

tape recording



2/16/76

It takes nerve to ask \$1,000 for an FM/FM stereo receiver. Unless you have the stuff to back it up.

This is our SA-4000 stereo receiver. It costs \$1,000. But don't look for it at your Panasonic dealer yet. Because the first 25 units in existence have been snapped up by audio laboratories. They're ripping it apart to see how we created it.

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For your nearest Panasonic Audio Equipment dealer, write Panasonic, 200 Park Avenue, New York 10017.

"Scotch" Brand Cassettes prevent tape hangups

Here's the inside story.

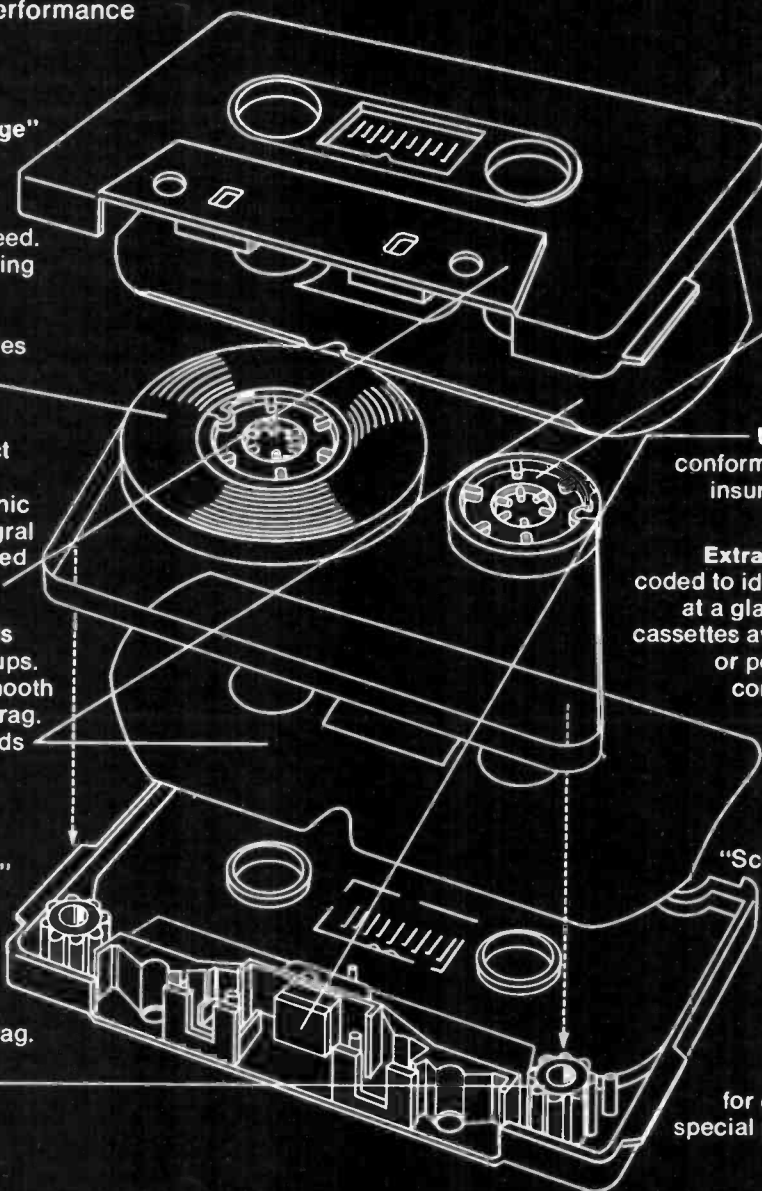
"Scotch" Brand builds in trouble-free performance with exclusive features:

Famous "DynaRange" Magnetic Tape provides highest possible fidelity at slow recording speed. A slick, tough coating affords smooth tape travel, resists oxide ruboff, assures long tape life.

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Also ask your dealer for catalog of special premiums.

3M
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Only yesterday, it would have cost you almost \$400.

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3. Three heads wide-gap record head, narrow-gap (2 micron) playback head and erase head for optimum fidelity and frequency response (20 to 23,000 Hz at 7½ips)

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9. Head gap-position markings for precise editing and cueing

10. Tape tension arms for smooth, quick start ups without "burble."

11. Flutter filter for better than 0.09% at 7½ips

tape

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NOVEMBER-DECEMBER, 1969

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tape

NOTES

Home Video Tape Players Are Being Readied For U.S. Market

NEW YORK — Despite Columbia's efforts on behalf of Electronic Video Recording (EVR) and RCA's new Selectavision process featuring laser beams and holography, home video tape is alive and well in new cassette versions being developed in Japan and Europe. From Sony Corp. comes the announcement of a cassette color video tape player at \$350 with record capability at a retail tag of \$450. Not to be outdone, Matsushita (Panasonic) is heralding a cassette color video player at a similar price. Meanwhile, Japan Victor (JVC3) has also announced a cassette video cartridge and player. All three Japanese-made units feature 90 minutes playing time despite different size cassette configurations. N. V. Philips of Eindhoven, parent of the audio tape cassette, is also known to be readying a video cassette recorder for marketing here. All of the above-mentioned cassette video units are said to utilize existing vtr technology.

Sony has announced a target marketing date of 1971. Matsushita is looking at 1972 and JVC might beat both to market here with a little bit of luck. The Philips unit is targeted for a somewhat later arrival. By comparison, the JVC cassette measures 5.5 x 5.5 inches. It uses $\frac{1}{2}$ inch tape and is less than one inch thick. Tape speed is $7\frac{1}{2}$ ips. The Sony cassette measures 8 x 5 inches and is $1\frac{1}{4}$ inches thick. It uses $\frac{3}{4}$ inch width tape. The Matsushita cassette is 10.5 x 6.3 inches with a thickness

of $1\frac{3}{4}$ inches. It uses half inch tape moving at $7\frac{1}{2}$ ips. Price of a blank 90 minute video cassette is estimated by Sony at \$20 retail. Others estimate the cost at about \$25.

Standards

Sony Corp. chief Akio Morita says his firm is seeking to standardize its video cassette with Philips and Grundig. The system would be licensed to others for a "reasonable royalty." The Sony unit features two sound tracks for stereo sound. It can be used with existing home television sets without modification. Color resolution is 250 lines. Audio frequency response is 50 to 12000 hz plus 1.5, minus 3.5 db. Signal to noise ratio is better than 40 db.

The principle reason cited for the flurry of announcements by vtr makers is to keep any one system from gaining the edge. The CBS developed EVR system has gained heavy interest from educational and industrial users. RCA and the video cassette suppliers are aiming their initial announcements at the home market. However, CBS claims its system is also designed for consumer use.

Although all the announced systems are premature—with no product likely for at least a year, proponents of each system are anxious to get the publicity edge. Retailers and other members of the trade queried by AUDIO TIMES are adopting a "wait and see" attitude.

The RCA system promises the lowest-priced pre-recorded tapes while the cassette video units promise the convenience of record-off-the-air and re-usability. Most industry marketers are convinced that a huge market awaits a low-cost, easy to handle cartridge video unit.

Japanese To Set HVTR Standards

TOKYO—One of the main stumbling blocks to the development of a low-cost home video tape recorder may be eliminated this fall—when leading Japanese manufacturers are expected to reach an agreement on a standard head, tape size and speed.

A VTR technical committee of the Electronic Industry Association of Japan, composed of representatives of 17 manufacturers and potential vtr manufacturers, has been working on this standardization project for over a year.

An EIAJ spokesman revealed that the group expects to have a prototype ready for this fall's annual meeting of the National Federation of Educational Broadcast Study Groups. He emphasized that this standard will be for Japan only, and that whether or not it will be acceptable throughout the world remains to be seen. "At least we will be the first to agree on a standard," he remarked.

Only A Beginning

The spokesman conceded that reaching an agreement on standards was only the beginning. To be of any effect, a majority of manufacturers both here and abroad would have to accept it.

At present, video tape recording in Japan centers around educational broadcast films shown by the Japan Broadcasting Corp. (NHK). Six companies are currently offering pre-recorded video tapes of NHK educational broadcasts — Sony, Matsushita (Panasonic), Shiba Electric (Shibaden), Victor of Japan, Sanyo and Tokyo Shibaura (Toshiba).

Each company pays a royalty, and

prints the programs on tape which is compatible in both size and speed to its own machines. The tapes are sold at a retail price of approximately \$22. per reel. Each company makes about 30 copies of each program, according to a NHK spokesman.

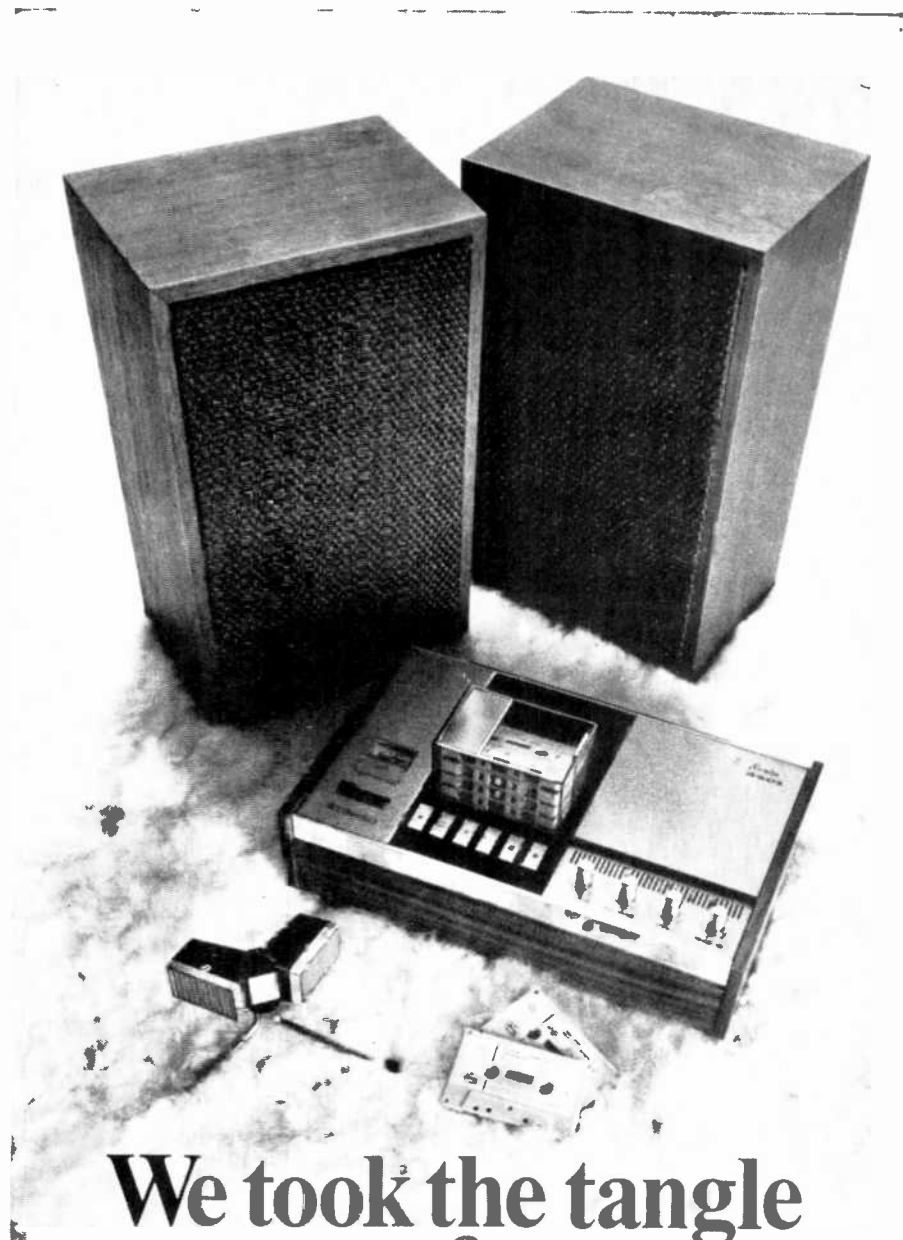
Video Tape Center

LONG ISLAND CITY, N. Y.— Sony Corp. of America has opened its Video Tape Production Center in Yonkers, N. Y. Services offered by the center include tape duplication (in either 1/2-, one-, or two-inch formats); tape-to-tape, tape-to-film and film-to-tape transfer; complete studio facilities for internal and external use. Both color and monochrome equipment is available for the production of video tapes.

