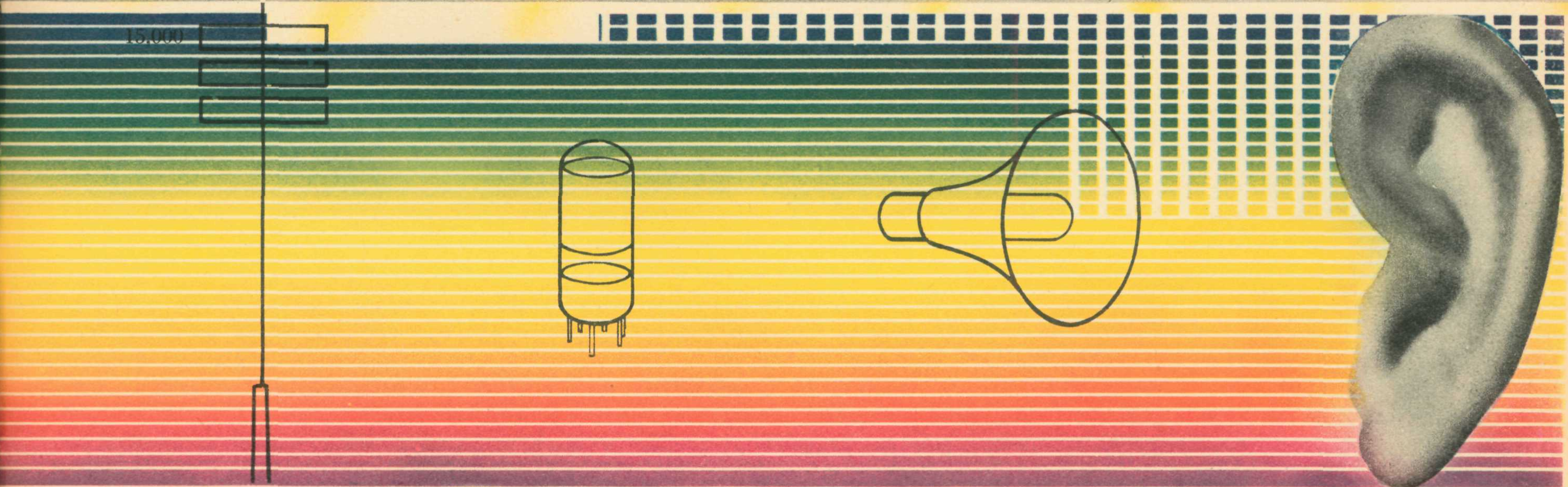
DESIGNER: SUTNAR + HALL



Most recordings are cut off at 8,000 cycles to avoid noise above. Ordinary phonographs lose another 4,000. Special records and equipment can bring in up to 12,000 cycles.



FCC rules and wire circuits limit broadcast channels to 5,000 cycles. Sometimes local broadcasts are allowed at 10,000 cycles. Special sets and speakers can receive up to 16,000 cycles.



Wide-band FM relays circumvent network wire limitations. Present FM operates in 15,000 cycles. Ordinary FM sets carry 9,000 cycles: the best could handle 16,000.

Music for the Home

[*Continued from page 161*]

has repeatedly shown a readiness to recognize and to appreciate fine music. All it needs are instruments of better design and the chance to hear more than short test snatches.

Caveat emptor

Potential purchasers of high fidelity will profit by a buyer's guide (see page 195) and substantial briefing before they shop around. First, there is nothing mysterious about a fine instrument, nothing that one company's engineers know and another's do not. Differences are matters of design, materials, workmanship—stemming from the point of view.

Custom-built extremes like Tom Kennedy's can be assembled by the mechanically skillful for an outlay in the neighborhood of $1,400. The items include: an FM-AM chassis, $600; a first-class amplifier, with both bass and treble equalizers, $150; a fine turntable, $175; a superior pickup, $180; and a custom-built two-unit speaker, $250.

Ready-made instruments ranging from the good to the superb can be had in the $400-to-$1,100 range. They have the new FM bands; they have powerful amplifiers and multi-unit speakers capable of reproducing ranges of 30 to 15,000 or 20,000 cycles; their pickups will pass up to 10,000 cycles without contributing excessive noise. They come in handsome cabinets, often with gleaming chromium chassis. In some of these models, however, there is a fly in the ointment—the presence, to a greater degree than good design would warrant, of cross modulation and several kinds of speaker distortion.

