

Auto Hi-Fi: Six Test Reports
A Guide to Battery Portables

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50c recording



JUNE 1965

Tips on Taping Your Vacation

audiotape

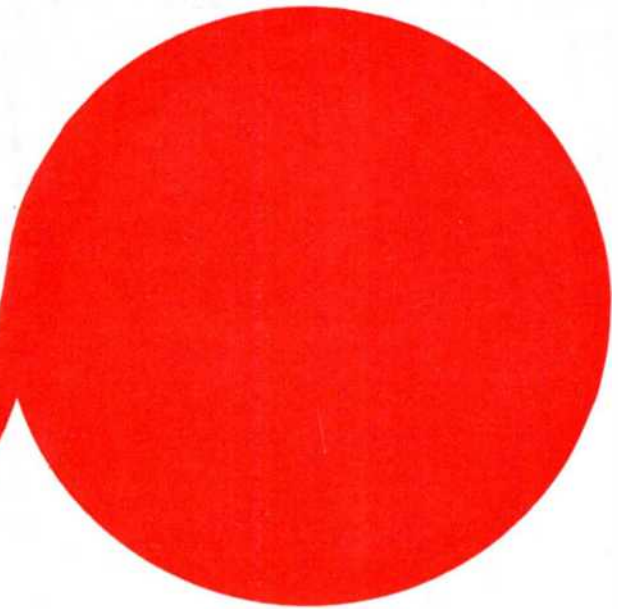
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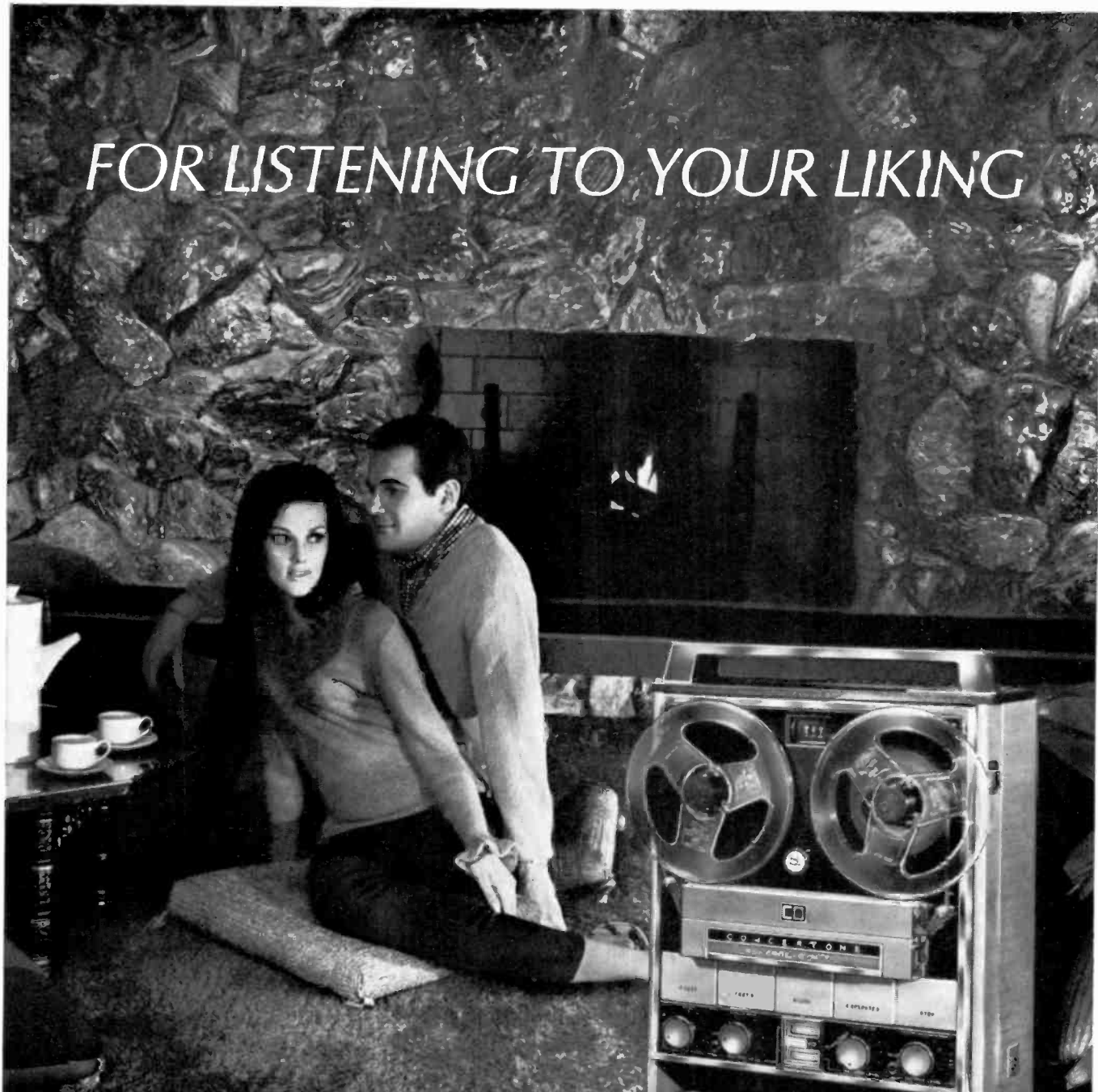
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May-June 1965

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3
5/28/65



This is the amazing Cipher VI stereo recorder from Japan.

Don't wait for expensive imitations.

Have you looked at Japanese tape recorders lately? They have been getting better and better for years; but right now, dollar for dollar, they are simply the finest you can buy. And the most remarkable of them all, in engineering as well as in price, is Cipher.

The Cipher VI, newest of the current Cipher models, is a perfect case in point. Here is a 4-track stereo tape recorder that would have to sell at a significantly higher price if made here or in Europe. It is, in effect, a full-fledged "semi-professional" machine at the price of an ordinary home recorder.

The main difference between the Cipher VI and professional-type recorders is that the former incorporates its own stereo playback system, including two detachable extended-range speaker systems, and comes with its own matched pair of high-quality dynamic microphones. Two VU-type meters assure accurate indication of recording

and playback levels; and the balanced capstan flywheel, combined with a pure idler drive (no belts!), assures rock-steady tape motion. The machine can be operated either vertically or horizontally. The two tape speeds provided are $7\frac{1}{2}$ and $3\frac{3}{4}$ ips; in the fast-forward and rewind modes an automatic tape lifter protects the heads from unnecessary wear; at the end of the tape an automatic shutoff is activated. All reel sizes up to 7" can be accommodated, and the case may be closed without removing the reels. For precise cueing and editing, both a digital tape index and a pause control are included.

How can Cipher give you all this at a list price of \$239.50? Ah, the mysterious East!

(For further information, write to Inter-Mark Corporation, 29 West 36th Street, New York, N.Y. 10018. In Canada: Inter-Mark Electronics Ltd., 298 Bridgeland Avenue, Toronto 19, Ontario.)

CIPHER

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MAY-JUNE 1965

VOLUME 12 No. 3

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Tape Recording: Publisher: Richard Ekstract; Editor: Robert Angus; Music Editor: Erwin Bagley; Technical Editor: Peter Whitlam; Associate Editor: Ann Eisner; Design Consultant: Peter Palazzo; Art Director: Michael Uris.

Tape Recording (title registered U.S. Pat. Off.) is published six times a year by A-TR Publications, Inc., Richard E. Ekstract, President; Robert N. Angus, Secretary; Executive and editorial offices 156 E. 52nd St., New York, N. Y. Subscription rates: U. S. and Canada \$3.00 for one year, \$5 for two years, all other countries \$4.50 per year. Single copies 50 cents. Entire contents copyrighted 1965 by A-TR Publications, Inc. Second class postage paid at Baltimore, Md. Distributed by Eastern News Distributors, Inc., 255 Seventh Ave., N. Y. 1, N. Y.

tape

LETTERS TO THE EDITOR



Do you own one of these fine tape recorders?

If you do — and you don't own a set of Koss Stereophones — you've got a lot of fun still coming!

Koss phones are perfect for monitoring and editing in either stereo or monaural. Now you can group your favorite selections on one tape with no disturbance to or from others in the room.

Check the chart for the Koss phone which plugs directly in to your own recorder. If you don't see your recorder below, write us for a complete listing.

And for playback listening — well, prepare for an emotional lift! Just plug your Koss phones into your recorder's output jack and you'll be soaring on a solo flight of perfect sonic bliss. You'll hear every sound with startling clarity and a new "up-closeness" you've never experienced before.



SP-3X, SP-5NS, SP-5VW
\$24.95

PRO-4 STEREO PHONES
\$45.00



KOSS SP-3X
or PRO-4

SP-5NS
or SP-5VW

	1	2	3	4	5	6	7	8
	Viking	Roberts	Sony	Wollensak	Concertone	Ampex	Concord	Norelco
KOSS SP-3X or PRO-4		330 770 997	CS300 500				884	
SP-5NS or SP-5VW	220	440 990 1040	200 600 777	1580 T1980	510	970 1270 4470		400 401

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Arlington, Va.

I understand TAPE RECORDING is publishing again. I saw a copy on the newsstand here recently but when I went back to buy it the stand was sold out. Can you tell me where in the Washington area I can be sure of finding a copy?

Robert Cox

Effective with this issue, Mr. Cox, you should have no trouble finding TAPE RECORDING on your favorite newsstand — or on leading newsstands anywhere in the country. But may we suggest a subscription (a postage-paid return card is bound into the magazine) as the best way to insure that you receive your copy promptly each month?

St. Paul, Minn.

We note in the "Tape Clinic" of the February issue of TAPE RECORDING (p. 37) that you recommend a number of good tape-duplicating agencies to one of your readers.

Having one of the largest tape-duplicating facilities in the country, we should like to introduce ourselves to you and to your readers for future reference. Whether it's an order for 12 copies (as your reader requests) or for 10,000 copies of a tape, we'll be happy to fill the order within a 24-hour period.

Harry L. Bratnober, Jr.

*Vice President
EMC Corporation*

In addition to this letter, TAPE RECORDING was contacted by American Tape Duplicators, 5280 W. Pico Blvd., Los Angeles, Calif. They, too, will handle any size order and welcome all inquiries. The principals of the firm took TAPE RECORDING on a guided tour of their plant and we can attest it is one of the finest in the business.

(Continued on page 40)

Tape Recording



Cracked cadenzas in your concerto?

...then "bargain" recording tape's no bargain!

Mistakes you can buy cheap. And tape-making mistakes you're almost sure to get in recording tape sold dirt cheap without the manufacturer's name. The dangers for audiophiles? Fade out of high and low frequencies. Distortion. Background hiss. Even tape flaking, or worse, abrasiveness that can damage your recorder. Worth the gamble? Hardly.

You can make fine performance, long-life crystal-clear recordings a certainty by specifying "SCOTCH" BRAND Recording Tapes. All "SCOTCH" Tapes must pass over 100 quality tests to earn their "brand". . . tests no bargain tape could hope to pass!

Thinner, more flexible coatings of high-

potency oxides assure intimate tape-to-head contact for sharp resolution. Precision uniformity of coatings assures full frequency sensitivity, wide dynamic range, *plus* identical recording characteristics inch after inch, tape after tape. Lifetime Silicone lubrication further assures smooth

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Enjoy pleasure filled hours in full fidelity with an 88 Stereo Compact — the choice of music connoisseurs.

Play standard tapes or build a library — easily recorded from AM and FM radio or LP's. Concerts, lectures, family or social events — all come to life — ready at your fingertips.

Features exclusive "Edit-Eze" cuing and editing. Superb 30-18,000 cps frequency response for finest mono or stereo recording with three hyperbolic heads. Monitor-off-tape, Sound on Sound, Erase-Protek, automatic shut-off, tapelifters, are but some of the many features to let you thoroughly enjoy high quality tape recording.

Ask your Viking dealer to run an 88 Stereo Compact through its paces. You'll enjoy the practical features and superb quality of this fine tape recorder — truly a masterpiece made by **SKILLED AMERICAN CRAFTSMEN**

4-track model . . . \$339.95
2-track model . . . \$347.95
Walnut enclosure . \$ 18.95



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(Continued from page 8)

Czechoslovakia takes the international copyright agreement pretty seriously, and has prosecuted violators in the United States.

Only three years ago, the tourist who showed up on a platform at the city's main railway station with a tape recorder or camera might well have found himself explaining to some unsympathetic soldiers or policemen what he thought he was doing. Today, you can record and photograph to your heart's delight the country's large, powerful steam engines, each carrying a large red star. If you're lucky, you may be able to find a traffic cop bawling out a motorist who has made an illegal left turn. Unless you get in his way, he's unlikely to think twice about you or your recorder.

Czechoslovakia's silences are as eloquent as its sounds. Wenceslas Square at 5 PM is a medley of auto horns, the voices and footsteps of thousands of homebound workers, the tingle of tram bells. Only four hours later, it's virtually deserted — your footsteps echo from blacked-out storefronts as you walk along. Sunday morning in the Tyn Church or St. Vitus cathedral is even quieter. These huge, ornate edifices built during Austrian domination are completely empty and silent on Sunday mornings, except for the occasional tourist. Footsteps on the marble floor bounce off the high ceilings. Since Sunday is a day of rest, even though it has no religious significance, the entire city is a blanket of quiet during the morning.

Prague, however, is by no means as square as are other Communist capitals. You can tape commercials from television (but you won't be able to understand them). You can record chanteuses singing Western-style pops in Prague's night spots or young performers singing topical ballads in the city's newly-opened coffee houses. Your recorder, in short, will be as busy as you are.

Recording tape, made locally and in East Germany, is on sale in a few department and radio supply stores. But it is both expensive and of poor quality, so it's advisable to bring your own with you. The amount you'll need depends on how much recording you plan to do and how long you plan to spend in Prague. We used about an hour's worth during a recent five-day stay to capture most of the sounds outlined here plus some samples of Czech radio jamming and children's choirs singing patriotic songs in school.

Some plain talk from Kodak about tape:

Print-through and sound brilliance

Kodak
TRADEMARK

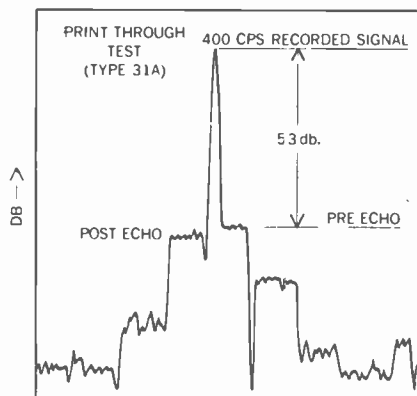
Put a magnet near a piece of iron and the iron will in turn become magnetized. That's print-through. With sound recording tape, it's simply the transfer of magnetism radiating from the recorded signal to adjacent layers on the wound roll. Print-through shows up on playback as a series of pre- and post-echoes.

All agreed. Print-through is a problem. There are some steps you can take to minimize it. You can control the environment in which you keep your tapes, for example. Store them at moderate temperatures and at no more than 50% relative humidity. Also store them "tails out" and periodically take them out for "exercising" by winding and rewinding them. What fun! If worse comes to worse, you can even interleave the layers with a non-magnetic material such as paper. Any volunteers? A better way, however, is to start with a tape that doesn't print much to begin with . . . which leads to low output problems *if* you don't make the oxide coating substantially more efficient.

And this is Kodak's solution. It's not simple, but it works, and it works well! It starts with the selection of the iron oxide. In order to achieve low print-through, the oxide needles must have the proper crystalline structure. Kodak's oxide needles have that structure . . . offering the highest potential of any oxide currently available. But oxide alone doesn't make a low-print tape.

Milling the oxide ingredients, for example, is very critical. If you mill for too long a time, the needles will be broken up and print-through will be drastically increased. Too short, and the dispersion will be lumpy. But other factors in the milling process are equally important. Like the speed at which the ball mill turns. It can't be rotated too fast, otherwise the needles will be broken up, and broken needles, you

know, exhibit horrible print-through behavior. If you rotate the mill too slowly, the oxide and other ingredients will not be blended uniformly. Other factors such as temperature and the composition and viscosity of the in-



gredients must also be critically controlled. One more thing. You've got to make sure all the needles end up the same size (.1 x .8 microns) if print-through is to be kept down.

A very important contributor to low print-through is the binder that holds the oxide particles in suspension. The *chemical composition* of a binder contributes nothing magnetically to the print-through ratio. What a binder *should* do is completely coat each individual oxide needle, thus preventing the particles from making electrical contact. And that is just what our "R-type" binder does. The final step is to take this superb brew and coat it on the base. The coating mustn't be too thick, for print-through increases . . . or too thin, for then output suffers. For best results, extreme uniformity is the word. Here's where our film-making experience really pays off.

Print-through tests are a million laughs. We record a series of tonebursts . . . saturation, of course. We then cook the tape for 4 hours at 65°C. and then

measure the amplitude of the loudest pre- or post-echo. The spread between the basic signal and the print-through is called the signal-to-print-through ratio. The higher the number, the better the results. Most of the general-purpose tapes you'll find have a ratio of 46-50 db. Low-print tapes average about 52 db. You can see from the graph that our general-purpose tape tests out at 53 db., so it functions as both a general-purpose tape and a low-print tape—and at no extra cost. High-output tapes with their thicker coatings have pretty awful print-through ratios—generally below 46 db. Kodak's high-output tape (Type 34A) has something special here, too. A ratio of 49 db—equal to most general-purpose tapes.

KODAK Sound Recording Tapes are available at all normal tape outlets: electronic supply stores, specialty shops, department stores, camera stores . . . everywhere.



FREE! New comprehensive booklet covers the entire field of tape performance. Entitled "Some Plain Talk from Kodak about Sound Recording Tape," it's yours free on request when you write Department 8, Eastman Kodak Company, Rochester, New York, 14650.

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EASTMAN KODAK COMPANY, Rochester, N. Y.

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so easy to use...

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Product



AT-100 Alignment Tape (full-track, 7.5 ips, 1/4" professional) is essential for proper azimuth alignment of tape recorder heads. Selected signals ranging from 40-10,000 cps are also provided for checking playback frequency response (NAB Curve).

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2. Playback amplifier equalization.
3. Tape head alignment.
4. Proper record level for 0 VU reading (standard operating level).

P.S. Time to replace heads? Replace with Genuine NORTRONICS Tape Heads—the industry leader in design. NORTRONICS heads have continuously set standards in size, mounting and performance. Nortronics has pioneered in laminated core construction, which has set the industry standards.

WRITE FOR FREE COPY OF NORTRONICS
TAPE HEAD REPLACEMENT GUIDE

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tape

TAPING FROM FM STEREO

By Lon Cantor

It's a fact—sad but true—that too many tape recorders lie unused in closets most of the time. When you've run out of parlor games and tired of recording the kids' voices, what do you do with your recorder? The real music lover has no trouble answering this question. He periodically consults his FM program guide, rubs his hands in glee at the prospect of the goodies scheduled to be broadcast, and prepares to add them to his tape collection.

With a good FM receiver and a good tape recorder, you can, rather quickly, build an enviable music collection. But one more thing is needed: a good FM antenna system. No tape recorder can improve on the music it gets from the FM receiver. And no FM receiver is any better than the signals fed into it.

In the days of monaural FM, antennas were relatively simple. A loop of wire indoors or an omnidirectional turnstile type of outdoor antenna usually produced pretty good results. However, FM stereo broadcasts are a lot harder to receive. Using the same antenna at the same location, you can pick up monaural broadcasts from twice the distance that you can pick up FM stereo. Further, FM stereo is considerably more susceptible to multipath distortion interference.

FM stereo requires an extra signal carrier, which is detected in phase. (This concept of phase is important; we'll return to it later.) Remember, by FCC regulation, the amount of power radiated by an FM station must be the same for both monaural and stereo. The extra carrier, however, effectively reduces the signal-to-noise ratio of the FM signal. You

lose about four db in signal-to-noise ratio with a monaural tuner, but a full 20 db with a stereo tuner. This is because the stereo difference frequency (left-right), is weaker than the stereo sum frequency (left-right). A monaural FM tuner uses only the stronger sum frequency, but FM stereo reception requires both.