Complete information, including price lists and studio rental rates, is available from Eugene Maffei, manager, Sony Video Tape Production Center, 165 Tuckahoe Road, Yonkers, N. Y. 10710; phone: (914) 423-4400.

New Record Line

SUN VALLEY, CALIF.—Superscope has released three record albums on the new Superscope label featuring the "Keyboard Immortal" series. The first releases include performances by Rachmaninoff, Debussy and Hofmann. The albums mark Superscope's initial entry into the classical record field and include music previously heard only over the Sony/Superscope-sponsored radio programs throughout the US and Canada.



We took the tangle out of tape.

Norelco introduced the tape cassette, and cassettes make tape recording simple, because the tape is locked up safe inside.

After we introduced the cassette, we didn't stop there—we introduced complete cassette systems to go with it. We kept introducing and improving until today, Norelco knows more about cassettes and cassette systems than anybody. And we sell more than anybody.

Ask your Norelco dealer to show you one of the Norelco stereo cassette systems. Either the Norelco 450 single play or the 2401 changer that plays up to six hours non-stop. Both record and play back too.

But make sure you buy a Norelco, not an imitation. After all, we introduced the whole idea in the first place.



North American Philips Corporation, High Fidelity Products Department, 100 East 42nd Street, New York, N.Y. 10017

America's Railroads Live On—On Tape

by Robert Angus

To today's youngsters, there's nothing wonderful about what's left of America's railroads—a once-a-week railcar spewing forth diesel fumes and rocking slowly up the rails where luxury trains once rolled; a way station boarded up and covered with graffiti or a city terminus in a rundown section of town whose waiting room smells of urine; Daddy arriving home late almost every night because the commuter train broke down.

But it was not ever thus. A bare 30 years ago, a ride on an express like the New Haven's "Berkshire," the Reading's "Crusader" or the Soo Line's "Dominion" was a real adventure. A rainy Saturday afternoon spent at the downtown railroad station was an adventure in watching big locomotives come thundering in, the trains disgorging visitors from who knew where, and rolling smoothly out again. Even the child of the 1930s who had to be content to watch the



through trains roll past stations like Ballico, California or Berwyn, Pa. had the fun of waving to the engineer, sure of a friendly greeting in return.

Or to the small boy living on a farm in the mid-west, there was the romance of listening to the far-off wail of a locomotive as it reached a level crossing. If the day was clear, he could follow the train's progress as a white plume of smoke and steam crept across the horizon. Like other members of his generation, he

wondered where the train was going and dreamed of the day when he, too, might be a passenger on his way to the magical city of Chicago, or Kansas City, or Omaha.

By the time that boy grew into manhood, the "Crusader" and the "Phoebe Snow" and the steam locomotive had all become a part of railroad history, and the opportunity to have dinner on a white linen tablecloth while the country outside whizzed by the window at speeds of 90 miles an hour had vanished. For many of those men, the glamour of the railroads had vanished without a trace.

But wait! Isn't that a puff of smoke just beyond the next hill? Didn't I detect the toot of a train whistle on the evening air? If you're in the vicinity of Oneonta, N. Y., or Bellows Falls, Vt., or Ashland, Pa. or Delson, Quebec or some 65 other communities across the United States and Canada, the answer might well be yes. For the steam locomotive is making a comeback. Bands of rail buffs, amusement park operators, wealth collectors and a few common carriers (the Interstate Commerce Commission's term for the railroads) have been busy retrieving rusty locomotives from scrap yards, reconverting day coaches from luncheonettes and laying rails to establish some 69 monuments to the great days of steam. These oases in the age of the diesel engine and the automobile range from a single midget locomotive built originally to haul coal out of a mine or carry logs down a hillside to collections of 20 or 30 engines, some of which saw service on the main lines of the Union Pacific, the Canadian National, the Missouri Pacific, the Reading, even of Britain's Great Western Railway. The trains may be good for a ten-minute spin around a circle of track hardly bigger than the one you made for your Gilbert American Flyer electric train back in 1949 to a 30-minute trip through the cranberry bogs of eastern Massachusetts or an abandoned right-of-way of the Rutland Railroad, the Pennsylvania, the Central of New Jersey or some other line.

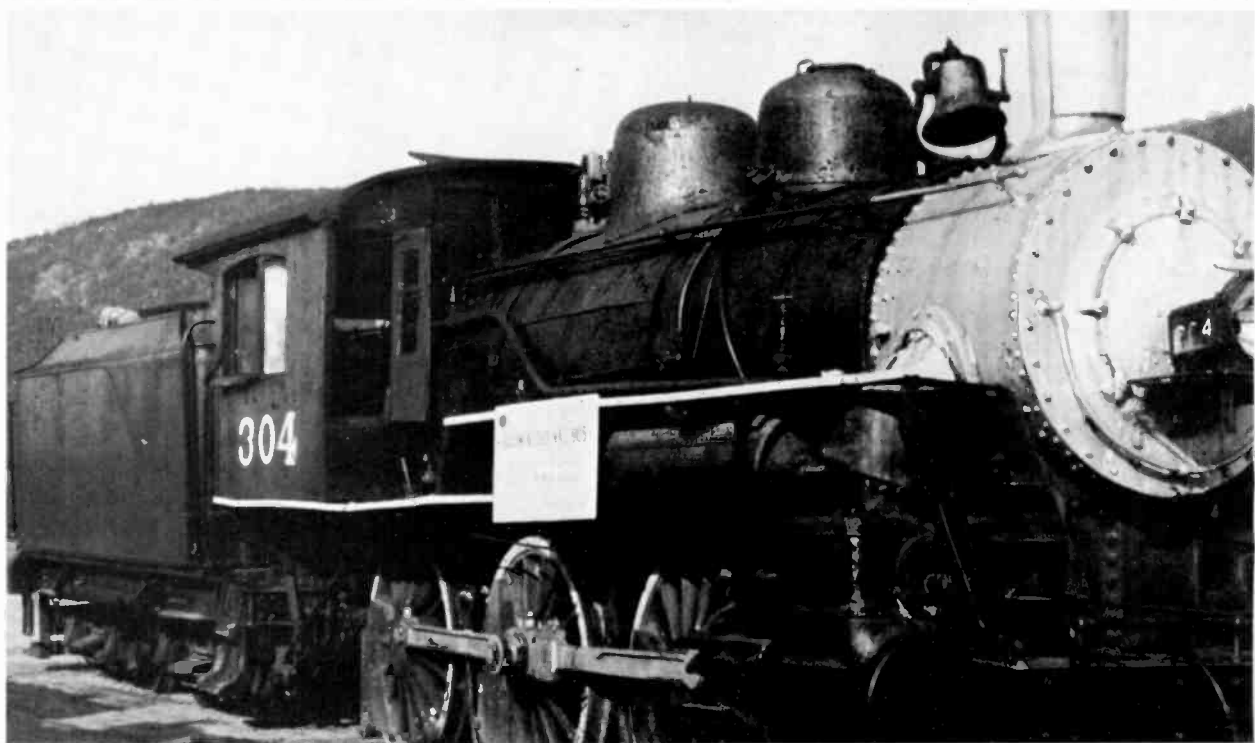
In the 1940s, today's railfans never dreamed that the day was coming when the steam locomotive would disappear from the nation's railroads—even less that the railroads themselves would close up shop or convert to all-freight operation. By the time it became evident that this was just what was happening, it was too late for most enthusiasts to document



the age of steam with their own recordings, made on the few portable recorders which became available in the early 1950s. By the time today's lightweight, reliable and easy-to-use portables made their appearance, the steamers had headed for the scrapyard.

But thanks to the enthusiast, you can go out practically any weekend in the summer in almost any

part of the United States (and not a few parts of Canada) and find a 4-6-2 locomotive pulling a string of coaches full of kids (and not a few adults). For the price of a ticket—anywhere from 25 cents to \$2—you can ride the train yourself, or get close enough with your recorder to tape every chuff and wheeze. And you can photograph to your heart's content. To the

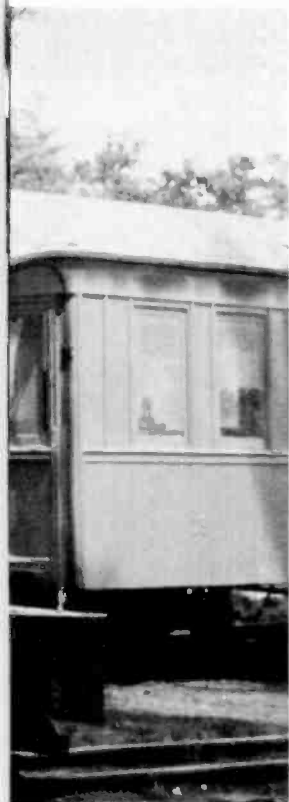


true aficionado, there's nothing like projecting 35 mm slides on a backdrop above his model train setup while a tape recorder reproduces the whistle and approach of a distant train, the click of the wheels as they pass over a switch, and the fading into the distance again of the train. When the citizens of Canaan, Connecticut staged their annual Railroad

Days festival last year, the entire town was treated to day-long recordings of this type in stereo. Canaan, incidentally, boasts the oldest passenger station in the United States still having scheduled train service.

What's to record? The wives of most rail buffs contend that once you've seen one coal-burner, you've seen 'em all. You'll quickly discover that 'tain't so—that the narrow-gauge steamer in Massachusetts sounds no more like that Canadian Pacific main-liner in Quebec than the wood-burning locomotive in Georgia sounds like the Streetcar Named Desire, on display at Warehouse Point, Connecticut. Whistle sounds are different; each engineer has his own style of whistling, even with the same locomotive. The weight of the locomotive, the speed at which it's moving, the load it's pulling and whether it's climbing a hill or running on the level all affect the sound it produces. Some of the vest pocket railroads also have old-time crossing warnings, which may be worth recording, too. One railbuff I know has taped several hundred hours' worth of toots, clanks and gasps from railroads in the United States, Canada, Germany, Britain, and Morocco.

How to record? Train recordings fall into two categories: On board and trackside. A really good tape of train sounds includes some of each—skillfully edited into a portrait in sound. The first type is perhaps the easiest to make. All it involves is finding a good location on a train (such as the vestibule, an open coach on an excursion train, or in a pinch hanging the microphone out the window), setting the volume level and letting the tape run. You'll have to come supplied with plenty of tape (and perhaps an extra set of batteries) if you want to make good on-board recordings. On a trip from Launceston to Plymouth, England (a steam line which, unfortunately, no longer exists), I left the recorder running for the full trip. Result: every toot of the train, the slamming of compartment doors and a lovely argument between a trainman and a stationmaster along the line that I could have recorded no other way. If you hang a microphone out the window (1) make sure it's expendable, which means inexpensive; (2) try to fix it so it doesn't bang against anything (I do this by closing the window tight on the barrel, leaving the business end to pick up the click of the wheels, the whoosh of a passing freight, and so on); and (3) pick a mike that's as rugged as possible. The current rash of inexpensive dynamic mikes from Japan fit the bill, and produce tolerable recordings, as well. If the microphone is abnormally sensitive to wind, of course, you'll have little but the rushing



breeze. But most low-cost dynamics I've tried will produce satisfactory results.

