

# TAPE RECORDING

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See Page 28

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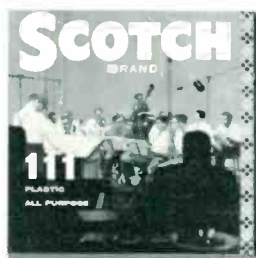
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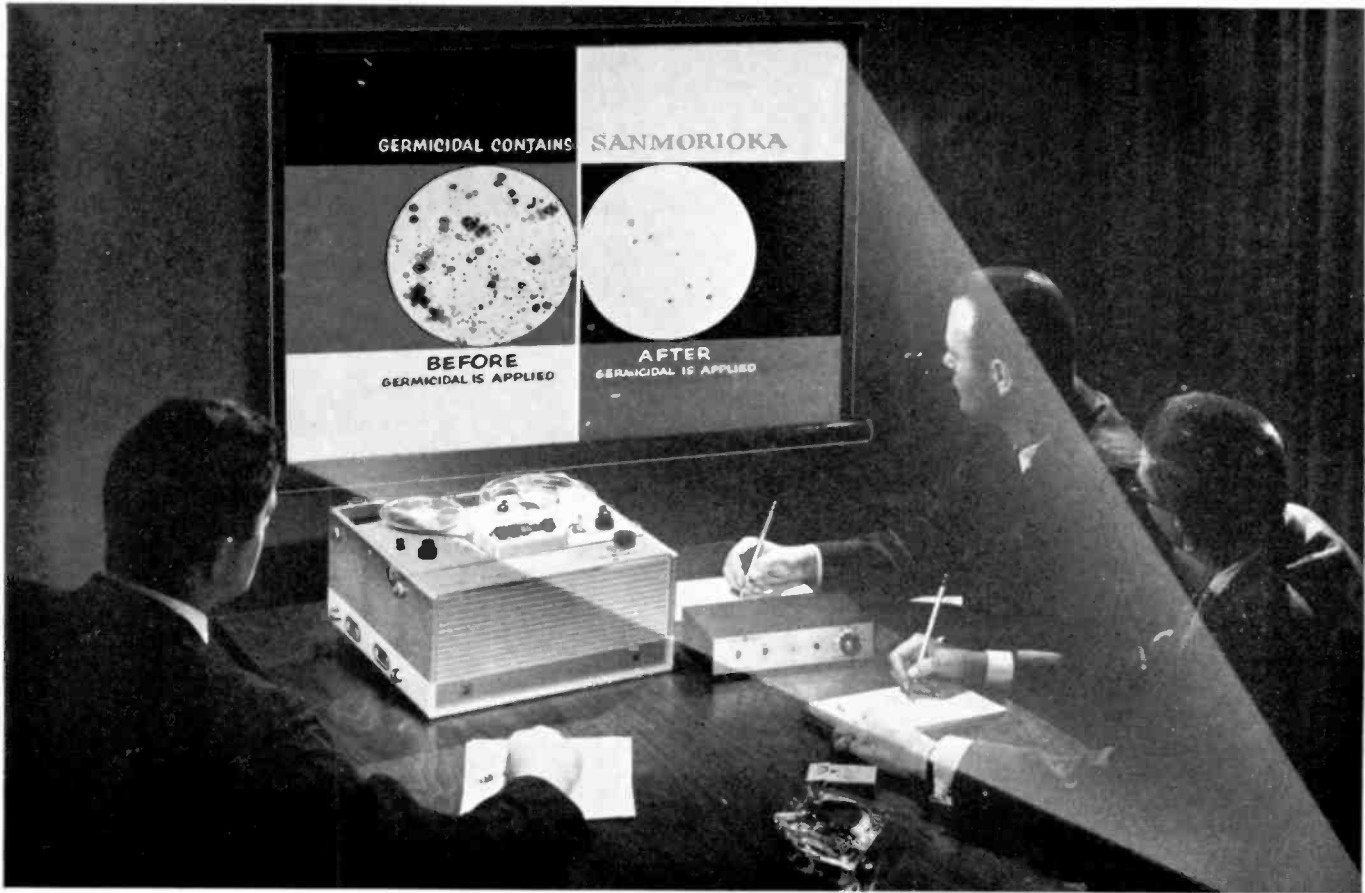