Your choice of an FM antenna will depend on two things, primarily:

1. Your location. How far away you are from FM stations and what reception conditions are in your area.

2. The FM stations you want to receive. If you are content with one or two local stations, you probably can get by with an inexpensive antenna. If you want to reach out for distant stations, you'll need a more elaborate antenna system.

The biggest problem with FM stereo reception is multipath distortion. This is similar to the ghosts you occasionally see on TV sets. Signals bounce off a tall building or hill and are reflected to the receiving antenna. The antenna, therefore, actually gets two signals (in a metropolitan area there may be multiple reflection paths), one direct from the transmitter and one reflected from the buildings. Because the reflected signals arrive later than the direct signals, they generally are out of phase. Thus, they weaken the signal considerably, reducing the signal-to-noise ratio. The resulting sound may be full of hash and squawks. Also, multipath distortion often reduces stereo separation.

The only cure for multipath distortion is a highly directional FM

(Continued from page 47)

Harman-Kardon STRATOPHONIC is the largest-selling all-transistor stereo receiver today!



the sound is why!

It's a clean, pure, *spacious* sound, freed at last from the heat and distortion of tubes and output transformers. It's literally *sound unbound*.

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center, power amplifier. Each is an ideal signal source for off-the-air tape recording.

And—if you prefer your components separate—there's the all-transistor Stratophonic AM/FM stereo tuner and the all-transistor Stratophonic integrated stereo amplifier. Hear these magnificent instruments at your Harman-Kardon dealer's today. *Harman-Kardon, Inc., 15th & Lehigh Ave., Philadelphia, Pa. 19132.*

harman kardon

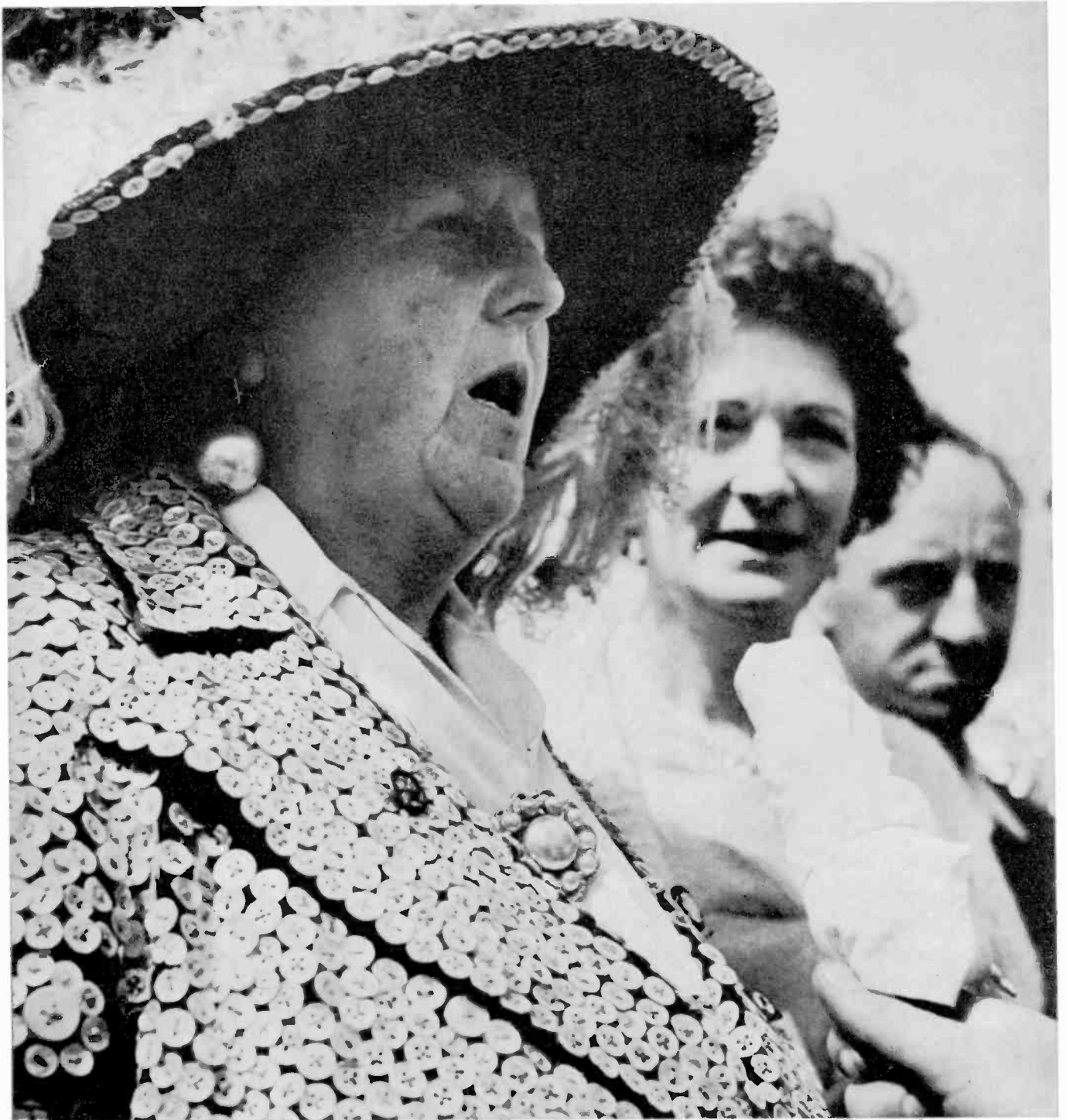
A subsidiary of The Jerrold Corporation

LEADER IN SOLID-STATE STEREO COMPONENTS

Circle 44 on Reader's Service Card

Taping Your Vacation

by Robert Angus



Whether your vacation consists of two weeks at a quiet seaside resort, a hectic week at the New York World's Fair, or six weeks' worth of the Grand Tour of Europe, a battery-operated tape recorder should be as much a part of your luggage as a good camera. For more and more vacationers these days are capturing sounds as well as sights—and integrating home movies or slides with sound during the long winter nights.

In the 10 years since American travelers first started lugging battery-operated portables across the Atlantic to tape the sounds of London or Rome, the units have gotten smaller, lighter, more reliable and less expensive. Today, there are literally dozens of models ideal for vacation recording.

Whether your vacation will be spent in the hubbub of London or Paris or in New York City; along the French Riviera or the Maine Coast, there are hundreds of sounds you'll want to remember during the cold, dark days next winter. What about the sound of waves lashing the rockbound coast of New England, to the accompaniment of a chorus of seagulls? What about the barkers and crowds at Coney Island or any other major amusement park? What about the strains of the town band during a summer concert?

Taping the sounds typical of Peoria, Illinois or Llandudno, Wales requires no more technical skill than taping your own voice in the comfort of your living room. It does require some special equipment, and some advance planning. It may also require some practice before you begin producing professional-sounding tapes.

What are the sounds that go to make up your vacation? Are they the sizzle of steaks over a charcoal fire, the first squeal from the kids as they plunge into the cool, clear waters of a mountain lake, the roar of the Orient Express across western Europe, the rich voices of Welshmen after a hard day in the coal mines, or the calm quiet of your own back yard, interrupted by the occasional chirping of a robin or the lawn mower of a neighbor?

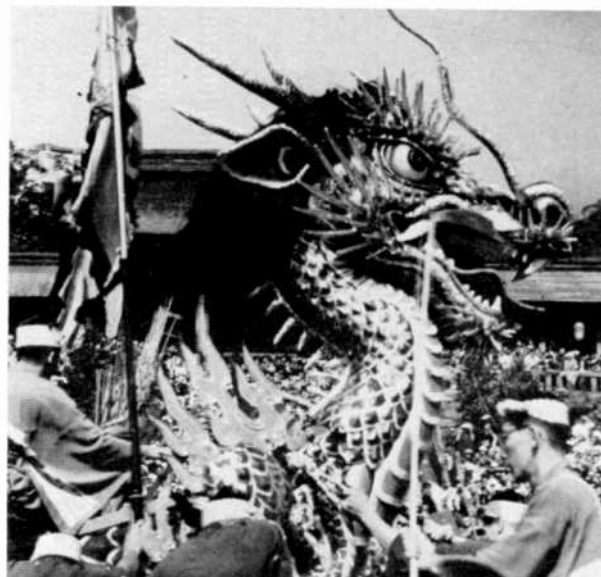
Let's suppose that you'll be one of the 1.5 million Americans the European Travel Commission expects to visit Europe this summer. Europe has literally hundreds of sounds you'll want to remember—from a London publican's cry of "Time, gentlemen, please" at 10 PM to the fractured, fanciful English of a Venetian gondolier; from the squeals of an Innsbruck tramcar to the roar of Paris traffic; from the yodelling of a Swiss goatherd to the trained voices of a Prague folk choir.

If you're planning to fly, you'll be particularly in-



A group of Scottish Highlanders "piping the Guard" at the Tower of London will be a treasured remembrance of your visit to London.

The exotic town of Nagasaki has many interesting festivals. This one, the Okunchi Festival, shows the Chinese influence with this Dragon dance.







terested in recorders which are lightweight and sturdy (a 10-pound recorder is plenty for the casual tourist to tote about, particularly if he's also carry-a camera). Remember that you may have to pay extra for overweight baggage. If you're planning on doing much taping, it's a good idea to take the tape with you. Much European tape is of inferior quality, and all of it is priced so much above American levels that it pays to take all you need along, even if you have to pay overweight charges on it. As a practical matter, you'll find that one hour's recording time per week of your stay is more than ample. The tape speed you will use will depend, of course, on just how critical you are. I've made recordings which later were used for broadcast at $3\frac{3}{4}$ ips, although I prefer to use $7\frac{1}{2}$ ips for music and for any recording which later may be used professionally. As a writer, I like a three-speed recorder which can be used at $7\frac{1}{2}$ ips for professional recording, at $1\frac{7}{8}$ ips to tape interviews, and at $3\frac{3}{4}$ ips for fun. It's at the latter speed that you're likely to get the best combination of fidelity and playing time—at least, with the better recorders.

About tape—I've had excellent luck with double-play tape in combination with a variety of recorders, making my original recordings on it, then transferring them to standard $1\frac{1}{2}$ mil acetate when I get home for editing and storage. Triple-play tape frequently can't take the wear and tear of location recording without stretching. On the other hand, $1\frac{1}{2}$ and 1 mil tapes require more reels to yield the same amount of recording time, thus producing a packing problem.

Another gadget you're going to need is a good microphone with a length of cable. If your recorder permits, it's a good idea to invest \$30 or more for a quality mike (but only if your recorder is in the over-\$150 category and can make use of it.) If you can take only one, choose a good omnidirectional—preferably one which can take a beating. Crystal or ceramic mikes supplied with battery recorders have a way of copping out if you drop them on the sidewalks. Personally, I prefer to travel with two—a good omi and a highly discriminating cardioid, to permit recording of interviews on the street.

On a first trip to Europe, or any place out of the country you'll want to record your departure as well as your arrival. So before your plane takes off from Kennedy (or O'Hare or Philadelphia International), or before the boat pulls away from the dock, be sure to record the sounds—the bustle on the dock, the last-minute passengers rushing up the gangplank, the public address announcement of your flight's departure and your welcome aboard by the stewardess. Wherever you land outside the country there will most likely be a customs officer to greet you. Don't hesitate to record him, either (your neighbors next winter will be particularly interested in the questions he asks).

Don't worry about official shyness before the microphone. Europeans—from the customs officer to the street laborer—are much more used to amateur recordists than Americans, and are not above posing for the microphone as they used to for the camera. One of the first things you'll learn after clearing customs is to have both recorder and camera at the ready. The cab which whisks you from the airport to your hotel may look like a refugee from the Battle of Britain (and you'll surely want a picture of it). The man who drives it is just as full of anecdote and song as the most gregarious New York hackie, and much more worth taping.



Fireworks are easy to capture in sound.

You'll find street organs in Amsterdam that simply must be recorded; vendors on the streets of Paris you must record; or a Welshman telling a very long, funny story at his favorite pub in a dialect so thick you can cut it with a knife. None of these people will object to the intrusion of your microphone—although some may expect a tip for becoming performers. Tipping under these circumstances can be particularly touchy. A Briton, for example, can become insulted if you offer him something (unless

he's a professional street singer or entertainer). An Italian or Frenchman is likely to be just as insulted if you don't. The do's and don'ts of the situation have yet to be ironed out, so you'll have to feel your own way.

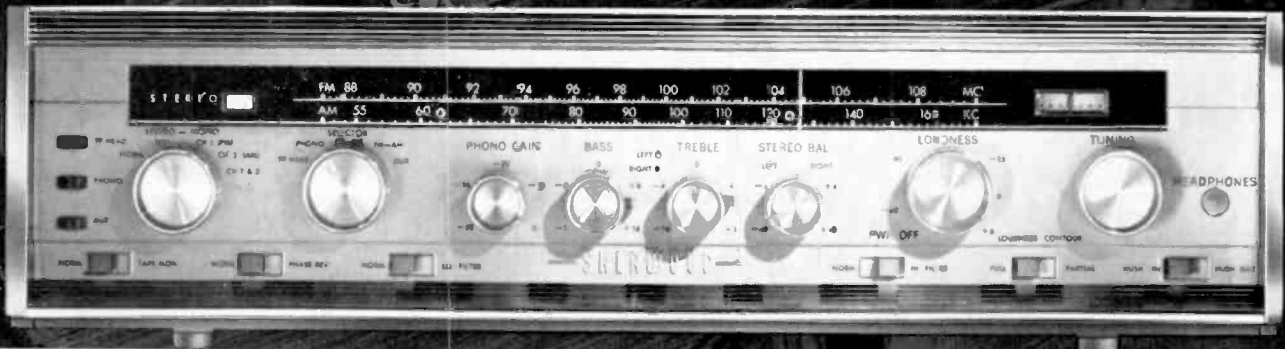
Be sure to tape sounds of travel as well as sound snapshots of the cities you visit—particularly if you plan to use the tapes with movies or slides. For example, train sounds can be used to connect France with Germany; Holland with Austria. Be sure to have all the "ordinary" sounds—Big Ben from London, the thieves' market in Paris, the click of the roulette tables of Monte Carlo. And don't miss those unexpected little sounds which can add so much to a sound travelogue—two old Italian gentlemen crooning opera duets over a glass of port in a small cafe in Rome; the belles of the night drumming up business in the alleys of Paris; the waves lapping a wharf in the south of England while a troupe of young actors rehearses "Macbeth," a calypso group on the beach in Jamaica. The opportunities are as limitless as your imagination and your energy.

You'll find that you can obtain beautifully clear recordings of surf pounding on rocks from distances of 30 feet or more (provided your volume level is adjusted properly and there are no other sounds to interrupt your work). You can record a street vendor from a distance of 10 feet or more (although chances are he'll be glad to speak directly into your microphone if you make a purchase). By holding the face of the microphone in the general direction of a band marching by, you can capture much of its sound. For all the details (boots tramping on cobblestones, commands barked by a sergeant) it's a good idea to try to stand in the front row along the curb and extend your microphone into the street as far as possible. You'll find that you can make perfectly acceptable recordings of European trains, subways and streetcars by simply holding the microphone in your hand inside the carriage. For an even better recording of the click of the rails and the whoosh as you pass another train, simply hang your microphone outside your compartment window. But be very careful to see that it doesn't bang against the side of the railway car.

Finally, there's a story prevalent among American tourists travelling with recorders that this or that airport has a magnetic field through which visitors and luggage must pass, thus automatically erasing any recordings. I've been through dozens of airports in Europe and North America with recordings, and I've never found the one yet with the "magnetic field." And that includes airports in some communist countries.

TAPE RECORDING's editor, Robert Angus, carries a recorder with him virtually wherever he goes. Some of his candid sound snapshots have turned up on NBC Monitor, on records and in film documentaries.

Are separate
tuners and
amplifiers passé ?



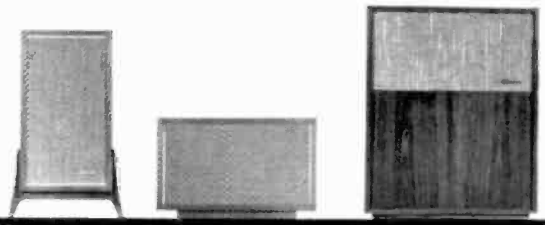
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Circle 61 on Reader's Service Card

Move Stereo Outdoors

by Hans Fantel



Taped music by starlight . . . yours under summer skies. You listen in your lawn chair, your receptiveness enhanced by nature and a tall drink. Or, if you are a social type, picture yourself as the shirtsleeved impresario of an intimate, informal soiree right in your own garden or back yard. You pick the players, the program, and the guests. And during intermission, you're the cook. You might even stage your own summer theater productions, with a repertoire ranging from Broadway musicals to Shakespeare. All it takes is a pair of outdoor speakers hooked to your tape playback system.

Surely there's no point trying to lug your heavy regular indoor speakers out into the open, and dragging out a 35-pound "portable" recorder every time you want music on the lawn can be a drag. You'd only risk damage to their outsides and your insides. Outdoor speakers are far better suited to such *al fresco* occasions. You don't even have to nestle them in a protected spot under the eaves. Leave them right out in the open, sitting on the lawn or hanging in a tree. If they're designed for outdoor use, they're completely weather-proof (which is more than can be said for your recorder or your bookshelf speakers). Neither rain nor wind nor owl nor squirrel can do them damage. In fact, these speakers are so impervious to the rigors of outdoor life that you can leave them out all year. They'll thaw out in spring.

Outdoor speakers owe their ruggedness to special materials combined with special design. Some are fully encapsulated in metal and fiberglass shells doing double duty as shields and baffles. Many of them employ plastic cone materials impervious to moisture.

Outdoor speakers as such are nothing new. You've heard them at railroad stations, in ballparks, and on sound trucks around election time. But few audiophiles would tolerate the tinny clangor of those ear-graters on their premises. Taking a cue from the growing demand for high-quality outdoor speakers, a number of top-rank manufacturers tackled the problem of designing weatherproof models capable of doing fair justice to music.

Although all but one of the speakers discussed in this article *can* be driven by your recorder amplifier (the exception is the relatively low-efficiency Bozak Bard), it's not a good idea to try it. You need much more volume outdoors to achieve the same listening level you enjoy in your living room. In most cases, this means cranking the volume control all the way up. That in turn may place a strain on the output stages of your recorder amplifier. If you decide to go in for music outdoors, it's a good idea to invest

in a component amplifier if you don't already have one, as well as a pair of outdoor speakers.

Bozak's Bard (Model B-1000, \$79.50) looks somewhat like a miniature kettledrum, being a hemisphere 18 inches in diameter mounted on a squat metal stand that may also serve as a mounting bracket if the Bard is to be hung on a wall or tree. The round shape of the fully enclosed baffle prevents the formation of spurious resonances, standing waves, and similar acoustic troubles within the enclosure. The heft of the baffle—the entire unit weighs 22 lbs.—helps the eight-inch speaker pump out clean, solid sound down to 50 cps. Treble response extends to 15,000 cps. The Bard takes up to 40 watts power output (per channel), which is ample for spreading the music out to the far corners of even a sizable lawn.

If your terrain extends over acres of landscape, Electro-Voice's Musicaster (\$75) is just the speaker to project sound to the far reaches of your domain. Its horn-type enclosure is highly efficient, producing lots of sound from a given amplifier wattage. The horn mouth surrounds the eight-inch driver in a square configuration that accounts for speaker dimension of $21\frac{1}{2} \times 21\frac{1}{2}$ inches. Front to back, the Musicaster measures $8\frac{1}{2}$ inches. Made of heavy diecast aluminum, the entire speaker weighs 34 lbs., and it comes with a hinged mounting bracket. Its tonal range extends from 60 to 13,000 cps, with extremely broad treble dispersion (120°).

