

tape recording

VOLUME 17, NO. 1

60¢

1210 R-871
MR ROY PERRIN
251 WOODLAND AVE
RUTHERFORD N J 07070

4/2/70

**TAPE: WHAT'S HAPPENING
CONTROL YOUR SLIDES**



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

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

For \$1,000, the SA-4000 better be something special. It is. How special? Try to tune it. You'll discover it's the first stereo receiver in history without a tuning knob. That's only for openers.

Nobody's ever combined the best pre-amp, the best power-amp, and best tuner into one unit before. This kind of ingenuity, creating a whole new generation of audio equipment, is commonplace at Panasonic.

It's happened 14,048 times, so far. That's how many patent rights and designs have come out of our 50 research and development labs. Where the racks of 2,500 engineers and scientists go up when somebody says, "It can't be done." Many of the audio components they've created never existed just 3 years ago.

But the real key to quality is this:

Every component, from the tiniest transistor to our 36-inch woofer, is manufactured in one or another of our 90 factories. Tested, inspected, and quality controlled by 40,000 master technicians. That's why we're so absolutely certain of their compatibility. Their excellence. And their reliability.

Nobody makes audio equipment like Panasonic.

And this goes not only for our \$1,000 receiver. But our 4 other stereo receivers as well. The same imagination. The same rigid quality control. The same loving attention to detail is present in all our stereo receivers. They'll give you sound that'll knock your ear on its ear.

Our 4-track stereo tape decks are packed with little miracles of audio engineering. Every circuit is married to every transistor. To every component. That's love.

Speakers? Take your choice from 5 new Panasonic multi-speaker systems. Each set of woofers and tweeters is acoustically matched for

the purest sound. With a range wide enough to wake up an Airedale.

You've never heard stereo component systems like these before. Because nobody ever made them before. The speaker systems. The tape decks. They're all compatible with our \$1,000 receiver. And with our less expensive receivers.

Stop by any dealer we franchise to handle the Panasonic Audio Equipment line. If he doesn't have the \$1,000 unit in stock yet, listen to our less expensive models. They sound like a million.



PANASONIC
just slightly ahead of our time.

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

COLUMBIA STEREO TAPE CLUB now offers you



**ANY
5
7" REEL-TO-REEL
STEREO TAPES
\$1.00
EACH**
FOR ONLY plus mailing and handling

if you join now, and agree to buy five additional tapes during the coming year, from the hundreds to be offered

 181909	 181875	 180281	 181222	 184035	 180968
 182246	 181156	 180661	 170357	 FREE —if you join now REVOLUTIONARY SELF-THREADING TAKE-UP REEL Just drop the end of the tape over this reel, start your recorder, and watch it thread itself! Unique Scotch® process automatically threads up tape of any thickness releases freely on rewind.	
 181230	 176776	 179671	 181677		
 179291	 180166	 180323	 172411	 181636	 171504
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				 176891	 183335
					 182378

JUST LOOK AT THE FABULOUS SELECTION of best-sellers the Columbia Stereo Tape Club is now offering new members! The greatest stars... the biggest hits... and all available in the incomparable stereo fidelity of 4-track reel-to-reel tape! To introduce you to the Club, you may select any 5 of the stereo tapes shown here, and we'll send them to you for only one dollar each! That's right... 5 STEREO TAPES for only \$5.00, and all you need to do is agree to purchase as few as five more tapes during the coming year.

AS A MEMBER you will receive, every four weeks, a copy of the Club's entertaining and informative music magazine. Each issue describes the regular selections for each musical interest... hits from every field of music, from scores of different labels.

If you do not want a tape in any month — just tell us so by returning the selection card by the date specified... or you may use the card to order any of the other tapes offered. If you want only the regular selection for your musical interest, you need do nothing — it will be shipped to you automatically. And from time to time, the Club will offer some special tapes which you may reject by returning

the special dated form provided... or accept by doing nothing.

YOUR OWN CHARGE ACCOUNT! Upon enrollment, we will open a charge account in your name. You pay for your tapes only after you've received them. They will be mailed and billed to you at the regular Club price of \$7.98 (occasional Original Cast recordings somewhat higher), plus a mailing and handling charge.

FANTASTIC BONUS PLAN! Once you've completed your enrollment agreement, for every tape you purchase you will be entitled to an additional stereo tape of your choice for only \$2.00... or you may choose one FREE tape for every two tapes you buy.

SEND NO MONEY NOW! Just fill in and mail the coupon today!

Note: All tapes offered by the Club must be played back on 4-track reel-to-reel stereo equipment.

APO, FPO addresses: write for special offer

**COLUMBIA STEREO
TAPE CLUB**
Terre Haute, Indiana 47808

SEND NO MONEY — JUST MAIL COUPON

COLUMBIA STEREO TAPE CLUB, Terre Haute, Indiana 47808

Please enroll me as a member of the Club. I've indicated below the 5 tapes I wish to receive for only \$1.00 each, plus postage and handling. Include the self-threading takeup reel FREE.

SEND ME THESE 5 TAPES (fill in numbers)

--	--	--	--	--

My main musical interest is (check one):

CLASSICAL POPULAR

I agree to purchase five selections during the coming year, under the terms outlined in this advertisement... and I may cancel membership at any time thereafter. If I continue, for every tape I purchase I will get an additional stereo tape of my choice for only \$2.00... or I may choose a FREE tape for every two tapes I buy.

Name (Please Print) First Name Initial Last Name

Address

City

State Zip

460-1/T1

The portable Concord F-400 a superb stereo tape deck

Combines cassette handling convenience with record and playback performance comparable to some of the finest reel-to-reel units. How? A newly engineered transport mechanism and an electronically-controlled capstan motor that all but eliminate the wow and flutter bugs. Plus narrow gap, flux-field heads for wide range frequency response. Has inputs for recording live, off-the-air, from records or from reel-to-reel tapes, or other program source. And outputs for playback thru external speakers, or thru your own home system power amplifier and speakers.



Operates on batteries as well as AC. So you can also enjoy it away from home. Make live recordings on field trips, get-togethers—indoors, outdoors—anywhere. (Has VU meters, or you can use the automatic record-level control.) Or you can entertain with pre-recorded cassettes, or your own. Has built-in stereo power amplifiers and matched stereo speakers.

The portable Concord F-400 a superb tape recorder

The Concord F-400 is like getting two instruments in one. Under \$160 complete with microphone, patch cords and cassette. Modern solid-state circuitry throughout. Concord Electronics Corporation, 1935 Armacost Ave., Los Angeles, Calif. 90025. Subsidiary of Ehrenreich Photo-Optical Industries, Inc.

tape

recording

JANUARY-FEBRUARY, 1970 VOLUME 17, NO. 1

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Volume II. Stirring adventure in 12 pages. This full-color Comparator Guide gives daring new insight into the world of modules. Garrard introduces four exciting units with fine cartridge, base and dust cover, ready-to-plug-in-and-play through your radio, TV set, cassette cartridge or reel-to-reel tape recorder. They range from the SLX-3 at \$99.50 to the X-11 "Demi" at \$39.50.

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If you're under 22, you can join the TWA 50/50 Club.

Which means that every time you fly with us in the U.S.A., you get 50% off.

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We make them happy.**

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FOR AGES 12 thru 21

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Month Day Year

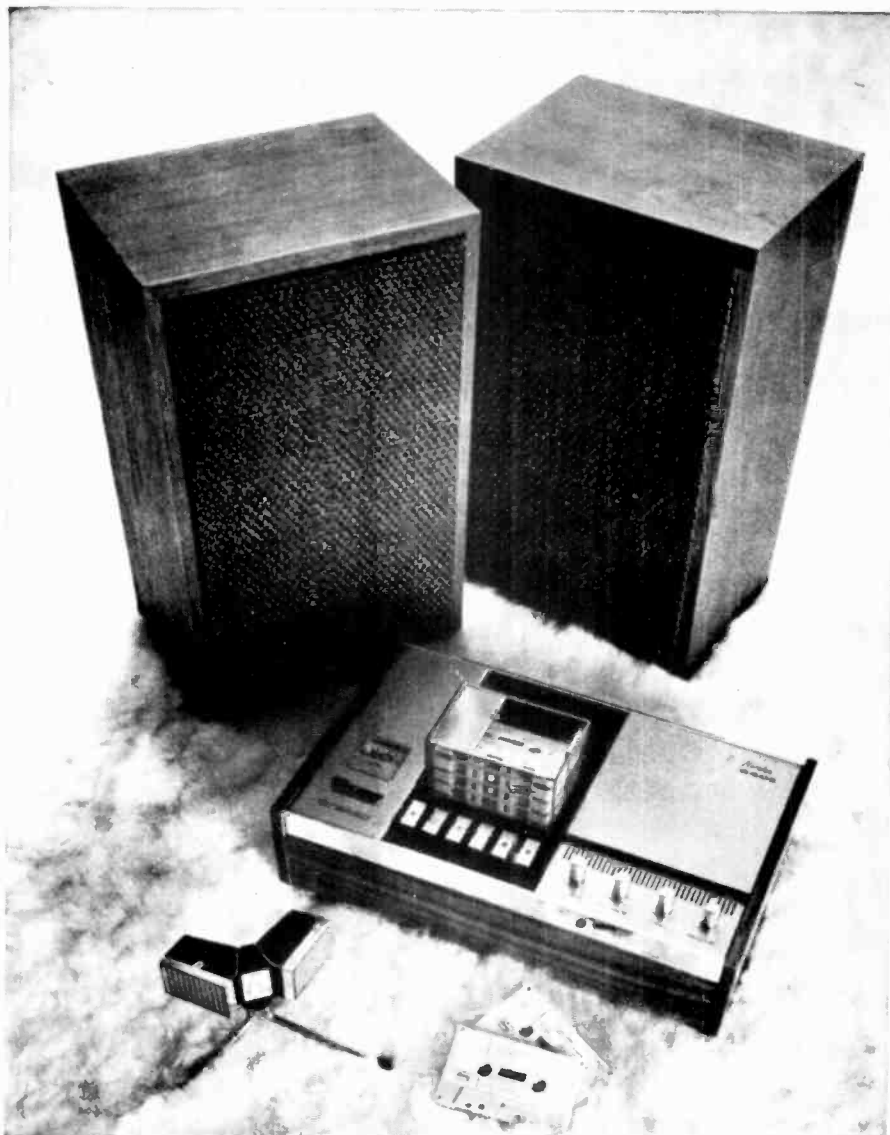
7. Fee enclosed: \$3.00 Check \$3.00 Money Order
Make checks payable to: TWA
(Not refundable — DO NOT MAIL CASH)

8. Signature _____

Mail to: Trans World Airlines
P.O. Box 2952
Clinton, Iowa 52732

1-067-9- 1 2 0 6 2

TRAVEL RESTRICTED ON CERTAIN HOLIDAY PERIODS



We took the tangle out of tape.

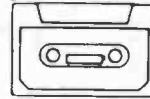
Norelco introduced the tape cassette, and cassettes make tape recording simple, because the tape is locked up safe inside.

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

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

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

Norelco[®]



The Re-Inventor
of Tape Recording

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Direct from Europe—announcing the amazing new

COMPUTAMATIC

world's first DIGITAL WRISTWATCH

- Flashes exact HOUR
- Flashes exact MINUTE
- Flashes exact DATE
- Exact SECOND shown by SweepScope Hand
- 3 OPTIVIEW "read-out" WINDOWS
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- Anti-Magnetic, shock-resistant
- Swiss-Jewelled Movement
- Electronically timed for accuracy
- Lifetime Mainspring
- Deluxe Goldtone Case
- Satin Brushed Dial
- Genuine Lizard Band
- Full year guarantee



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*The precision and prestige of a
"computer on your wrist"*

Not just a timepiece
but a conversation piece as well!

Not simply a watch—but a new *kind* of watch! No dials to read! No old-fashioned hands to follow! Instead—three newly perfected OPTIVIEW WINDOWS flash the exact time before your eyes INSTANTLY—in giant-size numerical digits! Just like a computer "read-out". And with computer accuracy! Destined to make conventional watches as obsolete as jets made propellers! Now obtain yours BEFORE general United States distribution. (Our first shipment is now fully cleared through U.S. Customs and awaiting immediate shipment to you!) COMPUTAMATIC makes a treasured personal accessory for yourself—or a truly UNUSUAL GIFT for that Special Someone on your list. Each one is brand-new, factory-sealed and FULLY GUARANTEED for a year. Luxuriously gift-boxed. Rare LIZARD (genuine!) BAND INCLUDED FREE. Your special Pre-Distribution Price is *not* \$60.00...*not* \$50.00...*not even the* \$40.00 you might think was absolute minimum for this revolutionary precision instrument. NO! Your special Pre-Distribution Price is only \$19.95—complete! (All overseas shipping costs, insurance, handling, postage and U.S. Customs duties have been taken care of. You pay not one penny more.) Right now strap COMPUTAMATIC to your wrist—and watch your friends' eyes light up with envy. Not only a timepiece but a conversation piece as well. Money back guarantee if not completely delighted. Mail coupon now. Limited supply!

MONEY BACK GUARANTEE

Special Pre-Distribution Price only **\$19.95** complete
(we pay all postage, handling, etc.)

HOUSE OF RITTER, INC.
P.O. Box 2995
Clinton, Iowa 52732
Please rush (how many: _____) COMPUTAMATICS on money-back guarantee. I enclose only \$19.95 each. YOU pay all postage, insurance, handling, etc.

Name _____

Address _____

City _____ State _____ Zip _____

1-331-1-1 1 2 0 6 2

THE 8-TRACK STEREO TAPE CARTRIDGE PLAYER OF YOUR CHOICE

FREE*

YOURS AS A GIFT JUST FOR JOINING NOW

Stereo Tape Club of America

*with one year membership and minimum tape purchase, six now and one a month for a year; speakers extra.



WHY WE GIVE YOU

THE FINEST 8-TRACK STEREO PLAYER FREE

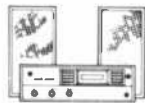
We are America's largest all-label, all-artist stereo tape cartridge club. We hope to win you over to the newest, most advanced, most convenient way to enjoy music in your home, car and office—with trouble-free, compact stereo tape cartridges that play continuously, switch tracks automatically, and last practically forever. They never scratch, warp or wear out. They never tangle or break.

If you like the system, you'll buy your stereo tape cartridges from us. You never pay more than regular price. You can pick free bonus tapes immediately, without waiting. You enjoy up to 50% savings on special offers.

To guarantee your continuing interest, the equipment must be fine enough to give brilliant high fidelity performance over many years of trouble-free service. That's why we give you our STEREOMATIC unit FREE. It's the best premium equipment. That's why we are willing to send it to you at no risk or obligation on your part. If you like it, KEEP IT. It's yours FREE just for buying stereo tape cartridges you would want to own anyway. If not, return it and your membership is cancelled. You pay nothing and owe nothing. To take advantage of this fabulous new membership offer—complete coupon and mail now.

PICK ONE FREE

NEWEST FINEST SOLID STATE AUTOMATIC 8-TRACK STEREO TAPE CARTRIDGE PLAYERS



\$114.95
reg. price

COMPLETE HOME SYSTEM

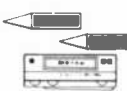
With built-in amplifier and 2 deluxe stereo speaker units in handsome walnut cabinets. THE PLAYER IS FREE. We will bill you only special member's price of \$24.95 for speakers. check HOME SYSTEM in coupon.



\$79.95
reg. price

HOME PLUG-IN SYSTEM

Pre-amplified model. Plugs into your present stereo record system. Beautiful walnut grain finish. THE PLAYER IS FREE. No speakers needed, plays through your own stereo system. check HOME PLUG-IN in coupon.



\$89.95
reg. price

DELUXE AUTO SYSTEM

Complete with easy installation kit and 2 deluxe flush mount speakers (no drilling holes). THE PLAYER IS FREE. We will bill you only special member's price of \$5.98 for speakers. check AUTO SYSTEM in coupon.



SELECT ANY 6 TO START MEMBERSHIP

Only Stereo Tape Club gives you full selection; all labels, all artists, all new releases.

POPULAR

- 1321—FRANK SINATRA'S GREATEST HITS (Reprise).....6.98
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- 4315—SAME TRAIN, DIFF. TIME, Merle Haggard (Capitol).....6.98
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- 7313—2001: A SPACE ODYSSEY, Orig. Sound Track (MGM).....6.98
- 7314—BERNSTEIN'S GREATEST HITS, Bernstein-N.Y. Phil. (Col.).....7.98

SEND NO MONEY • JUST MAIL

Stereo Tape Club of America
P.O. Box 2986 Clinton, Iowa 52732

Please enroll me as a member and send the FREE Stereomatic 8-track tape cartridge player checked below.