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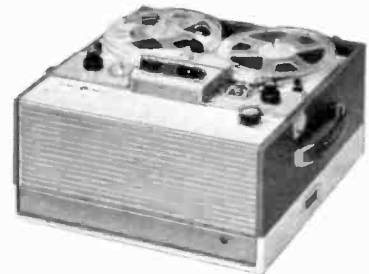
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# TAPE RECORDING

VOL. 8 NO. 4

MARCH, 1961

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TAPE RECORDING is published monthly by Mooney-Rowan Publications, Inc., 101 Old Annapolis Blvd., Severna Park, Md. (Mitchell 7-1800). Entered as second class matter January 7, 1954 at the Postoffice Severna Park, Md. under the Act of March 3, 1879. National Advertising Representative: J. V. Associates, 274 Madison Ave., New York 16, N. Y. (ORegon 9-0050). Subscriptions, U. S. and Possessions, Canada and Mexico \$3.75 for one year, all others add \$1.00 a year. Two years \$7.00. Contents copyrighted by Mooney-Rowan Publications, Inc., 1961. Printed in U. S. A.

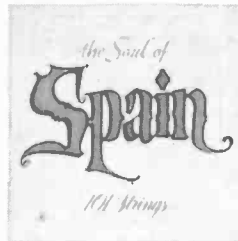
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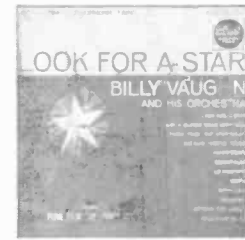
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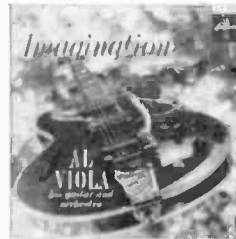
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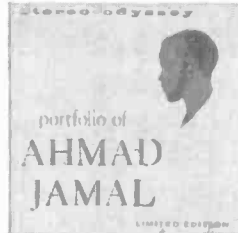


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# NEW TAPES

★—Fair

★★—Good

★★★—Very Good

★★★★—Excellent

## CLASSICAL

Reviewed by Robert E. Benson



Music ★★★★★  
Performance ★★★★★  
Fidelity ★★★★★  
Stereo Effect ★★★

**TCHAIKOVSKY:** *The Nutcracker Ballet*  
Philharmonic Symphony Orchestra of London, Arthur Rodzinski, cond.  
WESTMINSTER WTP 138 (twin pack)  
81:08 min.



Music ★★★★★  
Performance ★★★  
Fidelity ★★★  
Stereo Effect ★★★

**TCHAIKOVSKY:** *The Nutcracker Ballet*  
New York City Ballet Orchestra, Robert Irving, cond.  
KAPP K 45007 78:08 min.



Music ★★★★★  
Performance ★★★  
Fidelity ★★★  
Stereo Effect ★★★

**TCHAIKOVSKY:** *The Nutcracker Ballet*  
Suisse Romande Orchestra, Ernest Ansermet, cond.  
LONDON LCK 80027 81:47 min.  
\$11.95 each

What an overabundance of riches we have here! No less than three complete recordings of Tchaikovsky's ballet masterpiece *The Nutcracker*, with a common high level of performance and recording.

The Rodzinski version is already well-known to two-track tape collectors, as it was released several years ago on two seven-inch reels, at a total cost of more than \$35.00. The orchestra, consisting of players from England's best orchestras, is superb, and Rodzinski's direction is immaculate. Westminster's reproduction is quite remarkable, with scintillating highs, although it might have benefited from more hall sound.

The Kapp version is quickly paced, and well-performed by an orchestra that must know this music backwards, they perform it so frequently. Sound is not as clean as the Westminster, but very good, with big, resonant acoustics which I find attractive.