Trackside recordings require more patience and experience, but reward the recordist, in my opinion, with a better result. Trackside recordings may include early morning operations at a country railway station (I made a fascinating example one morning at Inverness, Scotland, when a load of chickens was waiting for shipment); the far-off cry of that train we heard when we were children, its gradual approach, the powerful thrust of its pistons as it passes, and its fading into the distance; the sound of work engines shunting in a yard; a particularly choice location such as that near a sounding signal as the train passes; and so on.

One trick with a trackside recording is to set your volume level in advance and leave it set. This makes the approach and fade-away that much more dramatic than a recording in which you have to keep cutting volume level as the train approaches. Only experience and good guesswork can guide you in making that setting, when the approaching train is nothing more than a puff of smoke on the horizon.

Another trick is finding exactly the right location, and setting up your equipment. Generally speaking, you can use better mikes for this kind of recording than you do for an onboard tape; you may even record the whole thing in stereo. Some early train recordists placed their microphones on the roadbed between the tracks and let the train move directly overhead. The results were usually no better than good placement beside the tracks, and posed the possibility of damage to equipment. Wherever you set up your equipment, most experts search for a join in the rails or a switch. When train wheels pass over the space between one rail and the next they produce the click which train buffs find irresistible. If you're recording in stereo, you may place your microphones anywhere from 20 inches to 20 feet apart—usually alongside the track and fairly close to it.

One of the finest trackside recordings I've ever heard was made by photographer O. Winston Link along the lines of the Norfolk & Western. Link set his microphones up to capture not only the sound of an oncoming train, but the night stillness which preceded it, the sound of katydids and grasshoppers, and birds in the trees. It's these extras which distinguish the ordinary train tape from a great one and like any other type of recording, it's a knack you pick up as you go along.

Once you've collected a fair assortment of line-side and onboard recordings, you're in for hours of editing out the dull spots, the repetitive pieces, the overloaded recording and other undesirables. Then you can integrate both types into a finished tape.

Fortunately, you don't have to hunt down the last run of the Podunk & Western. The railfan associations, the wealthy collectors and a few small railroads have preserved at least some of this past and made it readily available to the tape hobbyist and amateur photographer. If you're a member of the over-30 generation, perhaps some Sunday afternoon soon you may be seeking out one of the vest pocket railroads near you. Here's a guide of some of the larger ones around the country:

*Canadian Railway Museum, P.O. Box 22, Station B,
Montreal 2, P.Q., Canada*

Steamtown, U.S.A., Box 71, Bellows Falls, Vt. 05101

*Strasburg Rail Road, 1835 Pioneer Road, Lancaster,
Pa. 17602*

*Reader Railroad, P.O. Box 6049, Shreveport, La.
71106*

*Grizzly Flats R.R., 8910 Ardentale Ave., San
Gabriel, Calif. 91775*

*Denver & Rio Grande Western, Rio Grande Agent,
Durango, Colo. 81301*

*Gold Coast Railroad, 811 S.W. 6th Street, Fort
Lauderdale, Fla. 33315*

*Cadillac & Lake City Ry., Box 201, Lake City, Mich.
49651*

*Delaware Otsego Railroad, 1 Railroad Ave., Oneonta,
N. Y.*

*Vernonia, South Park & Sunset Steam R.R., 8138
S.E. 13th Ave., Portland Ore.*

*Black Hills Central R.R., Box 1880, Hill City, S.D.
57745*

*Rattlesnake & Northern R.R., North Freedom, Wis.
53951*

A Warning for people who carry credit cards.



In a recent issue of the Los Angeles Times the lead story, "Spiraling Thefts Lead to New Credit Card Protection Service," warned readers that credit card theft is soaring. That thousands of Americans who never thought it could happen to them will lose a whopping \$5C million this year. And that it can happen to *you*.

Fact is you can lose a credit card by carelessness or theft and find yourself with bills for *thousands* of dollars in a matter of days! (One of our members called in last week when his cards were stolen from his glove compartment. A lady whose purse was taken from the locked trunk of her car while she was golfing. And a businessman who lost his cards while vacationing in Hawaii. Etc.)

That's why we started Protect-a-Card. The Credit Card Protection Service that sends stop-payment notice to all your credit cards in minutes.

For only \$5 we record your cards and account numbers at our Data Center. Then if they're lost or stolen you just call us *collect*. 24 hours a day. From anywhere in the continental U.S. (From overseas you simply cable.)

We'll immediately wire stop-payment notice to all your card companies. At no charge to you. Then we'll send you copies of those wires. So you have time-dated *proof* of the notification that ends your liability.

Since you are liable for all charges made with your cards until you give proper (written)

notification to the card issuing company, the most important thing to do when your cards are missing is get notification to each card issuer *fast*. Protect-a-Card does this for you electronically. Infinitely faster than you could do it yourself. And with none of the worries and headaches.

End credit card worries today. Mail the coupon with a \$5 check (protects your cards for a full year) and a list of your credit cards and account numbers. We'll rush you a thief-warning membership card and a key-ring tag inscribed with our 24-hour emergency telephone number. (Like those in the picture.)

Then you can really enjoy your credit cards. And let the thieves do the worrying for a change.

Protect-a-Card, Inc.
 Data Processing Center
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I am enclosing a \$5 check and a list of my credit cards and account numbers. Rush me my membership. (Your cancelled check is your receipt.)

Name _____
 Address _____
 City _____ State _____ Zip _____

For telephone identification:
 Soc. Sec. No. _____ Age _____
 Occupation _____
 Signature _____

1-018-9- 12062



by L. L. Farkas

HOW TO RECORD WOODWIND INSTRUMENTS

Woodwind instruments, such as the clarinet, the flute, the piccolo, the oboe, and the bassoon form not only an important part of symphonic orchestras, but they are also popular as solo instruments. It is to our interest therefore to record their tones as well as possible.

In line with the general rule of examining the construction of the instrument as an aid to making the pick-up, let us begin with the clarinet and see how it produces its tones.

It consists of a cylindrical tube along whose length are located holes which can be opened and closed at will by means of stops and keys. A tone is produced by blowing air past a thin, flat, wooden reed set on the underside of the mouthpiece. The reed vibrates and in turn sets up vibrations within the cylindrical tube, thus creating the sound. By opening and closing different stops along the tube, the relative length of the cylinder is changed, producing different tones.

When the clarinet is being played a great deal of the sound comes through whatever holes are left open. This means that the sound waves will emerge from different spots along the length of the tube. Theoretically then, in order to pick up the tones to best advantage, either the microphone or the instrument should be shifted so that the sound will always emerge directly in the center of the pick-up beam.

However, this is far from practical. Instead the clarinet is held so that the midpoint along its row of stops is approximately opposite the center of the microphone beam. In this way the tones reach the microphone with about the same intensity. Then if some of the lower tones do not have enough volume, the clarinet can be shifted so that the particular spot producing the sound is closer to the microphone. Actually this is not required for normal playing, but when subtone effects are used, then it is important to shift the clarinet so that all the tones will be heard.

For the normal solo, the clarinet should be held about two feet from the microphone, with the tube in a horizontal position across the pick-up beam. When the clarinet is used for hot, swing type music then its tones have greater volume and the general staccato effect of the music gives the high pitched tones greater intensity. To obtain a good pick-up in this case the microphone should be moved back, to five or six feet. Of course when soft passages come along the player will have to move in and this is an



inconvenience, but it is better to do so that to have low passages of good quality and the other parts distorted. With this type of playing the instrument does not have to be held in a horizontal position; the bell can be raised only slightly and can be facing directly toward the center of the microphone beam.

Subtone effects on the clarinet must be played very close to the microphone. This is necessary because the notes produced by a combination of lip movement and damped reed vibrations are very low in intensity. The instrument should be held in a horizontal position within the beam and about six inches from the microphone. If you have a chance to make a trial recording, you can easily tell if the clarinet is too far away by the loss of tone definition. When it is too near the microphone the tones will vary quite a bit in volume; those emerging directly in front of the microphone will be so intense that they will distort and blur, while those that originate outside the pick-up beam will be very low in volume and may be lost completely. Remember that the microphone pick-up beam generally narrows as you come closer to the microphone; hence the possibility of easily falling outside of it. For best results, start at six inches and move closer if you wish, but stay beyond the point where the tones will distort. And when you play, you will have to weave back and forth in front of the microphone so that the hole emitting the lead tone is always in the center of the microphone beam. It takes a little practice to do this smoothly, but the results are well worth the effort.

In bands and orchestras, different clarinets play their part in different tonal ranges to create the desired chord. The lead instrument is then placed directly in front of the microphone, while the accompanying clarinets are set on either side. By setting these three clarinets about three to five feet away from the microphone, their tones can be balanced with the lead voice slightly predominating to accentuate the melody.

The bass clarinet, also called the basset horn, belongs to the same family as the concert clarinet, but it is larger and plays an octave lower in tone. It still has the long cylindrical tube, but the top end is slightly curved and leads to the mouthpiece, while the lower part is turned up into a bell-like opening. It actually looks like an overgrown saxophone.

Solos from the bass clarinet should be played without raising the bell and from a position at least two feet from the microphone. Do not come nearer

than that or the bass notes will distort. Conversely do not stand farther away than approximately four feet for those same bass notes will not carry very far and will very quickly lose their fullness and definition as the distance is increased.

When this instrument is used in the orchestra, it is generally located on the side of the clarinets, at a distance of approximately five feet from the microphone. In this particular role, a solo tone is not required; hence the bass clarinet can be placed farther back than on the solo position and still produce sufficient volume for its notes to effect the required blend of tones with the other instruments.

Now let us examine another important woodwind instrument: the flute. It consists of a narrow cylindrical tube of wood or metal, jointed in several sections. Along its length are located apertures which can be opened and closed by keyed stops. The flute has no mouthpiece. Sound is produced by blowing across a mouth opening. The column of air produced by the lips, known as the air reed, breaks across the sharp outer edge of the opening, setting up an air flutter which is transmitted to the air inside the tube, thus producing sound.

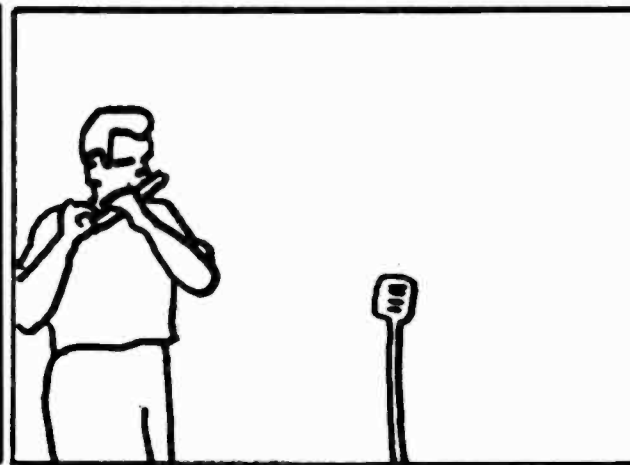
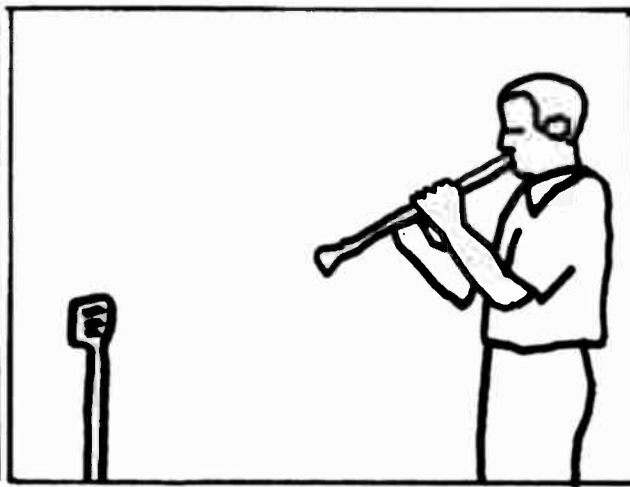
The tones of the flute are fairly high and have a penetrating quality. These high-pitched notes and their harmonics thus have a tendency to cause distortion when produced too close to the microphone. To prevent this you should keep the flute at least two feet away from the microphone. If the instrument is held too close to the pick-up unit, the distortion will be characterized by a pronounced reinforcement of certain notes. In addition the rushing sound of the air blown past the mouth aperture will be emphasized and will thus mar the overall quality of the tones.