Beneath them in quality are the mass-produced sets costing from $150 to $400. Before the war they accounted for most combination sales. Financial savings are usually accompanied by a marked loss in fidelity. These machines generally incorporate most of the features found in more expensive jobs. But some are only token assets. A single tone control can scarcely compensate for both an exaggerated bass *and* a weakened treble. A twelve-inch speaker with a feeble magnet will not give wide range without hangover.

Ears unfamiliar with high fidelity should be warned that the term is often applied to lesser quality—which, for that matter, may give great musical pleasure. Hints toward the recognition of the real thing:

1) If the instrument is a table model, forget it. High fidelity is impossible; for one thing, the cabinet is too small.

2) Test the highs of well-recorded piano music—with high fidelity they are clear and resonant, not thick or tinny.

3) Turn the volume far up. If the set is free of distortion, the loudness will not be unpleasant. If there is distortion, the sound will be disagreeable.

4) Buy Columbia's special test record (10002-M) for $1.05. It reproduces a whistle ranging from 40 to 10,000 cycles per second and will test any radio-phonograph for frequency range and distortion.

THE 1947 HIGH-FIDELITY SETS

THE FISHER

Best of the postwar radio combinations in price and performance is the Fisher, made by an independent high-fidelity enthusiast named Avery Fisher. Before the war, Fisher turned out radio-phonographs with the tradename Philharmonic, which became known to a coterie of critics and musicians as the finest ready-made instruments obtainable. He sold the company, and the name Philharmonic now graces a line of cheaper sets put out

[*Continued on page 193*]

Music for the Home

[*Continued from page 190*]

by an entirely different firm. But Fisher is back making an even better combination under his own name. At $885, the Fisher sells for less than the big-name "quality" sets and, by ordinary standards, it is worth a good deal more. It reproduces the soft, small tones that give depth and texture to music with a clarity and realism that are startling to owners of average instruments. It is, in fact, perhaps the only set on the market that would completely satisfy a golden ear.

The Fisher's amplifier has a distortion-free frequency response from 20 to 20,000 cycles. The speaker is of the coaxial type and in some models incorporates a multicellular horn (for extreme high frequencies) mounted in a fifteen-inch cone. A six-pound magnet and a paper-thin metallic diaphragm keep tones sharp and clean over a range of 30 to 15,000 cycles—the range of human hearing. The record player is equipped with a lightweight, wide-range pickup, capable of reproducing frequencies up to 12,000 cycles without bothersome noise.

The Fisher comes in modern or period cabinets—or the chassis, ranging in cost from $670 to $786, can be built into a favorite piece of furniture, a bookcase, or a wall. Like the Philharmonic, the Fisher will not be widely advertised—except by word of mouth. But word has already gotten around and production is running three months behind orders.

THE SCOTT

Scott built the best known of the higher-priced prewar sets. It featured full frequency ranges, short-wave bands, and a large power output. Cost considerations were secondary. Promotion for the 1947 sets stresses superbly designed cabinets and "elegant engineering." The chassis, with its impressive assortment of tubes, wires, and gadgets on a chromium-plated base, has an irresistible appeal. Visual elegance and chrome-plating show up in the price; the least expensive model sells for $1,042.50.

THE CAPEHART

There are two basic Capehart lines, each made in three different chassis types. All have twenty-one or more tubes, dual-speaker systems, and frequency ranges up to 10,000 cycles in the pickup and 12,000 cycles in the amplifier and speaker. The Panamuse line begins at $495; the more expensive Capeharts—$895 and up—stress fine cabinets and the Capehart Record-changer, which holds twenty disks and turns them over automatically.

OTHER 1947 SETS

• Meissner, in the high-priced field, offers high fidelity through quality construction and design. Except for its cabinets, which are elegant, it claims no special features. Prices begin around $850.

• Ansley's Dynaphone combinations are well engineered for quality performance. Prices begin at $200 but the more expensive models, in strikingly beautiful cabinets, may go as high as $800.

• Magnavox makes two combinations that cross the price dividing line. The more expensive model has a twenty-five-watt power output and a dual speaker, features unusual in a $388 set. FM is classed as optional equipment for both sets.