For more modest establishments that don't demand sound projection over large areas, Electro-Voice's Sonocaster (\$36) will do very nicely. A light-weight plastic enclosure with a convenient carrying handle (and fasteners attaching to mounting brackets) houses a variant of Electro-Voice's Michigan MC8 speaker. This is an eight-inch unit with a $2\frac{1}{2}$ -inch whizzer cone at its apex for better treble dispersion—an updated version of the Radax design employed by Electro-Voice in its coaxial speakers for many years. The sound is agreeably smooth and covers the range between 70 and 13,000 cps without any noticeable peaks. The total dimensions of the unit are $16\frac{3}{4} \times 17 \times 5\frac{7}{8}$ inches.

Despite its light weight, the Sonocaster accepts up to 30 watts amplifier output (per channel), so you'll have no trouble hearing every musical detail—even in a crosswind. The Sonocaster, incidentally, is an exception to a rule cited above—its efficiency (ability to convert electrical energy into sound) is so high that it's quite safe to use it directly with virtually any good tape recorder—thus dispensing with the need for a component amplifier. (A new version of the Sonocaster has just been introduced by

Electro-Voice. It features a newly designed eight inch speaker and sells for under \$30.)

Jensen and University, who once made loudspeakers for battleships, able to withstand the onslaught of the sea and just about everything else, have now come up with home-style speakers that seem to have inherited their naval ancestors' ruggedness. A case in point is Jensen's HF-100A, which combines two horn-type speakers in a single bell-shaped fiberglass baffle of 24-inch diameter. The woofer is an eight-inch unit feeding into a folded horn, and the tweeter is one of Jensen's compression horns. Between them they cover the range from 60 to 15,000 cps. Unlike all the other outdoor units, which have an input impedance of eight ohms, this one works at 16 ohms impedance. Thanks to the efficiency of its horn-projected sound, it can cover wide areas with a maximum input of 25 watts per channel.

A similar design is University's Model CLC (\$69.95), with a response of 55 to 14,000 cps, 30-watt power capacity and 120° treble dispersion. The physical dimensions of the bell-shaped unit are 22¾ inches in diameter, and 13 inches depth.

Now that you've made up your mind about a speaker, the next decision is where to place it. Some units (E-V's Sonocasters, for example.) work best on the ground, placed near your chair. Others, such as the bigger E-V, Jensen and University units, produce better sound when mounted off the ground. Any tree, windowsill or pole will do, with a height from eight to 15 feet being considered optimum. Chances are that you didn't plant the trees in your backyard with stereo in mind—so placement of the speakers for best stereo may be a problem. One solution is a stout 2 x 4, mounted in the right spot to complement an established maple or elm. Mounting a speaker permanently is relatively simple, thanks to the brackets provided with each of these outdoor models. The brackets have screw holes through which the speaker can be fastened to any wooden surface.

If you're looking for something between the intimacy of the Sonocaster and the more stentorian sound of the larger speakers, you may be interested in the Bard, which can be hidden in pairs in shrubbery or mounted conveniently on the lawn and moved about as needed.

The next step is to connect the speaker to the amplifier. You follow exactly the same procedure as with any other extension speaker, being careful to match impedance. Stereo phasing makes relatively little difference in most outdoor situations, so you need not be overly concerned about it, but try reversing the leads to one of the two speakers and note if it improves the bass projection. All of the speakers described in this article are equipped with screw terminals for the speaker leads. All are protected from shorting out of the speaker leads by rainwater under

ordinary conditions, provided you wrap your leads carefully around the screw terminals. If you want to be extra sure, taping screws and leads tightly can't do any harm—and for the perfectionist, a coat of melted paraffin over screws and exposed wire will protect from just about any eventuality. Let me repeat, however, that 99 per cent of the time, such precautions are unnecessary.

Screws and wire exposed to the elements eventually will rust. But when you've wrapped the wires tightly, you don't have to worry about the rust breaking the electrical contact.



If the distance between the amplifier and the speakers is more than 40 feet, it's a good idea to use wire somewhat heavier than normal lamp cord. Otherwise resistance builds up in the line and impairs the damping characteristics of the amplifier. Result: transients become blurred and the music sounds less clear and crisp. As a general rule, use at least No. 14 hookup wire. Also, be sure to get the heavily insulated type whose outer coating withstands the weather. If the insulation deteriorates, it can cause a short circuit in the speaker line that might damage the output stage of the amplifier. Such heavy-duty wire with tough insulation is more expensive than ordinary lamp cord, but the price shouldn't exceed 7¢ per foot. Cable such as this can

be left on the ground during the summer (although it gets in the way). It can be strung from house to speaker like telephone wire. Or it can be planted a few inches underground, to keep it out of the way. If you do the latter, it's a good idea to use cheap lead pipe to enclose the wire from the point where it enters the ground to the point where it comes up again. This will protect it from rodents and garden tools.

You can use the same technique to plant a live power cable to an outdoor electric socket, if you decide to lug the recorder outdoors after all. In



many communities, local ordinances require that wiring such as this be supervised by a licensed electrician. Others don't require this if you use an ordinary plug to your house current and unplug the line when it's not in use.

Once you're stretched out in your lawn chair for your outdoor concert, you don't want to have to jump up and run back to the house to change the volume. This problem finds an ingenious solution in the L-pad or T-pad, a remote volume control which you can build into your line. Make sure that the kind you select is the outdoor type—waterproof, preferably with screw taps. Run the line past your favorite garden spot and insert your controls in that

location. If you're using an aerial line, it may be a good idea to run the line down a tree or pole and mount the controls on your mounting. If you've an underground cable, you can tap it near a fixed outdoor chair or table, mounting the controls on the chair's armrest or on the underside of the table. Prices for the controls average around \$2.

Scanning the specs of outdoor speakers, you may notice that their bass response does not extend to the lowest reaches of the musical range. As a rule, their bass falls off at about 60 cps. Don't hold that against them. The vagaries of open-air sound, lacking the helpful containment of walls, wouldn't let you hear the bottom notes even if the speakers actually reproduced them. To extend the bass response further merely would add bulk to the speakers, dollars to their cost, and nothing whatever to audible results.

This absence of the lowest bottom bass is a natural characteristic of outdoor sound. Without walls to retain the bass and strengthen it by reflection, the low notes sneak off in all directions, quickly dispersing their energy, and are lost to the listener. Just because this is a wholly natural condition, you don't experience the lack of extreme bass as a disturbing factor. The music simply sounds right for its outdoor setting.

The same factors affect "live" music. Composers were aware that the lower strings do not carry well in the open air. This is why music specifically conceived for outdoor performances is often scored predominantly for winds and brass. For instance, Mozart's various wind serenades come off superbly outdoors, as will most jazz and pungent orchestrations of show tunes and pops.

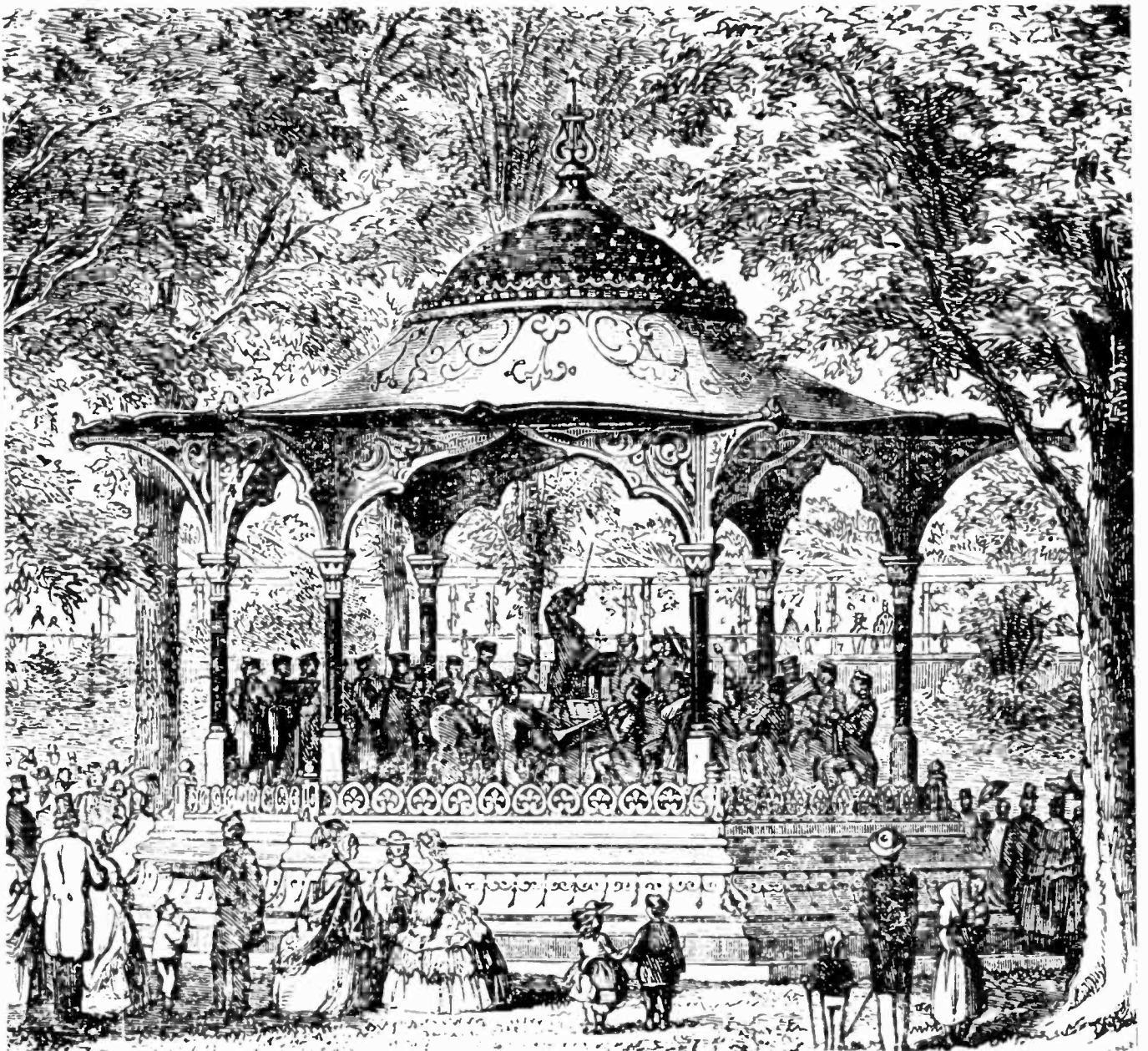
However, there is no need to confine your outdoor concerts to "blowhard" music. The surprising fact is that recorded music is better able to tackle the acoustic challenge of the open air than "live" music. The record itself carries with it the indoor acoustic of the concert hall or the studio. It is as though the walls of the room where the music was recorded were standing invisibly in your garden. This advantage no "live" outdoor concert could possibly match.

One acoustic problem to keep in mind is the neighbors. To them, your musical fare may seem like so much sonic air pollution, and you can't exactly blame them if they take after you with pitchforks or legal summonses. So be sure your volume control is set to avoid acoustic trespassing. Proper selection of the right loudspeaker in the first place can eliminate some trouble—don't get one which can carry the Admiral's orders to the entire Pacific fleet if a more discreet type will do. Then aim your speakers away from neighbors who may not dig Bach or Rock as much as you do. A little experimenting before bolting the speakers down permanently can keep you from becoming a neighborhood nuisance. Then there's nothing to do but find a scientific way of getting rid of the mosquitoes.

The Basic Tape Library

Music For Summertime Listening

by Erwin Bagley



Courtesy Bettman Archives

Once upon a time, summertime meant band concerts on hundreds of village greens across America. The groups weren't always very good, but they made up in enthusiasm what they may have lacked in skill in interpreting warhorses like the *Il Guarany* overture or the *Second Connecticut Regiment March*. When big bands hit their stride in the late 1930's they supplemented the village band by providing—in a series of one-night stands—music to dance to under the stars.

Today's there's plenty of music under the stars—ranging from a folk music festival in northern Ontario to light opera in Dallas and St. Louis; from Jazz festivals in Newport to symphonic concerts in Ravinia and the Robin Hood Dell. You can even hear a baroque trumpet from a New York City church tower, or a string quartet in a city park.

Summertime traditionally is the time for abandoning Beethoven, Brahms, Mahler and Tchaikovsky for the lighter composers—Deliuss, Gershwin, Coates, Offenbach, Sullivan and Mendelssohn, to name only a few. It's probably the best time of year for the music lover to relax with American music or the recently-revealed gems of the baroque.

Listening to music out of doors involves several considerations not encountered in the listening room. For one thing, string sounds tend to get lost out of doors. So many tape listeners, in preparing music for hammock listening, select compositions which emphasize brass or woodwinds. These sounds can be projected much more clearly and easily by an outdoor speaker than can a string quartet. Unless you're really a serious music listener, you're more interested in music to provide a background or help establish a mood than that which requires concentration. With this in mind, we present herewith several avenues worth exploring.

Some of the lighter contemporary American pieces, for example, are just right for a sun-drenched summer afternoon. Some of the best were composed to provide background music for films, and quickly set a mood. Take Epic EC 822, "Music for a Golden Flute," for example which includes Griffes' *Poem for Flute and Orchestra*; Foote's *Night Piece*, and

others. Try *that* on your system some balmy summer evening!

If you're prepared for longer works, an excellent place to start is with Samuel Barber's *Summer Music for Woodwind Quintet*, Concertapes 4009, an aptly named piece of program music. Or there's Vanguard's excellent collection of Copland (VTC 1668), which contains *Quiet City*, *Our Town*, *Outdoor Overture* and *A Lincoln Portrait*. An excellent companion piece is Leonard Bernstein's reading of *Appalachian Spring*, with *Danzon Cubano* and *El Salon Mexico*, on Columbia MG 559.

George Gershwin's music is as much a part of summer as ice tea and picnics. There are two tapes here which are musts for summer listening, both by Arthur Fiedler and the Boston "Pops." RCA Victor FTC 2004 couples *An American in Paris* with *Rhapsody in Blue*, while FTC 2101 includes the *Concerto in F* with Earl Wild as soloist, the *Cuban Overture* and variations on "I Got Rhythm." Louis Moreau Gottschalk's *A Night in the Tropics* (Vanguard VTC 673) certainly will fit in with your mood during the summer heat, while Morton Gould's *Latin American Symphonette* provides an entertaining diversion. On more familiar ground again are Ferde Grofe's *Grand Canyon* and *Mississippi Suites*, both of which should be slated for summer listening. There are two versions on tape—by Howard Hanson and the Eastman-Rochester Orchestra (Mercury ST 90049) and Felix Slatkin with the Hollywood Bowl Symphony, (Capitol ZP 8347).

Other moderns worth a listen include Aram Khachaturian, Ralph Vaughan Williams and Claude Debussy. A perfectly delightful international selection of 20th century composers is that on Columbia M2Q 575, in which Eugene Ormandy and the Philadelphia Orchestra play Alfvén's *Swedish Rhapsody*, *Finlandia* by Sibelius, the two *Enesco Roumanian Rhapsodies* and others. There's Malcolm Arnold's guitar concerto on RCA Victor FTC 2049, performed by Julian Bream and the composer; or our own favorite composer of summer music, Aram Khachaturian, whose *Masquerade Suite* is available in a stunning recording on RCA Victor FTC 2028. The more familiar Gayne suites (Westminster WTC 123) also make for a relaxing mood.

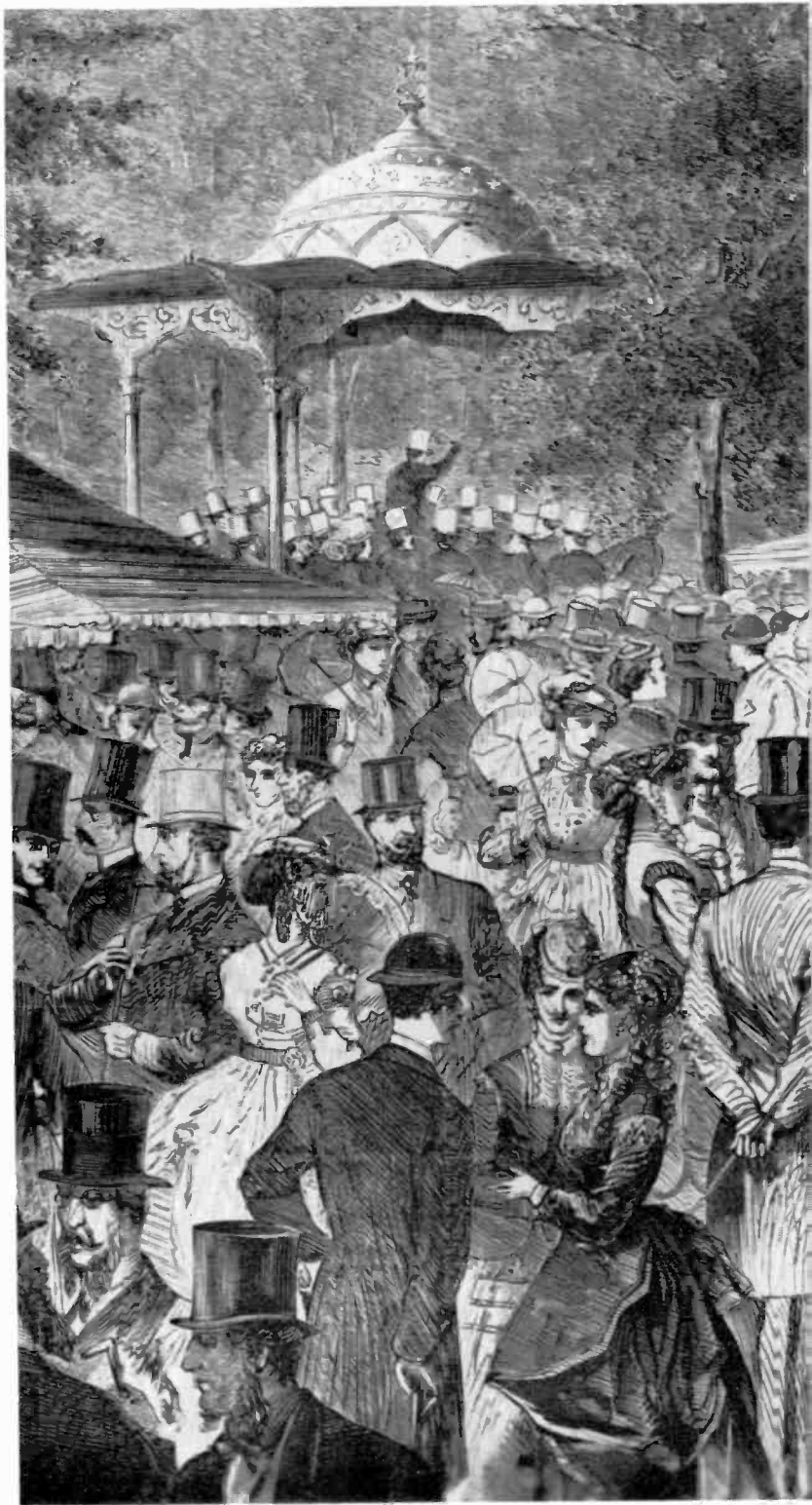
The best Debussy for this time of year is *La Mer* and the *Nocturnes* which, fortunately, have been recorded on a single Epic tape by the Amsterdam Concertgebouw (Epic EC 813). Some listeners may wish to add the Debussy and Ravel string quartets (Victor FTC 2036), which require less concentration than do some other chamber works. Helst's tone poem, *The Planets*, can cast rather an eerie spell when heard under just the right outdoor conditions, particularly in Herbert von Karajan's recording of it on London LCL 80097. Also from Britain comes a collection of short pieces by Albert Ketelby, "In a Chinese Temple" (Westminster WTC 132), tune-full Victorian items designed for casual listening. Vaughan Williams' three pieces on Westminster WTC 148 include the *Folk Song Suite* and the *Fantasia on Greensleeves*—a highly satisfying hot weather program.