Although the flute has piercing tones in its solos, the actual volume is not very high and therefore its tones can be easily covered up by the tones of other instruments. To overcome this when the flute is used in an orchestra, it is placed in the direct beam of the microphone, at times right in the midst of the clarinets. The correct position will be found when the tones of the flute are heard but do not predominate.

The piccolo is built along the same lines as the flute, but it is smaller in size and consequently is pitched an octave higher.

The tones of the piccolo have quite a few overtones. This, plus the fact that its tones are already high, make it necessary to keep it a good distance

Top left: the correct position for an accordion pick-up. The keyboard should be held toward the microphone. This permits the bass to record even though the higher notes are favored by this position. The distance from the mike is about four feet. Upper right: the microphone here is a bit low but should be satisfactory for a jazz pick-up for the clarinet. The normal position is about two feet from the mike with instrument horizontal and across the pick-up beam. Lower left: this is a good position to record the flute as the air flutter will be above the microphone and will be subdued. A minimum distance of two feet from the mike should be maintained. Lower right: a distant type pick-up on a piccolo.



from the microphone. On a close perspective solo, you should place the piccolo at least three feet away. A closer position would produce the type of distortion noted when the flute is in too close.

In the orchestra the piccolo is generally located next to the flute. This slightly off-center position

compensates for its higher intensity and produces a good blend when the two instruments are played in a duet.

Another well known woodwind instrument is the oboe. While similar to the clarinet, its construction is more complicated. It consists of a short metal tube

which has finger holes along its length, a set of keys used as in the clarinet, plus two automatic octave keys to assist in reaching the higher notes. Two thin pieces of cane forming the mouthpiece are bound to the metal tube by many turns of waxed silk. Blowing past these reeds sets up the vibrations which are amplified by the column of air in the metal tube and in turn creates the sound emanating from the bell and holes of the instrument.

The tones of the oboe are not only loud, but they have a thin, penetrating and somewhat nasal quality. As a result the close pick-up distance is not critical. For a solo the microphone can be placed only three feet away; it can also be as far back as five feet without affecting the tone quality. While playing, the oboe should be held with the cylinder slightly inclined, the bell down, and the holes facing directly toward the center of the pick-up beam.

For a distant perspective, the oboe should be placed from ten to twenty feet away from the microphone. In the orchestra it generally takes its place on the extreme end of the woodwind section, from which position enough of its tones can still be heard to produce the desired effect.

A variation of the oboe is the English horn. It is actually the same instrument but with its tones pitched an octave lower. The same method is used in the pick-up except that the distance from the microphone is decreased to compensate for its lower volume.

The next instrument to be considered is frequently called the oboe's big brother. This is the bassoon. Basically the construction of the oboe and the bassoon is about the same, with the exception that in the bassoon, the tube to which the double reed is attached is curved and the instrument is much larger in size. The low notes that it produces fulfill the same purpose in the woodwind section as the bass viol does for the strings. Its peculiarity of tone also makes it useful for creating grotesque effects.

The volume of sound produced by the bassoon is fairly low. For that reason, when the bassoon is used for solos, it should be played about two feet from the microphone. With the orchestra, it is usually placed behind the clarinet section. Then, as a solid rather than a loud tone is required, it produces sufficient sound from that position to form the required background for the woodwind section.

The last instrument to be considered is the accordion. While not a woodwind instrument in the strict sense of the word, it is nevertheless a reed instrument. Air is forced against free reeds of different thickness by the pressure of the bellows to produce sound. Stops on each hole where the reeds are located are controlled by the action of keys on the accordion keyboard. These select the particular reed to be used and hence the tone to be produced.

Now most of the tones of the accordion come through the openings above the keyboard, so naturally when recording its tones, this part of the instrument should face the microphone. However, the bass notes of the accordion come out from the other side of the bellows, through stops located there, so that to pick them up directly would be impossible without also losing the melody. Fortunately enough of the bass tones are heard, even when the higher notes are favored, to furnish the necessary background and accompaniment without changing the initial position of the instrument in relation to the microphone.

The distance that you should use for accordion solos is approximately four feet. Any performance closer to the microphone than that will have a tendency to blast and thus produce distortion in the recording. You should also be careful, when working the bellows, that you do not bring the high keyboard end of the instrument too close or again blasting would result. You can recognize the condition on a monitor speaker by a distinct rise in volume each time the bellows are expanded.

On the average orchestra set-up, the accordion is placed in a fairly close position but slightly off-mike so that its tones do not blast. For longer perspective it can be placed as far as twenty feet from the microphone, depending of course on the acoustics of the room. At that distance, however, a slight shift either forward or back will change the quality of the tones picked up and recorded. In such a case a test recording is useful to set the position of the accordion for the desired results.

There are of course other woodwind instruments, but their construction and operation is sufficiently similar to those described that you should, by comparing the methods of pick-up indicated, be able to derive the correct set-up and obtain a recording of good quality. By making a few test recordings you should be able to get good results.

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What is more, he vowed to do something about the lack of opportunity for educated Americans with an interest in "in-depth" travel. And that was the beginning of Horizons for Professional People. An idea in travel whose time is now.

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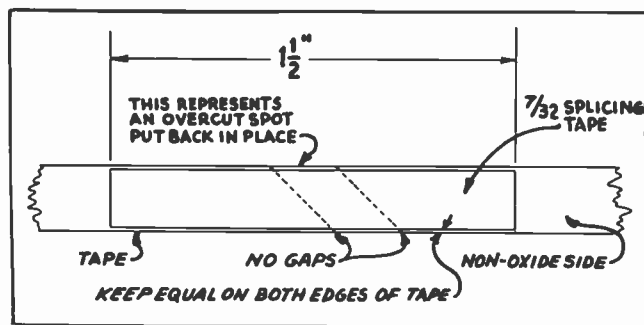
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HOW TO CLOSE EDIT

by Jack Bayha

Everyone who has done any tape recording work in any quantity has certainly tried to edit his own tapes. Probably you have not been too successful either. The more you try it, the more amazed you become at the legendary skills of those people you have heard about who can edit a conductor's baton click out of a music tape, etc. Just how this can be done with merely a razor blade, a splicing block, and some tape is a most amazing trick, yet one which with a little practice you can approach, if not actually do. The mere assembling together of a number of selections into a single unit does not comprise the "close edit," and we will concern ourselves only with the "close edit," the big art in tape editing.

We call this form of editing an art, it is just that, but it can be done by anyone, with a little practice, and the right, but simple, equipment necessary. It is impossible to do a close edit without a good splicing block. This block must be one of the precision metal type, one which will hold the tape firmly while you are working with it, it cannot be the relatively inexpensive plastic type. The "Editall Jr." at a net cost of about \$3.00 is the least expensive we know of. In addition to our splicer block, we will need a good single edge razor blade. This must be kept demagnetized at all times, and kept away from any-



Close editing, snipping out words or even syllables requires accurate splicing. The drawing shows a proper close-edit splice, close line up tape cuts, splicing tape, etc.

thing which might magnetize it. It can be demagnetized with a head demagnetizer, or a bulk eraser, or by placing it on a power transformer, and slowly drawing it away.

Next we will need splicing tape. For close edit work, this must be the 7/32 wide type. It is available as Scotch Tape No. 41-7/32 L. Under no circumstances use regular pressure sensitive tape, or attempt to use the standard half-inch width tape. Close edit work will require the use of this tape only. Next we will need a yellow china or glass marking pencil and a supply of leader tape. With these few simple tools, and our tape recorder, we need add only infinite patience and we are ready to start splicing, close edit style.

The best way to explain editing of the close type is to take as an example a typical case. We have, say, an announcement, followed by musical selections. We want to shorten the announcement, and we want to take out the crowd noise between selections. There is a loud clicking sound in the middle of one music piece, and we want to fix the whole thing up so that our local radio station can broadcast it.

Knowing that it was to be used for broadcast, and that we would want to edit the tape, we have used only one half of the tape on our dual-track unit, since editing one track would, of course, ruin the other half track. Then again our local radio station has only a full track playback unit, common in many stations and naturally the second track would mix with the first, and being backwards to boot would sound pretty awful. Let's go at the job step by step, as a typical edit job.

First, we remove the head escutcheon on our tape recorder, if it uses one, since we will need free access to the front face of the recorder's play head as we do our job. On the take-up side of the recorder we will place a blank reel. We now wind onto this reel about six feet of leader tape, this will serve as a threading leader, and help cueing of the tape for broadcast. Remove this reel with the leader from the recorder.

Place another empty reel on the take-up side and play the tape to be edited until you come to the very first spot you wish to have audible sound. Stop the recorder here, and with it in play position, but without the take-up reel running under power, roll the tape back and forward, by turning the reels with a "rocking" motion, until you can locate the precise place you wish the tape to commence. This rolling action may be difficult with some recorders, but they usually can be rigged in some fashion to allow this action. When you hear the precise spot, you can soon

learn to find this even at the very slow speed you will be turning the tape, mark the tape back with your china pencil right over the head gap. Now roll the tape back and forth a bit to make sure you have the right spot, or even play it, when you know you have it right, move about half an inch forward on the tape, and cut it there.

Now remove the reel on the take-up side, and put the reel with the prepared leader on the machine. Splice the tape to the leader, rewind a bit, and check it. Naturally you will save the reel you just took off, just in case of an error in cutting, and because later on we will want some "room sound." We can now play the tape until we come to the part of the announcement we want to delete. Here we find that the spot we want to stop at, has another sentence right on top of it, and we want a pause before the musical selection to follow. By now we have already mastered the matter of cutting the tape at a given spot by "rolling" it, but how do we put in a pause? Well, you might think the best way would be to put in some blank tape. This would not be correct however, since the sound of the room in which you made the recording would not be there, and it would have an odd sound when played back. Cut the tape at the spot desired, then remove the reels from the supply and the take up. Place the earlier discarded tape on the supply reel, and a blank on the take-up, run through the tape until you find a spot with room noise only, cut it out. Remember that for editing most tapes should be at 7½ inches long, two seconds 15, etc.

Having located our quiet spot, put the reel of "keeping" material back on the take-up, and splice to it the quiet, or room noise. Now put the master reel back on the supply and proceed to check it.

Next we move to the clicking sound we want to delete. You may think this will be very difficult to do, but it's surprisingly easy. The click sound will be of very short duration, since it is a click, and you can generally edit it out without it bothering the music content too much. First, let's locate it, by playing the tape. Once it has been found, you can by using the slow roll technique, locate it precisely. Mark the beginning of it, and the end. You will find it occupies only an amazingly short piece of tape. Cut out this section of tape, using the edit block, to be sure it's cut at the right angle. If you miss the spot, just put it back with splicing tape and try again. You can cut and try many times. You can have ten splices in an inch of tape, and if carefully aligned, and done with a non-magnetized razor blade, you cannot hear it on

playback. In re-doing splices just peel the splicing tape off the recording tape. Do not double up splicing tape.

The crowd noises we get rid of in the same fashion, by chopping them out between selections, and using "room" sound if necessary for pauses.