[*Continued on page 195*]

Acknowledgments:

Pages 156, 158, 162, and 163—Designed by Ladislav Sutnar
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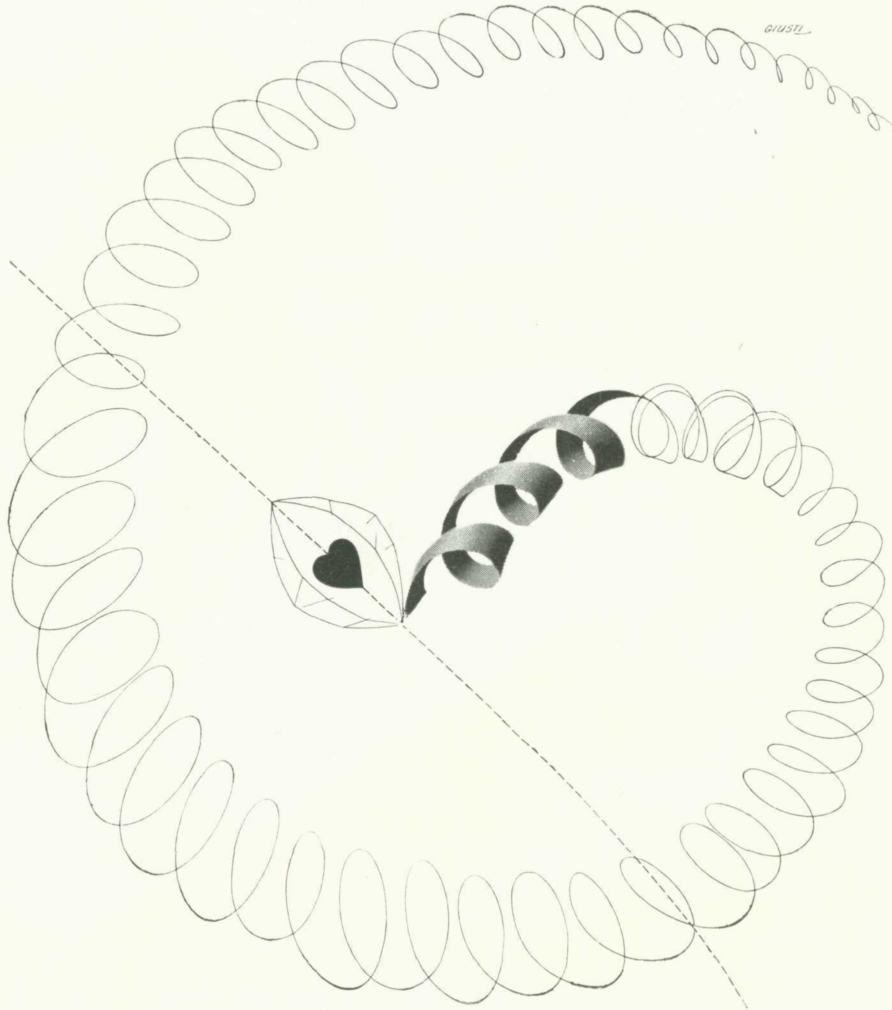
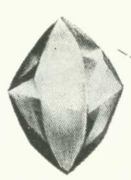
Pages 160 and 161—Dave Henderson





Music for the Home

[Continued from page 193]

The description of new combinations that follows is hardly complete. Thirteen months after V-J day, the business is just picking up. Deliveries are usually delayed weeks or months. At this writing, sales and engineering specifications of the new Philco, Crosley, and RCA-Victor combinations are not available. In all cases, specifications given below are those of the makers; since makers are generally—and understandably—enthusiastic about their own products, their claims should be viewed with this in mind. Prices are manufacturers' estimates for each chassis in its least expensive cabinet, subject to OPA approval.