- HOME SYSTEM (speakers \$24.95)
- HOME PLUG-IN (no speakers)
- AUTO SYSTEM (speakers \$5.98)

Also send the 6 stereo tape cartridge albums I am buying now to start membership. (Select 6 from list, print numbers below.)

Bill me for these. I may pay in 3 monthly installments if I wish, including mailing and handling. If I am not 100% delighted, I may return player and cartridges in 10 days and my membership will be cancelled. I owe nothing.

Name _____ Age _____

Address _____

City _____ State _____ Zip _____

Auto make & year _____

Phone _____ Spouse Name _____

Bank _____ Branch _____

Credit Ref. _____ Loc. _____

Credit Ref. _____ Loc. _____

Charge albums above to my credit card.

BankAmericard Master Charge Interbank
Acct. # _____ Diners Club

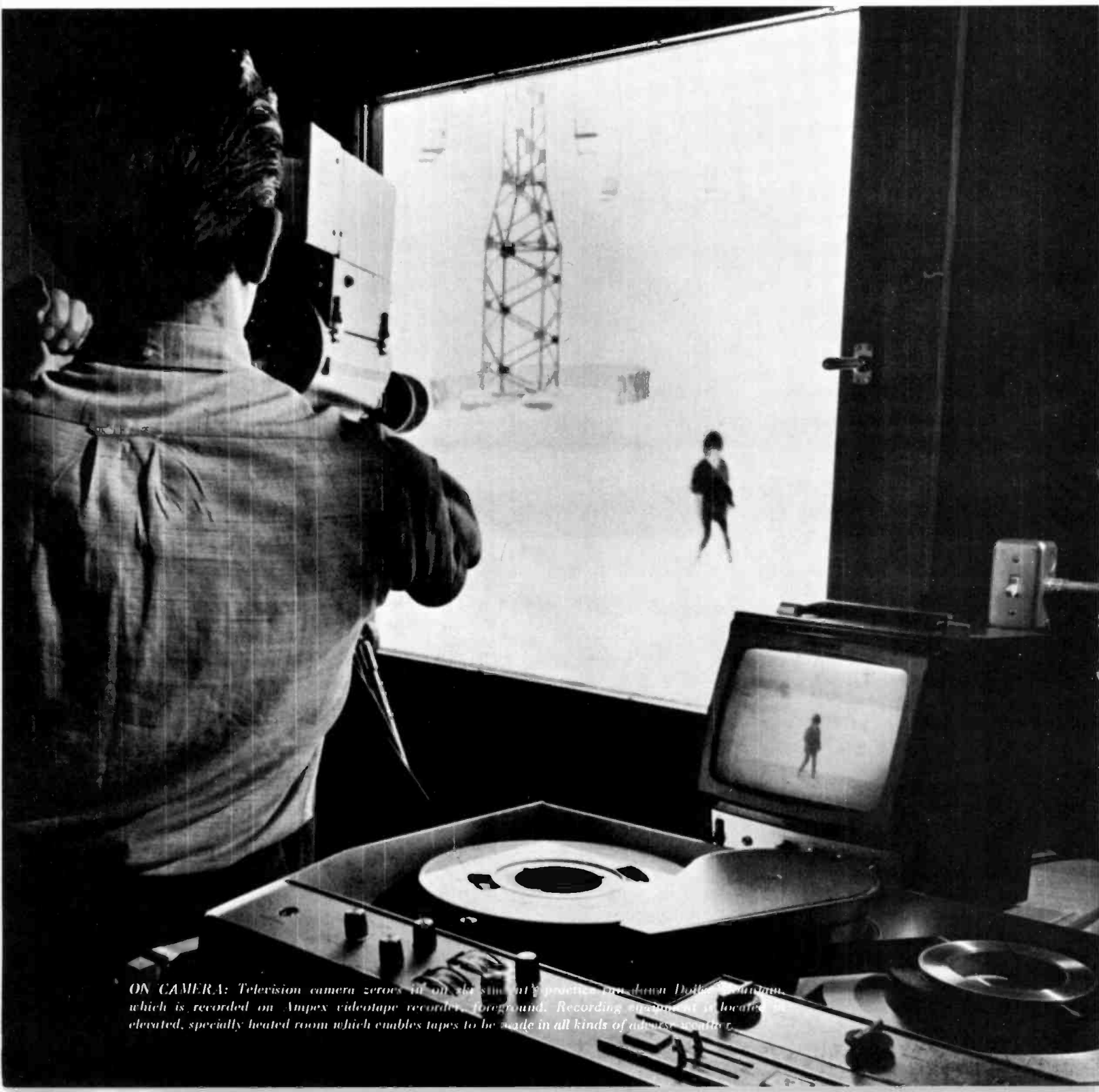
MY MAIN MUSICAL INTEREST IS (check one)

Popular Rock & Folk Show & Classical

In addition to the 6 cartridges I am buying now to start my membership, I agree to purchase a cartridge a month during the coming year. (Albums you'll want to buy anyway; thousands to choose from.)

SIGNATURE _____
(REQUIRED) 1-232-12-12062

VIDEO TAPE: WHAT'S HAPP



ON CAMERA: Television camera zeroes in on the stunt as it practices run down Dallas' skyline, which is recorded on Ampex videotape recorder. (foreground). Recording equipment is located in elevated, specially heated room which enables tapes to be made in all kinds of adverse weather.

Videotape recording, recently cited as one of the most significant technological developments of the last 30 years, is today the core of a bustling multi-million dollar closed circuit television industry. The versatile videotape recorder (VTR), which records moving pictures and sound on magnetic tape for immediate and repeated playback, is assuming new tasks and meeting new challenges every day as more people take advantage of its unique capabilities.

A videotape recorder records moving pictures and sound on reels of magnetic tape much as a conventional audio tape recorder records sound alone—and like an audio recorder, it permits instant replay of recorded material. Audio tape recorders record sound from a microphone, from a radio receiver, or by duplication from another recording. Similarly, videotape recorders record television pictures from a television camera, from a television receiver or by duplication from another recording. Sound tracks on the video tape permit audio recording from microphone or television set resulting in sound motion pictures.

In audio tape recording, where frequency responses up to 18,000 cycles per second produce high fidelity stereo music, the tape moves past the recorder's stationary heads. Tape speed of 7½-inches-per-second is the accepted standard speed for high quality performance. Much higher frequencies are required to record television pictures. To achieve this, the tape is moved past rotating heads, increasing the frequency response to permit the recording of picture information.

Two kinds of video tape recording are commonly used today—transverse and helical. In 1956, Ampex created the rotary recording head and a technique called transverse recording which is still the standard in the broadcast industry. Two-inch-wide video tape is moved past recording heads at 15 or 7½-inches-per-second. Four record/playback heads are mounted on a disc which is rotated rapidly across the tape at virtually a 90-degree angle to the path of the tape, increasing the relative tape-to-head speed to 1,500 inches-per-second and achieving frequencies of more than 5,000,000 cycles per second.

In 1963 a new generation of smaller recorders for closed circuit use was introduced, utilizing a helical recording technique. In this case, one or two record/playback heads are mounted on a moving drum and record across the moving tape in a diagonal curve known as a helix. In the popular one-inch-wide format, the tape travels across the moving head at 9.6 inches-per-second to produce a relative tape speed of 1,000 inches-per-second and frequencies of up to 5,000,000 cycles-per-second. Most closed circuit videotape recorders purchased today are obtained for the purpose of producing and playing original video tapes.

Minimum equipment needed to produce a video tape is a camera for converting visual images into electrical signals, a tripod for securing the camera, a microphone for picking up sound, a videotape recorder for recording the signals, a reel of magnetic tape for providing the recording surface, and a television set for viewing the picture. Cables for connecting the camera, recorder and TV set, as well as for power, are provided with the equipment. A simple professional closed circuit videotape recording system may be obtained for approximately \$2,800. More complex systems—incorporating electronic editing, color recording and playback, multi-recorder and multi-camera installations—are necessarily more expensive.

Ampex invented the first practical videotape recorder in 1956. It was large—more than 1,000 pounds—and expensive—approximately \$60,000—and was designed for network delays of television broadcasts.

It wasn't until 1966 that the first low cost, portable VTRs designed exclusively for closed circuit television use came along. These recorders—weighing less than 100 pounds and priced from about \$1,000 and up—opened the door to a vast number of potential users and vitalized the closed circuit television industry. Today, more than 45,000 closed circuit videotape recorders are in use today in the United States, with growing sales in Europe, Japan and other parts of the world. Approximately 55 percent of the recorders now in the field are being

PAINLESS CHILDBIRTH: A young couple watches the video tape replay of a mother and child soon after the child was born with the mother under caudal anesthesia. Dr. Robert H. Tamis, Phoenix, Arizona obstetrician and gynecologist, discusses the method of painless childbirth with the prospective parents. Dr. Tamis records on an Ampex videotape recorder patients in labor and delivery under caudal anesthesia. Prospective parents view the replay of the tapes on television receivers to better understand what is involved in the procedure.



used in formal education—by schools, colleges and universities. The most significant growth area, however, is in business and industry. This market accounts for about 25 percent of the machines and is expanding more rapidly than any other market. Other major users of closed circuit videotape equipment include government/military, with 8 percent of the total figure, medicine, also with 8 percent, and cable television, with 4 percent.

As videotape recording has become more widespread, and as its uses have become more diverse, manufacturers have broadened their product lines to fit a variety of budgets and specialized applications. The compact VTRs now range in price from less than \$1,000 to more than \$21,000 for a color unit with sophisticated editing capability. Frequently heralded as the ultimate home entertainment device, the videotape recorder presently is a consumer product for the wealthy few, though its future in the home is promising. Only a small percentage of today's recorders are used to record family activities and television programs for home viewing.

The dramatic part of the videotape recording story is in the variety of its applications. Videotape recording has captured for instant replay the faraway stars, peered beneath the seas and revealed the inner human body for the enlightenment of scientists. It has helped increase factory productivity and contributed to quality control. It has given new hope to remedial students and enriched the lives of the gifted. It daily assists those involved in law enforcement, selling, teaching, training and communicating. Here are just a few of the many interesting ways in which videotape recording is being used today:

The May Company, Los Angeles, California, uses videotape recording to demonstrate the latest women's wear, furniture, appliances and other products to their sales people at 16 southern California stores. The tapes enable company buyers to reach the entire sales force in a single presentation instead of repeating the information at each of the stores.

The Columbia Gas System Service Corp., Columbus, Ohio, is training 800 customer servicemen

AS THE CAMERA SEES IT: Robert C. Field, supervisor of distributor promotions, turns camera on advertising executive Charles S. Granieri while preparing a videotape recording for Motorola's franchised semiconductor distributors. Second camera (left) is focused on the inside of a giant mock-up of a single integrated circuit. The video tapes are being developed to help distributors extend their competence in semiconductor technology.



per year using videotape recording to keep their employees informed on new home appliance changes.

The Budd Company, Philadelphia, a major supplier of industrial automotive parts, has reduced the training time of its 16,000 labor and management personnel through videotaped programs. The courses, previously presented 25 times each, are taped once and replayed as often as is necessary, reducing speaker time and increasing uniformity.

Humble Oil and Refining Company executives in Houston have eliminated some business trips with transcontinental meetings via videotape recorders and the telephone. Executives in Houston tape their report and send it to New York where other company executives view the tape. The two groups discuss the report via a telephone conference call—resulting in significant savings in travel costs.

Republic Steel Corp., Cleveland, Ohio, has prepared 41 half-hour videotaped programs on economics, government and management development as an educational public service for use by chambers of

commerce, schools and professional societies.

The First National Bank of Fort Collins, Colorado, the only bank in the United States to have a subsidiary dealing in computer software, utilizes videotape recording to interest prospective customers in its software line.

The Carborundum Company, Niagara Falls, New York, a diversified material systems manufacturer, records executive level messages on videotape for employee viewing, observes customer reactions to new product lines shown on tape, and trains their salesmen for customer presentations via "instant replay."

The Giddings and Lewis Machine Tool Company, Fond du Lac, Wisconsin, uses closed circuit videotape recording as a key element in training salesmen and customers in the use of highly sophisticated machine equipment which requires detailed operational knowledge.

The Memphis Building Maintenance Company, Memphis, Tennessee, uses videotape recording to train novice janitorial employees to become quickly

DOUBLE DUTY: Two cameras record both instructor and students, using a split image technique which enables both to be video taped for later playback and analysis in Lane County, Oregon. The project is designed for teachers who feel they are not communicating with their students.

INSTANT REPLAY: (Opposite page) Watching the television receiver, Duane Buchtel, teacher-TV technician, operates the controls that select which picture is to be recorded on the Ampex Model VR-7000 videotape recorder, which enables teachers in Lane County, Oregon, to see themselves as their students see them in a project designed to help teachers communicate with their students.





skilled with a mop. New employees view "instant replays" of themselves in cleaning tasks, resulting in improved performances.

The Michigan Credit Union League, Southfield, Michigan, assists individual credit unions with their operational problems through a series of videotaped programs shown to credit union officials throughout the state.

Miehle-Goss-Dexter, Inc., Chicago, one of the world's largest manufacturers of printing presses, uses videotape recording to help train hundreds of manufacturing personnel in Chicago and servicemen at nearly a dozen company service centers throughout the United States and Canada. The programs cover everything from technical demonstrations to general information talks by Miehle officials.

Monsanto Company, Sauget, Illinois, a major producer of organic chemicals, has produced a series of videotapes on safety which are shown to the 1,500 employees of the company's William G. Krummrich plant.

Steel Service Center Institute, Cleveland, Ohio, a nationwide trade association for the steel service industry, keeps college professors informed of latest industry developments through videotapes taken of in-plant operations. The college professors then are equipped to instruct busy steel executives at seminars conducted by the institute.

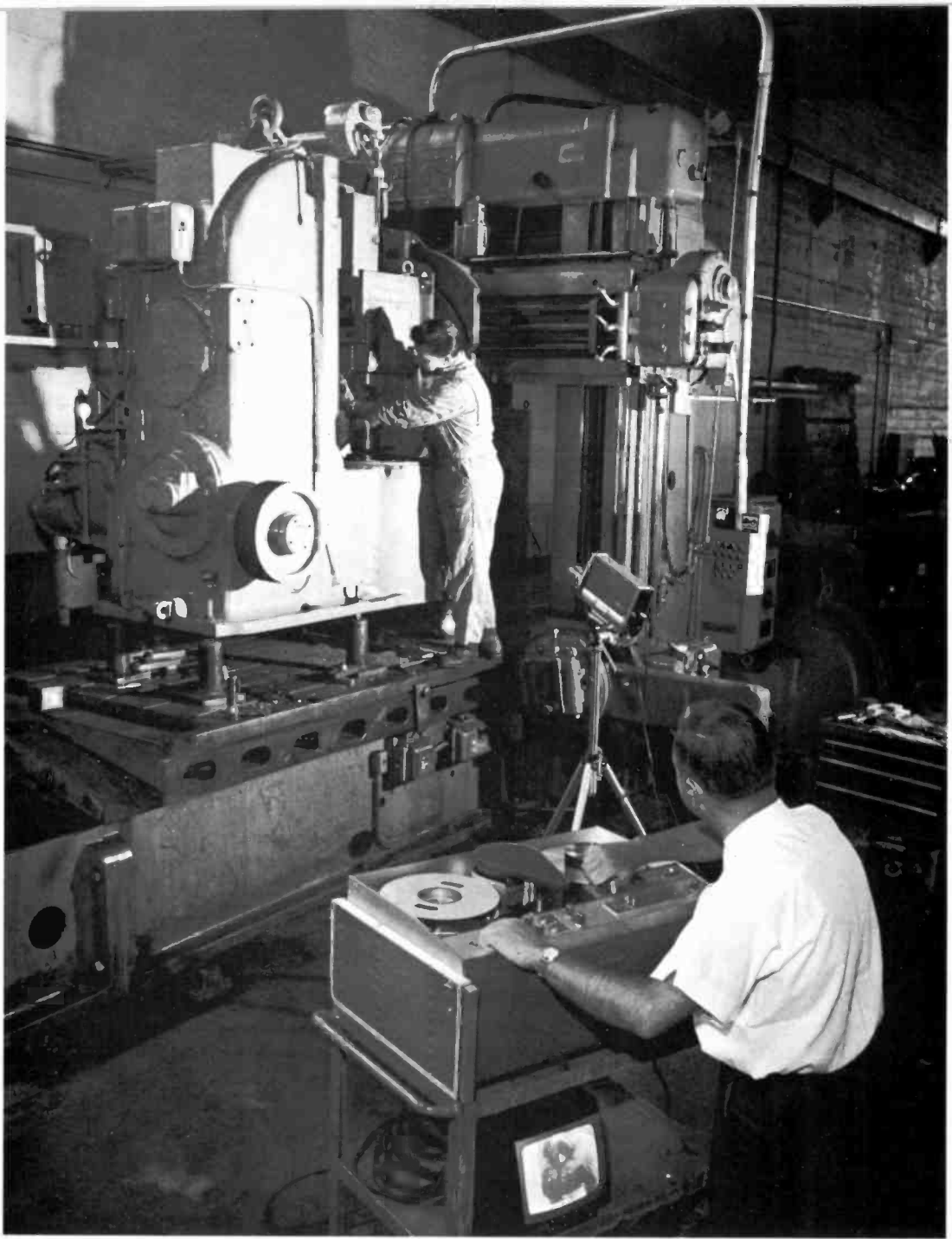
National Cash Register Company, Dayton, Ohio, has purchased about 300 Ampex videotape recorders and 275 Ampex cameras for use in a program to train customers and employees at various NCR facilities.