Sometimes a loud baby crying in the hall or something of like nature may make you want to remove a complete musical passage. This you can do quite well, by deleting a portion of the music. To see how precisely this can be done, we generally run an inch or two more, past the break we want to make on the take-up reel. Then we splice onto the end of the tape on the take-up reel a piece of leader. We now replay and shorten the end attached to the leader until the break occurs at the right spot. To start the next passage at the right spot, we place leader on the tape on the supply reel and shorten the tape until the break-in spot is right. Now join the tape on the supply to the take-up, and way we go. At the end of the reel, we cut it where we wish, and put on six feet of leader, and the job is done.

A great American once said, "We have nothing to fear but fear itself," and this is true of tape editing. Despite the feeling you might have to the contrary, if you carefully align every cut and use non-magnetized tools, you can cut and reassemble tape a fantastic number of times without the splices being audible. You must, however, very carefully align the tape each time. Naturally, such a tape is apt to be slightly more fragile than a one-piece tape, but it will hold up for many playings and can be copied, if desired, onto a single piece of tape.

You will find that after you have mastered the art by practice, you can do an amazingly good job of editing. When you get a bit of practice, you can have an excellent practice session for yourself by recording some narration; then trying to cut it apart and make it say something different. With a little practice you can do this. A favorite editing trick is to get someone to say a few words on politics, then in secret reassemble the words to say the opposite. At your first opportunity, play it back for them. They will refuse to believe it's possible, but with a bit of practice you can do it. In this type of editing, you will have to watch inflection, etc., which makes it more difficult to do than the straight form of editing. We can promise you that when you learn to close-edit you will be in for many hours of absorbing fun.

We wish to thank Bob Rose of Livingston Audio Products, who taught us to close edit, for his generous teachings.

HOW YOU HEAR AUDIO PERS

It all began a long time ago and lies deep in the origin of man as an evolved animal. This may sound somewhat academic and scholarly in describing the "new" sound. Since this sound will be with us the rest of our days it might be wise to dispel some of the misconceptions about stereophonic sound. To begin with, let's think about the dictionary definition of stereophonic: "... pertaining to a three dimensional effect of auditory perspective ..." The key words to remember are *three dimensional effect* and *auditory perspective*. Actually what you hear, that is the characteristics of stereophonic sound, is an *effect* with an auditory illusion of depth and perspective. You might if you wish call stereophonic sound an *auditory illusion*, with all the effects of the familiar *optical illusion*. In essence your hearing system is being fooled... no matter how pleasant the effect, stereophonic sound is an illusion. Now we can go back into man's early progress to see how this illusion can take place in our time.

There was a time when man walked small upon the earth primordial. He has no natural elements of protection like those of the pre-historic animals but he had the use of five senses and the ability to reason and take profit from his experience. In the beginning ancient man more than likely relied largely upon his hearing than upon any of his other innate senses. His eyes either clouded by physical ailments or obscured by the heavy undergrowth of his natural environment, were only of short range help in warding off danger. However, his hearing system, protected by nature's "choice" of location and, chances are, overhanging long hair provided him with a fine "early warning" acoustical radar system. His *binaural*, i.e., two channel, hearing system functioning in cases of danger not unlike the acoustical aircraft spotting devices used by the army before World War II.

The way we hear sounds within their natural context allows us to place them in relationship to our own position. In the dawn of civilization man never heard sounds that were not within their context of naturalness. All sounds came from their source, and that source whether an animal in the forest, or a child's cry in the cave, had made these sounds as a part of its existence. It was thus that man was instinctively aware of its existence. It was thus that man was instinctively aware of his surroundings, its

sounds and their instantaneous location. His life often depended upon his hearing ability.

Even the first manmade instruments, like log drums or reed flutes, were natural sounds. Only these instruments could make their own sounds, of course, mechanical or electronic sound reproduction was unknown.

Whenever a sound was made our pre-historic man instinctively turned his head in the direction of that sound. There was an inner compulsion in the hearing system of man that made him seek to equalize the volume of sounds reaching either ear. In doing this his head turned toward the sound just as his eyes sought to focus on one object; his "ears" sought to do the same thing. In a manner of speaking, man makes an effort to hear in one plane or dimension just as he seeks to see in only one dimension. Our world of sight and sound becomes three dimensional only as we move to refocus our eyes and ears. When the musical instrument was developed within our knowledge of history, the concert hall with large groups of musicians became part of our lives. Here was a stage filled with a hundred or more sound sources, that is instruments... each a separate sound source in itself. As you and I sit in front of this complex group of sounds our instinct tries to control our head movements in listening. It is easy to see that no matter how quick our reaction time none of us could "center" our ears on each instrument as it made a sound. The side to side motion of our heads would be quite rapid, and impossible to do. If during the concert there is an outstanding solo sound like the cymbals, or the trumpet our head will turn toward it centering both our eyes and ears on it. During the performance of these many integrated sound sources our mind is at work trying to make our head track these sounds. At the same time our conditioning as evolved human beings "tells" us we need have no fear in the concert hall surroundings and our automatic and instinctive head movement, for the placement of sounds, is partially overcome. This "tension," as it were, of instinct versus involvement in our hearing system has become a natural part of our hearing ability. It is this "tension" and its effects on our mental "ear" that makes it impossible to gain any spatial realism and definition out of monaural high fidelity sound. No matter how good the frequency

PECTIVE

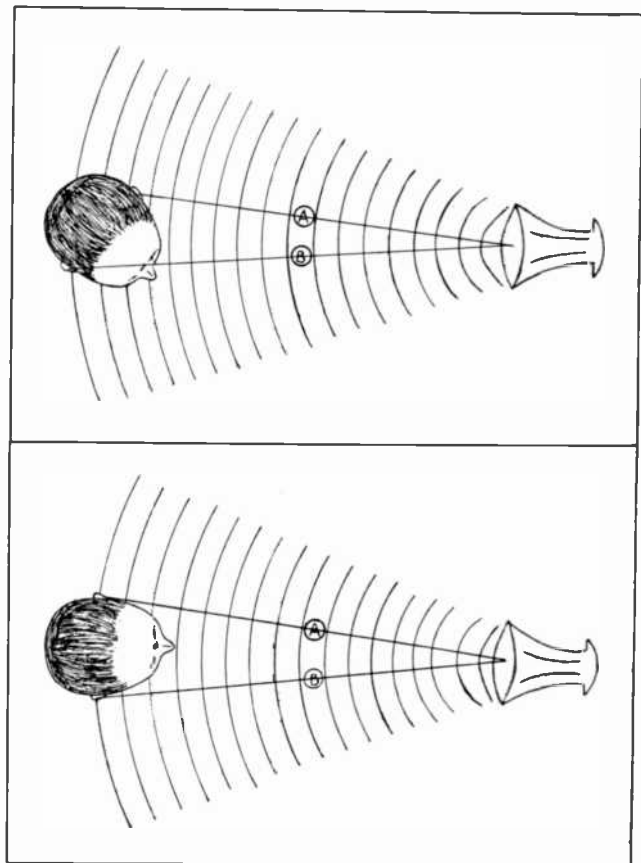
by Robert Oakes Jordan and James G. Cunningham

response, how wide the dynamic range, or how many speakers you have hooked to your single high fidelity amplifier, the resulting sound can not satisfy all the natural requirements for hearing. To be sure the developments in the stereophonic art would never have been possible but for the past improvements in the audio field. It is well to remember that this "tension" we spoke of is not something you can notice as it happens but rather it is a natural part of hearing come about through mankind's time of earth.

It is plain to see that to be at ease while listening to any moderate sound, that sound must fill the natural requirements present in the human hearing system. Let's go back to the words we were to remember from the first part of this article: *three dimensional effect* and *auditory perspective* or better still an *auditory illusion*. For the most part these words may only be applied to sounds mechanically and electronically reproduced out of their natural aspect. In nature all sounds heard are weighed by our hearing intellect. For instance, we hear the sound of an elevated train approaching. It can hardly mean any thing to us by way of a warning unless we are on the tracks. The sound is heard, its location noted but before we turn toward it our intellect breaks the "circuit" and stops our head movement by saying in effect: "This train is an elevated train, it is on tracks twenty feet above me and cannot cause me harm . . . I am safe." However, if at the time you were crossing the street, this sound appeared, your intellect gave you this same message, and you took no warning; there might be a new type of street car which made a very similar sound and in the next few seconds you could have a fatal accident. This side note is simply to point out that we can make hearing mistakes, with natural sounds in their own locale. If you ask your hearing system to make a conscious "mistake;" that is to listen to monaurally reproduced music or sounds lacking the elements for *auditory illusion*, but to pretend to hear-between-the-lines those missing elements of spatiality, and dimensional definition . . . it cannot and will not do this. Thus far no amount of gimmicked and "doctored" monaural sound has provided these special requirements for natural hearing. While not perfect stereophonically reproduced sound provides an *auditory illusion* which the human hearing system accepts without the usual

listening fatigue of monaural sound. We have not made an effort to cast aside present day monaural high fidelity equipment. It is our contention rather that the single system is a perfect starting place for the sound in your future. . .

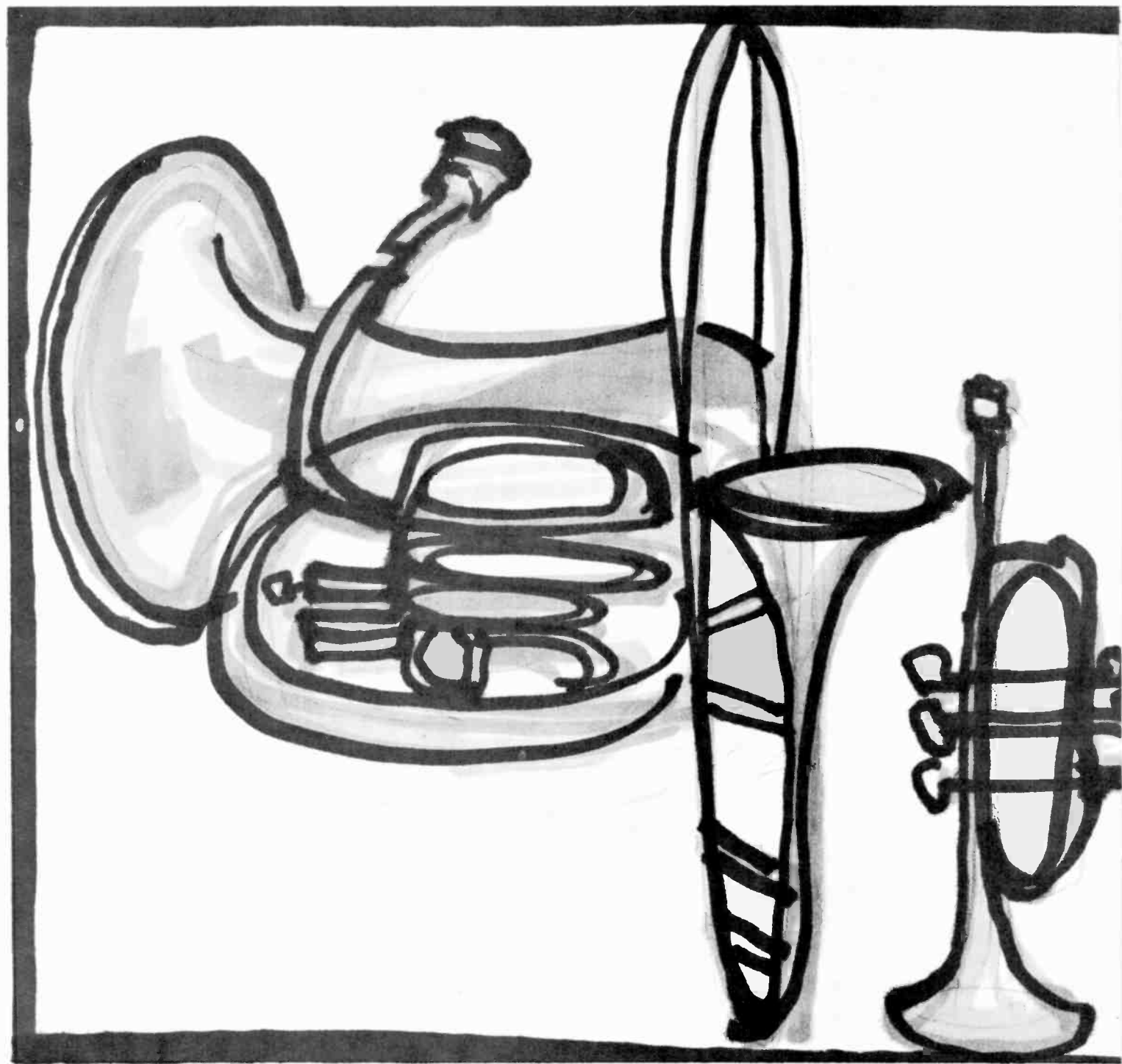
In our next article we will explain further about the nature of stereophonic sound, and those aspects involved in both the recording and playback of the unique means of audio reproduction.