Ansermet is meticulous as he always is, but his orchestra has a lighter timbre than either of the other two versions,

recorded with London's typically fine quality.

You could not go wrong with any of the three recordings; my personal preference is for the Rodzinski.



Music ★★★★★  
Performance ★★★  
Fidelity ★★★★★  
Stereo Effect ★★★

**BEETHOVEN:** *Symphony No. 6 in F Major, Op. 68 "Pastorale"*  
**BEETHOVEN:** *Symphony No. 7 in A Major, Op. 92*  
Suisse Romande Orchestra conducted by Ernest Ansermet  
LONDON LCK 80052  
four-track, 7½ ips  
\$11.95... 80 min.

London has released stereophonic discs of all nine Beethoven symphonies with Ansermet and the Suisse Romande Orchestra, but these are the first two symphonies in this series to be available on tape. This is a wise coupling, for Ansermet is more successful in the less heroic symphonies, which are also better suited to the sound of the Swiss orchestra.

The *Pastorale* is as good as any on tape, leisurely, but with a truly exciting storm. The *Symphony No. 7* is given a vigorous treatment, Ansermet giving us several repeats not usually heard. The sound is exemplary with the wide range and fidelity characteristic of London. Vanguard has a similar coupling conducted by Sir Adrian Boult which has even more spacious sound, but it lacks the clarity of the newer London tape.



Music ★★★★★  
Performance ★★★  
Fidelity ★★★★★  
Stereo Effect ★★★

**RACHMANINOFF:** *Piano Concerto No. 2 in C Minor, Op. 18*  
Peter Katin, pianist; New Symphony Orchestra of London conducted by Colin Davis  
RICHMOND RCH 40002  
4 track, 7½ ips  
\$4.95... 33 min.

A big-scaled, virtuoso performance of this perennial favorite, with some of London's best sound. The Victor two-track tape with Rubinstein and Reiner, not yet available on four-track tape, still gets my vote for the best performance and recording on tape, but this new Richmond release, is almost as good in both respects, and at a price of only \$4.95, must be recognized as the extraordinary bargain that it is.



Music ★★★★★  
Performance ★★★★★  
Fidelity ★★★★★  
Stereo Effect ★★★★★

**BRUCKNER:** *Symphony No. 4 in E Flat Major "Romantic"*  
Bamberg Symphony Orchestra, Heinrich Hollreiser, cond.  
SMS 541-A  
four-track, 7½ ips  
\$8.95... 64 min.

The heavily orchestrated symphonies of Bruckner, as well as those of Mahler, cry out for stereophonic sound for their fullest sonic realization, and SMS is to be commended for releasing two of the Bruckner symphonies on tape. As was the case with their earlier release of the *Symphony No. 7* conducted by Hans Rosbaud, their version of the *Symphony No. 4* is of extraordinary merit. This is perhaps Bruckner's most easily understood work in this form, with dramatic surges of sound and an abundance of spectacular orchestral passages, particularly in the brass, which have an immediate appeal for those uninitiated in the music of this composer.

Heinrich Hollreiser, whose fine recording of the Bartok *Concerto for Orchestra* (Vox XTC 704, \$7.95) was favorably received some months ago, shows an equal affinity for the music of Bruckner, providing a spacious, well-controlled reading, abetted by uniformly fine playing from the Bamberg Symphony, although I would have preferred a more dynamic approach in the *Scherzo*.

Reproduction is big and open, with rather vague directionality, but plenty of concert hall presence. Columbia has recorded a performance of this music conducted by Bruno Walter, but it is not known when it will be released, and if it will be available on tape. The SMS release is of such high quality that one need not wait.



Music ★★★★★  
Performance ★★★★★  
Fidelity ★★★★★  
Stereo Effect ★★★★★

**TCHAIKOVSKY:** *Manfred* (Symphony in Four Tableaux After the Dramatic Poem of Byron) Op. 58  
London Symphony Orchestra conducted by Sir Eugene Goossens  
EVEREST T4-3035  
4 track, 7½ ips  
\$7.95... 48 min.