Prudential Insurance Company of America, Newark, New Jersey, the nation's top ranked life insurance company in assets and number two in insurance enforced, produces training and information tapes for showing to its insurance specialists.

Shearson Hammill, a leading international investment house in New York, is using videotape recording to keep employees and customers up-to-date on the latest finance and market trends. In addition to training and instruction tapes for employees, the firm also makes videotapes on mutual funds, municipal bonds and other timely financial topics.

Albany Bowl, Albany, California, uses videotape recording's instant replay capability to help beginners to learn how to bowl and veterans to sharpen their skills.

District Attorney Doyle L. Schiffman, Douglas County, Oregon, videotape records drunken driving suspects, confessions and discussions with clients in an attempt to make his work more effective while safeguarding the rights of suspects and the accused.



(Above and opposite) A machine-conversion operation is videotape recorded at Harron, Richard & McCone Co.'s San Francisco facilities for replay to newly hired machinists. Machine is a Sellers planer which has been developed into a planer-mill by use of a Futurmill head and drive system. The nine-inch monitor (bottom of picture) permits viewing of the image throughout the recording process.



POLITICAL "INSTANT REPLAY": (Left) Governor Edmund G. "Pat" Brown of California studies videotape "replay" of his opponent, Republican candidate Ronald Reagan. Both Governor Brown and Reagan are employing Ampex portable videotape recording systems as campaign aids.



The U. S. Forest Service Oregon, is attempting to prevent the spread of disease in trees by taking the temperatures of trees. Forest Service personnel hover 150 feet above a suspected "sick" area in a helicopter equipped with two television cameras and a videotape recorder to record the data gathered by a heat sensing device. Pictures recorded on tape help them to locate diseased trees.

The Federal Aviation Administration Academy, Oklahoma City, Oklahoma, is training air-traffic controllers with a streamlined curriculum that stimulates working situations using video tape. Television tapes

give trainees the closest experience possible to on-the-job training.

The Utah State University Extension Service is using videotape recording and color slide shows to train employees in tourist industries to be expert hosts. As a result of this program, it is hoped the state of Utah will attract more tourists.

Miami, Florida, Police Department obtained a murder conviction through the use of a videotaped confession, which was admitted as evidence by the Florida Supreme Court. The department uses videotape recording primarily as an identification tool, and has tapes of more than 15,000 suspects on file in its library.

The world's largest closed circuit television network is used by the Continental Army Command to train one-half million troops annually. Military videotapes are produced on-location using television mobile vans, then duplicated and distributed to bases throughout the United States for playback to soldiers.

The Instruction Service Center of the Bureau of Indian Affairs in Brigham City, Utah, is using videotape recording to help mathematics instructors teach the principles of mathematics to Indian students throughout the United States. The tapes are distributed weekly to bureau instructors who use the tapes in conjunction with general mathematics and algebra courses.

Columbus Policy Academy, Columbus, Ohio, utilizes videotape recording in a self evaluation program for community service officers and in-service officers to help improve their public speaking. The equipment is also used to record guest speakers on law enforcement techniques.

The California Department of Public Works is using videotape recording to help prepare their administrative employees for making public appearances and to give impromptu speeches. Also, approximately 150 state employees participate in an annual program using videotape recording to aid in improving employee relations between personnel and California Public Works employees on the labor level.

Instructors at Woodrow Wilson Junior High School, San Jose, California, have found that the English and mathematics skills of underachieving students can be dramatically increased through the use of videotape recording. Students are recorded on video tape as they recite and show marked improvement after watching "instant replay" of their recitations.



PRETTY PICTURE: (Above) Opera student Maurine Walton is recorded on Ampex videotape recorder while performing at Oglebay Institute Opera Workshop, Wheeling, W. Va. Boris Goldovsky, well known operatic stage director and producer, focuses camera. Videotape recording enables Goldovsky and his students to criticize a performance moments after a rehearsal to improve the acting and singing techniques of the opera students.

OPERA WORKSHOP: (Below) Boris Goldovsky, center, calls instruction to performers during rehearsal of Mozart's Don Giovanni. Performance is recorded on Ampex videotape recorder, foreground, for immediate critique by Goldovsky and the singers. Cameraman is Al Petrucelli, and videotape recorder operator is David Codd. Singers who are training under Goldovsky at the Oglebay Institute Opera Workshop, Wheeling, W. Va., are Ana Maria Carmona, David Barron and Maurine Walton, right.





Donald Gay, science teacher, points out parts of the human anatomy to students in the classroom and those confined to their beds. Television camera (upper center) scans classroom work and relays TV pictures to bed students.

The Northwest Regional Educational Laboratories, Seattle, Washington, distributes videotaped instructional courses to rural schools in remote areas of the Northwest so that these students might have access to talented instructors and modern techniques which they would otherwise not have.

The New York State Educational Television Network, operated by the State University of New York, is the forerunner of a national network of educational television stations, linking college and university campuses by television. Within a year, a potential audience of 15 million people will be served by the New York network.

The Medical Television Network, University of California School of Medicine at Los Angeles, records lectures by authorities on the latest medical advances. It distributes these videotapes to subscribing hospitals in over 35 states so that medical professionals can keep abreast of latest medical advances.

Colorado State University's Manpower Studies program provides individuals from poverty areas with insight into their behavior and attitudes during employment. An employee with an adjustment problem is recorded during a discussion with a counselor and can more objectively view himself when the tape is replayed, thereby developing positive job working habits and increasing job performance.

Educators in *Cayuga and Cortland Counties* in New York State are experimenting with bus-mounted television learning systems, using videotaped instructional material. The tapes are shown to students during long bus trips between schools and special educational centers.

A progressive school district in the small Northern California community of *Marysville* has installed what is believed to be the first school television system combining videotape recorders, specialized dial access equipment and 2500 MHz broadcast transmission. The system, which permits individual student retrieval of instruction materials recorded on Ampex VR-7800 recorders, is now serving two schools, with two more schools in the

district soon to be added.

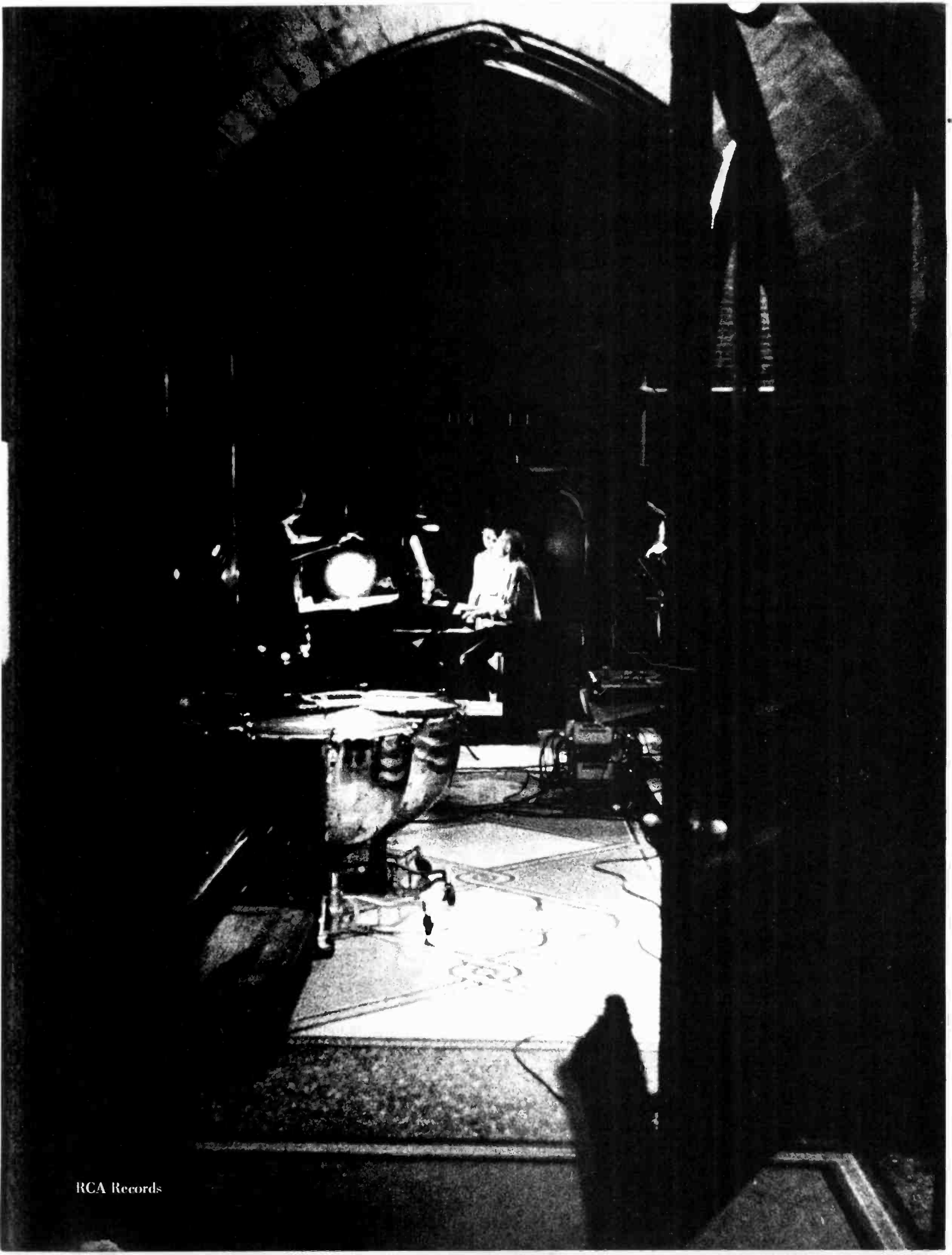
Chicago public schools use 10 videotape recorders in a successful cluster system to aid in teaching 30,000 disadvantaged grade school children. Five studio schools feed videotaped course material to 40 schools on schedule during the school day. All tapes are produced locally, and are tailored to classroom needs. Courses are designed to integrate classroom teacher into taped presentation.

Southern College of Optometry, Memphis, Tennessee, has found videotape recording to be a valuable aid in three areas of study. Clinical studies, patient progress reports, and information tapes are all used for immediate study or saved for future reference.

Medical University of South Carolina Department of Pediatrics provides videotaped presentations of patient case histories and treatment to four other hospitals in state network on treatment of cancer in children. Material includes X-rays, microscope slides and other pictorial information. Using special telephone network, doctors discuss patients and procedures while viewing video tape. Original conference in Charleston, S. C., was videotaped for addition to growing library on pediatric cancer treatment and research.

Sacred Heart Hospital, Pensacola, Florida, has put videotape recording to work for both the hospital staff and the patients. The hospital's continuing education program for the staff is videotaped as the lectures are given and played back at a later time for staff members who could not attend. Patient education and entertainment is played both live and on video tape for viewing on TV sets throughout the hospital.

Hopkins County Hospital, Madisonville, Ky., is using videotape recording to instruct postoperative orthopedic patients and to teach and train attending and full time physicians, nurses and allied health workers in all departments of the hospital. The hospital maintains a library of tapes on lectures, medical subjects and the like for staff viewing at convenient times.



There is only one way to find *The Lost Chord* and that is to record it before it becomes lost.

With the electronic organ fast becoming the number one home musical instrument, the interest in recording individual efforts has grown also.

Two factors make recording worthwhile: one is more rapid progress in the art of organ playing and the other satisfies the desire to be able to hear your performance over and over again, as many times as you like.

Then too, it seems a little sad to realize that the golden notes you have produced, the expression and the feeling you have put into your playing, and the pride you feel in a fine performance are doomed to die and become a memory the moment you lift your fingers from the keys. With a recorder this need not be so.

Recording with the Microphone

The obvious way to record the organ is with the microphone, just as you record your voice but this is not necessarily the best way.

For one thing, you will also pick up any extraneous noise that occurs while you are recording. Should the phone ring, the baby cry or a jet fly over, the mike will pick this up too and spoil the purity of the recording.

Also, there is the possibility of picking up the mechanical sounds of your feet on the pedals or, if you are a foot tapper that will record also.

If a microphone pickup is desired the mike should be placed far enough away from the organ so that any mechanical sounds will not be picked up. It is best to put the mike on a stand or, lacking a stand, to place it on a soft cushion or a piece of foam rubber so that vibrations transmitted through the floor will not reach it.

The exact position of the microphone in relation to the organ speaker will have to be found by experiment as the acoustic qualities of the room will have an effect on the sound of the organ.

We would suggest that you try a few mike positions and from the playback, determine which best suits your taste.

When recording with the mike, or electrically, as we shall describe below, the recorder may be placed anywhere but if you are acting as your own recording



RECORDING THE ORGAN

by **Mark Mooney, Jr.**



This capability has widespread uses. For instance suppose you are to play a duet with another organist. If you both owned this kind of machine, you could each record your separate parts and practice without the other person being there—and know how you will sound.

The recorder and the organ are truly a “ham and eggs” team and the slight expense in hooking your recorder up so it can both record from and play back through the organ will be quickly repaid in added pleasure and faster learning.

Better than a straight volume control is a control called an attenuator. This will cost four or five dollars. These are constant impedance controls and are called also L pads or T pads. The 8 ohm unit is the one to get. The hookup for this is shown in the direction sheet accompanying the control. When buying at your parts jobbers store explain to the clerk just what you want and how you intend to use it. Most clerks in these stores are well versed in matters of this sort and will see that you get the proper control. If you are hesitant about making the connections yourself



your local Hammond service man can do it for you quickly.

On the Chord, Extravoice and Spinet organs the power must be taken from speaker voice coils.

On the console organ, which has a separate speaker cabinet the point to take off for recording can be the terminal board of the preamplifier. On this you will find two terminals marked "G." You may clip an alligator clip to each of these, or, if the amount of current is too great, hook one slip to a G terminal and the other to the chassis, or ground, of

the organ. This will cut the current in half. If, after trying these connections your recorder still overloads then insert an attenuator and adjust it until good, clear recordings are obtained.

Because the signal is being taken from the pre-amplifier, the reverberation will not be present. This may be added if the recorder is played back through the organ by attaching the leads to the same terminals, but more of this later.

Some of the later models of tone cabinets used with the large organs have two and three channel systems. Hence making a connection to the voice coil terminals of any one channel will not give the full range for the recording.

If you are recording the large console for your own practice or amusement make the pickup from the G terminals or use a mike. If you are recording professionally drop a note to the Hammond Service Department for the hookup necessary for recording from the multiple channels.

Playback

Playback, of course, can be had by simply re-winding the tape and playing it through the recorder. But better than this is to play it back through the organ itself and thus take advantage of the fine amplifier and speaker system.

Here, oddly enough, the shoe is on the other foot for the tape recorder will put out more current than the radio/phono input of the organ can handle. Hence it will be necessary to install a volume control in the connection between the recorder and the organ input as was done between the organ speaker and the tape recorder.

The connection to the recorder should be made to the amplifier output, which most recorders have, to the radio/phono input of the organ. You might try making the connection from the external speaker output of the recorder to the organ. In this case, the volume control on the tape recorder will be effective. After putting a tape on the machine, put it in play and turn the volume up cautiously. If you get too much sound and distortion of the music then this method will not work with your recorder and you will have to use the preamplifier output with a volume control as described above. Since both the tape recorder output and the organ input are high impedance you will need a high impedance volume control ($\frac{1}{2}$ or 1 megohm) or high impedance attenuator.

engineer then place the recorder on a small table or bench alongside the organ bench where you can reach the controls easily and quickly.