Music of the baroque period—composed roughly from 1675 to 1750—has become immensely popular during the last decade, eclipsing some once-familiar concert hall staples. According to one critic's analysis, the reason is that baroque music is melodic, almost mathematically ordered in a way most of us wish our lives could be. The tranquility and orderliness of the baroque strikes a responsive chord within most of us, caught up in the rat race. Another view is that the baroque is only a step removed from modern jazz and such contemporary composers as Paul Hindemith and Igor Stravinsky. Jazzman Ward Swingle recently took that step with his hit-parade versions of Bach, Mozart and Vivaldi.

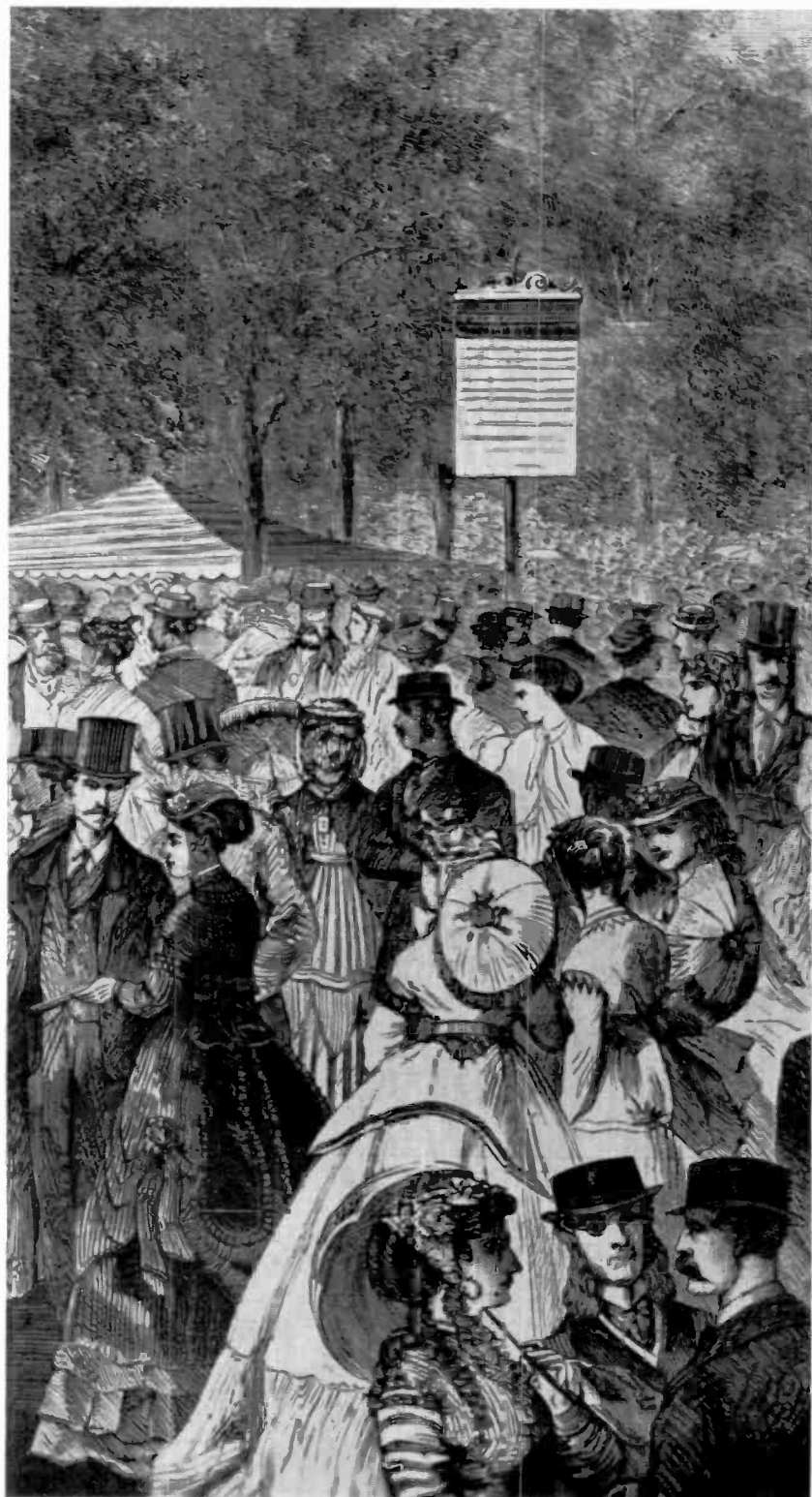
Fortunately for outdoor listeners, there's plenty of baroque music scored for brass and woodwinds. While some is very cerebral indeed, there's plenty of baroque music composed originally as background music for royal dinners, for gala parties and for mood listening of just the type you're contemplating—which is not to say it isn't very good, indeed.

Baroque music has fared well on tape—and much of it is worth listening to during the warm weather. Perhaps the best place to start is with Kapp catalog, which includes no less than four tapes (ETL 49000, 49006, 49008 and 49011) of music for the trumpet by Purcell, Vivaldi, Torelli, Scarlatti and others. If you must choose one, let it be 49000, which includes the Purcell *Trumpet Voluntary* and trumpet concertos by Haydn and Vivaldi—but try to listen to them all. In the same vein is KTK 49009, which includes music of the period for oboe and french horn by Handel, Telemann and others.

Two of the best programs of baroque music to come along in recent months are Epic's *Four Italian Baroque Flute Concertos* (EC) and "A Decade of Elegance" performed on Philips (C 90052) by I Musici. Vanguard's recording of Vivaldi's *The*



Courtesy Beermann Archiv.



Courtesy Bettman Archives

Seasons is a must at any time of year (VTC 1611), as is "Serenata Notturmo," a collection of music by Rossini, Haydn and others (VTA 1802). From the same source comes a fiery version of Handel's *Fireworks Music*, (VTC 1661), performed as it might have been the night in 1748 that King George II of England heard it for the first time.

There are a number of other items worth considering this summer. Take Westminster's collection of Offenbach overtures (WT 162), for example. It offers light, witty tuneful music to plant the garden or mow the lawn by. Or "Cream Puffs Aus Wien," a collection of froth from the waltz capital (Vanguard VTC 1658). The collection of Rossini overtures on Mercury (ST 90139) may well bring back memories of those band concerts in the park, for it includes two staples of the village band repertoire—*William Tell* and *Semiramide*.

A list of music for summertime can, of course, go on forever. We hope we've included some of your favorites—and perhaps indicated some new paths worth exploring. In the next issue, we'll investigate some more warm weather music—concentrating on jazz, pops, folk and show tunes.

IN THE NEXT ISSUE

The August issue of TAPE RECORDING will feature a number of articles of interest to tape enthusiasts. Look for these features.

- Tape Goes Back to School.
- The Case for Sleep Therapy.
- What You Should Know About Servicing Your Tape Recorder.
- Test Reports on Six Tape Recorders.
- Tips from the Pros.
- Microphone Artistry.
- Taping FM Stereo.
- Music for Summertime Listening—jazz and pops.



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Circle 47 on Reader's Service Card

Guide To Battery Portables

by Frank Peters

Summer is almost here and the outdoors beckon as vacation time draws near. Along with determining where to go, how to get there and what to pack, there is the matter of entertainment—both en route and at the eventual destination.

Many dread a long drive for it means endless radio listening with constant sales messages often delivered by irritating disc jockies. But we need not accept this alternative. Like television viewers, we have recourse to the “blab-off.” In this case it takes the form of a portable, battery-operated tape recorder. The tape recorder can serve as an “extractor,” delivering the music we want for our pleasure as we want it.

The singing strings of Mantovani will take on a new shimmer as you listen uninterrupted to his music from your battery-operated tape recorder while watching the scenery go by. Your favorite singers can soothe or stir you—as you want them—via your portable recorder. Folk music has more of a chance to convey its message if there is no announcer to break the mood with a product pitch.

In the car, in the woods, at the beach, in a boat or, for that matter, a haystack . . . at the flick of a switch, presto—uninterrupted music to suit your every mood.

We repeat: this summer tape it, and take it with you!

Present owners of portable tape recorders know their capabilities as music recorders and reproducers. Those with rim-drive units know they are limited to using tapes cut on their machine only with that machine . . . or another of the same model and manufacture. Owners of capstan-drive portables know they can play the tapes cut on their machine on any other machine that operates at the speed the recording was originally taped.

The capstan-driven machine at one time was costly . . . perhaps four or five times more expensive than the average rim-driven machine. But today, all is changed. A reasonably good capstan-driven machine can be bought for half the price of an equivalent machine of two years ago.

There are a number of points to consider in the purchase of a portable tape recorder. Here are a few:

The sound of the recorder will depend to a great extent on speaker size. The larger the better. If a large speaker is not provided, determine if there is

provision for hooking in an auxiliary speaker when it is to be played in a stationary setup.

As with transistor radios, the number of transistors is a clue to operating and sound capability. The more the better can be taken as a rule of thumb. Remember, however, that a transistorized recorder does not need as many transistors as a portable radio, since the former has fewer circuits. A four-transistor recorder could easily sound as good as the average six-transistor radio.

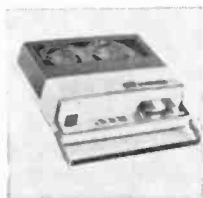



Although a lot of music can be packed in a three-inch reel of extra-thin tape, more can be accommodated on a five-inch reel. If music is an important factor, consider a machine that uses five-inch reels. Such sets generally house larger speakers. Another important feature to look for is a volume-battery level meter, to indicate both proper recording levels and battery condition.




Most of the battery-operated recorders don't have a digital counter to show how much tape has been consumed, or where to look for a given selection. A machine with a tape scale printed on the motor board (under the reel) should be considered if these factors are important.





Where the unit will be used outdoors in the day and indoors at night, consider an optional a.c. current supply device, or a machine with built-in house current adapter. Otherwise, buy a charger and rechargeable batteries, or extended life batteries, rather than the ordinary types.




Since the number of miniature pre-recorded tapes is limited, it will be up to you to “roll your own.” Many prefer to do this simply—using the microphone as the sound-gathering device. If the recorder has a good microphone and the room acoustics are good, passable recordings may result. Some battery-operated portables offer an input for “tapping” a radio, phonograph, or large tape recorder as a program source. This is preferable and results are much better.

Following is a representative list of portable, battery-operated recorders in all price classes. All have constant-speed control, usually a capstan-drive system, for better music reproduction. Prices given are manufacturers' suggested list prices, subject to local retailing policies which in some areas may mean a substantial discount. Details given are based on available manufacturer specification lists.

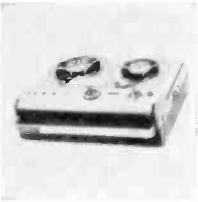

Model	Size	Price	Comments
AIWA TP703  Selectron International Co. 4215 West 45th St. Chicago 60632, Illinois	2½" x 8½" x 8¾"	\$46.95	Two-tone grey styling with chrome trim highlights this compact. The six transistor instrument plays at 17/8 and 3¾ ips, and features VU meter for record level and battery strength. Also featured is push-button operation. Reel size is 3¼". There is provision for playing back through hi fi system, radio or other amplifier. Price includes dynamic remote control mike, recording tape, two reels, earphone, batteries and accessory case. Auxiliary equipment cord is optional. Unit weighs 4½ pounds.
Belsona, TRQ 300  Hitachi Sales Corp. 666 Fifth Ave. New York 10019, N. Y.	9" x 3½" x 6"	\$99.95	The Belsona TRQ features "Levelmatic" (automatic recording level) controls and weighs just under 4½ lbs including batteries. This unit uses three inch reels. It runs at 17/8 and 3¾ ips and claims frequency response of 150 to 4,000 and 150 to 7,000 cps respectively. Includes seven transistors, three diodes and 4" x 2¾" speaker, four flashlight cells power the instrument and an AC adapter is available as an option. Included in the price are dynamic microphones, earphone and a set of batteries. Other optional accessories include foot switch and telephone pickup.
Channel Master Lodestar  Channel Master Corp. Ellenville, N. Y.	6½" x 3½" x 1¾"	\$59.95	Two-second cartridge loading is the key feature in this miniature reorder weighing 32 ounces. A single knob handles record, rewind, stop and playback. The tape stops automatically when either end is reached. A tri-purpose indicator tells correct recording volume level, permits user to maintain constant speed even when batteries weaken, and provides a check on battery life. Tapes play 16 minutes per side. The double decker cartridges can be obtained from Channel Master dealers. The instrument, named the Lodestar, is powered by four penlight batteries. It uses five transistors, a thermistor and a diode and two-inch speaker. It includes a clip-on microphone.
Commodore 101  Commodore Import Corp. 507 Flushing Ave. Brooklyn 11205, N. Y.	11¾" x 4¾" x 9¼"	\$49.95	Model 101 weighs nine pounds and is capable of using five inch reels. It offers 7½ and 3¾ ips speeds, fast forward and rewind, one-knob function control and camera body finish. A tape-use scale is printed on the motor board. Four D cells power this model, and it can also play on AC current with an adapter that sells for \$7.95. The mike (included along with the batteries) is the remote type. The set has an earphone jack.


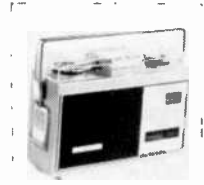
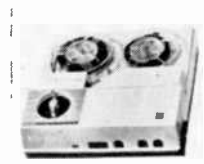
Model	Size	Price	Comments
<p>Concord-Sound Camera F85</p>  <p>Concord Electronic Corp., 809 North Cahuenga Blvd. Los Angeles 38, California</p>	<p>7" x 5" x 3"</p>	<p>\$39.50</p>	<p>The Sound Camera, Model F85 is designed as a straight all-around recorder rather than one reserved for photographic use. The maker says it is for taking "snapshots in sound." The push-button-operated instrument uses 2$\frac{3}{8}$" reels and runs at 1$\frac{7}{8}$ ips. It offers claimed frequency response of 50 to 8,000 cps. It is powered by four C cells and has five transistors and two diodes. The unit weighs two lbs. Included in the price are dynamic mike and pouch, empty reel and a reel of tape. Optional accessories include earphone, AC adapter, patch cord for recording from auxiliary equipment and telephone recording device.</p>
<p>Concord 330</p>  <p>Concord Electronics Corp. 809 North Cahuenga Blvd. Los Angeles 38, California</p>	<p>12" x 8$\frac{3}{4}$" x 3$\frac{3}{4}$"</p>	<p>\$199.95</p>	<p>Model 330 has full automatic voice operation. The set starts recording whenever a sound is present at the sensitive mike and it stops when the sound source stops. Another feature is automatic slide advance for use with slide projectors. This unit weighs six pounds and uses nine transistors and one diode. The speaker is 3$\frac{5}{8}$" in diameter. Five inch reels are used and it runs at 1$\frac{7}{8}$ and 3$\frac{3}{4}$ ips. Other features include recording level and battery condition indicator, four pole governor-controlled motor and claimed frequency response of 50 to 10,000 cps. The price includes remote control mike, earphone, self-threading reel, sensing tape and special slide projector plug. Optional accessories include AC adapter, foot switch and telephone pickup.</p>
<p>Craig TR 403</p>  <p>Craig Panorama, Inc. 5290 West Washington Blvd. Los Angeles 16, Calif.</p>	<p>2$\frac{3}{4}$" x 7$\frac{1}{2}$" x 6$\frac{7}{8}$"</p>	<p>\$134.95</p>	<p>Model TR 403 is a six transistor recorder which operates at 1$\frac{7}{8}$ and 3$\frac{3}{4}$ ips using a total of 10 Eveready 1015 (or equivalent batteries). It can also function on house current with an optional AC adapter. Features include three inch reel capacity, 2$\frac{1}{4}$" speaker, one-lever operation, VU meter, battery condition indicator, and time index. The price includes leather carrying case with shoulder strap, microphone and case, an accessories case including earphone, patch cord and splicing kit.</p>



Model	Size	Price	Comments
Craig TR 505  Craig-Panorama, Inc. 5290 West Washington Blvd. Los Angeles 16, California	5" x 12" x 10½"	\$159.95	Model TR 505 weighs 10 pounds, has five inch reel. This unit comes complete with six D cells, AC cord, microphone, earphone, reel of tape and blank tape. Speeds are 1⅞ and 3¾ ips using a DC governor-controlled motor. The TR 505 contains a three inch speaker and features fast forward, instant stop-pause levers for accurate editing, tone control, VU meter battery indicator and radio-phonio input for recording from external sources. It uses six transistors. The AC power supply is built in. Options include telephone pickup and foot switch.
Crowncorder CTR 5400  Crown Radio Corp. 150 Fifth Ave. New York 10011, N. Y.	4 3/16" x 11¼" x 8 7/8"	\$69.95	The Crowncorder CTR 5400 is a six transistor, two speed instrument that accommodates reels up to five inches. Operation is from flashlight cells or AC (via optional adapter). The unit features two power DC micro-motors for quieter, more precise tape movement. The mike supplied with the set has a built-in on-off switch.
Dokorder PT 18C  Rengo Traders, Inc. 234 Fifth Avenue New York 1, N. Y.	9¾" x 7¾" x 3½"	\$49.95	Slim lines are featured in Model PT18C, with remote dynamic mike, earphone, reel of tape, blank reel and a set of four D cells. Housed in unbreakable polypropylene case the unit weighs less than four pounds with batteries. Operation is at 1⅞ and 3¾ ips. The five transistor instrument uses a three inch speaker and accommodates 3¼" reels. It has a record level control. Optional accessories include AC adapter, foot switch, patch cord for recording from radio, another tape recorder or from a phonograph and telephone pickup.
Fi-Cord 202  Karl Heitz, Inc. 979 Third Ave. New York 10022, N. Y.	9" x 6½" x 4½"	\$339.50	Model 202 is a British-made unit that operates at 3¾ and 7½ ips with a governor to assure correct speed. Featured in the set are VU meter, built-in battery tester, two outputs, two inputs, rapid forward and rewind and versatile power sources. The Fi-Cord will function on seven mercury cells or on AC via optional transformer or 12 volt auto battery with optional transformer. Microphones are available at \$24 to \$189. AC Adapter is \$39.95. Frequency response of the 202 is claimed to be 50 to 12,000 cps at 7½ ips and 50 to 8,000 at 3¾; in both cases ± 3 db. Reel size is four inches. Used is a three inch speaker.