*Manfred* was composed in 1885, between the Fourth and Fifth symphonies. There are four movements to this colorful score: *Manfred Wanders in the Alps*, *The Fairy of the Alps*, *Pastorale*, and *The Un-*

background Palace of Arimanes. It calls for a large orchestra, including a tam-tam, two harps and an organ.

It is difficult to understand why this music is not more popular, for it contains some of Tchaikovsky's finest music. The dramatic *Manfred* theme of the first movement, which recurs throughout the work, is one of the composer's most powerful themes, and as heard in this new recording, stated by brilliant brass, sonorous strings and shattering cymbals, is exciting indeed.

There are several monophonic recordings, notably Toscanini's with the NBC Symphony, but they all must bow to this splendid new version. Goossens plays the score without cuts, and gives a dynamic, virile reading, with top quality playing from the London Symphony.

EVEREST has here a sonic wonder, recorded in deep, resonant stereo, despite somewhat stentorian highs. The conclusion of the first movement, with its sustained tympani and brass drum rolls, is one of the most spectacular hi-fi displays I've ever heard.



Music ★★★  
Performance ★★★★★  
Fidelity ★★★★★  
Stereo Effect ★★★★★

GERSHWIN: *An American in Paris*, Rhapsody in Blue

Leonard Bernstein as pianist and conductor of the New York Philharmonic and Columbia Symphony Orchestras

COLUMBIA MQ 322

four-track, 7 1/2 ips

\$7.95...35 min.

Recommended unhesitatingly as the near-definitive recording of these fine works of Gershwin. Bernstein is perfectly at home in this music, and stresses the jazz influences; it is difficult to imagine a more idiomatic interpretation of the *Rhapsody*. Most other four-track versions of the *Rhapsody* couple it with *An American in Paris*, but none of them is the equal of this in either performance or sound, the closest being the Victor with the Boston Pops conducted by Arthur Fiedler, with Earl Wild as soloist in the *Rhapsody*. (RCA FTC 2004, \$8.95.)

Columbia's sound is dazzling and somewhat overly brilliant. Everything is close-up and bright, as it could never be in the concert hall. For this music, this engineering approach sounds just right.

**POPULAR**



Music ★★★  
Performance ★★★★★  
Fidelity ★★★★★  
Stereo Effect ★★★

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I Hear Music, Dry Bones, In the Still of

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\*CAN CAN (Sinatra, MacLaine; Soundtrack)  
*I Love Paris; It's All Right with Me; Just One of Those Things; You Do Something to Me; C'est Magnifique; Let's Do It;* more. ZW 1301

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☆☆☆ **Classics**

\*AMERICANA (Dragon, Capitol Symphony)  
*On the Trail; Battle Hymn of the Republic; America the Beautiful; Home on the Range; Stars and Stripes Forever; Dixie;* etc. ZP 8523

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the Night, Ol' Man River, Hit the Road To Dreamland, Smoke Gets In Your Eyes, Give Me Your Tired, Your Poor, Cigarette, Sweet Music and You, The Whiffenpoof Song, Hora Staccato, Lolly Too Dum Dey, Sometimes I Feel Like A Motherless Child, You'll Never Walk Alone, Battle Hymn of the Republic, Sleep

CAPITOL ZW 845

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Fred Waring and His Pennsylvanians have delighted audiences for quite some time now and they are still held in great esteem by most al. who hear them.

Choral groups are meant to be listened to—really listened. They harmonize to create a single musical body, functioning smoothly.

On particular selections, soloists display their individual talents, and some of the

Pennsylvanians are indeed quite talented. Fred has a knack for choosing just the perfect voice for a solo performance. They fit like a well-fitted glove.