Recording Volume

The organ is capable of producing tones that vary from a thin, reedy whisper to floor shaking bass. This wide dynamic range can be handled by the average tape recorder, however, once the volume is set it should be let alone.

The best method is to have the organist sound and hold for a moment the loudest combination of stops and organ volume that will occur during the actual playing. Put the recorder in record position and adjust the recording volume so that the indicator on your machine indicates a peak but not a distortion. Some recorders have the "magic eye" type of indicator. This should just close. Some have two neon bulbs, one to indicate distortion. The regular record light should glow but the distort light should stay out. On a recorder having a VU meter, the needle should not pass the 100% modulation point or go into the red area of the scale.

The importance of letting the volume control alone once it is set can be easily understood. One of the organ controls, the swell pedal, or the knee volume control, allows the organist to put expression in the music. Should the recordist increase the record volume when the organist drops the organ volume the two will cancel each other and on the tape there will be no noticeable change. Conversely, if the volume has been increased on the recorder and the organist suddenly shifts to a high volume level on the organ, the signal on the tape will be distorted and spoil the recording.

So, basically, set the recorder for the loudest peaks and let it alone. If the soft tones fail to register properly you can either have the organist increase the volume on these by not dropping so low or you may "ride the gain" and increase the recording volume. However, if you do so, do it cautiously.

If you are both the organist and engineer, set the recording volume and forget it.

Recording Electronically

Recording electronically is the best method. By taking the current directly from the organ and not using a microphone any extraneous noises are eliminated.

On all larger models of the Hammond organ, the takeoff for recording can be the voice coil speaker terminals of the tone cabinet. This point permits recording of the reverberation with which these organs are equipped.

The only difficulty is that the organs may, depending upon the number of keys depressed and the number of stops used, put out as much as 10 volts to the speaker. This may be more than your recorder can handle.

The connection is made by using the accessory cord of the recorder, clipping the alligator clips to the voice coil terminals and plugging the other end into the radio/phono input of the recorder.

If you do get overload and distortion then you must insert a volume control between the organ and the recorder. Purchase a 100,000 ohm volume control (or potentiometer) from your local radio supply house. You will find it has three connections on it. Fasten a short length of wire (solder if possible) to the two outside connectors. Then attach the other ends of these wires to the two voice coil terminals of your organ speaker. Next take the accessory cord that came with your recorder and clip one of the alligator clips to the center connector of the volume control and the other to the right hand connector (looking at the volume control from the back). That's all there is to it. Adjust to suit.

By playing back through the organ you will be able to hear your music exactly as you played it, since you will be using the same amplifiers and speaker system.

Adding A Track

Since it is possible for you to make a recording and play it back through the organ speaker from the recorder, at the same time you can also play another part along with it and, in effect, play a duet with yourself.

But even better than this is to use a recorder which has the ability to record one track while playing another, such as the V-M 720, shown in the picture heading this article.

On this machine, which is a four track recorder, you can make a recording on track 3 then, after rewinding the tape, put the machine in the Add-A-Track position and make another recording on track 1. When the tape is played back with the recorder in Add-A-Track, both recordings will come through together. If you again add another part you will be a trio!



by Tommy Thomas

REMOTE MIKE CONTROL AT 100 FEET

For those of you interested in utilizing an overly long cable with your microphone, here's a somewhat unique method that may well be of interest. It costs a bit of money, but the results are superb, with the added "extra" that you can control your recorder from the microphone position...turning the machine instantly on or off by remote control. And strangely enough, the wires that control the recorder are right inside the shielded mike cable itself.

Now before possibly scaring you off with a listing of high priced components, let me point out that this is an "add-on" system. You can purchase the separate items one at a time as you can afford them, and use each one as you get it. Their versatility expands as you combine more and more of them together.

The accompanying photos and their captions and diagrams explain the basic procedure. Note that there are two completely separate circuits involved: the low impedance microphone hooked up to one hundred feet of cable and the relay switching arrangement that turns the recorder motor on or off from the mike position. Except for the 100-foot shielded cable that these two circuits "share," they have nothing at all in common.

LOW IMPEDANCE MICROPHONE:

Most home recorders come with an inexpensive crystal or ceramic mike that is quite adequate for the beginner in recording. But for more advanced work, where a smooth wide response is required for a more

faithful reproduction of both voice and music, a *dynamic* microphone is usually recommended as the best type for general applications. I'm sure you've read articles describing the various features of dynamic mikes so I won't go into that now. The important feature here is *that they come in low impedance*, which is absolutely essential if you're interested in an extra-long cable. You can use a hundred, two hundred or even a thousand feet of cable with a good low impedance microphone without *any* loss in quality in your recordings.

Any decent dynamic mike will do the job, but don't expect to buy a cheapie import job and get adequate results. My own mike, which I've been using for over a year now with all-around excellent results in many different applications, is the *Knight KN-4550 Cardioid Dynamic Microphone*. It has a super-cardioid anti-feedback pickup pattern (it picks up sound mostly from the front) that greatly reduces the recording of unwanted noises on the other side of the mike. Also, the sharply defined pickup pattern permits the user to stand as much as twice the usual distance from the mike without audible loss of response. It has many other fine features for the not unreasonable price of \$34.50.

Best of all, this mike *can be wired EITHER for high or low impedance*. It comes with eighteen feet of cable and is wired for high impedance. This means that you can plug it into your recorder and put most of its quality features to work for you immediately. Then later, you can rewire it very simply for low impedance use with long cables.

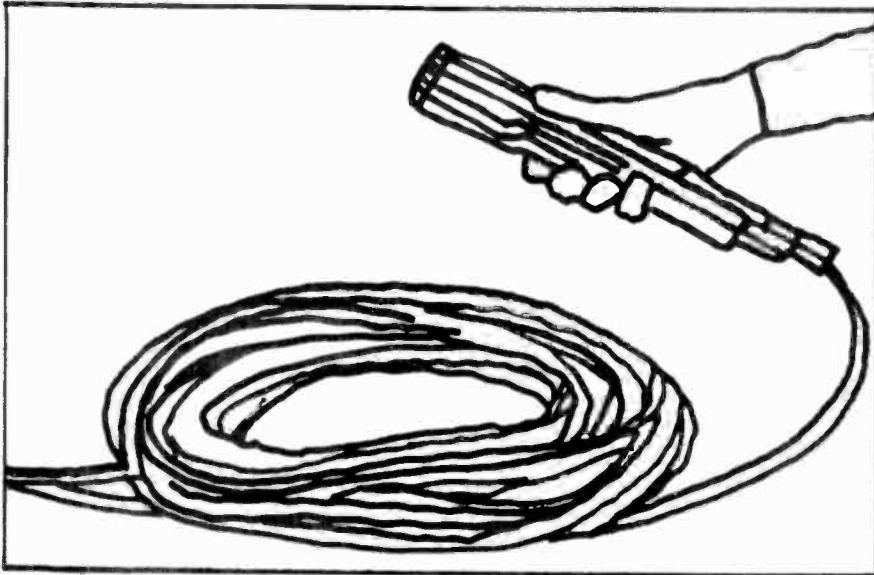


Fig. 2. Best of all, on low impedance and despite the hundred or more feet of cable, your recordings will sound astonishingly more real and natural than those made with your regular "short-corded" crystal/ceramic mike. A quality microphone yields a smooth, wide response that records with a wonderful clarity and trueness of tone.

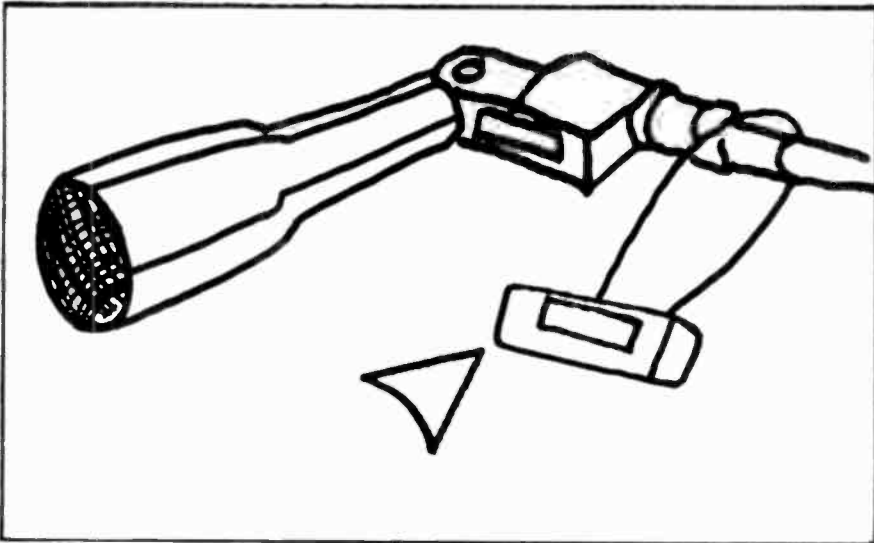


Fig. 3-a. Here's the remote control push-switch that activates the recorder. It is taped to the mike (see Fig. 2, arrow): press it down and the tape starts moving and recording... release it and it stops instantly. This particular doorbell switch must be held down to work the recorder, but you may prefer one that holds itself down.

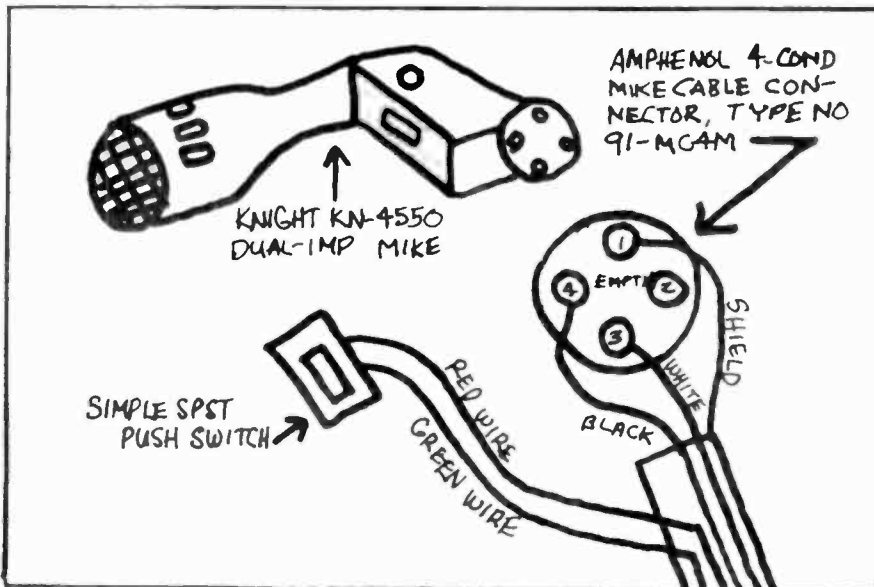


Fig. 3-b. Normally the shielded cable used with a low impedance mike has only two inside conductors (white and black wires) that go to the microphone via a male connector as shown here. But by using a FOUR conductor shielded cable instead, the extra wires (red and green) can be used to control the relay that activates the recorder.

Fig. 4. Here, in outside "breadboard" arrangement is the complete hookup, though you may not need all of it. If you have enough extra space inside your recorder and if you're adept at this sort of thing, you may wish to conceal all of these components inside the single cabinet as illustrated in Fig. 1; but it's not at all necessary.

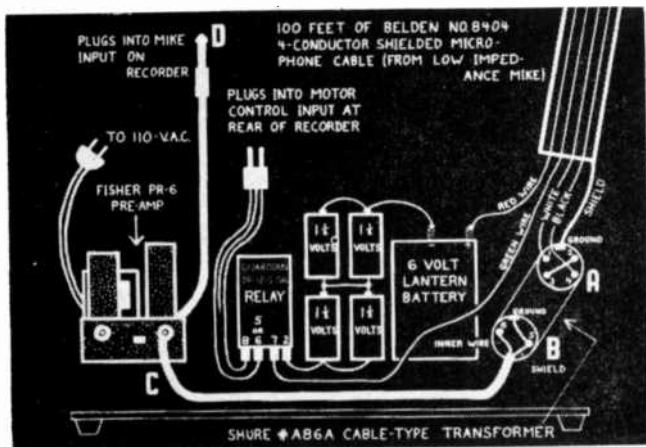
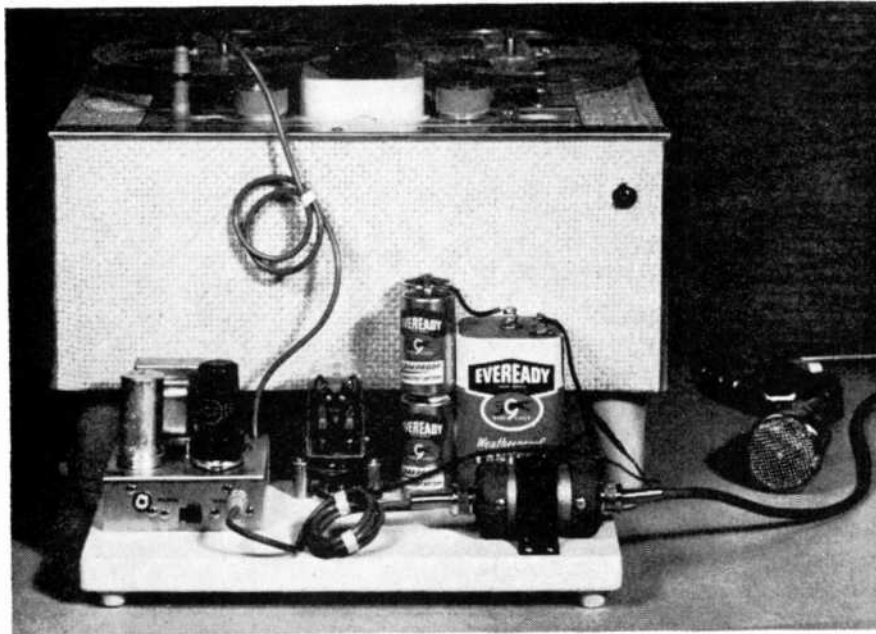


Fig. 5-a. Actually you have two individual circuits here: (1) the mike hookup that routes itself first through the cable transformer and then through the preamp before plugging into the recorder, and (2) the completely separate relay control that acts as a simple switch to remotely turn the recorder's motor on and off as needed.

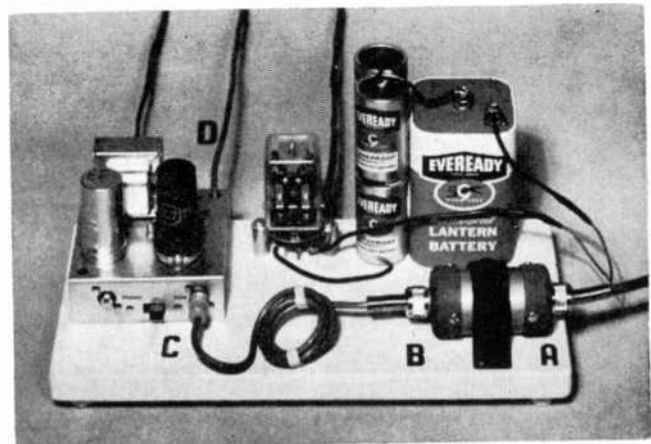
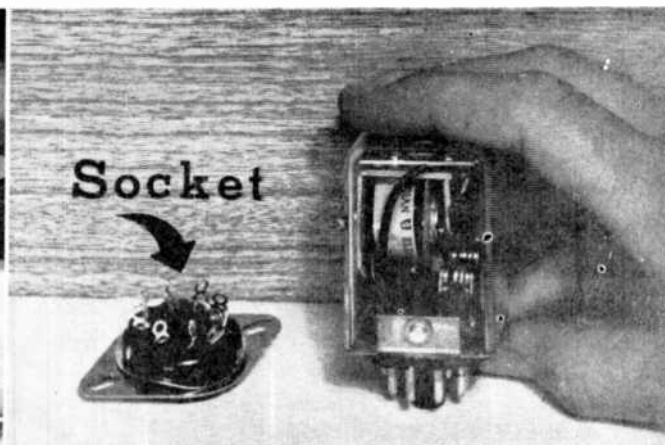


Fig. 5-b. The tiny original signal from the low impedance microphone goes through the hundred or so feet of shielded cable and comes to the "A" side of the Shure transformer. It comes out at "B" as high impedance. From there, still very weak, it goes into the Fisher preamp at "C", emerging highly "souped up" at "D".