Model	Size	Price	Comments
<p>Juliette 300</p>  <p>Topp Import & Export, Inc. 6540 N. W. 35th Avenue Miami, Florida</p>	<p>8½" x 9" x 2½"</p>	<p>\$49.95</p>	<p>Model 300 can be operated in transit. The lid accommodates a plastic see-through panel with tape consumption scale inscribed on it. Reel size is 3¼". The six-transistor set plays and records at 1⅞ and 3¾ ips and features a remote control mike. Power is from four flashlight cells. The recorder has push button function controls and record-battery level indicator and outlets for an auxiliary unit such as radio or phonograph. Price includes microphone and batteries.</p>
<p>Juliette 700</p>  <p>Topp Import and Export, Inc. 6540 N. W. 35th Ave. Miami, Fla.</p>	<p>16½" x 13½" x 6"</p>	<p>\$229.95</p>	<p>Model 700 has a matching pair of speakers that fold into an area the same size as the recorder itself. The stereo portable operates from a rechargeable battery and also functions on AC and DC current for universal operation. Three speeds are offered—1⅞, 3¾ and 7½ ips. The main housing contains a speaker for monophonic use, which continues to play when the speaker systems are attached for stereo playback. Seven inch reels can be played on this modern-styled set in walnut with chrome trim and solid wood handle. The deck (made by BSR of England) features digital counter, trident function lever and fast forward and rewind. Provided also are VU meter, tone controls and track selector. The four track unit comes complete with two microphones and detachable speaker systems.</p>
<p>Lloyd TY 799A</p>  <p>Lloyd Trading Co. 28 West 23rd St. New York & 1147 So. Hope St. Los Angeles, California</p>	<p>11½" x 9¼" x 3⅞"</p>	<p>\$52.90</p>	<p>Model TY 799A is a medium-size portable which accommodates reels up to five inches in diameter. Operation is at 3¾ and 7½ ips with power coming from batteries or AC current, the latter in conjunction with an optional adapter-charger priced at \$4.50. Pushbutton functions are provided. The five-transistor unit is priced complete with batteries, microphone and earphone.</p>



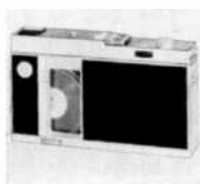
Model	Size	Price	Comments
<p>Martel 301</p>  <p>Martel Electronics 645 N. Martel Ave. Hollywood 46, California</p>	<p>12" x 5 1/4" x 10 1/4"</p>	<p>\$199.50</p>	<p>The Martel 301 weighing 12 1/2 lbs is a medium-sized portable that functions also as an upright table model. The four speed unit takes its power from six D cells and accommodates five inch reels. It has 11 transistors. Speaker size is 4" x 5". Features include VU record battery level meter, pause control for editing, tone control, remote control mike, external speaker and external amplifier outputs; also radio, phono and remote mike inputs. Frequency response at the 15/16 ips setting is claimed to be 80 to 4,000 cps and 60 to 14,000 cps at 7 1/2 ips.</p>
<p>Miniphon 978H</p>  <p>I.T.T. Distributor Products 320 Park Ave. New York 10022, N. Y.</p>	<p>4" x 6" x 2"</p>	<p>\$329.95</p>	<p>Model 978H is a light weight (1 lb, 2 ounces) instrument. Its response is claimed as 40 to 12,000 cps \pm 3 db. This recorder has a magazine load system, offering two cartridge sizes. The unit operates at 1 7/8 ips and uses batteries, rechargeable miniature "accumulator" auto battery or AC current via external adapter. Push-button operation is featured. Price includes batteries, tape magazine and remote control mike and earphone.</p>
<p>Mercury TR 3300</p>  <p>Mercury Record Corp. 35 E. Wacker Drive Chicago 60601, Illinois</p>	<p>8 1/2" x 9" x 4"</p>	<p>\$59.95</p>	<p>Model TR 3300 is a 5 3/4 lb. instrument complete with mike, three inch reel tape, blank reel and earphone. Features include break-resistant case, remote control on-off switch, and level meter. Power is supplied by four D cell flashlight batteries.</p>

Model	Size	Price	Comments
<p>Mercury TR 3500</p>  <p>Mercury Record Corp. 35 E. Wacker Drive Chicago, Ill.</p>	<p>12" x 9" x 4½"</p>	<p>\$89.95</p>	<p>Twin motors are featured in Model TR 3500 which operates at 17/8 and 3¾ ips and functions on four D cells or on AC with the aid of an adapter. The eight-pound machine can handle five inch reels.</p>
<p>Miranda Mirandette</p>  <p>Allied Impex Corp. 300 Park Ave. South New York 10, N. Y.</p>	<p>9⅝" x 8 5/16" x 2 5/16"</p>	<p>\$169.65</p>	<p>The Mirandette weighting 7¼ pounds has recessed controls and operates at 17/8 and 3¾ ips. It offers overall claimed frequency response of 200 to 6,000 cps. Power source is four D cells or AC current, the latter through built-in adapter. The six transistor, one diode circuit has a half-watt output. The speaker is oval, 2¾" x 5". The Mirandette comes complete with batteries and features remote control, dynamic mike, three inch reel of tape, blank reel, carrying strap and AC cord. Other accessories are optional.</p>
<p>Nagra 111B</p> <p>Kudelski Paudex, Switzerland</p>	<p>8¾" x 12½" x 4¼"</p>	<p>\$1,049.</p>	<p>Model 111B is featured at specialty stores who import the unit direct from Switzerland. This recorder operates at 15, 7½ and 3¾ ips offering claimed frequency response of 30 to 15,000; 40 to 15,000 and 70 to 9,000 cps, respectively. Signal-to-noise ratio is claimed to be 62 db at 15 ips, 60 db at 7½ and 50 db at the slow speed. The 30 transistor set functions on 12 flashlight cells, with the aid of optional power packs or virtually any type of house current. Five inch reels can be used with the lid closed, or seven inch reels with top open. Featured is a fast forward and rewind, plus a variety of outputs and inputs for virtually any recording use and for synchronization with film. The unit weighs 15 pounds.</p>

Model	Size	Price	Comments
<p>Norelco Carry-Corder</p>  <p>North American Philips Co., Inc. 100 East 42nd. St. New York 10017, N. Y.</p>	<p>7¾" x 4½" x 2¼"</p>	<p>\$149.50</p>	<p>The Carry-Corder is a midget instrument using cartridges. The unit weighs three lbs. It operates at 1⅞" ips. It offers 30 minutes' playing time per side on its 300 foot cartridge loaded with triple-play tape. Frequency response is claimed to be 120 to 6,000 cps and wow and flutter claimed at 0.35% (RMS). Signal-to-noise ratio is claimed to be 45 db. Inputs are provided to record from radio, TV, phonograph, and telephone as well as microphone. Playback is through the set's own amplifier or through external hi-fi system or headphones. The mike is the remote-type. The price of this seven transistor instrument includes the mike, carrying case with mike pouch, four cartridges and patch cord. The cartridge loading is accomplished in one second.</p>
<p>Norelco Continental 101</p>  <p>North American Philips Co., Inc. 100 East 42nd. Street New York 10017, N. Y.</p>	<p>11" x 3¾" x 8"</p>	<p>\$129.50</p>	<p>The Norelco Continental 101 comes complete with microphone, claims a frequency response of 80 to 8,000 cps. It features push-button operation, 1⅞ ips tape speed, tone control, output for headphones or hi-fi system and record/battery level meter. It uses four inch reels. It weighs seven lbs. Optional accessories include carrying case, remote start-stop microphone switch, AC adapter, headset, telephone pickup and foot control. Power is from flashlight batteries.</p>
<p>Panasonic RQ 101S</p>  <p>Matsushita Electric Corp. of America 200 Park Ave. New York 17, N. Y.</p>	<p>8" x 8⅛" x 3"</p>	<p>\$59.95</p>	<p>Model RQ 101S weighs 3½ lbs. Operation is from six D cells or an optional AC adapter (Model RP 935). The six transistor unit plays at 1⅞ and 3¾ ips using three inch reels. Audio output is 700 MV through a 3½" speaker. Other features include recording level indicator, AC bias system and one knob control. Price includes dynamic microphone, batteries, patch cord, reel of tape, splicing tape, and earphone.</p>

Model	Size	Price	Comments
<p>Panasonic RQ 116</p>  <p>Matsushita Electric Corp. of America 200 Park Ave. New York 17, N. Y.</p>	<p>7$\frac{3}{4}$" x 7$\frac{1}{4}$" x 2$\frac{1}{2}$"</p>	<p>\$129.95</p>	<p>Model RQ 116 operates at 1$\frac{7}{8}$ and 3$\frac{3}{4}$ ips either on its own penlite batteries or optional AC adapter (Model RP 935 at \$12.95). It offers four-track operation unusual in compact portables-for double the playing time on its three inch reels. Weight is 4$\frac{1}{8}$ lbs. Price includes leather case and accessories. Options include telephone pick-up, speaker, AC adapter and foot switch.</p>
<p>Phono-Trix 88B</p>  <p>Matthew Stuart & Co., Inc. 3650 Dyre Ave. Bronx 10466, N. Y.</p>	<p>1$\frac{7}{8}$" x 4$\frac{1}{4}$" x 7$\frac{1}{2}$"</p>	<p>\$99.50</p>	<p>Model 88B is a pocket sized compact that weighs 2$\frac{3}{4}$ lbs. It features automatic push button operation with all controls on top to permit recording and playback without removal from case. Tape reel size is 2$\frac{1}{2}$" and running speed is 1$\frac{7}{8}$ ips, with a governor-controlled motor. The battery complement is three C cells and three penlite cells. And, there is provision for operating the set off an auto battery or AC current (via adapter). Six transistors are used. Frequency response is claimed to be 100 to 6,000 cps. The price includes remote-control mike, amplifier-speaker, earphones, leather carrying case, telephone adapter, reel of tape and blank reel.</p>
<p>Ricoh-Commentator</p> <p>Ricoh Industries, USA Inc. 42-43 27th Street Long Island City, N. Y.</p>	<p>5" x 9" x 3"</p>	<p>\$109.50</p>	<p>The Commentator is a coat-pocket sized recorder that weighs less than five lbs. It uses seven transistors has a 2" x 4" speaker and runs at 1$\frac{7}{8}$ and 3 $\frac{3}{4}$ ips with claimed frequency response of 150 to 6,000 cps at the faster speed. Power is from six penlite cells, optional AC power supply, or auto cigarette lighter adapter. Reel sizes up to 3$\frac{1}{2}$" can be accommodated. Price includes reel of tape, blank reel remote control mike, leather case and accessory bag. Spring reel locks permit operation in any position-even upside down. A running time indicator is built into the lid.</p>

Model	Size	Price	Comments
Saxon 755 Kouyoh International Corp. 1200 Santee St. Los Angeles, California		\$259.95	Model 755 has seven transistors per channel and features four track stereo. It can be operated with 12 volt battery, six 1½ volt flashlight cells or AC current. Speeds are 1⅞, 3¾ and 7½ ips. Fast forward and fast rewind functions are provided along with other standard controls. Weighing 20 lbs. including batteries, this instrument has two detachable 3" x 6" oval extended range speakers with extension cords. Frequency response at 7½ ips is claimed to be 50 to 15,000 cps ± 2½ db and wow and flutter is claimed to be less than 0.24 per cent at 7½ ips. Signal-to-noise ratio is claimed to be 45 db at peak record signal. Response at 3¾ ips is claimed to be 50 to 12,000 cps and 50 to 9,000 is claimed at 1⅞ ips with the same decibel variation.
Sony Tape recorder 801A  Superscope, Inc. 8150 Vineland Ave. Sun Valley California	12 4/5" x 10 4/5" x 3 4/5"	\$250.	Model 801A is a slim-line machine using five inch reels and running at 1⅞ and 3¾ ips. It uses 12 transistors and functions on six D cells. It can also operate on a car battery or AC via proper optional converters. Featured are VU meter for recording level and battery life check, digital counter, self-contained speaker, instant stop and variable back space lever and push-button operation. The microphone is a remote type, included in the price. Frequency response is claimed to be 90 to 9,500 cps at the higher speed. The unit weighs 13 lbs. Options include foot switch and telephone pickup.
Sony Voice Command 905  Superscope, Inc. 8150 Vineland Ave. Sun Valley, California	8 5/8" x 6 1/2" x 6 1/2"	\$129.50	Voice Command 905 features voice activated mechanism with transistorized computer-type electronic switching and automatic gain control. The first permits starting and stopping the recorder by voice, the second provides automatic adjustment of recording level. The instrument consists of two units; the upper part is for recording. When detached from matching AC-powered amplifier-speaker base, it serves as an independent battery-operated portable recorder weighing 4½ lbs. When placed on the base, recorder will play back through the amplifier speaker. The base also contains a charger and while the amplifier-speaker is in operation charges the batteries. The complete set weighs 7⅞ lbs. Tape speeds are 3¾ and 1⅞ ips. Frequency response claim is 90 to 9,500 cps at the higher speed. Reel size is 3¼". Inputs are provided for microphone and auxiliary units and outputs are provided for monitor and external speaker.

Model	Size	Price	Comments
<p>Telefunken Magnetophone 300</p>  <p>American Elite Inc. 48-50 34th St. Long Island City Long Island, N. Y.</p>	<p>x 10½" x 1½"</p>	<p>\$169.95</p>	<p>The Magnetophone 300 is a 10 transistor portable using reels up to five inches in size and operates off five D cells or special Telefunken rechargeable battery. With the aid of optional adapters it will also operate off house current or automobile battery. Tape speed is 3¾ ips and frequency response is claimed to be 40 to 14,000 cps. A 3" x 4" speaker is used and an output is provided for external speaker. Function controls include a pause button and speaker switch. The recording level meter also functions as a battery condition indicator. The instrument weighs 7½ pounds without the battery. Price includes microphone.</p>
<p>Uher 4000S</p>  <p>Martel Electronics 2356 South Cotner Los Angeles, Calif.</p>	<p>10½" x 8½" x 3¼"</p>	<p>\$329.95</p>	<p>Model 5000S is a four speed portable weighing seven pounds, 6½ ounces. Features die-cast frame, push-button controls and illuminated VU meter for recording level and battery check. This unit operates from D cells, alkaline batteries, AC current or auto battery. Frequency response at 15/16, 17/8, 3¾ and 7½ ips is claimed as follows: 70 to 5,000, 50 to 11,000, 50 to 18,000 and 50 to 22,000 cps all at ± 3 db. Signal-to-noise ratio at the top speed is claimed to be 50 db or better. The price includes remote control dynamic mike, leather case, AC power unit, battery charger and storage battery. Other accessories too numerous to mention are also available.</p>
<p>Westinghouse 29R1</p>  <p>Westinghouse Electric Corp. 200 Park Avenue New York 17, N. Y.</p>	<p>3¾" x 6½" x 1¾"</p>	<p>\$69.95</p>	<p>Model 29R1 is a miniature cartridge recorder which uses a cartridge that plays up to 35 minutes. Operating on four AA penlight cells, the unit features battery voltage and recording level indicator, "push-to-talk" button on the microphone and a selector control on top of the unit with stop, record, play and rewind position. A variable speed adjustment control is provided to enable the user to compensate for any loss of recording speed when batteries begin to lose power. It weighs less than three pounds. It includes leather case, earphone, tape cartridge, microphone case and "ready tape mailer." Cartridges sell for \$2.95 each.</p>

LETTERS TO THE EDITOR

(Continued from page 6)

We do not report on tape hiss when, in the opinion of our reviewers, it is less noticeable than disc surface noise normally is. To the best of our knowledge, the tapes we receive for review are regular production runs from manufacturers—but to be sure, we will, beginning with the next issue, include some samples selected at random from dealers' shelves.

Kenmore, N. Y.

Nice to see TAPE RECORDING again. I thought you had gone for good. My subscription would have expired this month—but I received almost no copies during 1964. Will I continue to receive the magazine to make up for those missing issues?

Don Webber

Last fall, A-TR Publications pur-

chased the assets—the name and files—of TAPE RECORDING from bankruptcy. We agree that existing subscribers got a raw deal during 1964, and automatically continued the subscriptions of all paid subscribers to December, 1965. The state of the former owners' files made it impossible for us to determine the actual expiration date of each subscription, so some subscribers may receive extra copies while others get a few less. We believe this to be the fairest way of dealing with the problem.

Q. Why haven't the raw tape manufacturers come up with a more attractive package for tapes—something like those tissue boxes, where the advertising comes off with the wrapper, for example?

Helen G. Brown,
East Norwich, Conn.

A. Good question.

New Haven, Conn.

Robert Angus' article in your March-April issue seemed to ignore several important points about using different tape types. As a technician and semi-professional recording engineer, I have had cause to compare different tape types. The procedure used by Robert Angus, while meaningful to the average user who will just throw different tapes on his machine and compare them, is rather misleading for someone who is really serious about maximizing recording quality. One cannot know what a tape type will do unless the machine he uses to test the tape is aligned for the *specific* tape being used. Professionals know that even different lots of the same tape type may require different bias settings. To compare any two different tapes by ear, the machines must first be aligned for each tape to be tested. This align-

(Continued on Page 60)

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sound
deserves
telex
phones

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REVIEWS

Bartok

Dance Suite; Two Portraits Opus 5; Roumanian Dances *L'Orchestre de la Suisse Romande, Ernest Ansermet, conductor, London LCL 80157, \$7.95.*

Mus'c Performance ♦♦♦
Recording ♦♦♦

Ansermet is brilliant at this kind of music and the present trio of Bartok's lesser-known works is no exception. The unusual fabric of this complex music is revealed sharply, yet without losing any of the infinite coloration.

Listeners will probably be most attracted to the lively rhythms of the Roumanian Dances, which make their tape debut with this release. The Two Portraits and the Dance Suite are more original in design, and they have been recorded for tape before: by Antal Dorati in another selection of Bartok pieces, and by Bernard Haitink in a coupling of the Dance Suite and the well-known Concerto for Orchestra.

It is this latter performance that I would suggest. Haitink may lack Ansermet's sensitivity, but his reading is far more dramatic. Moreover, his performance of the Concerto for Orchestra is one of the finest available. The London engineers have given Ansermet sonics that smolder rather than blaze. They are no match for the brilliance and luminosity of Haitink's Epic tape. —P.W.

Beethoven

Symphony No. 6, "Pastoral," *London Symphony Orch. cond. Dorati with Haydn—Symphonies Nos. 94, "Surprise" and 100, "Military."* Mercury STP 90415, \$11.95

Mus'c Performance ♦♦♦♦
Recording ♦♦♦

It's unfortunate that Antal Dorati must face such formidable competition as Fritz Reiner and Bruno Walter (in the Beethoven) and Krips, Monteux, Woldike, Munchinger and Scherchen (in the Haydn). In fact, Hermann Scherchen has virtually monopolized the Haydn "Military" since he first recorded it in the early 1950s. Of course, you'll have to buy three \$7.95 tapes to get all this music (although you'll get some extra bonuses along the way). But for your money, you'll get much more incisive or stirring performances and somewhat better recording, in some cases. This tape doesn't strike us as one of the more happy twin-pack pairings. —R.A.

Beethoven

Symphony No. 1 in C, Op. 21; Symphony No. 2 in D, Op. 36, *The Cleveland Orchestra, George Szell, conductor, Epic EC 843, \$7.95.*

Mus'c Performance ♦♦♦♦
Recording ♦♦♦

This is the fifth tape release by Szell and the Cleveland Orchestra in what promises to be a complete edition of the Beethoven symphonies. Still missing are the Fourth, Sixth and Seventh. In general, all the tapes offer straight-forward readings by a master conductor leading possibly the finest orchestral ensemble in the country. Recording quality varies, but it is mostly excellent.

There are competitive versions of the present symphonies. Reiner

couple the First with a rather self-conscious Ninth in a performance that sounds heavy-handed. Ansermet has recorded both the First and the Second symphonies. His First, (coupled with a spirited Fifth) captures the grace and gusto of this early symphony better than most conductors seem to do. His Second (coupled with an equally fine Fourth) is a rhythmically strong, individually styled performance.

In comparison, Szell, despite the superb playing of his orchestra, seems dispassionate. The youthful zest of the First Symphony is not evident. Neither is the warm lyricism of the Second. The recording has fine separation but is cold and dry. In conclusion, unless this coupling is desired, both Ansermet performances offer greater rewards. —P.W.

Grieg

Peer Gynt Suite with Tchaikovsky—Nutcracker Suite *Vienna Philharmonic Orch. cond. von Karajan, London LCL 80160, \$7.95*

Mus'c Performance ♦♦♦♦
Recording ♦♦♦

This isn't the first time on tape for either of these suites—but it's one of the best readings currently in the catalog. Here are all of the familiar Grieg and Tchaikovsky melodies, done with a faintly Teutonic air which tends to dilute just a little the usual dollup of treacle with which they're served up. London's recording puts you in 14th row center—with the hint of a large, spacious hall behind you. If you want the music, this is the tape to have. —R.A.

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Bizet

Carmen Maria Callas, Carmen: Nicolai Gedda, Don José; Andréa Guiot, Micaëla; Robert Massard, Escamillo; Choeurs René Duclos and Choeurs D'Enfants Jean Pesneaud; Orcestra du Theatre National de L'Opéra (Paris), Georges Pretre, conductor. Angel ZC3650, \$21.98.