It is amazing what emotion a human voice can inject into music. Enough to make you shiver, or laugh out loud, or maybe cry. For instance, when you are sad, a sympathetic sad song, sung as though the singer were experiencing the emotion being expressed, can sting the eyelids until the salty stream begins its flow. This is true, of course, if you are a person possessed of emotions, as most of us are. A minority group wouldn't be touched at all.

The Waring group does sing with expression and by so doing they breathe life into each number. Good listening.

You would have to have extremely sensitive hearing to detect any flaws in fidelity here. It is a well reproduced tape.

**RECORDING TAPE**

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as it was with the great Glenn Miller, Guy Lombardo's style can be copied, but it can never really be exactly duplicated.

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This music is absolutely perfect for dancing and the fact that most of the selections are in medley groups makes it even better. There are uninterrupted passages of just about the proper duration for dancing

**MUSIC** ★★★  
**PERFORMANCE** ★★★  
**FIDELITY** ★★★  
**STEREO EFFECT** ★★★

**MOTION PICTURE THEMES OF VICTOR YOUNG**

Song of Delilah, Stella By Starlight, Love Letters, When I Fall In Love, Wintertime of Love, The Seven Hills of Rome, Golden Earrings, Around the World, A Love Like This, My Foolish Heart, Alone At Last, Moonlight Serenade  
Richard Hayman conducting  
MERCURY STC 60012  
4 track, 7 1/2 ips  
\$7.95...38 mins.

Romantic, warm, calming music, pleasant to listen to. This is the type tape to play in the evening when everyone is home from work and settled down for the rest of the day. It slowly helps brush away the day's cares.

Generous orchestration—rich harmony. Mr. Hayman has always been an admirer of Victor Young's work and he thus uses extra care in conducting the playing of it.

The music has a tenderness about it, both in the way it is written and the way it is played.

A relaxing footage of tape from start to finish.

**MUSIC** ★★★  
**PERFORMANCE** ★★★  
**FIDELITY** ★★★★★  
**STEREO EFFECT** ★★★

**STRICTLY FOR DANCING**

Lorelei, Joanne, Evelyn, Angela, Connie, Pauline, Shirley Jean, Anna Marie, Lois Anne, Geraldine, Carol Ann, Cathy Sue, Marguerite  
Lawrence Welk and his orchestra play champagne music  
DOT (Bel Canto) DST-25274  
4 track, 7 1/2 ips  
\$7.95...30 mins.

**ROAR along with the singing 20's**

**MUSIC** ★★★  
**PERFORMANCE** ★★★  
**FIDELITY** ★★★★★  
**STEREO EFFECT** ★★★★★

radio, theatre, supper clubs, the concert world and even the symphonic stage.

Her voice is not the most beautiful in the world, but then few entertainers, and I'm referring to some of the top, have a really beautiful voice. Their success has rather resulted from their style, or training, or their method of presentation, or perhaps the talents of some arranger—not from the actual sound of their voice.

But Hildegard has a manner of putting across a song. It may be her extreme pronunciation or her singing in varied languages, or her expression, or a combination of all three. Whatever it is—it is engagingly entrancing.

She strikes me as a female Danny Kaye in the sense that she has the talent of being able to pronounce languages or songs fast and accurately without missing a single word. She and Danny would be a great entertaining duo.

The only backing here is a single piano, but somehow or other it just fits Hildegard's singing.

Every accent, every syllable, every word Miss Hildegard puts forth has been perfectly captured on tape.

**MUSIC** ★★  
**PERFORMANCE** ★★★  
**FIDELITY** ★★★  
**STEREO EFFECT** ★★★

**STRICTLY FOR DANCING**

Lorelei, Joanne, Evelyn, Angela, Connie, Pauline, Shirley Jean, Anna Marie, Lois Anne, Geraldine, Carol Ann, Cathy Sue, Marguerite  
Lawrence Welk and his orchestra play champagne music  
DOT (Bel Canto) DST-25274  
4 track, 7 1/2 ips  
\$7.95...30 mins.