Fig. 6. The output "D" of the preamp may be so strong as to overload your recorder. The preamp instructions show how to reduce this gain by shorting out a capacitor inside the unit but a simpler method (for some) will be to use an auxiliary 1-megohm control in the line as shown here plugged into the recorder (Switchcraft Part No. 366).



Fig. 7. The main component of the second circuit (switching the recorder motor on and off) is this Guardian d.c.-operated relay. It's a small relay that comes completely encased in a plug-in type Lucite enclosure for efficient, dust-free and trouble-free operation. The 8-ampere contacts easily handle the motor switching.



LOW-TO-HIGH IMPEDANCE CABLE TRANSFORMER:

But then, of course, you will have to use a special transformer that will change the low impedance to high so it will work with your recorder (only professional recorders are originally wired for low impedance). This means another ten dollars or so for a *Shure Model A86A Cable-Type Transformer*. Actually, the transformer itself is quite tiny, but in order to shield it from strong magnetic fields that would introduce noise into your recordings, it is sealed inside a sturdy magnetically shielded cylindrical metal casing (see Fig. 8 for a closeup of this transformer). Even then, as the instructions point out, if you place the transformer inside the recorder cabinet, say, you should try out various positionings until the one that yields the least hum is found. Placing the transformer outside the recorder, as illustrated here, of course minimizes this problem of hum pickup almost to non-existence. In either case, read the instruction sheet carefully and you'll get excellent results.

Just how strong the now-high-impedance signal is at "B" (see Figs. 5, a & b) depends on how long your microphone cable is. If it's only fifty or so feet long and you have a fairly powerful recorder, you should be able to record directly. Just plug from the transformer on the "B" side (using shielded cable, naturally) right into your machine. With my little recorder here and a full hundred feet of cable, I had to turn it up to full recording volume and speak into the mike from only inches away to make it work . . . which of course is less than adequate.

EXTRA ("PRE-") AMPLIFICATION:

(Here go another thirteen bucks!) The little *Fisher Model PR-6 Preamplifier* shown here is the same one I've been using for years for many different recording jobs. Rewired slightly, it'll work equally well with a phono deck, a tape head or a low-level microphone to provide the voltage gain and equalization necessary to use any of these components with a



Fig. 8. Notice the extra batteries added in series/parallel to the lantern battery hookup. Although this relay is rated at six volts, a number of variables (such as going through two hundred feet of fine cable wire) makes it necessary to build up the voltage to nine volts or so for best and consistent results with the relay.

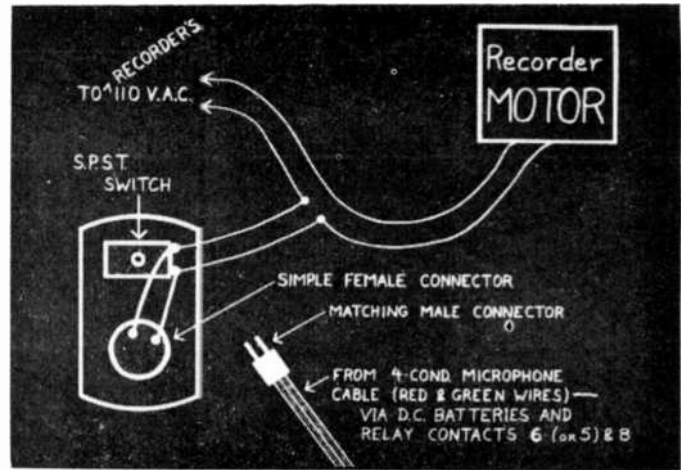


Fig. 9-a. This diagram shows the change and additions necessary to control the recorder. Cut one (either one) of the two wires coming from the motor and lead the two ends to a SPST switch and a parallel-connected female socket connector. The switch allows normal use of the recorder when the mike-switch is not plugged in for use.

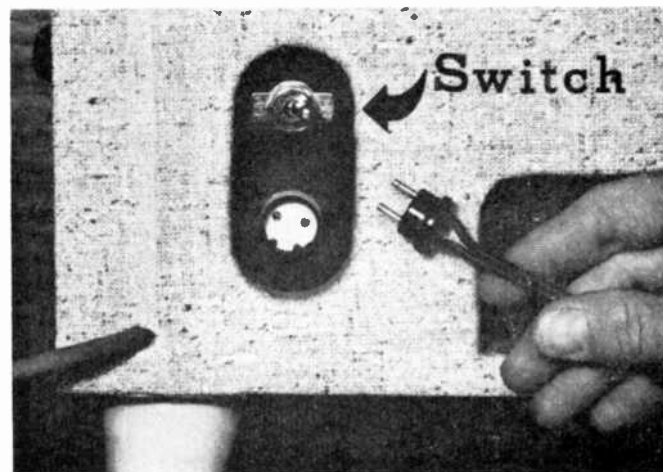


Fig. 9-b. A good place to locate the auxiliary switch and socket is at the rear of the recorder, shown here recessed right into the cabinet. But since the wire lengths are not at all critical, you can locate these parts wherever most convenient. Then, for remote control, plug in the relay plug and flip the toggle switch to "OFF."

regular amplifier (recorder). Here it is used to build the tiny signal—much weakened from all that cable travel—into a mighty one that the recorder can handle. In fact, as pointed out in Fig. 6, the amplified signal may now be so powerful as to need cutting down by means of an accessory volume control. The preamp instructions, which you should read thoroughly, show how to reduce this more-than-ample gain by shorting out a 1,000 mmfd. ceramic capacitor inside the chassis. But as I use this handy little preamp for various purposes, it's easier for me to just insert the auxiliary *Switchcraft Volume Control* when I'm using it for mike amplification.

This, now, takes care of the initial circuit, involving the microphone proper. Fig. 3-b points out that instead of using regular two-conductor shielded mike cable, FOUR-conductor cable is used instead so you'll have an extra two wires for the motor control switch that tape-mounts onto the mike. A hundred feet of Belden No. 8404 four-conductor shielded cable costs about \$7.50, which is less than two dollars over the price of "regular" two-conductor cable. So even if you don't intend to add the extra motor control circuit to your recorder system right away, it's a good idea to get this cable. You can ignore the extra two wires until you need them.

RECORDER MOTOR CONTROL:

Once set for "Record," you can remote-control the "On" and "Off" of your recordings by inserting a switch in the motor line as shown in Fig. 9-a. It would be impractical for a number of reasons to run this wiring directly through to the auxiliary switch on the microphone, but a nearby relay will do this job for you perfectly. Shown here is a *Guardian No. IR-1215-C6 Enclosed Plug-In Relay* with a 6-volt d.c. coil and 8-amp. DPDT switch contacts. You can't get less than a DPDT switching arrangement with this relay, so the extra contacts will go idle until you maybe need them some day if and when the first set burns out (just switch your wiring). This dandy little relay sells for a bit less than six dollars, though a less expensive open-type relay will do the job just as well. But for the uninitiated, this is a sturdy, tamper-proof relay that is worth the extra money. It plugs in like a regular tube, so be sure to get a matching octal socket.

By using contacts "8" and "6" (the octal socket is numbered underneath) the recorder will go ON when you press the mike switch. By using contacts "8" and "5", the recorder will go OFF when you press the switch. NOTE! The switch taped to the microphone (see Fig. 2, arrow) is a *push* switch. If you're not careful when you use it, it can lead to relay "chattering" under prolonged use, as your hand gets tired and relaxes its grip. So you may prefer a switch that will hold without constant pressure. Or here's an idea! Use a small *mercury switch* that is positioned on the microphone to automatically start the recorder working whenever the mike is held upright, with the machine stopping immediately every time the mike is upended.

It's usually safe to overload a relay coil as much as 100% without doing a big of harm, so note that the Fig. 5-a wiring of the various batteries comes out to about nine volts total (which is but an extra 50% overload). I had trouble at first with only a 6-volt lantern battery—which even when brand new only checked out to 5½ volts—because often the relay would not snap shut when activated a number of times in quick succession. Building the voltage up well past six volts solved this problem neatly and permanently. And in case you're wondering why I didn't use an a.c.-operated relay so batteries wouldn't be necessary . . . that's just exactly what I first tried. I used a Guardian 6-volt a.c. relay that I activated with the current from a small 6.3 volt filament transformer (plugged into 110-V. A.C.) and it functioned beautifully. EXCEPT THAT the 60-cycle a.c. current pulsating through the 100 feet of mike cable and back again was picked up and amplified into a small but annoying hum when recording. So I *had* to use direct current.

FINAL NOTE! I ran into a freak deal (which you may or may not run up against) when running the short shielded cables from the cable transformer at "B" to the preamp at "C", and from the preamp at "D" to the mike input on the recorder. At first cables "B-to-C" and "D"-to-recorder were made very short, which seemed the convenient thing to do. But all of my first recordings were distorted and it took me hours to discover that somehow these too-short cables were the culprits. When each shielded cable was lengthened to 30 inches, the distortion disappeared and I've had nothing but wonderful results ever since.

TAPE CONTROL YOUR SLIDES FOR \$6.00

by Tommy Thomas

I've been having just an awful lot of fun lately. For a long time now I've wanted a slide control "gizmo" for my tape recorder, but I never could talk myself into spending from thirty to fifty dollars for one I liked. So I finally got busy and put one together myself for a fraction of the cost of a commercial unit. It's extremely simple to construct; it's rugged and dependable and consistently works like a charm. And it'll operate with just about any tape recorder made. Want one?

Naturally, first you have to have an automatically controlled 35mm slide projector . . . the kind where you just sit off in an easy chair somewhere and press a button on the end of a cable every time you want to change slide. If you don't already own such a projector, buy one! If you already have a projector but it's not automatic, *trade it in!* And if you don't even own a 35mm color camera, then by all means get one right away. If you don't, you're sure going to miss out on all kinds of excitement.

For instance, imagine if you will a front room scene where you're all set up as shown above. Your friends are gathered so you turn off the room lights and turn on the recorder . . . then you sit back, relax and watch the fun. One after the other the different slides come on the screen, automatically, each accompanied by from ten to forty seconds of appropriate narration or sound effects. First it's *you* describing the scenic beauties of a vacation slide. Then it's *your wife*, perhaps, telling about how you wandered off on a little side road during this same

trip, and discovered this lovely field of flowers. By golly, here's a cute shot of your dog and he's actually barking. And there's Sister Sue all dressed up for Easter and happily exclaiming about all the pretty colored eggs she found in the back yard.

Let me tell you, the effect is tremendous! I'm not at all running down home *movies*, now, but if you're a color slide fan as I am, then this is for you. And if you can beg or borrow a battery-portable recorder the next time you go on vacation, then there's no limit to the exciting things you can do. The sounds of happy people at the beach, monkeys at the zoo, the hissing and thumping of an old-time steam locomotive, kids playing, etc. If you think they're something on tape alone, you just ought to hear these sounds coupled to color pictures thrown on a home screen.

But enough of this dreaming! Let's get down to the business of making the control unit we need to make all this possible. Actually, though I think of this as one unit, it's really two separate units wired together: the main RELAY/TRANSFORMER unit and what I call the "SENSOR CONTROL" unit that mounts on the recorder (Figs. 1 and 2). Now, if you're not familiar with what a relay is, don't let it bother you. It's just an *electric switch*. The transformer supplies power to the relay coil, the coil acts as an electro-magnet and attracts an armature, and this in turn closes a switch (contacts) which is directly hooked up to operate your projector (Fig. 4). This entire assembly is controlled by tiny strips of

very thin and special aluminum "Sensing Tape" that apply to the BACK of the recording tape in every place where you wish a slide to be changed. *In effect, your narration tape has a series of "switches" (the foil strips) built right into it.*

The Relay/Transformer unit is easily put together (honest!). You'll need a SIGMA Type 41FZ-35ACS-SIL RELAY. This is a highly sensitive, long-life relay with 5-ampere SPDT contacts. I obtained this relay from the Burstein-Applebee Co., 1012 McGee St., Kansas City 6, Mo. It's their Stock No. 19A509 and sells for \$4.00 plus postage for 2½ oz. You'll also need their Stock No. 18B135, a midget FILAMENT TRANSFORMER that sells for 79 cents plus postage for 6 oz. This transformer takes your regular 110-volt a.c. house current and steps it down to a more practical (for our purpose) 6.3 volts at 0.75 amps. And since this Sigma relay only needs 0.2 volt-amperes to operate, there's no "heavy" current that can shock you. NOTE! The transformer I used had secondary leads that were green and yellow, as noted in Fig. 4. If yours should be a different color, remember that the *black leads* always indicate the primary, and go to the 110-volt house current. Fasten (solder and tape) these black leads to a few feet of lamp cord and to a regular male plug and this side is all set to go. Your local parts jobber may also have these in stock.

Mount your relay and transformer on a small board and wire as shown, being careful to have the main incoming wires "1," "2" and "3" securely fastened to the board (I used ordinary insulated staples from the hardware store) so the small inner wires won't pull loose. And it might be a good idea to make a PROTECTIVE COVER for your assembly. Use sheet metal, thin wood or plastic, and be sure to put a goodly number of *vent holes* on the top and sides so the heat from the transformer can escape.

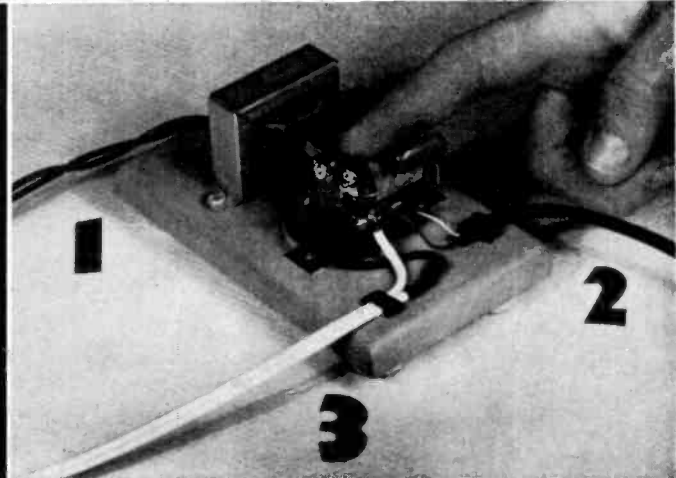
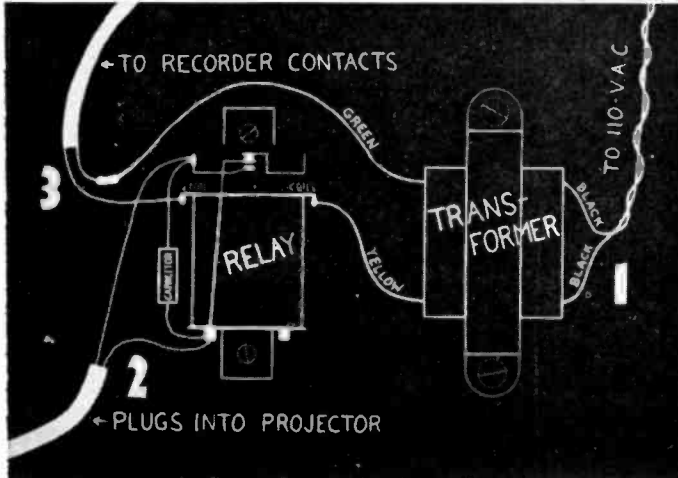
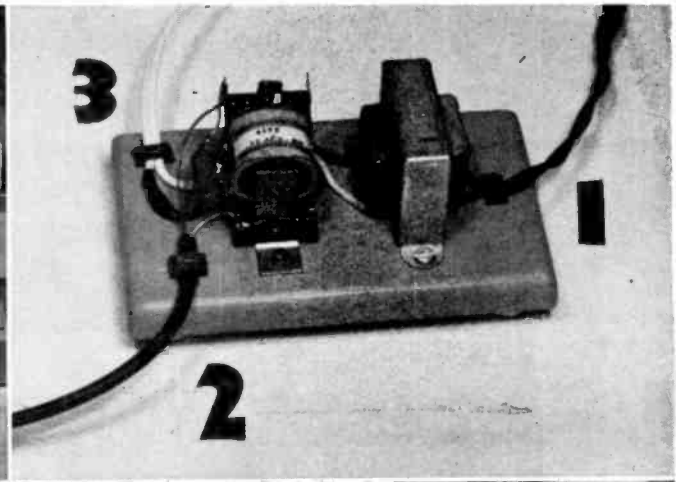
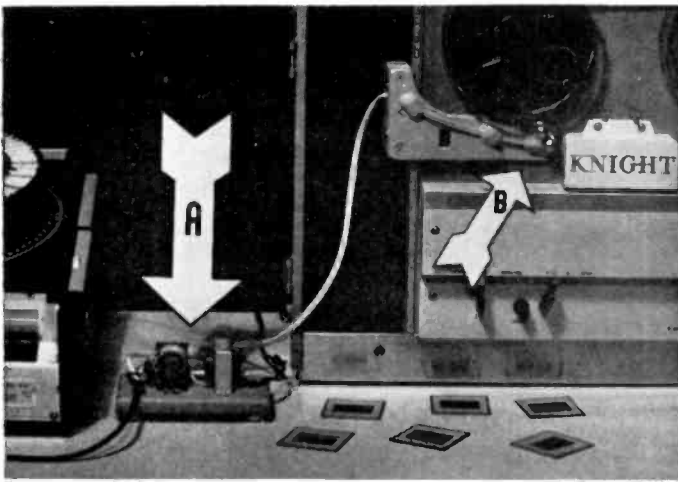
The CAPACITOR shown in the circuit is optional. It's a .01 Mfg., 600 V.D.C. Sprague capacitor, and for 18 cents it's worth installing ("shunting") across the relay contacts even on the chance that your particular projector setup doesn't require it (?). At worst it's a few pennies lost, and maybe it's cut down on the arcing across the relay points, thus extending the life of the relay. Any radio store can supply you with this capacitor, or you can get one from Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill., for 18 cents plus postage on 2 oz. It's their Stock No. 28L725, Sprague Type 6PS-S10 Capacitor. And while we're mentioning Allied, they

also carry the special Scotch "Sensing Tape" you'll need. This is a thin, flexible, strong conductive aluminum foil tape with pressure-sensitive adhesive on one side that sticks tight and stays clean. It's Allied's Stock No. 80R577, Scotch Type 51-7/32 S Aluminized Sensing Tape, in a dispenser package of 150 inches for \$1.85 plus 3 oz. postage. Or try your local hi-fi shop; they should stock it by now.