Music Performance Recording



Well, here it is. The Callas Carmen. Without doubt, a considerable tour de force by the most compelling diva of our day. It is clear that Callas has lavished great care on her interpretation. Time and again, one is impressed by the rightness of her characterization, by her sense of style, by her incredible success with the French language. In the two and a half years since her last complete operatic recording, the voice has darkened, become more idiosyncratic. Her middle scale, her chest tones, are as strongly controlled as ever. But in the lower-middle register, her voice has picked up an unusual coloration. There are still obvious restrictions to her high register which, fortunately, Bizet does not tax.

The real fire in this performance

is undoubtedly created by Callas, although she is well supported by Nicolai Gedda who brings a greater passion to this recording than he did to the same role with Beecham. The supporting principals are all quite capable, and Georges Pretre obtains lively support from his French orchestra.

It all seems fine until, about half-way through, one suddenly becomes aware how irregular the whole performance really is. Excellent sections (the Habañera, the Chanson Bohème, the Flower Song, the Card Game) are juxtaposed with moments of flat mediocrity (some of the First Act arias, the duet with Escamillo in Act Four, scenes shared by Chorus and Orchestra without the presence of Callas.) When the prima donna is around, the sparks fly. When she isn't, the performance sags, the overall architectural structure falls apart.

This impression is confirmed after listening again to Beecham and De Los Angeles. True, their recorded sound was only fair and makes no attempt at dramatic staging. But De Los Angeles produces an extraordinary quality as Carmen, calculatingly feline, with great flashes of fire. Her singing is simply magnificent, vocally more secure than Callas . . . a voice that woos the listener with its beauty. It is Beecham, however, who invests the score with magic. The musical scope, the rich colors of the opera are revealed with a freshness and lucidity never captured before or since in a recorded performance.

So there you are. Now there are two exciting new Carmens, Callas and Price. The Leontyne Price/Von Karajan recording for Victor is the best recorded of the lot, but it is the least idiomatic. The French language is massacred, especially by Corelli, who otherwise sings the best Don José of all. The other principals, particularly Freni, are excellent. But Price is uneven, producing a snarling characterization, accentuated by ugly guttural sounds. Von Karajan molds a beautiful interpretation, stimulating in the grand opera sense, but certainly not the way of Beecham . . . or of Carmen.

There is a fourth version, on London, containing Regina Resnick's vocally ragged Carmen, Thomas Schipper's slapdash conducting, and the worst performance Del Monaco has ever recorded. It is just not in the running. Unless you desire Callas for the sake of Callas, or excellent recorded sound, Sir Thomas Beecham's miraculous exposition of Bizet's score still leads all the rest.

Kodaly

Hary Janos Suite; Galanta Dances, London Symphony Orch. cond. Kertesz. London LCL 80159, \$7.95

Music Performance Recording



Kodaly's Hary Janos is a charming old humbug who whiles away his golden years regaling the children of his village with tales of heroism and derring-do of which he is the sole hero. Kertesz retells some of these tales with charm and wit. Most concertgoers are familiar with the tuneful Intermezzo (which receives a stunning performance here), but totally ignorant of the rest of the score. London has given an extra large helping, by including two soprano arias from the opera. John Leach, the cymbalom soloist, is to be especially commended for a fine performance captured in true high fidelity. For owners of machines which reverse automatically on a recorded beep signal, Ampex has included such a tone at each end of this tape.

—R.A.

Pergolesi

Flute Concerto No. 1 with Vivaldi—Flute Concerto in A, P. 77; Tartini—Flute Concerto in G; Sammartini—Flute Concerto in F Jean-Pierre Rampal, flute. Saar Radio Chamber Orch. cond. Ristenpart Epic EC 844, \$7.95

Music Performance Recording



There may be other flute soloists

specializing in the masters of the German, French and Italian Baroque who record—but offhand, we can't think of one. Certainly none to compare with Jean-Pierre Rampal, who already is represented on tape in a number of similar works. He has chosen a perfectly delightful (if not always particularly distinctive) program, which is played with tenderness. For our money, the Vivaldi is the runaway favorite; the Pergolesi and Sammartini could just as well have been composed by some other Italian of the period. The recording was made in France by Erato, and a sonic splendor it is. If you dig the Baroque, you'll want this tape.

—R.A.

Rimsky-Korsakov

Le Coq d'Or Suite and Stravinsky—Firebird: Suite, Boston Symphony Orch. cond. Leinsdorf, RCA Victor FTC 2168, \$7.95

Music Performance Recording



The information above tells the story here. If you're looking for a pairing of *Firebird* and *Coq d'Or* (or either one separately and don't have the other work in your library), then this tape is for you. Leinsdorf breathes fire into *Firebird* and finds gold in *Le Coq*. The Boston Symphony gives him everything he asks for, as do the RCA engineers. The two works show an interesting shift in musical taste dur-


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ing the last half century. Both, of course, are excerpts from longer works—*Le Coq* coming from a fairy-tale opera and *Firebird* from a fairy-tale ballet. One rarely encounters either work in its complete form these days, although the *Firebird* was considered quite fashionable as recently as the early 1950s.

—R.A.

Verdi

Highlights From *La Traviata*, Joan Sutherland, *Violetta*; Carlo Bergonzi, *Alfredo*; Robert Merrill, *Germont*; Chorus and Orchestra of the Maggio Musicale Fiorentino, John Pritchard, conductor. London LOL 68006, \$7.95.

Music	◆◆◆
Performance	◆◆◆◆
Recording	◆◆◆

This 58 minute tape is a condensation of the complete London "Traviata" that appeared just over a year ago. About half of Verdi's tragic opera is represented, including the magnificent aria "Ah, fors' e lui," the memorable duet "Ah! dite alla giovine", and Germont's well-known "Di provenza il mar."

The cast is excellent, perhaps the finest collection of principals recorded for this opera. Sutherland, normally associated with the "bel canto" operas of Donizetti and Bellini, plays a vocally perfect, if dramatically languid *Violetta*. She lacks the soft quality Anna Mollo brings to her interpretation on the rival RCA highlights tape, but Sutherland fans will be enraptured by her singing. Robert Merrill repeats his RCA performance as *Germont* with equal strength and intelligence, and Carlo Bergonzi brings much more lyricism to the part of *Alfredo* than RCA's Richard Tucker.

The RCA tape, however, does benefit from the excellent conducting of Fernando Previtali. His approach is truly in the tradition of the Italian opera maestro, firm in tempi, with a rich use of orchestral textures. In comparison, Pritchard, despite his color and variety, indulges too often in over-intensification.

This new recording, though admirably clear and unexaggerated, does not have the wide dynamic range captured by the RCA engineers. For fine leadership and recording, then, try the RCA highlights; for overall vocal excellence, look no further than this new release.

—P.W.

Wagner

Die Meistersinger von Nurnberg, Claire Watson, Jess Thomas, Otto Wiener, Orch. & Chorus of Bavarian State Opera, cond. Keilberth. RCA, Victor FTC 9501, \$32.95.

Music	◆◆◆◆
Performance	◆◆◆
Recording	◆◆◆

Here's a set that just misses the boat. Performances by the soloists and conductor are competent, satisfactory—but nothing more. Recording is satisfactory—but not of the caliber one might have expected from RCA. The music, of course, is stunning—and since this is the only complete *Meistersinger* in sight, it certainly is worth buying. The performance was recorded live at the opening night of the restored Munich National Theatre, which may help to explain why stereo isn't used as effectively in this album as with some other recent Victor operas. All of the singers and the chorus sound just a bit remote. Then, too, there are bits of recorded applause at the ends of the acts which this reviewer finds annoying on repeated listening. Jess Thomas' portrayal of Walther von Stolzing here will disappoint those who heard him in the role at the Metropolitan Opera this past season. Like everything else about this set, it is good—but not great.

—R.A.

David Oistrakh

Mozart: Violin Concerto No. 1 In B Flat Major K.207 Stravinsky: Violin Concerto In D Major David Oistrakh, violinist. The Lamoureux Orchestra, Bernard Haitink, conductor. Phillips PTC 900050 \$7.95.

Music	◆◆◆◆
Performance	◆◆◆◆
Recording	◆◆◆

An unusual coupling which again stresses the astonishing virtuosity of the Russian violinist. Both these performances are magnificent. Every phrase, every idea is superbly balanced and projected. Moreover, to the lean classical lines of Mozart's and Stravinsky's music, Oistrakh adds just the right touch of Russian romanticism.

The technique is slick, perhaps a little too slick, particularly in the Mozart. Here, the playing becomes too impersonal, without the jubilation suggested by the music. Nevertheless, since no other version of either work exists on tape, this release is undoubtedly welcome and duly recommended.

Unfortunately, the recording engineer cares nothing for musical perspectives. The balance between soloist and orchestra is all wrong. Oistrakh dominates the recording, leaving the orchestra, elegantly conducted by Bernard Haitink, wallowing resonantly in the violinist's back-wash. When will recording companies stop this dreadful practice? —P.W.

Buck Owens

The Best Of Buck Owens / I Don't Care, Buck Owens and his Buckaroos, includes Foolin' Around, Excuse Me, I Can't Stop, I Don't Care, Loose Talk, Abilene, Playboy and 18 others, Capitol Y2T2227, \$7.95. (Recorded at 3/4 i.p.s.)

Music Performance Recording

Typical hillbilly maudlinizing on themes of second-fiddling, lost love, infidelity, false pride, lives of lies, desertion, destructiveness of gossip, broken dreams and plans, and the old standby, homesickness. Buck and his Buckaroos stir the listener for nearly an hour through a gamut of emotions ranging from (A)gony to (Y)earning. The wailing fiddlers clinch matters by intensifying these emotions.

Fortunately, two happy instrumentals — Buck's Polka and Buck's Bounce—and a cheerful folk item entitled Louisiana Man, break up the almost unrelieved monotony of soap

opera in song. Masochists will love this reel containing two complete stereo albums. So will students of cliches in Western song lyrics.

—F.P.

Hank Williams, Jr.

Hank Williams Life Story, (MGM Film, "Your Cheatin' Heart"), Hank Williams, Jr., includes Your Cheatin' Heart, Kaw-Liga, Cold, Cold Heart, You Win Again, etc., MGM STC 4260, \$7.95.

Music Performance Recording



Hank Williams, Jr., perpetuates his father's memory in this album of top country songs associated with the elder Williams in his tragically-interrupted career. He does it effectively. At the same time, he puts himself across as a country singer of considerable talent and his own set of artistic mannerisms. Orchestrations and accompaniment are good.

That this is a sound track recording may account for the fact that *Jambalaya* is played twice—in two different versions — and *Hey, Good Lookin'* is played twice, plus an encore! The sound track angle may also account for the shortness of the tape—less than 26 minutes—despite a lineup to 13 tunes.—F.P.

James Bond

Themes from James Bond Thrillers

includes Goldfinger, From Russia with Love, Dr. No. Roland Shaw Orch. London LPM 70091, \$6.95

Music Performance Recording

Okay, gang, it's here. Now let's all go out and get a copy—that is, if you dig 007 enough to go along with the rather ordinary music which is being used to support the action in the three thrillers listed above. Unfortunately, there is no Pussy Galore packed with this tape to make it more interesting (although the three lovelies shown on the box are some sort of substitute). Performance and recording are quite adequate to this material.

—R.A.

Oscar Peterson-Clark Terry

Oscar Peterson Trio Plus Clark Terry, Includes Brotherhood of Man, Blues for Smedley, Mumbles, Mack the Knife, Incoherent Blues, Jim and others, Mercury STC 60975, \$7.95.

Music Performance Recording

Guest stars really bring out the best in this trio. Certainly trumpeter/flugelhornist Clark Terry does. He plays both instruments in this new release and the flow of musical ideas is highly stimulating. Terry's technique is fantastic, especially in the growling "Blues for Smedley" and jaunty "Brotherhood of Man."

For many, the most unusual selections will be "Mumbles" and "Incoherent Blues." Here Clark parodies the blues shouter, mouthing a stream of meaningless sounds that creates an extraordinary effect.

The superb-orchestrations are highlighted by first rate performances by all members of the trio, particularly Peterson, who is truly one of the finest accompanists. The recorded sound is beautifully clear, with excellent presence, and just the right amount of resonance. Quite obviously, everybody had a great time putting together this release . . . as you will have listening to it.—P.W.

Roger Williams

Family Album Of Hymns, *Roger Williams, includes Beyond the Sunset, Old Rugged Cross, Abide With Me, Whispering Hope, In the Garden, etc., Kapp KTL 41089, \$7.95.*

Music Performance Recording ◆◆◆◆
◆◆◆◆
◆◆◆◆

To those seeking the reverence of these fine church standards, a word of caution: this set comes across more as a combination "sing-along" and sweet-pop collection than a "family album of hymns" — despite Roger's protestations of understanding "mostly because as a preacher's kid my earliest recollections are of church and its music."

To Roger Williams fans this, of course, will matter little. They will want the album to keep up with his outpourings. It is apparently not in Roger's character to vary his playing one whit to accommodate the music. Witness the digital gymnastics in "Vesper Hymn" — common to so much of what he plays.

The two selections that most closely resemble what the album purports to be are "Abide With Me" and "What A Friend We Have In Jesus."

—F.P.

Tapeotique

Tapeotique, 170 dance hits played by *Ralph Marterie, Leroy Holmes, Tito Rodriguez, etc. Roberts RLPT-3, \$14.95.*

Music Performance Recording ◆◆◆◆
◆◆◆◆
◆◆◆◆

The virtue of this recording is its very fault; it is too long. While we admire Roberts for its pioneering efforts in behalf of long-long-play tapes, this one goes too far—at least in the popular music category. Its three--hours-plus length would be fine for a complete opera or drama, but for pop music, it's a bit much. Just how long can one listen or dance to a Ralph Marterie, Leroy Holmes or Tito Rodriguez at one sitting? Even the interlude by the George

Williams band and the bits by Al Caiola, Nick Perito and a few others are not enough to allay the dominance of the afore-mentioned "big three."

For those with auditory or terpsichorean endurance, however, this set could be a delight. The sound is bright and crisp and the arrangements solid. The selections include some of the greatest pop music of our time.

—F.P.

Johnny Mathis

This Is Love, *Johnny Mathis, includes Put On A Happy Face, Just Move Along Meadowlark, Under A Blanket of Blue, You Love Me, etc., Mercury STC 60942, \$7.95*

Music Performance Recording ◆◆◆◆
◆◆◆◆
◆◆◆◆



For Johnny Mathis fans, a bonanza of fine tunes, tastefully done in Johnny's inimitable styling. Top arrangements by Allyn Ferguson, long associated with Johnny, lift some of the standards to a new level of interest, yet preserve their inherent greatness. Notable in this respect are Limehouse Blues, done in a totally relaxed manner suggesting someone quite "high." Another is Poinciana, which gets an out-of-the-ordinary slow, sultry ballad treatment—a nice change from the fast clip at which it is so often played.

Johnny's comment on the liner, "For me this recording has been a labor of love," is strongly evident throughout. Conductor Jack Fierman has given him strong support in this venture.

—F.P.

Hollyridge Strings

Hollyridge Strings Play Instrumental Versions of Hits Made Famous By Elvis Presley and The Beach Boys, *includes Teddy Bear, Heartbreak Hotel, Don't Be Cruel, Ask Me, Return To Sender, I Get Around, In My Room, Wendy, and 15 others, Capitol Y2T2224, \$7.95. (Recorded at 3/4 i.p.s.)*

Music Performance Recording ◆◆◆◆
◆◆◆◆
(see note)

Saccharine strings, interesting, bright arrangements plus top sound (even at the slow speed) put this album in the upper bracket for those who want Presley material sans Presley and the Beach Boys material without the Beach Boys.

The songs on the Presley segment are varied and interesting, but the Beach Boys surfin' field items are cut from the same cloth—rather dull and of a repetitive pattern.

Outstanding in the Presley group are the melancholy Heartbreak Hotel, the rhapsodic Love Me Tender, and Can't Help Falling in Love, the Mediterranean-flavored Kiss Me Quick and the Mantovanesque Are You Lonesome Tonight.

Sparking the Beach Boys group are the mad-cap, whirlwind Fun, Fun, Fun (just that!) and the tender, plaintive In My Room.

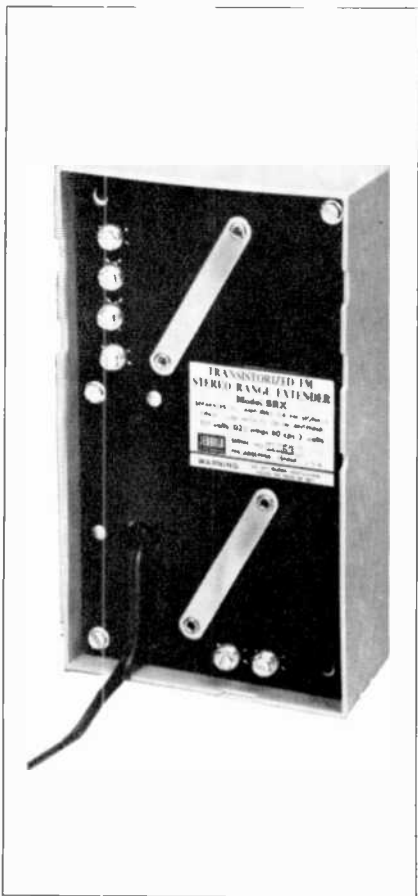
Note: The B.B. side was marred considerably by drop-outs and no-sound periods ranging up to three minutes, plus a lower volume level and poorer signal-to-noise ratio. We trust this was merely a matter of a slip in the dubbing process encompassing the review copy, since other Capitol items in this series were flawless.

—F.P.

Taping FM Stereo

(Continued from page 12)

antenna, carefully oriented. An antenna of this type will pick up signals only from one direction, rejecting the reflected signals. Unfortunately, this brings us to another problem. FM stations are sel-



dom all located in the same direction. If you orient a directional antenna for distortion-free reception of one station, there is no guarantee that it will pick up the other stations you want. A good rotor is the answer to this problem. It enables you to lock your antenna in on the FM station to which you are tuned.

In choosing a directional antenna, there are three important factors:

1. Antenna gain. The higher the gain figure, the more signal the antenna will pick up. For example, an

antenna with a gain of 12 db will pick up twice as much signal voltage as an antenna with six db gain. Each six db increase in gain is equal to a doubling of signal voltage.

2. Clean lobes. In general, the higher an antenna's gain, the narrower its lobe. This is important in eliminating unwanted signals. However, some antennas are afflicted with troublesome side lobes, which pick up unwanted signals. The size of the antenna's rear lobes, in relation to its front lobe is expressed in terms of front-to-back ratio. A high front-to-back ratio is important in eliminating multipath distortion.

3. Flat response. Some antennas achieve extra gain by sacrificing response. This may do for mono, but can ruin stereo reception. Uneven response can result in phase shifts which reduce stereo separation. The new log-periodic design antennas are better in this respect than yagis.

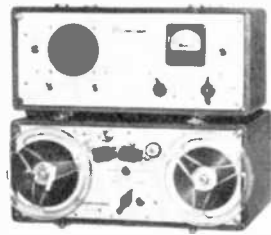
In areas with no multipath problems, you can eliminate the need for a rotor by using a non-directional antenna. You may even be able to use your outdoor TV antenna. To do this, you will need a TV-FM splitter. This type of unit sends FM signals to your FM tuner and TV signals to your TV receiver. It also provides high isolation between the two, preventing interference. Many TV antennas, however, are designed specifically to minimize FM pickup. If your TV antenna is of this type, you'll need a separate FM antenna. It can be mounted on the same mast as the TV antenna, but should be separated vertically by at least five feet, to prevent interaction.