In order to locate the source of a sound it is necessary to have "binaural" or two-eared hearing, just as you must have two-eyed sight in order to perceive depth. In the upper drawing, sound path "A" is shorter than path "B." While the difference in the arrival of the sound at each ear is measured in microseconds, the brain detects it and orients the source. Lower: the simultaneous arrival of the sound in both ears indicates its source as dead ahead.

Continued from last month

THE INSTRUMENTS OF THE



ORCHESTRA

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THE BRASSES

Among the most spectacular instruments of the orchestra are the trumpets, trombones, French horns and tubas which occupy the back row. In a typical symphony orchestra playing a symphony by a Romantic composer, you'll find four horns, three trumpets, three trombones and one tuba (symphonies by classical composers like Haydn and Mozart call for smaller orchestras with fewer brasses; while such large-scale works as the Berlioz *Requiem* and Mahler's *Symphony of a Thousand* require even more). Some musicians refer to all of these metal instruments in which the lip of the player, stretched taut across a bell-shaped mouthpiece, causes a column of air to vibrate, as horns—which reminds us of their humble beginnings.

The earliest horns were made not of metal but of the horns of animals, hollowed out and blown by warriors to signal the start of battle. Like the early bagpipes, primitive man believed that loud, unexpected blasts on the horn of a ram or an ox would scare the daylight out of an enemy, thus softening him up for an attack. As musicians became more sophisticated, they discovered that you could make horns out of metal which were more reliable and more uniform than the ones nature provided. By the time of the Egyptians, metal horns were being used in religious ceremonies as well as in battle. The Romans used them for popular music; and by the Middle Ages, brass horns were being used for hunting as well.

As we've seen, the length of a column of vibrating air determines its pitch—the longer the column, the lower the note. Medieval musicians found that if they wanted to play marches or trumpet calls or just about any kind of music, they wound up with instruments six, eight, ten or more feet long. Somebody discovered that you could achieve the same results by bending the tube into a more convenient shape; hunting horns were bent into a circle which fit conveniently under the arm of the player (a shape later used for the French horn) while higher-pitched trumpets were bent back and forth into a shape which could be easily held in one hand.

Brass instruments—particularly horns and trumpets—were extremely popular with such baroque composers as Bach, Handel, Torelli and the Gabrielis. Players of the day had to play extremely complicated melodies without the aid of valves, which make life much easier for today's brass players; valves, which make possible rapid change of key and the ability to play scales easily, were introduced only around 1850. However, the baroque brass players did have certain advantages over their predecessors. Instead of having to form all of the notes with their lips, they could lengthen or shorten the horn by inserting crooks—tubes bent to fit interchangeably in a trumpet or trombone which would alter the pitch.

The trumpet, soprano of the brass choir, contains approximately six feet of tubing, with three valves to alter the length in order to make it easier to play a scale or melody. The instrument possesses a firm, brilliant timbre that lends radiance to the orchestral mass. It's associated with martial pomp and vigor; and its hard, lean sonority appeals to modern composers, who have assigned to it some memorable solos. Played softly, the trumpet commands a lovely, round tone. In addition, it's possible to mute the trumpet by inserting a stopper of metal or cardboard into its bell. This changes its tone quality completely, to produce a squeezed and hoarse and, if the trumpet is played loudly, almost ridiculously tinny and nasal sound.

If the trumpet is the direct descendant of the ram's horn and the signal horn of Roman and Christian times, the French Horn is the direct descendant of the hunting horn. Like the trumpet, it began appearing regularly in the symphony orchestra around 1700, with the introduction of crooks. And in the mid-1800s, it acquired valves which made it more versatile.

The horn consists of approximately twice as much tubing as the trumpet (12 feet) and plays one octave lower—roughly from the second C below Middle C to the second G above it. There are more horn players in the orchestra than trumpeters not only because the tone of the horn is more subtle and less loud, but also because horn players play in pairs—the first and third covering the lower portion of the instrument's tonal range; the second and fourth the upper portion.

Horns are most useful orchestral instruments. Their tone—round and mellow when played softly, and rich and brilliant when sounded loudly—blends beautifully with either the woodwinds or the brasses; and they form a convenient link between the two. They can disappear from view unobtrusively like the clarinets, and they can fill out sustained harmonies in the middle register of the orchestra. Small wonder that horns have been a favorite with composers from Haydn through Richard Strauss. Like the trumpet, they can be muted to produce muffled, obscure tones.

The trombone may be said to be the senior member of the brass family because, since it uses a movable crook or slide instead of valves, it most resembles the sackbut. The latter dates back to Biblical times, but became one of the first brass instruments capable of playing a scale, thanks to its moveable slide. Its massive, heavy tone made it useful in reinforcing Medieval church choirs; and during the Renaissance it won ready acceptance in military bands as well. Giovanni Gabrieli used it in the score of his *Sacrae symphonia* (c. 1600). However, it took operatic composers like Gluck and Mozart to make the trombone really respectable; they began including it in opera scores toward the end of the 18th century. Trombones finally won a place in the symphony orchestra in 1808, when Beethoven included them in the score of his *Fifth Symphony*. Hector Berlioz, who loved to use trombones in his large-scale works, described them this way: "Directed by the will of a master, the trombones can chant like a choir of priests, threaten, utter gloomy sighs, a mournful lament or a bright hymn of glory."

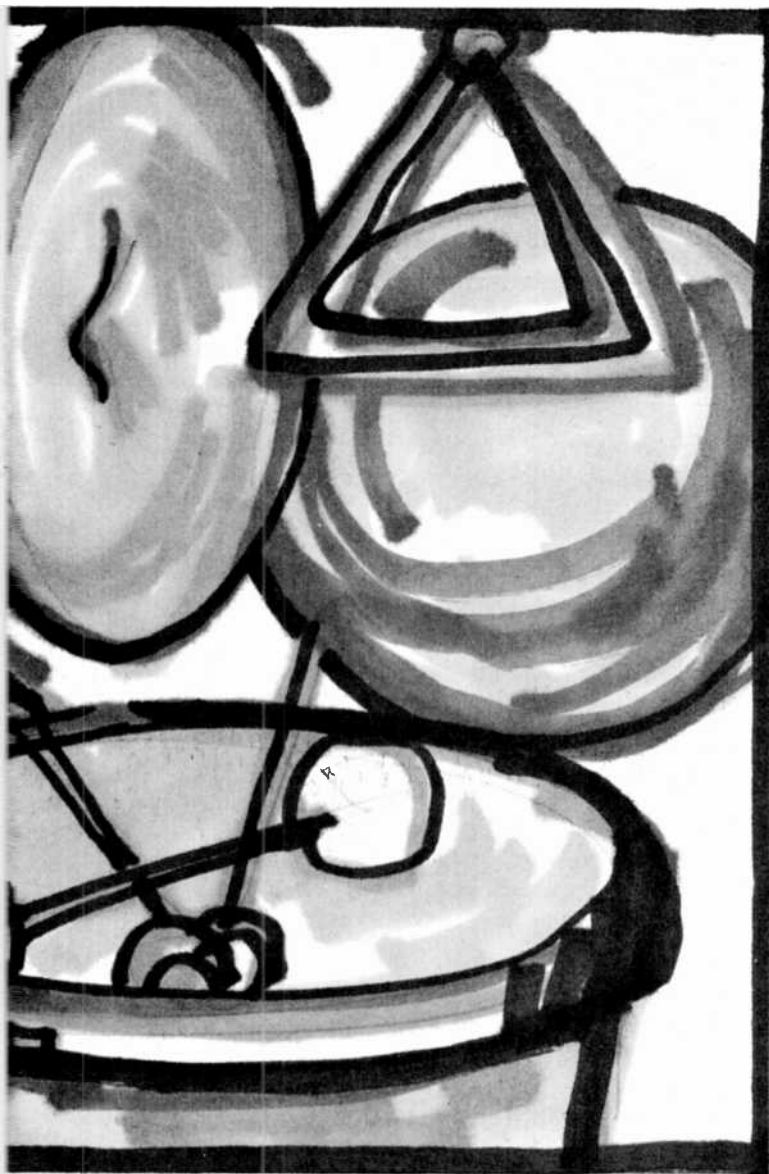
Actually, trombones come in two voices—tenor, with a $2\frac{1}{2}$ -octave range beginning with the second E below Middle C; and bass, beginning roughly two notes lower. The latter is somewhat larger, and a typical symphony orchestra may contain two of the higher-pitched instruments and one bass trombone.

The real bass voice of the brasses is the tuba, which also comes in more than one size and shape. The standard orchestral tuba is an upright instrument with a range of about three octaves, ending with the F above Middle C. A familiar fixture in military bands is the Sousaphone, a tuba which coils about the body of the player and terminates in a bell over the player's head. It may cover the same range as the orchestral



tuba, or the even deeper range of the larger double bass tuba. There's also a smaller version of the orchestral tuba which has a somewhat higher range and is also known as the euphonium.

Tubas were an important part of the military band as long ago as Biblical times. In fact, the trumpets which are said to have levelled the walls of Jericho probably were augmented by some sort of tuba. However, it wasn't until the development of the instrument we know today in 1835, complete with valves for playing melody, that the tuba was formally admitted to the symphony orchestra. Considering its size, the tuba is a remarkably mild-mannered instrument, producing a velvety dark resonance which serves as a solid foundation for the orchestra, rather than the kind of bite or roar one might expect. Like the bass viol and contrabassoon, the tuba is practically never heard as a solo instrument; yet it manages to make its weight felt in orchestral scores, something like the kettledrums.



THE PERCUSSION

Most children, the first time they attend a concert, secretly envy the men in the back row of the orchestra who play the drums or the other percussion instruments. Although there are only from two to five of them, they make a great deal of noise in relation to the rest of the orchestra. It must be fun to get paid for beating a bass drum or clanging the cymbals; and many an eight-year-old practicing the piano while the other kids were out playing baseball has suspected that percussion instruments are easier to learn to play.

The percussion section of the orchestra actually isn't a "family" in the same sense as the brasses or the strings, most of which look like each other, produce a similar kind of sound in similar ways. The percussion have in common only the fact that you strike or beat them to produce music (or at least sound). In addition to a variety of drums, they include cymbals,

tambourine, xylophone, chimes, gong, a wooden block, a metal triangle, wooden rattles. Some, like the kettle drum or xylophone, produce definite musical notes; others, like the bass drum or cymbals produce sound which has no definite pitch.

Because the number of instruments outnumbers so greatly the percussion players found in the average orchestra, most players actually operate several different instruments. The exact number of instruments and of players at any given concert depends on the demands of the composer and the desire of the conductor; an all-Haydn concert may dispense entirely with percussionists, while a program including some of the large-scale works of the Romantic composers may require four or five players with a wealth of instruments.