Now let's get on to the "Sensor Control" unit (Figs. 6 through 10, Figs. 1 & 2, Arrow "B"). Exactly how you make this particular assembly will depend on the type recorder you have. And also, on whether or not you want this to be a permanent addition to your tape deck. A permanent installation would be much neater because then you could eliminate about 90% of the unsightly bulk necessary when you make the "add on" type unit shown here. Also, you could use a much lighter *wire* (ending in a small plus, perhaps, that would plug into the wire coming from the Relay/Transformer unit whenever you wanted to have projection control). I need my recorders for many different uses so I *had* to make a removable assembly . . . and I used heavier-than-otherwise-necessary wiring so it would stand up under constant use. By limiting myself to 5-inch tape reels I had plenty of room on the tape deck, and since 1-mil recording tape at 3¾ ips gives me an ample 45 minutes of narration, this works out fine.

I used two NORTRONICS TG-5 *Tape Guide Posts* obtained from Allied Radio for 70 cents each (their Stock No. 81R962, 3 oz. postage on each). If you'd rather figure this out so you can use 7-inch tape reels, or if for any other reason you don't have too much space to operate in with your own recorder, you may wish smaller guide posts (see Fig. 7). SONY recorders have tape guides that are especially small and easy to adapt, and so do a number of other recorders. Your best bet here (if you can't use the Nortronics tape guide posts) is to talk to the repair man at your local hi-fi shop and see what he can supply you with.

Notice, in Fig. 7—"A," that I filed the Nortronics posts down a bit to better expose the underneath brass for soldering. Also, I drilled tiny holes for the wires. Then I located the guide posts (Fig. 8) so that *when the reel of tape was almost empty* the two posts still exerted pressure AGAINST THE REAR SURFACE OF THE PASSING TAPE. There's plenty of pressure when the reel is full of tape, but be sure it's still there at least a little bit when the reel is almost empty or the final passing foil strips may not make



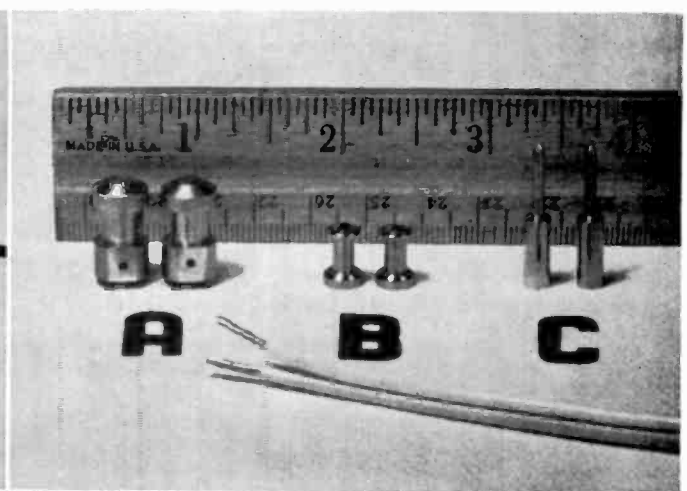
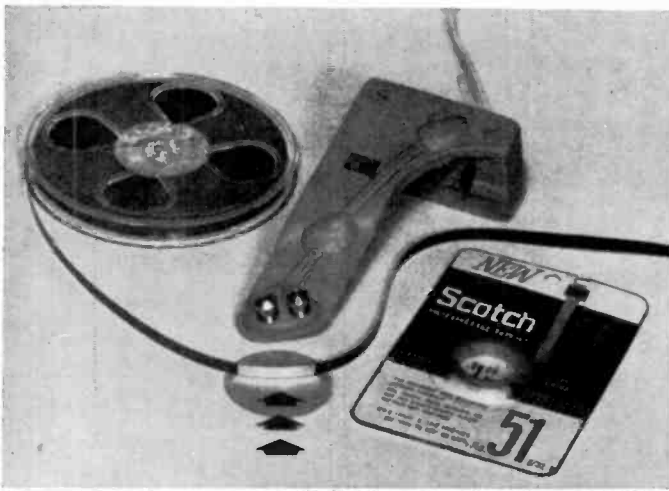
Upper left: Fig. 2—The two arrows point out the *COUPLING* between the projector and the tape recorder. The slide projector must be an automatic model, of course, but your recorder can be almost any make or model, any type track, stereo or mono. As long as there is room on the tape deck for a pair of "Sensor Contacts," you're in business. Upper right: Fig. 3—This is the main unit "A": a 79-cent midget filament transformer and a four dollar AC relay mounted on a 3" by 5" board. The transformer plugs into regular 110-volt a.c. house current (at "1") but it then steps down this power to a fairly harmless 6.3 volts, which is plenty enough to reliably operate the sensitive SPDT relay. Lower left: Fig. 4—Here is unit "A" in diagram form, following out the extremely simple wiring. The relay is operated by the voltage from the transformer, which in turn is controlled by the *SENSOR CONTACTS* on the recorder (Fig. 2, Arrow "B"). When the recorder "closes" the relay, the 5-amp. relay contacts close, operating the auto-projector. Lower right: Fig. 5—Pointed out here, in a semi-rear view, are the SPDT (Single-Pole, Double-Throw) relay contacts. Since these are rated at five amperes, they should be more than ample to handle any home projector. Note that the small capacitor (which is optional; see text) has been pushed up, out of the way, so you can see the wiring better.

proper electrical contact. NOTE! Fig. 8 shows the two posts being epoxied into place about an eighth of an inch apart (Arrow "A"). When the epoxy adhesive was partially hardened, I taped down the two tape reels (Arrow "B") to exert just enough pressure on the recording tape so as to keep the guide posts perfectly aligned until the epoxy hardened completely. Then I finished the job as shown in the photos, using generous quantities of heavy-consistency epoxy to properly secure my wiring, and ending with a neat paint job.

IMPORTANT! The electricity that goes from the secondary of the transformer (Fig. 4, green wire) is

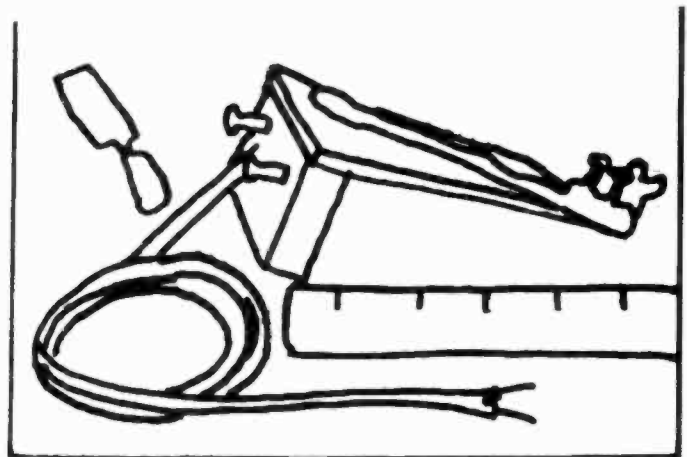
not harmful. Bridge the two metal guide posts with your finger and nothing will happen. But if you're test-operating your projector and would like to advance a slide, bridge the two posts WITH A COIN OR A KEY and one slide will advance each time you make contact.

I haven't space to go into the making of a narration tape but I would like to mention that it would be a good idea to make a short PRACTICE TAPE first. Your own particular setup will have a number of variables that should be carefully determined. The length of the aluminum foil strips, for instance, depends on just how you make your particular sensor



Upper left: Fig. 6—The "Sensor Unit" consists chiefly of two mental TAPE GUIDE POSTS firmly epoxy-fastened to a wooden "jig" that holds them in proper place on the tape deck of my recorder. When a strip of metal foil, which is on the rear of the recording tape, comes by, it "joins" the posts, making the electrical contact that works the relay. Upper Right: Fig. 7—Tape guide posts come in various shapes and sizes. The Nortronics pair ("A") that I used are large enough to make working with them quite easy. For more compactness (especially if this is to be a permanent addition to your tape deck), SONY has some very small guides ("B"), or you can make your own out of phone tips ("C"). Lower left: Fig. 8—Keep in mind, when picking out a spot on your tape deck ("A") for locating the two Guide Posts, that it is the BACK of the recording tape that must come in contact with the two guides. Also, if you limit yourself to using a 5" reel when making narration tapes, this will give you a lot more room for placing the Sensor Unit. Lower right: Fig. 9—Epoxy adhesive securely anchors the guide posts in place . . . then the two wires are soldered on afterwards. Underneath each guide post (though not visible here) is a metal washer that lifts the post up just exactly high enough for accurate tape travel. Note the FOIL STRIP about to make contact with the two metal posts.

unit and what speed the tape is running. The contact strips should be generously long enough so they will always trigger your projector, but keep in mind that the longer they are, the harder this ultra-thin foil is to put on accurately. Another thing to determine is the number of seconds of silence you should leave between the separate talks for the individual slides. Be sure your projector not only has time to change to the next slide, but also that all slide-changing noises have time to subside each time before more narration begins again. Done smoothly and carefully, you can put together a highly polished narration/slide show you'll be proud to show to any audience.



Above: Fig. 10—Before painting, a few more gobs of epoxy are added to secure the wires more firmly to the metal posts and to anchor them to the SENSOR UNIT base. The unit is made of two layers of Masonite, notice, glued to each other and screw-glued to an end piece of wood. Two wood screws fasten the entire unit to the side of my recorder.

ELECTRONIC MUSIC GOES

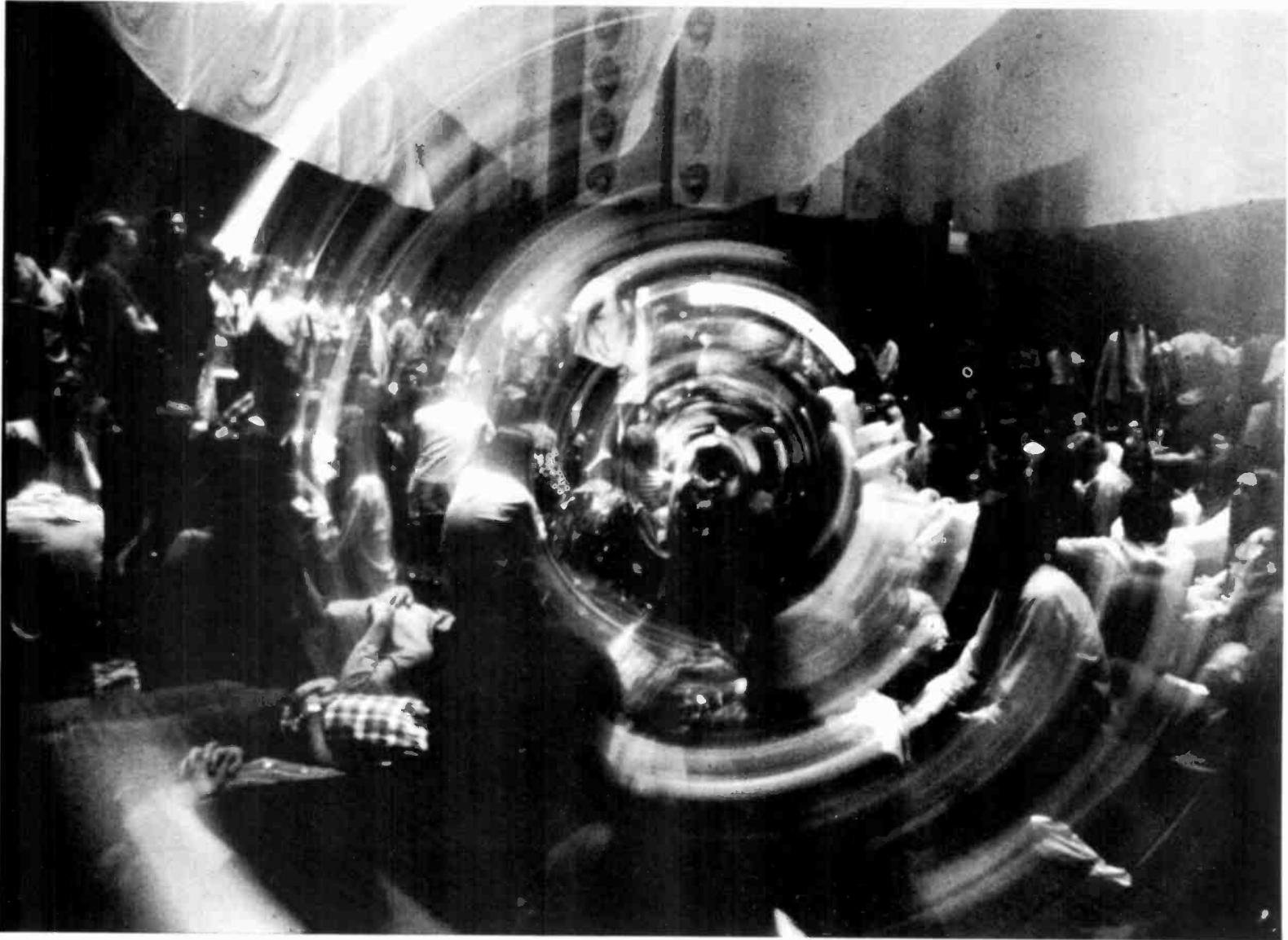
When avant-garde composer John Cage prepares for a concert, it's not just another musical event. For Cage, an early experimenter with electronic music, each concert is an experiment in mixed media. Take this recent Cage happening at the University of Illinois, for example. Nominally, the performing artist was harpsichordist Antoinette Vischer of Geneva, Switzerland. Actually, the unseen start of the event were 52 Wollensak recorders concealed backstage and operated by Cage and an associate, Lejaren Hiller.

For the premiere of his work HPSCHD, Cage recorded Miss Vischer at the keyboard. Then by dubbing from one recorder to another, the composer was able to build up tonal patterns unlike anything live musicians could possibly imitate. By using Scotch 201 low-noise tape, the composer kept tape hiss to a minimum during the repeated dubbings. Other Cage techniques for composing at the tape recorder include playing a tape backward, taking notes and tones out of context with a pair of scissors and splicing tape, or even creating different tonal patterns by juxtaposing forward and backward recordings.

But HPSCHD was more than simply tape recordings — even 52 of them, synchronized to produce sound from all corners of the auditorium. The show included colored lights and images projected on a series of enormous screens suspended from the ceiling. As the music progressed and tonal patterns were formed, the lights formed corresponding visual patterns and impressions. By the end of the evening critics were undecided on the merits of Cage's latest electronic creation — but the audience was agreed that the experience was unique.



TO ILLINOIS



The University of Illinois' Memorial Auditorium was converted into a multi-media theatre for the debut of John Cage's HPSCHD.