There are two basic types of FM preamplifiers: indoor and outdoor. Both increase signal strength. The outdoor units have the advantage of also increasing the signal-to-noise ratio, while indoor units are easier to use. The typical outdoor FM preamplifier would be mounted on the mast as close to the antenna as possible, to take advantage of the best signal-to-noise ratio available. The mast-mounted unit is fed from an indoor remote power supply which in turn, is connected to your

(Continued on page 51)

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Who's Afraid of Recorded Videotape?

by Richard Ekstrat

When home videotape becomes a reality in the next year or so, owners of machines will begin looking around for recorded videotapes to buy just as today's tape recorder fans buy music on tape. What's likely to be available? It all depends on the owners of the recorded material. At the moment, there is a great deal of recorded material which *could* make an appearance on home videotape recordings. Material ranging from the silent films of Charlie Chaplin through complete operas and educational features to current or recent Broadway plays. Much of it has been seen before, on the silver screen or on home TV screens. Included in this category are full-length feature films like *Henry V*, *The Maltese Falcon*, or *The Bank Dick*, operas such as *Boris Godounov*, *Amahl and the Night Visitors* or *Cavalleria Rusticana*, or the episodes from TV series like *Profiles in Courage* and *The Twentieth Century*. In addition, there's a good deal of material which has been videotaped for eventual showing on pay-television—some of which may never make an appearance other than on videotape recordings. Included here are the Bolshoi Ballet, opera from Salzburg, theatre productions like *Spoon River Anthology*, *The Advocate*, or *The Irregular Verb To Love*. Besides entertainment, there's plenty of educational material, ranging from historical recreations to lectures on mathematics and anthropology.

The Problem

The problem is that all of this material is in the hands of people whose vested interests currently lie elsewhere. The movie studios, in the early days of television, refused to let their films be shown on the small screen because they felt they would hurt theatre owners. After several years of wrangling, however, most studios sold out to TV—and, of course, both industries have gained. Now motion picture firms and television broadcasters are faced with a similar problem.

Since the TV networks and show producers plus the Hollywood studios account for the vast majority of material already produced which could be sold

as recorded videotape, it would be logical for them to sell it as such—either themselves or through licensing arrangements with firms which would produce and sell the actual videotapes.

"It doesn't work that way," one TV network executive told TAPE RECORDING. "If you're sitting at home watching a videotape of, say, Danny Kaye highlights, you're probably seeing it with the commercials cut out. In any case, you're not watching Danny Kaye or whatever else we're broadcasting at the same time because your television screen is being used to replay the recording. If we started selling off our inventory of taped programs, we might find our ratings dropping. As ratings drop, income drops. The more tapes sold, the lower our ratings would be. We'd end up putting ourselves behind the eight ball." A narrow point of view, you say? This is the type of thinking that prevailed in Hollywood during the early days of television.

Since the videotape recorder owner will be perfectly free to tape programs off the air as they're telecast, the case for withholding recorded material would seem poor. Yet a number of executives in all three networks and many independent program packagers and film distributors are for holding back material. The film companies, who have been through it all before, feel it will be years before the home videotape market is big enough for them to bother with. "In the meantime, we've got to worry about not alienating the broadcasters, who are our biggest customers at the moment; and we've already got a commitment in home movies," one major distributor commented. "If we converted just our home movie library to videotape, we'd probably have the entire photo industry down on our backs."

Not all of the good program material is tied up in this manner. Some important productions are knotted in union problems. The British Broadcasting Corporation, which has a backlog of programs ranging from Shakespeare's historical pageants to light comedy, is unlikely to release any of its material as recorded videotape (although viewers may be lucky enough to find local stations broadcasting

some of these features, and thus would be able to make their own tapes directly off the air). A number of sound recording companies for years have tried to persuade the BBC to release some of its musical repertoire for records. In some of the Commonwealth countries, BBC sound transcriptions have been pirated by local record manufacturers. But the BBC's contractual agreements with performing artists and unions forbid the government monopoly from going into the record (or home videotape) business.

The Independents

There's plenty of "independent" material around. For the past several years, companies like RKO General, Westinghouse Broadcasting Company and Subscription-TV have been taping Broadway plays, musicals, travelogues and the like, or obtaining American rights to such features. Video Tape Productions, a subsidiary of Minnesota Mining & Manufacturing Co. (a company with its own vested interest in home taping), has produced tapes of shows starring Cyril Ritchard, Cornelia Otis Skinner, Jack Gilford, James Daly and others. The "indies" who own much of this material so far haven't made any announcements about what they're going to do about home videotape.

"Practically speaking," a VTP executive says, "there will be material for recorded home videotapes when the producers and copyright owners are convinced there's a market. At first, when the market is small, there probably will be a limited number of titles and they are likely to include cheap British and Italian movies which made the rounds before Hollywood sold out. Small companies and foreign companies will sell whatever they've got in order to make a fast buck. Later, the weaker Hollywood studios, American program packagers and so on will sell. Eventually, everybody should be in the field because people can tape what they want to off the air anyway."

When the Smoke Clears

What ultimately are we likely to get on home videotape? "Just about everything you've seen on TV in the last five years that you'd want to see again," a network executive, speaking off the record, says. "That includes the really good old movies, the educational features like *Twentieth Century*, the spectaculars like Sophia Loren in Rome and Charles Boyer at the Louvre, and drama like the David Susskind series for Esso or the Westinghouse Broadcasting Spectaculars." He opined that educational features—specifically *Twentieth Century* and *Profiles in Courage*—would be among the first network shows to appear. "I wouldn't be surprised to see them on videotape by this time next year for use in colleges and schools," he said.

What about price? None of the professionals TAPE RECORDING interviewed was prepared to guess. "Price will depend on the cost of the videotape itself, the contractual agreements with the performing artists, and the number of tapes which can be sold or manufactured at one time," one expert said. "It would be wishful thinking at this time to expect videotape to be less expensive than home



"Once upon a Mattress," adapted from the fairy tale "The Princess and the Pea," was originally broadcast on CBS.

movies in its earliest stages. However, as the public interest grows and duplicating runs begin to approach mass levels, prices should drop to the point where virtually every television set owner in America can afford the popular videotape recordings—even in full color. When that happens, the home entertainment industry as we know it today will be completely revolutionized."

Taping FM Stereo

Continued from page 47

FM tuner. Power is fed up to the mast-mounted preamp on the same lead-in wire that takes the signal down. Indoor preamplifiers are generally mounted right behind the FM receiver. An indoor preamplifier doesn't get the FM signal until after it has been attenuated by the downlead. And no preamplifier can improve on the signal-to-noise ratio at its input.

How then does an indoor preamplifier help in receiving weak FM stations? What is the actual effect of an indoor preamplifier? It increases the amplitude of the FM signal, along with the noise. When the signal is strong enough, the FM receiver's limiter action is activated, cutting off the signal peaks. Since most of the noise is concentrated in the peaks, the result is vastly improved FM sound, especially on the weaker L-R difference signal. Hence, vastly improved stereo tape recordings with excellent separation.

Assuming that you have good, clean FM stereo signals at the antenna, the next thing you want to do is get them down to your FM tuner without deterioration. For many years now, flat 300-ohm ribbon twinlead has been used as downlead for both TV and FM signals. But twinlead isn't the final answer for FM stereo. TV and FM engineers have always known the coaxial cable was superior to twinlead. Twinlead is used widely for one reason: it's cheap. As long as TV was restricted to monochrome and FM was restricted to monaural, twinlead had its place. The growth of FM stereo and color TV make coaxial downlead the thing for really good FM stereo reception on a continuous basis. Let's take a close look at the two types of cables to show why this is so.

Both the inner conductor and the outer conductor (braided shield) of coax have the same center. Thus, the magnetic fields surrounding the inner and outer conductors also have the

same center—they occupy the same space at the same time. However, when current flows through the center conductor in one direction, it always flows through the outer shield in the opposite direction. Obviously, the magnetic fields generated by these current flows are also of opposite polarities. Therefore, they cancel each other out. The result is that no magnetic fields exist outside the coaxial cable.

Further, the electrostatic lines of force always appear between the two conductors. In coax, they are confined between the center conductor and the shield. Thus, coax is impervious to its surroundings. Nothing outside the cable can effect either its electrostatic or magnetic fields. This is the essence of coax's superiority.

With twinlead the story is entirely different. Both electrostatic and magnetic fields extend out into the space around the two conductors. Almost anything can affect these fields—a metal standoff insulator used to secure twinlead to the mast; a staple used to hold the twinlead at a baseboard indoors; a metal windowsill; proximity to pipes or other wires; even rain, ice or industrial smog. Everything that affects twinlead fields changes its impedance. Nominally, twinlead impedance is 300-ohms. It is for this reason that most antennas and TV and FM tuners are made with 300-ohm impedances. But twinlead impedance is 300-ohms only when it is suspended in dry air. Which is never.

Every standoff and staple causes a mismatch or lump in the line. When the signal hits one of these lumps, it bounces back into the line, causing reflected signals. Reflected signals don't have a great deal of effect on monochrome TV and none on FM. They do make the signals a little weaker, but generally the gain of the tuner handles this problem. And, you get a slight ghost problem on black and white TV. However, reflected signals cause intolerable effects on FM stereo and color TV, each of which requires an extra carrier, detected in phase. Because the reflected signals arrive at the tuner a split

second late, they are out of phase. This phase shift gives you technicolor ghosts on your color TV set. It has exactly the same effect as multipath distortion on FM stereo. Sound gets buzzy, separation decreases, and high end response falls off. Often, the poor FM tuner manufacturer bears the brunt of the blame, innocent though he may be.

A lot of people find it hard to believe that twinlead is inadequate for FM stereo. If you're skeptical, try the following experiment. Wrap a two inch piece of aluminum foil around the twinlead feeding your FM stereo tuner. Now, slide the foil up and down, watching the stereo indicator light. You'll notice that the light flickers and you'll hear a difference in the sound. What you are actually doing is changing the timing, hence the phase, of the reflected signals. Try the same thing with coaxial cable and you'll see absolutely no change. Coax can be taped to a mast, run in conduit, next to AC wires, through window frames, coiled in a ball behind the tuner, and its impedance never changes. Also, coax lasts about ten times as long as twinlead. Coax, of course, has a characteristic impedance of 75-ohms. How then do you match it to your 300-ohm tuner and antenna? With matching transformers. Some modern FM antennas, as well as preamplifiers, are being matched to 75-ohm cable, eliminating the need for matching transformers.

Now that you are an expert on what it takes to get a superior FM stereo signal for taping off the air, you can forget the technical mumbo-jumbo and keep in mind how simple it really is. All you need is a good FM antenna (your present outdoor TV antenna may even do with an FM splitter), possibly a rotor and an FM preamp and some coaxial cable for hooking it all together. A few minutes spent in setting up a good FM antenna system will reward you with a tape library that may some day be irreplaceable. As an investment, it will pay dividends that will probably exceed the cost of your recorder many times over.

tape

EQUIPMENT REVIEWS

Whether you're a sports car buff or a commuter, a weekend traveler or the family chauffeur, chances are you like to listen to music in your car. There's AM radio, of course—but in far too many communities, that means rock and roll, endless commercials, dull chatter and little to interest an adult. These days, there's also FM. But once you're outside a metropolitan area, or on a long trip, you find yourself searching the dial every few miles to find something to listen to.

One answer catching fire with music listeners is the tape cartridge player for cars—all-transistor units designed to work directly off the car battery. Many provide exciting full stereo as well as the music of your choice. There's nothing new about car cartridge players. The first one was introduced in 1956, and worked on an endless loop tape principle. Tape fed out from the hub past the player heads and rewound on the outside of the reel. Since the two ends of the tape were spliced together, the tape repeated itself every 15 or 30 minutes. One refinement was to give the tape a half twist before splicing it, thus effectively doubling the playback time. Another was to use a metal foil at the end of the tape to stop it automatically.

These cartridges, by Cousino and Fidelipac, still are in use today—with modifications—despite the introduction in 1959 of the RCA twin-hub cartridge and the 3M cartridge changer system several years later. At this stage of the game, the earlier cartridges look as if they may replace the later ones. The interest in tape for the car was stimulated recently by the rumor from Detroit that one or more of the major auto manufacturers may offer tape systems as

optional extras in next year's models. At the same time, RCA Victor announced that it would back the Lear Jet cartridge player system, as well as providing music for it. The Lear Jet system utilizes Nortronics Inc.'s eight-track stereo head, described in these pages last issue.

As recently as January, there were only a few types of car players on the market (one manufacturer was producing units under contract for several others). Today there are more than half a dozen, including some produced in Japan. Some of the more prominent models are discussed on the following pages.

One question which springs to mind in regard to the players is just what kind of music is available for them. Each of the developers has made arrangements for a library (usually consisting of standard pops and classics) ranging in size from less than a hundred to over a thousand. In addition, some cartridges and machines are interchangeable, widening their owners' choice. One of the better catalogues is Programmers, Inc., which includes some 240 titles from the Command, Mercury, Verve, MGM, Impulse and ABC Paramount libraries. Classical devotees can choose from among works by Moussorgsky, Schubert, Tchaikovsky, Beethoven, Rimsky-Korsakov, Gershwin and others on Mercury and Command; from pop tapes by Frankie Laine, Eydie Gorme, Xavier Cugat, Yves Montand, Fats Domino, Ferrante & Teicher, Andre Previn, David Rose, etc. There even are original cast show albums (Bye Bye Birdie, Gigi and Carnival) and comedy tapes (Mort Sahl and Shelley Berman). Prices are comparable with LPs—generally \$1 or \$2 below the conventional reel-to-reel price.

Although some of the earlier models are mono only, more recent systems are equipped for stereo. Some of these, such as the Auto Stereo and Lear Jet, are being adapted for 117 volt 60 cycle AC use, so that you can use the same cartridges in the living room and in the car. If Detroit has guessed correctly, the market tape cartridge players in autos next year may be as large as the entire tape recorder industry is today. Here-with, then, our test reports on six of the units available today.

Notes From The Lab

Tape players for mobile use are attaining considerable popularity. The following is general comment—rather than comment on specific makes, which comes later.

So far as we have been able to determine, none are made for six-volt operation, meaning that older cars cannot be equipped with tape players.

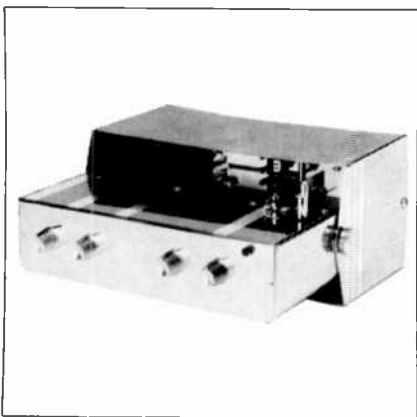
Location and installation of the speakers is of utmost importance and prior thought should be given to their placement to insure proper sound dispersion. Thought must also be given to the location, with respect to physical damage. Locating the speakers in the parcel shelf behind the rear seat is appealing, but be careful that the cones do not pop out when the trunk lid is slammed shut. Locating speakers in door panels requires care to see that they do not interfere with operation of the window mechanism and that the connecting leads are properly dressed to avoid breaking or pinching. Carefully observe the manufacturer's instructions regarding phasing of the speakers as this will critically affect overall performance.

Heed the old "ounce of care" proverb and be sure that all grounds are made to clear, bright metal, even if it means extra work scraping off paint. And give some thought to storage of spare tape cartridges. Give careful consideration to available knee room when mounting the unit under the center dash. Some units allow more clearance than others.

It seems that there are no standards for record/playback equalization of mobile tape players, but at the moment this is not a problem, for we exchanged cartridges among several machines with completely satisfactory results. The tone control ranges, on the models we tested, were more than adequate to cover any variations in record/playback equalization. Gain on all units is quite adequate. The balance control settings were different for different cartridges, indicating that levels on the tape channels were different or that track alignment was different.

A remarkable selection of music is available for use in mobile tape players. A world of entertainment pleasure awaits those who own a mobile tape player.

Autostereo MC-8



Manufacturers Specifications:
Power Output: 8 watts (per channel)
Output Impedance: 4 ohms (per channel)
Harmonic Distortion: less than 1% @ 1 Kc.
Frequency Response: ±1db. 20—18,000 C.P.S. @ 4 watts

Controls: Volume, Bass, Balance and Treble

Warranty: One Year

Before we comment on the Autostereo MC-8, we would like to comment on the thoroughness of Autostereo, Inc. Autostereo has nothing to hide and this is obvious from the complete material accompanying their unit. Descriptions were supplied for the Autostereo car units, marine units, home units, speakers, hardware, cartridges and other accessories. Autostereo has a very comprehensive library, apparently the largest available, with a tremendous selection of music. Their units are warranted for one year. Proof of their thoroughness is the reminder card packed with the unit advising the new owner to have his insurance broker include the new Autostereo unit in the vehicle insurance without delay.

The Autostereo MC-8 uses the same basic mechanical design as several other mobile tape players we tested. The channel selector lever and the start-play lever are located on the top of the mechanism. The finish and general appearance of the MC-8 are excellent. The mounting bracket is slotted in three locations, with limited range of adjustment in the slots. This will call for some advance planning on the part of the installer if leg room is a consideration.

The electronics of the Autostereo MC-8 are twice as powerful as most mobile player unit electronics and this undoubtedly accounts for the fact that Autostereo has better sound specifications. It also accounts for the fact that the MC-8 consumes just about twice as much power as the others tested. The MC-8 has the usual volume and balance controls, but has separate tone controls for bass and treble, giving better control of the sound in the car. The MC-8 sent to us for testing was supplied with four cartridges, a half-hour, an hour and two hours in length of music and an azimuth tape.

We installed the Autostereo MC-8 in our test car with ease. The me-

chanic commented that the installation of tape players was easier than installing car radios. We tried all cartridges under rough road conditions and the MC-8 came through with flying colors. It is a first-class mobile tape player.

Viking Auto-Tape 500



Manufacturers Specifications:
Tape Speed: 3.75 I.P.S.
Frequency Response: 60—10,000 C.P.S. ±3db.
Output: 2 watts per channel
Distortion: 2%
Flutter & Wow: 0.3% R.M.S.
Signal to Noise Ratio: 50 db.
Power Requirement: 1 ampere, 11 to 14.5 V.D.C.
Dimensions: 9⁵/₈"W x 9"D x 3¹/₂"H
Weight: 10¹/₂ lbs.

"Travel in style with stereo" is the motto of Viking when talking about their Auto-tape 500. Very apt too, for the Viking Auto-tape 500 is a simple, functional and promisingly reliable instrument. The Viking library offers a wide variety of cartridges priced at \$6.95. The choice ranges from Basie through Strauss.

As for the player itself, it is of straightforward design and well constructed to withstand the rigors of being bolted to the body of an automobile. The Auto-tape 500 performed well in all of the operational tests in the lab. The capstan is driven

by a governor controlled D.C. motor coupled to the large capstan flywheel by a special "O" ring belt. This driving arrangement (common to mobile tape players) minimizes wow and flutter over a very wide range of power input voltages.

The (10) transistor amplifier delivers more than adequate power to drive the speakers. The amplifier has volume, balance and tone controls. Power is applied to the amplifier when the "play-start" lever is actuated.

The Auto-tape 500 is factory wired for 12 V.D.C. negative ground, as this is the most common battery polarity found in automobiles. It can, however, be re-connected by a qualified electronic technician for positive ground operation. (The instruction book contains the necessary information).

Operation of the Auto-tape 500, like that of other mobile tape players, is quite easy. It involves, after installation, only the insertion of the tape cartridge, operation of the start lever and adjustment of volume, balance and tone controls. Choice of tracks one and three or two and four is made by a mechanical track selector lever.

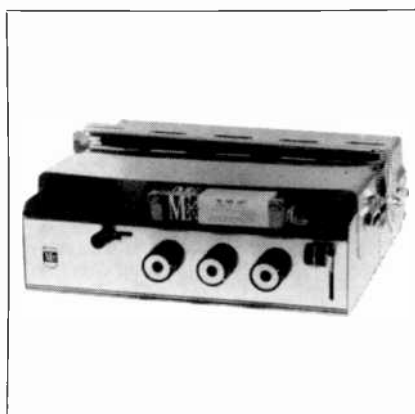
Normal maintenance consists of occasional lubrication and periodic cleaning of the head, capstan and pressure roller. The instructions recommend the use of pipe cleaners and alcohol or a good commercial head cleaning solvent. The pipe cleaners, because of their length and stiffness, are a good idea as the heads are deeply recessed in the player.