It's easy to see how percussion instruments developed from nature—and surprising how little they've changed since their primitive beginnings. The bass drum of today isn't that much different from the first drum made by a cave man stretching an animal skin across a frame and beating it. The blocks—pieces of hard wood—are not that far removed from the picket fences small boys love to run sticks across. And even in big city slums, children still crash the lids of two garbage cans together, to simulate the sound of cymbals.

The man in charge of the percussion section is the timpanist, the man who plays the kettle drums. He cuts a majestic figure with his drums around him, and placed as he often is higher than everyone else and in the center of the row, he appears monarch of all he surveys. The three drums are slightly different in size, and each can be tuned to produce a musical note. Almost constantly during a concert, you can see the timpanist bending an ear to the drums, adjusting the taps which tighten or loosen the stretched skin to raise or lower the pitch. Because of the almost constant need to adjust pitch on one or more of the drums, the timpanist spends more time adjusting them than he does actually playing. It's this adjusting which makes the timpani more difficult to play than they would appear to be.

The drumsticks have felt heads, and most drummers have two or three pairs of different degrees of hardness to produce different kinds of tone. Not all percussion effects rely on loudness; composers discovered early that continuous loud playing very

quickly tires the listener. Beethoven, for one, has achieved some striking effects by using the timpani very quietly.

Other percussion instruments which produce a definite musical tone include the glockenspiel, a series of horizontal steel plates of various sizes which produce a bright metallic sound when you strike them with a felt-covered hammer. The celeste looks something like a miniature upright piano, but it's a kind of glockenspiel that's operated by a keyboard. The steel plates are struck by small hammers and produce an ethereal sound. The xylophone consists of blocks of wood which produce a dry, crisp tone when struck. Chimes consist of a set of metal tubes of various lengths suspended from a frame and struck with a hammer. They have a broad dynamic range, from a metallic tinkle to a sonorous clang, and frequently are called upon to simulate church bells.

Among those with no definite pitch are the snare drum, the kind you see in a street parade, which is small and flat and is played with two wooden sticks. It has two parchment heads or surfaces. Stretched across the bottom one are wire strings or snares, which vibrate when the top is struck. The snare drum is useful for underlining rhythms or for soft or loud drum rolls. It can make itself heard even against a full orchestral climax. The bass drum looks like a larger version. It contains no vibrating snares, and produces a dull booming thud.

The cymbals, another instrument to be found in illustrations of Roman and even Egyptian military bands, are two thin plates of brass which crash together. Played softly, they sound mysterious, and played loudly, they can provide that final touch of excitement at the height of a climax. Some scores call for the timpanist to hang up one cymbal and play a roll on it with drumsticks, which gives a chilling feeling of mounting tension and suspense. Nobody is quite sure where the tambourine came from, but it's a favorite with composers of Spanish or gypsy music. Known in Europe as early as 1300, it consists of a parchment head on a solid frame containing tiny metal plates which jingle as the head is struck or the tambourine shaken. Another favorite of composers hoping to give their compositions a Spanish sound are the castanets, shell-shaped hollowed-out pieces of

wood which click together. Producing a similar sound is the wood block which, when struck with a drumstick, produces a dry, hollow sound.

The triangle, a small instrument of bent steel, produces a shining silvery tone when struck. Although the sound is very musical, it has no definite pitch, and may be used to highlight or accent an instrumental passage, as in Mozart's overture to *Abduction from the Seraglio*. There are two sheets of metal which turn up occasionally in the percussion section—the gong, which is round, struck with a soft mallet and produces a clear musical note; and the tam-tam, also round, and producing a rich crash rather than a definite pitch.

These are by no means all of the percussion instruments, and new ones such as pistols, whips, airplane motors and even cannon are being added all the time. But they are the most common—the ones favored by most of the composers of the classical, Romantic and Modern eras.

OTHER INSTRUMENTS

So far, we've discussed the instruments which make up the typical symphony orchestra—but we haven't mentioned the three most popular instruments of them all. No matter how regular a concert-goer you are, chances are you hear one or more of these instruments live or on television much more frequently than any of those we've discussed thus far—and all three are occasional visitors to the concert hall. In addition to these three, there are a couple of other instruments which make concert hall appearances at regular intervals.

The most popular instrument in America, according to the American Music Conference, which keeps track of such things, is the piano. In 1967, some 23½ million Americans played the piano—ranging from Vladimir Horowitz to the eight-year-old next door. The piano is a relative newcomer on the musical scene, having been invented by Bartolomeo Cristofori, a harpsichord maker in Florence, Italy, shortly after 1700. It took it less than 100 years to replace the harpsichord, a keyboard instrument dating from the mid-16th century.

Despite its popularity with composers, performers and the public alike, the piano never won a permanent place in the symphony orchestra—because, unlike the harpsichord in the baroque orchestra, it wasn't needed to fill out the harmony. Nevertheless, it appears as a solo instrument with the orchestra frequently for concertos by Haydn, Beethoven, Tchaikovsky, Bartok and other composers.

Musicians have never been quite clear about how to classify the piano. It contains an iron frame with strings, something like a harp; and might be classed as a stringed instrument. But it has 88 keys, each of which triggers a little felt-covered hammer which hits a string to produce music. The fact that the instrument is struck in this way leads most musicologists to consider it a percussion instrument—though it bears virtually no resemblance to the other members of that family.

Players of all the instruments we've discussed so far are able to play only one or two notes at a time. The pianist can play as many notes as he has fingers; and as a result can play both a melody and the harmony for it. This self-sufficiency makes the piano extremely useful either as a solo instrument, or to accompany a vocalist or instrumentalist. It has a wide range from the lowest to the highest tones, and can produce brilliant scales, arpeggios and trills, rapid passages and octaves. It can produce beautiful melody, or in the hands of some moderns, serve as a crisp, melodic percussion instrument. On the other hand, the piano cannot sustain tone as well as the strings or the winds, and is somewhat limited in tonal quality.



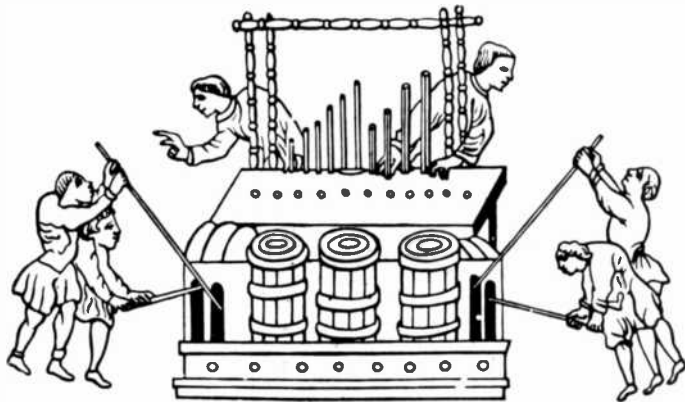
For more than 100 years—from approximately 1800 to 1935—the harpsichord was little more than a footnote in musical textbooks. Like the piano, it had a keyboard (in fact, some models had two), but unlike the piano, the keys plucked the strings instead of striking them. Classical and Romantic composers decided that the new piano could do everything the lowly harpsichord could, and then some. Pianos could sustain tones longer than could a harpsichord, and they could fill a concert hall with sound (most harpsichords produce a small, delicate tone).

During the 1920s and 1930s, the late Wanda Landowska began a one-woman crusade to bring back the harpsichord, and to give an authentic sound to the keyboard works of Bach, Couperin and others which had been transcribed for piano. Mme. Landowska was to describe the harpsichord as “that supreme monarch . . . Its great authority of rhythm, the compelling force of its rich arpeggios and chords reassured the soloists, kindled and inflamed the ensemble. The sound of its plucked strings mingled so miraculously with the other instruments that sometimes one seemed not even to hear it. The rich variety of its registers, its sharp outlines, its fluted tones, its shifting sonorities of the coupled keyboards, now deep and golden, now trilling and birdlike, the majestic fullness of its radiant arpeggios made of the harpsichord the *Roi soleil* of instruments.”

Today, the harpsichord is back on the concert stage—and indeed even in the orchestra, on occasion—to accompany an authentic performance of Handel's *Messiah*, or Mozart's *Don Giovanni*. And perhaps the supreme tribute to the crusading work of Mme. Landowska is the fact that contemporary composers are writing music for the harpsichord—including it in orchestral ensembles as well as as a solo instrument.

What Wanda Landowska did for the harpsichord, Andres Segovia has done for the guitar. As a result of his efforts (and those of folk singers like Pete Seeger and others), there were more than 11 million guitar players in the United States in 1967, making the guitar the second most popular instrument.

The guitar championed by Segovia (and the one you're most likely to hear in the concert hall, either as a solo instrument or with an orchestra) is a six-



stringed instrument from Spain. It has a range of more than three octaves centered on Middle C. Actually, the Spanish guitar can trace its ancestry through the vihuela all the way back to the Greek kithara, which, in turn, is a descendant of the shepherd's lute. Segovia first explored the music for lute or guitar by composers like Bach, Dowland and others from the 16th, 17th and 18th centuries. In recent years, composers like Villa-Lobos and Castelnuovo-Tedesco have written new works for the instrument.

The guitar revival in turn has led to a revival of the lute, and with it the rich literature of the Renaissance. The lute today is primarily a solo instrument, used to play the music of the 1600s—it hasn't yet inspired contemporary composers to create new literature for it.

The third most popular instrument (some 4.7 million Americans play it) is the organ. Actually, there are two major types: the pipe organ, and the electronic organ. The latter frankly is intended as an imitation of the former. The pipe organ, the one you're likely to hear at a concert, can trace its ancestry back at least to 250 B.C., when Ctesibius, a native of Alexandria, Egypt, is said to have played one. It's believed that the pipe organ may have evolved from the bagpipe.

A pipe organ produces sound in somewhat the same way as a flute; a bellows forces air into pipes cut to different lengths. The pipes may be made of wood or metal, they may be square or round, they may vary from a few inches in length to 20 feet or more; and the number of pipes varies from organ to organ. A group of keyboards activates the bellows mechanism which forces air into the pipes.

A well-constructed modern pipe organ has one of the widest dynamic and tonal ranges of all musical

instruments—a five-octave range beginning two octaves below Middle C, and dynamics which range from very soft to loud enough to drown out most of the rest of the orchestra. In fact, it is the tendency to overwhelm other instruments which has led composers to use the organ sparingly. Some successful examples of the combination are Saint-Saens' *Organ Symphony* and the opening bars of Richard Strauss' *Also Sprach Zarathustra*. Because there are so many different kinds of pipe organs, and because they vary so widely in size and capacity, it's difficult to generalize about them.

INSTRUMENTS AND HIGH FIDELITY

We've taken the orchestra apart and examined the contribution each instrument makes to the whole. When you listen to a great orchestral work—whether in a concert hall, or at home on your hi-fi system—you'll want to be able to recognize the oboe when it appears, separate the boom of the kettle drums from that of the string bass. As we've seen, it's important that you hear not only the basic notes these instruments play, but the harmonics and overtones which give color, life and a distinct personality to each



instrument. In the concert hall, these subtle shadings come to you directly. When you listen at home, you should have a system capable of bringing them to you free of extraneous noise or interference.

The philosophy behind component high fidelity—separate components to translate the mechanical energy contained in a record groove into electrical energy, amplify it into enough power to drive a loudspeaker capable of converting it from electrical energy back into pure sound—is simply that of bringing you all of these tones (or frequencies, as hi-fi buffs like to refer to them) and overtones to well beyond your range of hearing with a minimum of distortion. In this way, you can enjoy the same kind of sound you hear in a concert hall.

Designers of modern high fidelity sound reproduction equipment are well aware of this fact, and realize that if you're going to hear a violin exactly as it sounds in the studio, every element of your high fidelity component system must be able to reproduce not only the basic notes, but these harmonics. Not only must it reproduce the ones you can hear, but a substantial number beyond your range of hearing, as well. And it must maintain the delicate balance between full harmonics and intermediates, so that a violin sounds like a violin in your living room.