Whirling colored lights during the concert were projected not only on the screens hung from the ceiling, but on the audience as well.



Cage, a composer who is as acutely aware of such concert realities as auditorium acoustics and seating arrangements, checks over the design for the concert program (above). At right, with associate Lejaren Hiller, he inspects the screens on which images, such as that below will be projected.





Hiller and Cage, in white jacket, at the controls of their 52 stereo tape recorders during a rehearsal. Later, during the concert, Cage listens intently as his tonal patterns unfold (above). Below, the composer at the spectacular conclusion of his work.



The composer, listens as harpsichordist Antoinette Vischer records his score in its original form (at right). Below, University of Illinois art students silk screen streamers with a computer design to announce the Cage-Hiller concert.



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tape

REVIEWS

Bach

Violin Concertos Nos. 1 and 2; Double Concerto. David and Igor Oistrakh, violins. Royal Philharmonic Orchestra cond. Sir Eugene Goossens (in the Double) and Vienna Symphony Orchestra cond. David Oistrakh (in concertos 1 and 2). Deutsche Grammophon cassette 923087, \$6.95.

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

Blessings on you Deutsche Grammophon, for making this magnificent recording available on cassettes. When we reviewed the reel version some months ago, we called it a cornerstone of any collection of serious music. It's a pleasure to report that the cassette version, while lacking a bit of the brilliance of that recording, still sounds so good that some of our friends can't believe it's a cassette.

The Oistrakhs' performance are superb (David plays both the solo violin concertos and is aided in the double by his son) and their violins sound natural, warm and lifelike in the cassette format. Both orchestras are thoroughly familiar with these scores, and turn in first-rate performances.

R.A.

.....
Broadway

1776: Original Broadway Cast Recording. Columbia 7½ ips stereo tape OQ

1194, \$7.95; 8-track stereo cartridge 18-12-004, \$6.95.

Music **
Performance **
Recording ****

This is a much better show to watch than to listen to. In the Theatre, such numbers as The Lees of Old Virginia, Sit Down John, and Piddle Twiddle and Resolve really come off. On the record, they're dead and lifeless. None of the show's stars — William Daniels, Paul Hecht, Roy Poole or Rex Everhard (who substitutes here for Howard de Silva as Ben Franklin) — are known primarily as singers, although Columbia's engineers have made up in motion and stereophony what the performances and score lack in musical ability. If 1776 was your first Broadway show, this is a worthwhile souvenir.

R.A.

.....
Dvorak

Concert Overtures. Scherzo Capriccioso, op. 66; In Nature's Realm Overture, op. 91; Carnival Overture, op. 92; Othello Overture, op. 93. Istvan Kertesz conducting the London Symphony Orchestra. Ampex/London L80216. 7½ ips. \$7.95.

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

Overtures are little things usually added to the end or beginning of albums that contain symphonies that aren't quite long enough. Certainly this has been the case with Dvorak, especially his Carnival Overture, which has appeared coupled with several major works. At last, someone has thought enough of these jewel-like lesser works to assemble them into a wonderfully conceived tape that abounds with half-familiar melodies, excellent musical taste, top-notch performance and recording dynamics.

The Scherzo Capriccioso is almost as well known as the Carnival, while the other two works — of approximately equal length — round out a very worthwhile tape selection. Three of the four pieces were published consecutively, while the Scherzo preceded these overtures by about ten years. The overtures are loosely connected, with a recurring theme common to all three.

The LSO does a commendable job here, and London engineers have made an excellent, though not an outstanding job with the recording. There's some discernible tape hiss, which tells us that Dolby masters were not used. Even so, the wide dynamic range of the tape leaves little room for the hiss to come through, except in the very beginning.

W.G.S.

.....
Electronic Music

The Happy Moog! Includes Moog Foo Young, Blast Off Country Style, In a

Happy Moog, In a Latin Moog, Paris 2079 and five more. Pickwick P8-171 (8-track), \$4.98.

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

Here's a real fun cartridge for parties or just plain listening. The gloops and gleeps that composer Harry Breuer has gotten out of the Moog Electronic Synthesizer make for the most pleasurable (if least serious) of the current crop of recordings of electronic music. Try keeping a straight face through the final cut, "Short Circuit," for example. The cartridge version breaks in all the right places, and the recorded sound is first-rate stereo. In fact, there's only one trouble — the program is too short. Altogether, it runs only 22 minutes — barely enough music to occupy one side of an LP.

W.R.G.

.....
Gilbert & Sullivan

The Pirates of Penzance. D'Oyly Carte Opera Company and the Royal Philharmonic Orch. cond. Isidore Godfrey. London 7½ ips stereo tape LOD 90156, \$14.95.

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

This is D'Oyly Carte's and London's second attempt to commit the Pirates to stereo tape. The first, which appeared in the early days of stereo, ended in disaster. This version is very much better, with Donald Adams turning in a delightful performance as the Pirate King. The Royal Philharmonic is a very much better ensemble than that on the earlier album, and most of the cast sings and acts well. The exception is John Reed, whose Major General Stanley sounds a bit dry, even bored. The set includes all of

Gilbert's words as well as all of Sullivan's music, and should fill a niche on the shelf of any lover of G&S.

R.A.

.....
Giuliani

Guitar Concerto in A; Vivaldi - Guitar Concertos in C, D; Carulli - Guitar Concerto in A. Seigfried Behrend, guitar. I Musici. Deutsche Grammophon 7½ ips reel DGL 9417, \$7.95; cassette 9231000, \$6.95.

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

While the music on this tape is not essential to the well-rounded music library, it nonetheless provides some delightful listening. Highlights are the two Vivaldi concerti which begin the second track. If baroque is your bag, you'll find some very agreeable examples here, well played by Behrend and I Musici. The cassette and reel recordings are about as close to state-of-the-art in their respective formats as one comes these days, typical of DGG's high technical level. The major difference between them is a slight loss of high frequencies and what can best be described as richness in the cassette version. Nevertheless, the cassette is very, very good.

R.A.

.....
Herrmann

The Great Movie Thrillers includes Psycho, Marnie, North by Northwest Vertigo, A portrait of 'Hitch' London LCL 74126, 7½ ips reel, \$7.95; LKM 14125, 8-track cartridge, \$6.95; LKX 84226, cassette \$6.95.

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

In Hollywood's palmiest days, during the 1940s, the movie studios attracted a number of important musical talents, including Erich Maria Korngold, Miklos Rozsa and (on a temporary basis) Aaron Copland. Another of these major talents was Bernard Herrmann, who soon found himself doing the scores for Alfred Hitchcock's important thrillers.

There is no doubt that Herrmann's music did much to build up the mood suspense in such films as *Psycho* and *The Birds*; but it doesn't stand up well apart from the film. Here are crashing crescendos, eerie progressions and all of the other tricks of the trade — masterfully done — but adding up to nothing. This is perhaps the most disappointing of the current crop of movie music albums — perhaps because so much was expected and so little conveyed.

Full marks to the London Philharmonic, which plays under the composer; and to London's Phase 4 engineers who have made the best out of a good idea gone wrong.

R.A.

.....
Kodaly

Hary Janos. Peter Ustinov, London Symphony Orchestra cond. Istvan Kertesz London LCK 90159, 7½ ips, \$11.95.

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

Unless you're of Hungarian descent, or are a confirmed modernist, you've probably never thought of Kodaly's satiric opera *Hary Janos* as an essential ingredient of a complete tape library. That merely shows that you haven't heard this recording. I was delighted with it; my wife loved it; even the kids asked to hear it again. The star of the show is Peter Ustinov, who not

only provides a spoken plot summary but takes the parts of all of the characters (including a surly Russian border guard, the irrepressible Janos, the Empress of Austria and a number of others). The engineers have permitted Ustinov to hold stereo conversations with himself — he seems to jump from one speaker, where he is the stalwart Janos, to the other where he becomes a foppish nobleman. Not content with creating the entire cast, Ustinov even provides some of his own sound effects.

While the broad humor of the story and the fine acting of the star certainly make this tape, let's not overlook Kodaly's score or the performances of the orchestra and stars of the Budapest Opera. There's a great deal more music than the segments we hear in the Suite familiar to Western concert goers, and some of those segments sound better in the original form, with soloists or developed fully. If you like the suite, you'll love the opera; if you buy the opera, your kids will love you.

R.A.

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Leoncavallo

I Pagliacci. *James McCracken, Pilar Lorengar, Robert Merrill, Tom Krause, Ugo Benelli, Orchestra and Chorus of the Accademia Nazionale di Santa Cecilia, Rome cond. Lamberto Gardelli. London LOK 90162, 7½ ips.*

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

With a four-star tape like this, what could be wrong? Here's a first-rate performance of one of the cornerstones

of operatic literature by some of the leading artists of the day, recorded in splendid stereo by London. What's wrong is Ampex's failure to consider the result as a tape product, rather than as a record package. Note that the Ampex catalogue already contains a first-rate recording of Pagliacci, backed by Cavalleria Rusticana a two-reel Deutsche Grammophon set. Why, then, give us one with a James McCracken operatic recital as a filler? The 17 minutes of tenor arias form the fourth side of London's two-record set, but there's no need for them here unless you're a McCracken fan. A libretto is included.

To us, the DGG Cav & Pag pairing makes infinitely more sense than this duplication of the record package. We look forward to the day when somebody offers the whole 68 minutes of Pag on a single track, to avoid the break at the end of Track 1.

Besides the matter of pairing, the choice between London and DGG will depend on whether you prefer the latter's La Scala cast, which includes Carlo Bergonzi, Giuseppe Taddei and Joan Garlyle, and the current offering. While the Deutsche Grammophon stereo isn't quite as spectacular and the sound isn't as crisp, I find the orchestra and chorus better disciplined, and the male voices more pleasing.

.....

Mahler

Symphony No. 1. *Philadelphia Orchestra cond. Eugene Ormandy. RCA Victor R8S1133, \$7.95.*

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

At first glance, this would appear to be a bonanza for the cartridge buyer: the first appearance of the Mahler in cartridge form, a recording by a major orchestra of the long-lost "Blumine" movement, and on a cost-per-minute basis, one of the best buys in cartridges. The trouble is that the "Blumine" turns out to be a bit of a bore to all but the most dedicated Mahlerite; it's clear why even the composer dropped it after the first few performances. Otherwise, the Philadelphians get much out of the Mahler sonics. Nevertheless, one would hope for a recording of the symphony by Bernstein or Leinsdorf or the late Bruno Walter without the fifth movement. High marks to trumpeter Gilbert Johnson in the "new" movement for some spectacular virtuoso work.

R.A.

.....

Mozart

Horn Concertos Nos. 1-4, *k.412, 417, 447, 495. Gerd Seifert, horn, Berlin Philharmonic cond. Herbert Von Karajan. Deutsche Grammophon 7½ ips tape DGL 9038, \$7.95. Cassette 923091, \$6.95.*

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

Back in the late 1950s, the late Dennis Brain set an incredibly high standard for performance of these delightful works. That recording, in mono only, sounds faded now, but in its day it was considered the standard against which all other recordings should be compared.

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 Recording ****

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Leoncavallo

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Music ****
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Mahler

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Recording ****

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R.A.

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Mozart

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

Back in the late 1950s, the late Dennis Brain set an incredibly high standard for performance of these delightful works. That recording, in mono only, sounds faded now, but in its day it was considered the standard against which all other recordings should be compared.

What we have here is not a new

standard, but a very acceptable tape performance approaching the feeling and sensitivity of Brain and surpassing the Angel recording. The reel version is truly sumptuous, with the cassette version lacking only some of the highs and some of the spacious quality. Von Karajan's handling of the Berlin Philharmonic can best be described as masterful, with a genuine feeling for Mozart's delicate structure.

Either the reel or the cassette version is a must – and note that, unlike some other recorded versions, none of the concertos spills over two tracks of the tape. Tape hiss on the Ampex-made reel tape and the German-duplicated cassette are audibly non-existent.

R.A.

.....

Mozart

Symphonies Nos. 36, "Linz" and 39
*Boston Symphony Orchestra cond.
 Erich Leinsdorf RCA Victor TR3-1034, 3 3/4 ips reel, \$6.95; R8S-1134 8-track cartridge, \$6.95.*

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

Another winner from Boston. Everything about this tape is just right – Maestro Leinsdorf's Mozartean touch, the precision playing of the Bostonians tempered by the conductor's Viennese feel, the gorgeous sonics provided by RCA's engineers. We found the tape consistently more enjoyable than the cartridge not only because of better sonics, but also because Mozart doesn't divide evenly into four parts. The 39th Symphony, for example, starts at the end of Track two of the cartridge, where the opening allegro is interrupted by a track change.

Nevertheless, these are the first appearances on cartridge for these two works, and nobody is likely to do a better job. On reels, the major competition comes from Leonard Bernstein on Columbia. We think Leinsdorf has just that pinch of Viennese schmals – without overdoing it – which can make Mozart a truly delightful musical experience.

R.A.

.....

Mozart

Symphony No. 41, "Jupiter," and Schubert: Symphony No. 8, "Unfinished." Philadelphia Orchestra cond. Eugene Ormandy. 3 4/4 ips stereo tape TR3-1003, \$6.95. 8-track stereo cartridge R8S-1111, \$6.96.

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

These first fruits of the Philadelphia Orchestra's new association with RCA Victor are everything one might expect. The Philadelphians long have been famous for their lush string section which appears to best advantage here in the Schubert. Indeed, Ormandy's romanticism seems geared more to the Unfinished than to the Mozart, but nobody is likely to be unhappy with either side. RCA has partially solved the problem of making cartridge sides come out even by announcing a 21-second intermission between Mozart and Schubert. RCA's engineers have produced some of the best sound we've heard yet from Philadelphia's Academy of Music. Keep up the good work, fellas.

R.A.

Opera Collection

Great Moments from Grand Opera, Vol. II. Excerpts from Don Giovanni, The Barber of Seville, Lucrezia Borgia, Lucia de Lammermour, Tannhauser, Marta, La Traviata, Il Trovatore, Faust, Masked Ball, Samson and Delilah, Cavalleria Rusticana and Turandot. Featured artists: Carlo Bongonzi, Jussi Bjoerling, Montserrat Caballe, Mario del Monaco, Anna Moffo, Birgit Nilsson, Jan Peerce, Leontyne Price, Rise Stevens, Renata Tebaldi, Richard Tucker, Cesare Valletti, Jon Vickers, and others. RCA TR3-5042. 3-3/4 ips. \$10.95.

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

Fortunately, this collection isn't composed of a bunch of schmaltzy pot-boilers. Instead, it contains some strong, rather heady selections from both well-known and lesser operas. The only real shortcoming is that the excerpts are often much too short: just as we're getting interested and involved, the excerpt or aria ends and zoom – we're in another opera and another period.

The voices heard here are some of the greatest in today's opera scene: none is featured, but rather each is woven into the fabric of the program. Where needed, choral forces are called in, such as in the magnificent reading of the March from Tannhauser. Jon Vickers is stirring in M'appari from Marta, Anna Moffo is a delightful Marguerita in the Jewel Song, Stevens and Del Monaco are excellent as Delilah and Samson. Overall, this double-length tape is well construed, well programmed and superbly performed. The recording is a trifle flat in places – there's too much shifting from the resonances of one hall to another. But this

has to be a natural drawback in any collection of excerpts.

W.G.S.

.....
Rachmaninoff

Preludes in c Sharp; g; Etudes Tableaux in a, b; Elegie in eb and Chopin: Grande Valse Brillante in eb; Nocturne in F; Scherzo in bb. *Sergei Rachmaninoff, piano. Keyboard Immortal Series KBI 1 (cassette).*

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

Most of these performances have appeared on records before – but to the best of my knowledge, this is their first appearance on tape. Rachmaninoff, who died in 1943, plays in stereo through the medium of the Welte-Mignon player piano; and critics have been arguing for years just how much of the tempo and shading in these performances is Rachmaninoff and how much Welte. Suffice it to say that KBI's recorded sound is smooth and fully rounded in all versions. The piano playing occasionally sounds mannered and the phrasing sometimes a bit peculiar to these ears – but there is less of a mechanical sound to these transcriptions than in some of their earlier appearances. If you want to hear how the composer played his own works, this recording will be a valuable addition to your collection.

R.A.

.....
Strauss

Salome. Montserrat Caballe, Sherrill Milnes, Richard Lewis, Regina Resnik,

London Symphony Orchestra cond. Erich Leinsdorf. RCA Victor TR3-5045, \$11.95 (3 3/4 ips reel).