Viking supplies complete instructions for speaker installation, and we believe they should be carefully followed for this is the crux of a good installation. Viking supplies adaptor rings for use in speaker installation. The rings make for a neat and easy installation and Viking is to be complimented on their foresight.

Viking's Auto-tape 500 has an excellent appearance and is well finished. The front protrusion is large because the track selector and start-play levers are located on top of the unit, rather than on the front. The cartridge fit on the Viking is not too

snug, but this has no effect on the operation. Cartridges from other players worked well too. The Viking Auto-tape 500 met all expectations when installed and operated in our test car.

Metra Model MTP-G



Manufacturers Specifications:

Tape Speed: 3.75 I.P.S.

Frequency Response: 60—10,000 C.P.S. ± 3 db.

Output: 4 watts per channel

Distortion: 2%

Flutter & Wow: 0.3% R.M.S.

Signal to Noise Ratio: 50 db.

Power Requirements: 1 ampere, 11 to 14 volts

Dimensions: 9 $\frac{5}{8}$ "W x 9"D x 3 $\frac{1}{2}$ "H

Weight: 10 $\frac{1}{2}$ lbs.

Warranty: Six Months

...Here is a player for those who insist they won't leave unless they can take it with them. This is the first car stereo tape player we had the pleasure of testing and we must admit we were impressed.

The Metra MTP-C uses cartridge stereo tapes recorded at 3.75 I.P.S., equalized especially for this application, which give exceptional fidelity. The cartridges provided by Metra are suitable for use on other mobile tape players and the Metra MTP-C accepted cartridges from the other mobile players. Foreign language tapes are offered, in addition to a broad line of Broadway shows, movie music, Dixieland jazz, cocktail and dance music, ballads, symphonics

and Viennese waltzes. Cartridges are available in playing times of one-half, one and two hours. All this without the fuss of tuning, noise, fading or commercials.

The Metra MTP-C can be used in your car, boat, truck, in a bus for tour lectures, in fact anywhere that you can find a source of 12-volt direct current power. The cartridge deck is relatively uncomplicated, since only one motor is required to drive a cartridge and there are no reel motors, solenoids, etc. Maintenance should be easy, if it is ever required, and it seems little maintenance would be required except to keep the heads and pressure roller clean. The capstan motor is equipped with a governor which does a fine job of holding wow below audibility, and does it over a very wide range of voltage. (It is to be expected that battery voltage in an auto will vary over a wide range with changes in speed, the condition of the battery, whether the headlights are on, etc.) The Metra MTP-C, when operated from an adjustable lab power supply, maintained speed at input voltages between 11 and 14, which speaks well for the governor system.

The ten transistor amplifier was more than adequate to drive the speakers and the quality of the sound was easily equal to the finest car radio. In the lab we connected the Metra MTP-C to a good high fidelity speaker and found the sound to be pleasing and of high quality.

Operation of the Metra MTP-C is simplicity itself: simply slide a cartridge into the player, push the starting lever and adjust the volume. Human engineering of the Metra MTP-C is considered to be excellent. The front protrusion was small, making for small obstruction—and the front mounted operating lever and track selector were most convenient. Also the mounting bracket was most flexible, permitting the unit to be located for maximum convenience. All of the cartridges fit the unit well. Overall construction was extremely good.

When installed and road-tested in a Chevrolet, the Metra MTP-C left nothing to be desired.

Porta-Tape Model 74-2



Manufacturers Specifications:

Tape Speed: 3.75 I.P.S.

Wow and Flutter: 0.4% maximum

Distortion: 2% maximum

Power Requirements: 12 V.D.S. @ 300 MA

Output Frequency: 1200 Kc. to 1450 Kc.

Size: 9" W x 7" D x 3 1/4" H

Weight: 6 lbs. 4 oz.

The Porta-tape differs from most mobile tape players in that it has no built-in power amplifiers and does not have speakers supplied.

The Porta-tape 74-2 couples into the antenna input of the car radio. During installation of the Porta-tape the auto radio antenna is re-routed through the Porta-tape player to provide connection to the player when using the player and to the antenna when the player is not in use. Once this connection is made (and before the player is permanently mounted) a cartridge is placed in the player, it is turned on and the tuning capacitor of the Porta-tape R.F. oscillator is adjusted to the desired frequency.

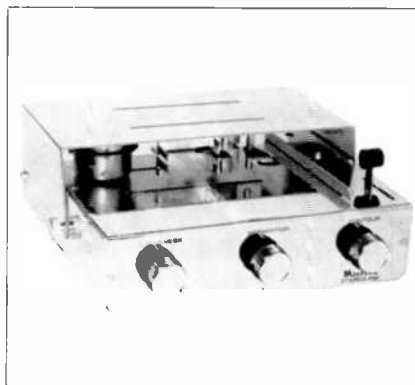
The manufacturer recommends choosing a favorite station, utilizing one of the easily located (end) push-buttons for it and for the Porta-tape 74-2. When the Porta-tape is operative the radio station will be inoperative and vice versa. The Porta-tape 74-2 utilizes the audio portion of the auto radio and hence is monaural. It is capable of utilizing stereo cartridges, however.

The mechanism design is basically

the same as the other mobile players, the same type of governor controlled drive motor, lever actuated pressure roller and cartridge guiding system. The outside case is made of vacuum formed dark gray Royalite plastic. There is a separate power switch on the Porta-tape 74-2 and the capstan motor runs all the time that the switch is ON, independently of the load-play lever. On the upper left of the front panel is a switch to select track one, track two or stereo. Alongside is the switch for selecting the upper or lower set of tracks. Thus the Porta-tape will play stereo tape cartridges (monaurally) or four-track monaural tapes. The monaural tapes naturally play twice as long as the stereo tapes. The quality of the audio reproduction is limited to the quality of the auto radio with which the tape player is used.

Our test car was not equipped with an auto radio, so all tests of the Porta-tape 74-2 were conducted in the lab using a standard broadcast receiver and a lab power supply. Performance of the Porta-tape 74-2 was very satisfactory in all respects.

Muntz Model C-1



Manufacturers Specifications:

Power Requirement: 12 V.D.C.

Speaker Impedance: 4 ohms

Dimensions: 9 1/2" W x 9" D x 3 1/2" H

The Muntz model C-1 is similar in size, appearance and performance to other makes of mobile tape players we have tested. It was designed by Muntz engineers and is manufactured to their specifications in Japan.

No cartridge was supplied with the unit, so our tests were conducted using the on-hand cartridges.

The basic mechanical design of the Muntz was the same as that of five out of six of the readily available mobile tape players, which points up the soundness of the design.

The electronics are equipped with volume, balance and tone controls, and the track selector lever is located on the top of the mechanism, as is the start-play lever.

When installed in our test car, the Muntz Model C-1 performed well. The volume was more than adequate and the fidelity above reproach.

Automatic Radio



Manufacturers Specifications:

Power Output: 10 watts

Output Impedance: 4 ohms

Power Requirements: 12 V.D.C. @ 2 amperes

Tape Speed: 3.75 I.P.S.

The Automatic Radio model STP-4499 is quite different from the other models tested. It is similar in that it is a dual channel, transistorized, semi-automatic tape player with a governor regulated D.C. capstan motor, but it is different because it uses the R.C.A. type cartridge rather than the continuous loop type used on most other mobile tape players. The R.C.A. cartridge is a "reel" type cartridge, having "A" and "B" sides and has to be turned over by hand when it is desired to play the other

(Continued on next page)

Norelco Continental Tape Recorders

Norelco Continental '401'

The recording studio in a suitcase

Fully self contained 4 track stereo record/playback. 4 speeds, 7 1/2, 3 3/4, 1 1/2, 1/4 ips — up to 32 hours on a 7 inch reel. Has dual preamps, power amplifiers, stereo matched speakers. (2nd speaker in lid). Ganged stereo controls eliminate need for dual knobs and microphones. Special facilities include monitoring, mixing, sound on sound, portable P.A. Frequency response 50 to 18,000 cps; wow and flutter less than 0.14% at 7 1/2 ips. Signal to noise ratio better than -48 db. Weighs 39 lbs. 18 1/4" x 15" x 10".



Norelco Continental '201'

New marvel of tape recording versatility

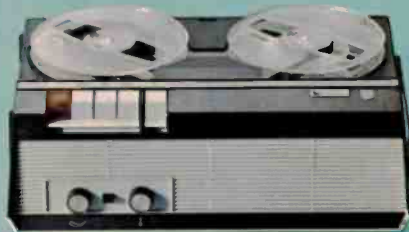
Multi-purpose 4 track tape recorder has every built-in feature for quality recording and playback; 2 speeds, 7 1/2 or 3 3/4 ips provide up to 8 hours playing time on a single 7 inch reel. Fully self contained. Has dual preamps for stereo playback with external hi-fi system. Special facilities include parallel operation, mixing, pause control, tone control, portable P.A. Frequency response 60 to 16,000 cps. Weighs 18 lbs. 15 3/4" x 13 3/4" x 6 3/4"



Norelco Continental '95'

Quality engineered, budget priced tape recorder

Compact 3 3/4 ips speed machine provides up to 3 hours playing time. New automatic record control electronically sets correct recording volume. Make a perfect tape everytime. Has simple pushbuttons to record, playback, wind, rewind, tape pause and stop; adjustable controls for on/off, volume and tone. Frequency response 80 to 12,000 cps. Weighs 12 lbs. 14 1/4" x 10" x 5".



All specifications subject to change without notification.

Norelco Tape Recorder Accessories

FOR MODEL	DESCRIPTION	FOR MODEL	DESCRIPTION
'101'	DL 86 Leather Carrying Case	'95', '101', '150'	TP 86 Telephone Pickup Coil
'101'	CC 86 Texon Carrying Case	'150'	TC 2 x 30 Tape Cartridge
'101'	BE 86 AC Adapter	'201'	EL 3775/21 Monitoring Headset
'101'	RS 86 Remote Mike Switch	'201', '401'	EL 3984/15 Foot Control
'150'	BE 50 AC Adapter	'201', '401'	TP 34/49 Telephone Pickup Coil
'101', '150'	FP 86 Foot Pedal	'401'	EL 3775/37 Stereo Headset
'101', '150'	HP 86 EL 3775/85 Listening Headset	'401'	2A1048 Mike Adapter
'101', '150'	CTM 86 Close Talking Mike		

NORTH AMERICAN PHILIPS COMPANY, INC.

High Fidelity Products Department

100 East 42nd Street, New York, N. Y. 10017

tape

CLINIC

In your test report on the Concertone 801 recorder, you said that wow & flutter characteristics at $3\frac{3}{4}$ ips were superior to those at $7\frac{1}{2}$ ips. How come? You also indicated that the flutter and wow specifications as you found them were not as good as Concertone advertises.

*Everett Hellmuth, Jr.
Corbin, Ky.*

In some tape recorders, recently, the masses of the drive mechanism have been designed to give optimum performance at a tape speed of $3\frac{3}{4}$ ips, with the feeling that a machine which performs well at this speed will also perform well at $7\frac{1}{2}$ ips. This is the case with the Concertone 801, whose flywheels provide a more constant tape speed at $3\frac{3}{4}$ ips (although the variation between $3\frac{3}{4}$ ips and $7\frac{1}{2}$ ips is negligible). This sort of engineering decision is more likely to be found in Reserve-O-Matic machines such as the 801, where the manufacturer is aiming at as long a period of uninterrupted listening as possible. Our test results showed very minor variations from the Concertone specs—slight enough to be explained by differences in measurement technique.

Where can I get a machine which will convert silent movies to sound by adding a magnetic stripe on the film itself?

*Frank Hitchens
Pittsburgh, Pa.*

Reeves Soundcraft introduced such a machine some five years ago, which it sold to film processors. The machine has since been discontinued, although Reeves continues to supply film processors who bought it with the necessary magnetic coating materials. A check with film processors in your area should turn up one who can coat your film for you.

I have a Crestwood Series 400 tape deck and companion amplifier. Recently, the belt broke and my dealer told me he couldn't get a replacement because Crestwood is out of business. Can you tell me the name of the successor of the company so that I can get replacement parts?

*John Ripley
Topeka, Kansas*

Crestwood, one of the earliest home recorder manufacturers, was purchased some years ago by Daystrom, Inc., which subsequently discontinued manufacture of the recorders. A Daystrom subsidiary, Heath Company, Benton Harbor, Mich., while in the high fidelity business, does not supply parts for Crestwood recorders. General Cement Co., (Audiotex) however, markets a wide variety of belts for tape recorders. Take your old belt to the Audiotex dealer in your area and see if he can match it with one he has in stock.

Please tell me how the Sony 905A portable compares with the Concord 330. What is the frequency response of each?

*Ralph Bucher
China Lake, Calif.*

Check Frank Peters' complete directory to battery-operated tape recorders on page 29.

Q. What are the advantages and disadvantages of using leader tape on recordings?

*Nick Seltos,
Phoenix, Arizona.*

A. Offhand, we can't think of any disadvantages. Among the advantages, identification and protection are the two most important. Because leader tapes are available in a variety of colors from such manufacturers as Ampex, Reeves Soundcraft and Ferrodynamics Corp., it's possible to color-code tapes according to program material. Scotch makes a leader you can write on, to make identification even more positive. All of these leaders are made of tough polyester, and are intended to take rough handling. If you use a self-threading reel on your machine, you're going to need leader tape on all your important recordings.

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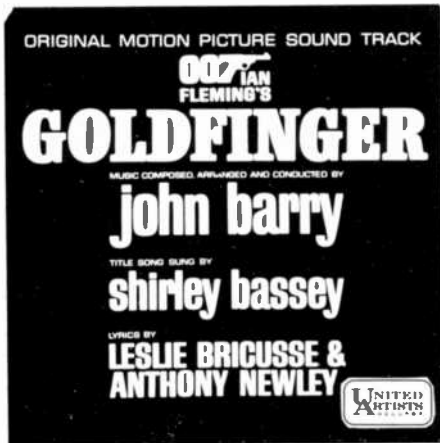
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GERMANS FIRST

Strange as it seems, West Germany—and not the United States—ranks first in per capita ownership of tape recorders. There are approximately the same number of machines in the country as there are in the United States—but Germany has only a quarter of our population. The U. S. doesn't even place second. The most recent figures show that Britain has about three million machines for some 52 million people, or about one recorder for every 17 citizens. The U. S. has approximately six million recorders for a population of just under 200 million.

LETTERS TO THE EDITOR

(Continued from page 54)

ment should include: setting the bias for peak output from the tape, at say 1000cps, then trimming the high frequency record equalization for flat overall record playback response (assuming the playback response has been checked and verified flat), and then finally setting the record current (or the meter voltage) so that a maximum indication on the meter corresponds to the manufacturer's maximum record level. When recordings have been made on the two types, with the machine aligned for each type, they may then be spliced together and compared audibly, or with test equipment. In my experience, for example, 3M #201 when used on a machine set for 3M #111, produces a B test (output from the tape) with too many highs (ca. 5db. @ 10KC) and with slightly lower overall output. With proper alignment, the reduction in tape hiss is dramatic, because with the proper cutback of the record high frequency equalization, hiss is not only reduced because of the improved oxide characteristics, but because noise from the record amplifier is attenuated when the equalization is adjusted.

It is regrettable that the test procedure used by Angus is the most that the average user can hope for. The adjustments required to obtain optimum response from a particular tape, i.e., record and playback equalization, playback and record level, and meter calibration, are also necessary to keep a recorder in proper condition over the years. Unfortunately, very few manufacturers seem willing to spend the extra pennies to make these parameters adjustable, so that in most cases, even if the audiophile could find a technician with the equipment, skill, and experience to make these adjustments for the tape type he had settled on, he will probably find that in his recorder these all important parameters have been fixed at the factory, making the task of the technician hopelessly involved.

I hope you will print this, as it seems that without an informed public, there is no hope for the kind of pressure that will make manufacturers include these simple, fundamental, and essential features.

Christopher Moore
Ramah Records

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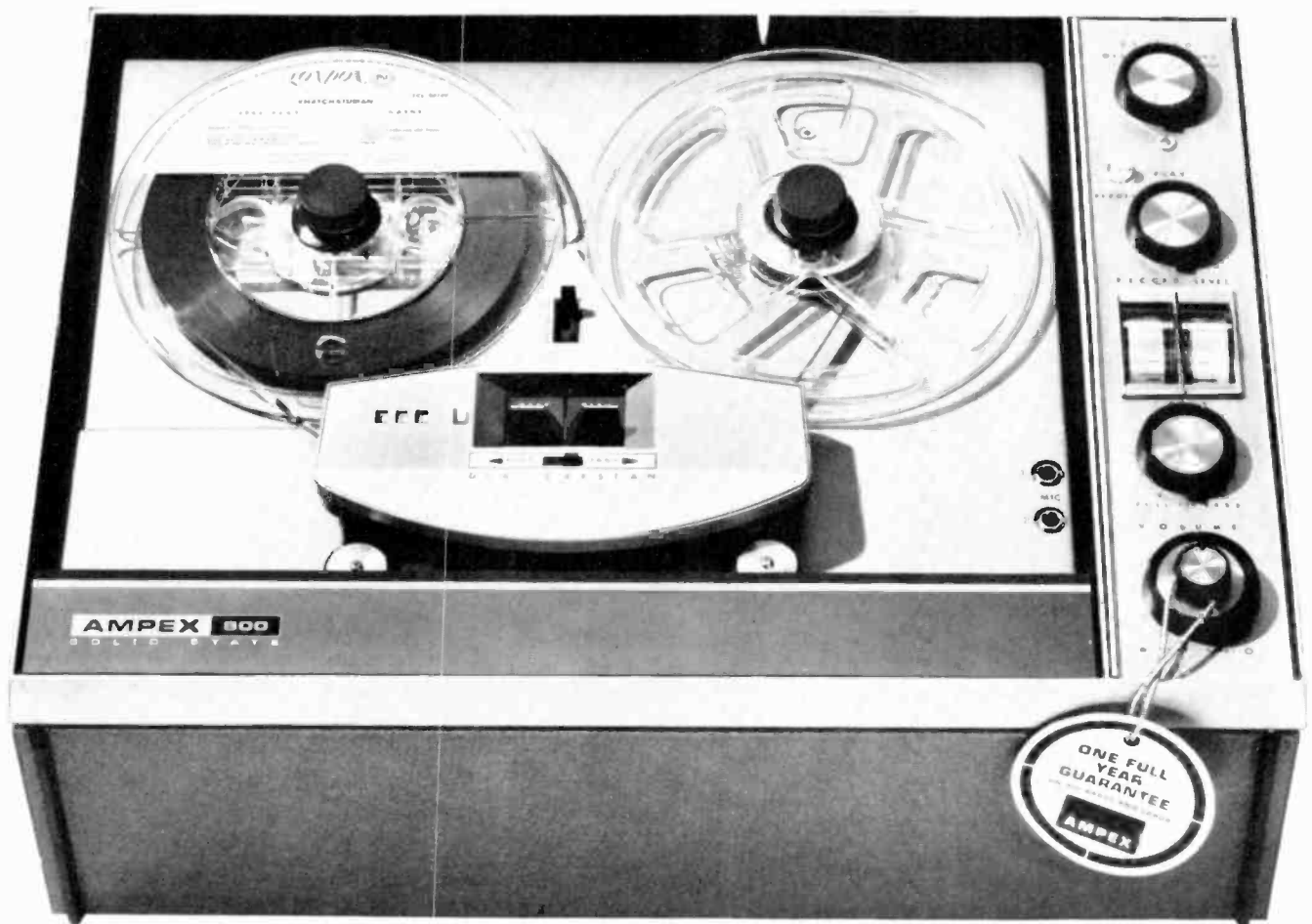
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