Difficult as it may be to believe, all of these minute distinctions are traced in the groove of a high fidelity stereo record. If you look at a record carefully, you'll notice that the groove wiggles back and forth. Still closer examination shows that some parts of the groove are wider than others; and that the modulations are vertical as well as horizontal. Each of these twists and turns represents not only the melody of the recorded music, but the overtones of each instrument in an ensemble which may include 96 instrumentalists, plus a full chorus and soloists. It's these overtones which provide the color and excitement of a live performance.

To track the record grooves without damaging the record, a needle or stylus must be precision-shaped, able to move freely from side to side and up and down in the groove, and it must exert a minimum of force. The cartridge itself must convert the mechanical energy generated by stylus movement into electricity without adding any color of its own, and it must do all of this without favoring one section of the orchestra, or one instrument, over another.

But fine music is more than the identification of an instrument here, or a basic theme there. Like the brush strokes and brilliant colors in a fine painting,



these are only parts of an artistic whole. You should be able to sit back and listen as the composer and conductor blend these parts into a complete masterpiece. For, like a great painting, music can be appreciated on many levels—its overall effect, the relationship of its component parts (the way the horn and violin blend together, for example), the individual tonal colors and patterns.

High fidelity component manufacturers produce home stereo systems which are capable of doing all of this because they specialize. Instead of using a single loudspeaker to reproduce the sound of an entire symphony orchestra, a good high fidelity loudspeaker system contains separate speakers to handle bass and treble notes. An elaborate speaker system may have as many as five separate speakers, each tuned to reproduce a limited part of the tonal spectrum. A quality component amplifier is designed to pump enough power into those loudspeakers to produce a level of sound equal to that in Carnegie Hall—with about as much distortion as you'd expect at Carnegie Hall (actually, most people listen to music at home at volume levels considerably below those in the average concert hall—but a reserve of amplifier power at lower volume produces an even richer sound). A modern automatic turntable offers you the choice of listening to as many as ten records in sequence, or of playing them one at a time manually—with the knowledge that the turntable speed is absolutely constant, and that the changing mechanism, arm and cartridge will protect your records for years to come.

As a conductor blends the instruments of the orchestra into a unified whole, so does the man who assembles a quality component high fidelity system. Like the conductor, he goes to specialists for the ingredients he needs to create a unified system. That's what component high fidelity is.

tape

REVIEWS

Laurindo Almeida

Classical Current. *Selections include: The Breeze And I, My Reverie, Till The End Of Time, The Lamp Is Low, Baubles, Bangles, And Beads, Full Moon And Empty Arms, Moon Love, My Prayer, My Moonlight Madonna, Our Love, When I Write My Song, The Warsaw Concerto.* Warner Bros.-Seven Arts.

Music	***
Performance	***
Recording	***

Whenever you gather a group of beautiful ballads such as these under one roof and present them honestly, how can you possibly miss. Laurindo Almeida, former sideman with the master innovator Stan Kenton, has sent current through the song-log for what proves to be an exciting excursion into electronically influenced music. Particularly effective treatments can be found on *Baubles, Bangles and Beads* and *Theme From The Warsaw Concerto*. —F.R.

Bizet

The Carmen Ballet. Gennady Rozhdestvensky conducting the Bolshoi Theater Orchestra in music from *Carmen* "freely arranged" by Rodion Shchedrin. Melodiya Angel Y1S-40067. 3¾ ips.

Music	***
Performance	****
Recording	****

There have been so many versions and adaptations of *Carmen* for orchestra that we'd think that the arrangers would leave well enough alone by now. But no, a Russian with an almost unpronounceable name decided that the Bolshoi's Melodiya recording needed still another arrangement. So be

it. So it's not so hot. Musical values have been sublimated to orchestral showmanship. The performance and recording are both excellent—far better than the arrangement deserves. This is one of those new-generation top-quality recordings to come out of the Soviet Union, and it does make good listening, notwithstanding Mr. Shchedrin. The slow speed, as with most Angel releases, does little to detract from overall technical excellence. If your collection's shy a *Carmen* for orchestra, this one is a possibility. —W.G.S.

Eubie Blake

The Eighty-Six Years Of Eubie Blake. Including: *Dream Rag, Charleston Rag, Maple Leaf Rag, Semper Fidelis, Eubie's Boogie, Poor Jimmy Green, Tricky Fingers, Stars And Stripes Forever, Baltimore Todolo, Poor Katie Red, Kitchen Tom, Troublesome Ivories, Chevy Chase, Brittwood Rag, Bleeding Moon, Under The Bamboo Tree, It's All Your Fault, Shuffle Along Medley, I'm Just Wild About Harry, Spanish Venus, As Long As You Live, Charleston, Old Fashioned Love, If I Could Be With You, You Were Meant For Me, Dixie Moon, Blues, Why Don't You Let Me Alone, Blue Rag In 12 Keys, Memories Of You.* Columbia.

Music	***
Performance	***
Recording	***

From the Bawdy houses of the Red Light Districts, to the New York State, to the memory of everyone who loves the piano, the eighty-six year old composer, entertainer Eubie Blake, reflects for us the evolution of every popular musical taste we know and accept today. Still active, still composing, still vibrant, Blake gives per-

formances that youthful players will sit up and take notice and be rocked into shock. Relaxed and completely at home at the piano he reprises about seventy years of show stoppers. Many of the tunes find their way into popular artists' standard repertoires. They are always good feed to fall back upon. I for one would like a followup set of chestnuts, with more of Eubie's interlocking dialogue. Columbia deserves a reward for giving us the grand old man of the upright. —F.R.

Pete Fountain

Both Sides Now. Included are: *Both Sides Now, The Dock Of The Bay, Let It Be Me, The Spinning Wheel, Traces, In The Year 2525, A Closer Walk With Thee, Cajun Blues, Shine, Do You Know What It Means To Miss New Orleans? Coral.*

Music	***
Performance	***
Recording	***

Pete Fountain a marvelous "stickman" reprises some oldies he had recorded about a decade ago plus a new sack of current standards. His ace jazz men Eddie Miller, Nick Fatool, Jack Delaney, are with him once again and their *New Orleans Nights* create a lusty sensitive portrait of the purest jazz art. It is indeed good to have extended versions of *A Closer Walk* and *Do You Know What It Means To Miss New Orleans?* —F.R.

John Gary

That's The Way It Was. Included are: *Red Lips, Kiss My Blues Away, That's The Way It Was, The Good Old Days, Baltimore Oriole, Me And My Bundle, Try A Little*

Tenderness, Flamin' Mamie, Abdication Speech, I'll Get By, Don't Forget, It's A Lonesome Old Town, She's Funny That Way, Why Did It End So Soon?, I Wanna Be Loved By You. RCA

Music ***
Performance ***
Recording ***

This could be the year The Duke of Windsor has a hit recording. A portion of his Abdication Speech precedes Mr. Gary's rendition of I'll Get By. Also along to help are snips of nostalgia by Helen Kane, Franklin Baur, and the Coon-Sanders Original Nighthawk Orchestra. Basically this fun idea is a sound one. But somehow it falls short of its goal. The reason being, the splices do not interpolate quite as well as intended. However, there are some top vocals by John Gary with the possible exception of The Good Old Days which falls flat. This is an interesting package make no mistake and well worth hearing. —F.R.

It's unfortunate that a composer of Mahler's genius and stature should be guilty of creating sheer boredom out of what is potentially high quality, but this is apt to be the case with his overly repetitive and too-long later symphonies. It is into this musical abyss that accomplished conductors will leap with both feet and little understanding. Unhappily, Klemperer is not one of those conductors gifted with the gift of total empathy and understanding needed to perform the mature Mahler. His reading of the first and last movements is more than passably all right, but those middle two. . .

Another unfortunate feature is the slow speed necessary for a single-reel recording of this symphony—unfortunate because the background noise level is distressingly high—something that recording companies should have licked by this time. This is definitely not one of the best Mahler Ninths around, but it's still a noble effort nonetheless. —W.G.S.

The Marx Brothers

The Marx Brothers/Original Voice Tracks From Their Greatest Films. *Selections are: Meet The Brothers Marx, The Inimitable Groucho, The Implausible Chico, The Sounds Of Harpo, The Zaniness Of The Marx Brothers, The Collected Speeches Of Groucho, Chico In Recital, Groucho Marx Does His Thing.* Decca.

Spoken Word ***
Performance ***
Recording ***

Thank you Decca should sum up anyone's thoughts who purchased this followup package to the best selling W. C. Fields of last season. I believe the Marx issue even surpasses Fields. Here we have the barbs of Groucho, who is still the best comedian around, loveable Harpo, his horns and harps and bottomless trench coat, and Chico, that double-take piano virtuoso. Meet the whole gang again and should you wish more (and I don't see how) there is the extra treat of a large Pop poster of the ageless nuts. This is a marvelous diversement. —F.R.

Johnson Rag, Indian Summer, Star Dust, Tuxedo Junction, Danny Boy, Pennsylvania Six-Five Thousand, Anvil Chorus, Song Of The Volga Boatman, Perfidia, Chattanooga Choo Choo, Adios, Elmer's Tune, A Strong Of Pearls, Moonlight Cocktail, Skylark, Don't Sit Under The Apple Tree With Anyone Else But Me, American Patrol, At Last, I've Got A Gal In Kalamazoo, Serenade In Blue, Juke Box Saturday Night, That Old Black Magic, St. Louis Blues March. RCA

Music
Performance
Recording

MILLE)R

Master trombonist, beloved Glenn Miller flew from British shores and disappeared over the foggy wartime English Channel, never to be heard from again. Victor has issued a Twenty-Fifth Anniversary set of all the very best of his recordings. The music that once was an American way of life. And in some cases still is. There seems to be a slight difference here and there. For I believe in part there are alternate takes of familiar numbers. Only the Miller Purist will be able to tell for sure. Nevertheless a fine production and a must for Big Band fans of all ages. Miller as you may remember was instrumental in bringing people together when they danced. —F.R.

Pete Jolly

Give A Damn. Including: Little Green Apples, What The World Needs Now is Love, Trolley Song, The Look Of Love, Whistle While You Work, Give A Damn. A & M.

Music ***
Performance ***
Recording ***

A set of six slices of cream cake by The Jolly six. Recorded live at Donte's in Hollywood, this is a creative portrait of what this fine jazz group is all about. The late Judy Garland's Trolley Song is given an extended spur of track. Almost nine minutes in length. All selections are marvelous and it is indeed a treat to the old drums to have such vibrant side men as Bobby Brookmeyer, Bob Edmonson, as well as Pete Jolly back on the fidelity system. —F.R.

Tiny Tim

For All My Little Friends. Included are: On The Good Ship Lollipop, Sunshine Cake, Mickey The Monkey, Hot And Cold Water, Two Times A Day, Chickery Chick, Oliphant The Elephant, I'm A Lonesome Little Raindrop, They Always Pick On Me, Aren't You Glad You're You, Sadie The Seal, The Viper, Bill The Buffalo, Remember Your Name And Address, What The World Needs Now Is Love. Reprise.

Music ***
Performance ***
Recording ***

Good old T.T., that bashful bridegroom, has in the back of his mind to be a father someday and he has decided to set down a group of Kiddie-Favorites. That is songs for kids from eight to eighty. I don't quite remember the last time I heard Chickery Chick, or On The Good Ship Lollipop. But I bet I'll be hearing much more of them throughout the coming months as his devoted fans plunk in coins to the local boxes for their favorites a la Tim style. A real fun showcase. —F.R.

Mahler

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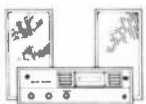
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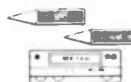
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