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

RCA has done what London should have done when it issued *Salome* on tape some time ago – squeezed the entire 100 minutes onto a single reel. This listener finds no advantage in London's sonics (on two reels recorded at 7½ ips), the Victor has packaged its libretto with the tape.

I must confess a lack of sympathy for this opera; although it has its admirers among TAPE RECORDING's reviewing staff, they were unavailable at the time this tape came in, and so it fell to me. I find it lacking in lyrical quality and boring through much of its instrumental passages. However, I know good singing when I hear it, and I can heartily endorse the performances Mmes. Caballe and Resnik, and the leading males, Messrs. Milnes and Lewis. Erich Leinsdorf is probably the world's greatest conductor of opera, and he is right at home with the music of his countryman Richard Strauss. If you want *Salome*, you won't regret buying this one.

W.R.G.

.....
Trumpet Fanfares

Royal Fanfares at Versailles includes Francoeur. Symphonie du Festin Royal; Lalande: Suite of Symphonies for the Royal Supper; Trumpet music by Lully, Philidor, Charpentier, Adolf Scherbaum, trumpet; Chamber Orchestra cond. Paul Kuentz. Deutsche Gram-

mophon 7½ ips reel, DGL 9431 \$7.95. Cassette 923101, \$6.95.

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

Here, under the collective title "Royal Fanfares at Versailles" are a collection of military marches, court dances, and dinner music from the time of Louis XIV to the Revolution. The music is a showcase for trumpeter Scherbaum, who proves to be a master of his instrument. It is also a peculiar combination of French elegance and daintiness with royal bad taste that will attract some listeners, repel others and bore still another group.

The tape, in either form, is a hi-fi spectacular, with crystal-clear separation of soloist and orchestra, plenty of directionality, no interference from tape hiss, and wide-range dynamics. If you want to demonstrate just how good cassettes can be, this is the recording to use. And if you want to show off your new speakers, slap the reel on your deck. It reverses automatically on Ampex equipment, thanks to a pulsing signal at the end of each track.

.....
Vivaldi

The Four Seasons. Wolfgang Schneiderhan, violin; Festival Strings of Lucerne cond. Rudolf Baumgartner. Deutsche Grammophon Archive. Stereo cassette, 9210112, \$6.95.

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

Although beautiful performances of The Four Seasons well recorded aren't uncommon on records, this is one of the first to appear on cassettes. Here, listeners are treated to some lyrical, sensitive bowing by violinist Schneiderhan, and by a chamber orchestra which is a delight to hear. Archive's recording is less spectacular than a recent London effort by Stokowski, but the sound is warmer and more pleasant. You can get cheaper disc versions equally well played and recorded, but it'll probably be a while before there's a cassette version to compete with this one.

R.A.

Rusty Warren

Look What I Got For You. Jubilee JST 8-2074, 8-track cartridge, \$7.95.

Program **
 Performance ****
 Recording ***

Here's that foul-mouthed broad again with another half-hour of the kind of party material which endears her to her fans. Suffice it to say that if you dig "for adults only" material, you'll find this cartridge in the right groove — not erotic, but dirty enough to be amusing after a couple of drinks. When you take it cold sober, you wonder what the hilarity Miss Warren inspires in her audience is all about. Recording is satisfactory.

W.R.G.

Spoken Word

American Poems of Patriotism. Includes

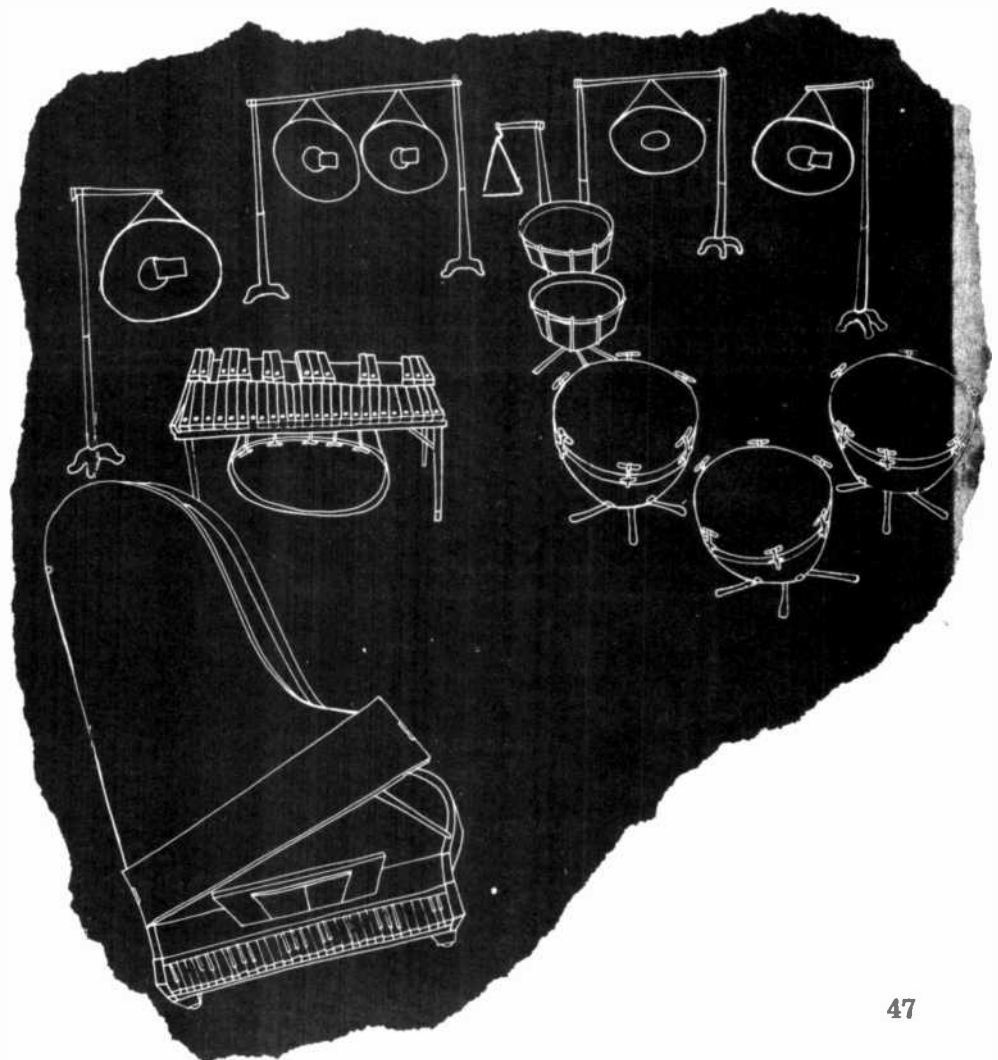
Key: *The Star-Spangled Banner*; Paul Revere's Ride; America; America the Beautiful; Yankee Doodle; Old Ironsides; The Declaration of Independence; The Gettysburg Address; and others. Read by Julie Harris, Ed Begley and Frederick O'Neal. Caedmen CX 4809, cassette \$6.95.

Program ****
 Performance ****
 Recording ***

The late Everett McKenley Dirksen recorded some of the same material for Capitol Records (thankfully, it's not available on tape), where it became a best seller. The difference between Senior Senator from Illinois and Harris, Begley and O'Neal is that between

cloying sentimentality and tasteful professionalism. While it may be that Sen. Dirksen felt these selections (only a handful are poems in the technical sense) more deeply, it is the actors who are able to shape them and give them meaning. Miss Harris and Mr. Begley in particular avoid the tendency to become sentimental, and provide excellent readings of material which is (or should be) familiar to every schoolboy. If you want this material in your home, this is the tape to have. We hate to sound unpatriotic, but since listening to it for review purposes, the cassette hasn't been out of its box. This just isn't the sort of program you listen to very often, no matter how well done it is.

R.A.



The First C-90 RECORDED CASSETTES

Bach

Brandenburg Concertos Nos. 1, 2 and 3; Concerto in a for Harpsichord, Flute, Violin and Strings. Mainz Chamber Orch. cond. Gunter Kehr. Vox VC 678002 cassette, \$6.95.

Bach

Brandenburg Concertos Nos. 4, 5 and 6; Concerto for 3 Harpsichord in C. Mainz Chamber Orch. cond. Gunter Kehr. Vox VC 678003 cassette, \$6.95.

Beethoven

Violin Concerto; Brahms: Violin Concerto. Susanne Lautenbacher, violin, Westphalian Symphony Orch. cond. Robert Wagner (in the Brahms). Vox VC 678020 cassette, \$6.95.

Copland

Rodeo, Billy the Kid, Fanfare for the Common Man. Dallas Symphony Orch. cond. Donald Johanos. Vox VC 678005 cassette, \$6.95.



Mozart

The Complete Masonic Music. Includes Psalm 129, Die Faurerfreude, Santa Maria Mater Dei, Dir Seele des Weltalls, Adagio in B Flat, Freimaurerlied, Ave Verum Corpus, etc. Vienna Voksoper Orch. and Chorus cond. Peter Maag. Vox VC 678017 cassette, \$6.95.

Mozart

Piano Concertos Nos. 23 and 25, "Coronation." Walter Klien, Vienna Volksoper Orch. cond. Peter Maag. Vox VC 678009 cassette, \$6.95.

Schubert

Symphonies Nos. 8, "Unfinished" and 9, "Great". Philharmonia Hungarica cond. Peter Maag. Vox VC 678008, cassette, \$6.95.

Vivaldi

The Four Seasons; Mandolin Concertos in C, G; Trio in g; Lute Concerto in D. Various soloists, Wurttemberg Chamber Orch. cond. Joerg Faerber. Vox VC 678019 cassette, \$6.95.

Organ Concerti

Includes Albinoni Adagio; Haydn Concerto in C; Mozart Sonata No. 4; Handel Concerto No. 13; Brxi Concerto in F; Auffmann Concerto in G. Various soloists with the Wurttemberg Chamber Orch. cond. Joerg Faerber (in the Albinoni, Mozart and Handel) and Stuttgart Soloists (in Haydn, Brxi and Auffmann). Vox VC 678001 cassette, \$6.95.

At last, somebody had done what this reviewer has been urging for more than a decade – using tape as a medium in its own right, without regard to duplicating exactly the contents of a long-playing record. It is fitting that Vox, one of the first companies ("way back in the mid 1950s) to license its catalogue for tape use, should produce such a well-considered release of some 20 titles. When you consider that Vox hasn't the resources in artists or in "popular" repertoire of some of the larger labels, this release becomes all the more remarkable.

What Vox has done is to combine the contents of from one to two LPs on a C-90 cassette to become the first company to produce any (let alone 20) titles on the thinner tape. In the past, engineers from Ampex and Deutsche Grammophon, among others, have expressed reservations about the frequency response, durability and overall fidelity of the thinner tape – at least for commercially recorded material. When you consider playing times ranging from 70 to 87 minutes for some of the longer albums – plus a suggested retail price of \$6.95 – the Vox catalogue becomes all the more interesting to the serious music listener who owns a cassette playback deck.

Is it too good to be true? Does the tape stretch? Is the fidelity low? Has Vox resorted to inferior performances or recording? Our initial sampling indicates that the answer generally to all these questions is no – but out of the nine tapes, we found two with defects. Vivaldi's Four Seasons had a distinctly mushy sound, particularly at the beginning of the tape, which might be

caused by a dirty head on a tape duplicator. Fortunately the second track, containing the miscellaneous Concerti was clear as a bell and delightful to listen to. And the Copland cassette had a pressure pad out of place, which resulted in mushy sound and very low volume throughout both tracks. Otherwise, we found the recorded sound of a high level — among the best cassette sound we've heard yet, in fact. Played through a Harman-Kardon CAD-4 deck, the Bach Brandenburgs indicated a frequency response of 50-12,000 cps within 3 db, with frequency continuing to 14,000 cps (albeit with a sharp increase in distortion). Wow & flutter was not measured, and appears to be inaudible. Tape hiss is not noticeable, even when the volume is turned up, and clarity — particularly of solo instruments — is remarkable in our cassette-listening experience. We tested for stretch by switching as fast as possible from fast forward to fast reverse and back again, then playing the tape. In order to do so, however, on the deck we used, you must depress the stop button. No amount of switching in this manner resulted in tape stretch or jamming that we could detect. Result: generally high marks



for the first C-90 release, but a cautionary word to buyers about possible manufacturing defects.

About the music itself: much of it appears here for the first time. In general, it is well played, with some outstanding fiddling by Miss Lautenbacher on several cassettes and some mediocre orchestral work here and there. We have a few bones to pick (the Masonic Music is not as "complete" as one might wish), but in general these are sensitive performances of music which belongs in most serious collections. Unlike some other cassette manufacturers, Vox does attempt to provide some background information in the form of liner notes.

Let's start with the Bach. Fine, sensitive playing of the Brandenburgs by a small chamber ensemble warmly recorded. Volume 1 comes off slightly better than Volume 2 because of the slightly marred solo playing in Brandenburgs No. 5 (a slightly muddy harpsichord sound) and No. 6 (the violas seem a bit tentative). But don't let that put you off. The fillers — the concerto for three harpsichords and concerto for mixed instruments — more than make up for any minor deficiencies.

Although these are believed to be the first cassette recordings of the Beethoven and Brahms violin concertos, others are sure to follow, played by better-known soloists and orchestras. What we have here are two provincial orchestras providing generally competent (if uninspired) support to an outstanding soloist. To make up for less-than-top-drawer orchestral playing (it's certainly tolerable), Vox offers the dual advantages of two concertos for the price of one and uninterrupted performances of each. To us, that's worth something! The Copland sound,



as mentioned earlier, was so poor as to make musical evaluation impossible. The Copland, incidentally, with 42½ minutes of music, is the shortest of the tapes supplied for review.

When Vox issued Mozart's Masonic Music on records, the critics hailed it as an important addition to the catalogue. We couldn't agree more. There's plenty of unfamiliar music here, tastefully performed by the Vienna Voksoper and soloists. The program includes several songs for soloist, a number of choral gems, and some instrumental pieces. The choral passages, in particular, sound lovely and powerful when





played through a large speaker system. Unfortunately, the 87-minute cassette contains only about 4/5 of the music from the two-record set. The most important omission is the Masonic Funeral Music, k.477. The others are three adagios available elsewhere on records. For Mozarteans, however, this cassette is a must. The same goes for the two piano concertos, exquisitely played by Walter Klien and ably abetted by conductor Maag. These two cassettes may be the only choice at the moment, but it will take something really outstanding to displace either one once competition starts to arrive. So feel free to buy now.

The Schubert tape is another story. Technically, it ranks near the bottom of the release, with a ragged sound in the crescendos of the "Unfinished" that detracts from Maag's lyrical interpretation. To squeeze the two symphonies (three record sides) onto a single cassette, Vox has cut the customary five-second break between movements to a minimum one or two seconds. Thus Schubert's period at the end of the first movement of the

"Unfinished" becomes something more like a comma. The extra-long playing time is an undeniable advantage, but the tape still splits the Symphony in C over two tracks and in any event, competition for both works is due from other sources.

The Vivaldi tape features some superb playing, mostly by Miss Lautenbach on the first track and by mandolinists Paul Grund and Arthur Rumsch on the second. Indeed, if the second side is any indication of the recorded quality of Vox's Vivaldi, more's the pity our first track suffered audible blemish. When the recorded sound is good, it's very, very good, giving warmth and clarity to the beautifully shaped performances. Vox's programmers evidently have selected the contents of two LPs with care to come up with a cassette that maintains interest throughout. And there's no denying the advantage of not having to get up after *L'Estate* to reverse the tape. If you can, check this one out before buying. If our damaged copy is an exception, this cassette is another Vox winner.

Finally, there's the potpourri of organ works featuring organists Franz Lehrndorfer and Douglas Haas. Here's



where wow and flutter should show up — and they don't. This reviewer might prefer a better balance between organ and orchestra — i.e. less prominent orchestra in the case of the Haas recordings, but for the most part the music is played tastefully and the orchestral accompaniment is ideal. This cassette isn't likely to face competition in the immediate future. When it comes, it will have to be very good to warrant your replacing this one.

The Vox release includes Bach's Bass in b, the Bartok piano concertos, the Bruckner Eighth Symphony and other goodies which were not for review. In summary, the C-90 pre-recorded cassette is an audio and artistic success, with Vox setting a very high standard (a standard, incidentally, the company does not always reach). Although the Vox cassettes are the first to use the long-play medium, it's likely that others will be marketing them soon. TAPE RECORDING has learned that Ampex Stereo Tapes is readying its own C-90 classical and popular titles with release likely later this year.

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