BUYER'S GUIDE FOR 1947 CONSOLE COMBINATIONS

					PICKUP		SPEAKER				FREQUENCY RANGE	
Manufacturer	Model	Price	No. of tubes*	FM	Type	Weight on record (ounces)	Power output (watts)	Type	Diam. (inches)	Magnet weight (ounces)	Pickup (cycles per second)	Speaker (cycles per second)
Ansley	32	$ 200-250	7	no	crystal	1	4.5	dynamic	8	field†	50-8,000	100-6,000
	53	350-700	17	yes	crystal	1	10	dynamic	12	field	50-8,000	60-8,000
	63	450-800	22	yes	crystal	1	15	coaxial	12 / 5	field / 8	50-8,000	50-15,000
Bendix	747B	250	6	yes	crystal	1	5	magnetic	10	3.16	50-5,000	50-5,000
	1417A	350-400	13	yes	electronic	0.75	15	coaxial	14 / 5	field / 5	50-10,000	50-12,000
Brunswick		500	16	yes	crystal	1	20	dynamic	12	field	30-11,000	15-15,000
Capehart	114N2	895	21	yes	resistance	1	18.5	dual	15 / 5	field / 18	50-10,000	50-12,000
	112N2	995	21	yes	resistance	1	18.5	coaxial	15 / 3	field / 7	50-10,000	50-12,000
	406N	1,295	23	yes	resistance	1	30	magnetic	12	80	50-10,000	50-12,000
Capehart Panamuse	19N3	495	21	yes	resistance	1	14	dual	12 / 5	field / 18	50-10,000	50-12,000
	26N2	550	21	yes	resistance	1	18.5	dual	15 / 5	field / 18	50-10,000	50-12,000
	13N2	675	21	yes	resistance	1	18.5	coaxial	15 / 3	field / 7	50-10,000	50-12,000
E.C.A.	206	175	8	yes	crystal	1.5	4	magnetic	12	7	100-6,000	70-10,000
	209	275-325	11	yes	crystal	1	12	dynamic	12	field	50-10,000	50-10,000
Emerson	537	160	9	yes	crystal	1	—	magnetic	12	6.18	—	—
Espey Philharmonic	10836A	180	7	no	crystal	1.25	8	magnetic	10	6.8	50-7,000	50-7,000
	11026A	210	9	yes	crystal	1.25	8	magnetic	10	6.8	50-7,000	50-10,000
Fada		150-200	10	yes	crystal	1	4	magnetic	10	3	50-7,000	50-9,000
Farnsworth		134	5	no	crystal	1	3	magnetic	10	6.8	50-8,000	50-8,000
		165	7	no	crystal	1	8	magnetic	12	6.8	50-8,000	50-8,000
		185	9	yes	crystal	1	8	magnetic	12	6.8	50-8,000	50-10,000
		225	13	yes	crystal	1	14	magnetic	12	21	50-8,000	50-12,000
Fisher	S1	885	23	yes	crystal	0.9	38	coaxial	15 / 5	96	30-12,000	30-15,000
	S2	1,000	23	yes	magnetic	0.9	38	coaxial	15 / 6.5	96	30-12,000	30-16,000
General Electric	326	198	7	no	magnetic	1	4	magnetic	12	6.8	—	70-5,500
	417	325-350	9	yes	magnetic	1	4	magnetic	12	9	—	60-10,000
	502	425-450	12	yes	magnetic	1	14	magnetic	12	9	—	60-8,000
	Musaphonic	475	14	yes	magnetic	1	19	dual	10 / 10	14.5 / 14.5	—	60-10,000
Magnavox	Contemporary	262	7	no**	crystal	1	12	dynamic	12	field	50-8,000	50-8,000
	Belvedere	388	10	no**	crystal	1	25	dual	12 / 12	field / field	50-8,000	50-8,000
Majestic	12FM475	425	11	yes	crystal	1	14	dual	10 / 6	field / 1.47	70-7,000	26-12,000
Meissner		850	26	yes	crystal	1	20	coaxial	15 / —	25 / 5	30-10,000	30-15,000
Scott	800-B	1,042	20	yes	crystal	1.75	18	coaxial	15 / 5	104	50-7,500	50-15,000
Stromberg-Carlson	1121	200-250	10	yes	crystal	1.25	8	dynamic	12	field	60-4,500	65-5,500
	1135	600	14	yes	crystal	1.25	19	dynamic	10	field	60-4,500	65-9,000
Westinghouse	Musicale 14	257	12	yes	crystal	1.25	17	dual	8 / 8	field / field	—8,500	—8,500
	Symphonic 14	309	12	yes	crystal	1.25	17	dynamic	12	field	—8,000	—8,000
Zenith	6RO87G	146	5	no	crystal	1.5	6	dynamic	10	field	—	—
	9HO81	229	7	yes	electronic	0.67	6	dynamic	12	field	—	—
	12HO90	314	9	yes	electronic	0.67	12	dynamic	14	field	—	—

**Less rectifiers and tuning eyes.*

†In dynamic speakers, the cone's magnetic field is created by a current passing through a field coil.

***Addition of eight-tube FM chassis optional.*