"Well-mmmmm," as Lawrence would say, put on your dancing shoes, or better yet, kick off the shoes and dance in stocking feet, but whatever you do—dance. The times I have caught Lawrence Welk on TV, I have thoroughly enjoyed watching his dancing with his Champagne Lady because he looks like he enjoys dancing so much. He loves music and he further loves to see the magic music can evoke from most folks via their feet.

He dispenses with the frills and vain falseness of most musical arrangements (the same as it is with some people) and rather seeks out the basic, genuine wholesomeness of a melody. He expresses what the composer had in mind when he first originated the composition. In fact, on this tape, all the selections are originals of Mr. Welk himself, together with Lew Quading, who has written many hits. All the songs are named after girls, and as the title implies are "strictly for dancing."



ROAR ALONG WITH THE SINGING 20'S  
Baby Face, My Blue Heaven, Varsity Drag,  
Ain't She Sweet, Margie, Yes Sir That's  
My Baby  
Sweet Georgia Brown, Black Bottom,  
Doodle Doo Doo, Five Foot Two Eyes of  
Blue, Somebody Stole My Gal, I'm Look-  
ing Over A Four Leaf Clover  
The Johnny Mann Singers  
LIBERTY (Bel Canto) LT-7149  
4 track, 7½ ips  
\$7.95...35 mins.

Even when you are feeling about as low  
as you can possibly get, this type music  
lifts your sinking spirits. It is happy music  
and personally I'm nuts over it. I feel I was  
born a bit too late because I would have  
belonged in the 20's era. You've heard of  
jazz enthusiasts becoming "sent" by the  
music, well this type music sends me—I'm  
not sure where, but it's nice to be there.

The Johnny Mann Singers do a great job  
on this and the arrangements are different  
and entertaining. I wish only that there did  
not seem to be quite so much channel  
separation.

You'll find yourself singing along with  
this tape—that is if you're not dancing your  
fool head off. The tempo is fast and sizzling.

Sound—well, Bel Canto's engineers have  
caught every note—every half-note, every  
quarter, eighth and sixteenth too, and faith-  
fully reproduced them all.

## SHOW



### THE SOUND OF MUSIC

Prelude, The Sound of Music, Maria,  
My Favorite Things, Do-Re-Mi, Sixteen  
Going on Seventeen, The Lonely Goat-  
herd, How Can Love Survive, The Sound  
of Music (Reprise), Laendler, So Long,  
Farewell, Climb Ev'ry Mountain, No Way  
to Stop It, An Ordinary Couple, Pro-  
fessional, Sixteen Going on Seventeen  
(Reprise), Edelweiss, Climb Ev'ry Moun-  
tain

Original Broadway cast featuring Mary Mar-  
tin and Theodore Bikel

COLUMBIA OQ311

4 track, 7½ ips

\$9.95...60 mins.

The Sound of Music has quite a dramatic  
background story for a musical. The he-  
roine, Maria (Mary Martin), is at first a  
postulant in a nuns Abbey. When it looks  
as if the religious life is not for her, she  
becomes a governess for the children of a  
widowed Captain (Theodore Bikel), later  
she and the Captain are married and in ad-  
dition they must all flee from the Nazis.  
Throughout the whole plot, the music of  
Rodgers and Hammerstein enhances all the  
happenings.

Reproduction here is extremely precise  
and every word sung is distinct and easily  
distinguished. Mary Martin is as always  
superb in this type production.

Those who have a show category among  
their tape collection will definitely want this  
addition.

Created in a tradition of excellence

*Wonderful, Wonderful*

# WOLLENSAK

WORLD FAMOUS FOR PRECISION QUALITY SINCE 1899



### POWER-ZOOM CAMERA

Fully automatic.  
Takes zoom-action  
telephoto, normal or  
wide angle views at  
touch of a button.  
Electric eye expo-  
sure. Continuous run  
feature. Moderately  
priced.



**AUTOMATIC PROJECTOR.** Feeds film right  
onto the take-up reel. Starts movies  
by itself. Forward, reverse, still. Zoom  
lens increases picture to almost twice  
the size without moving projector.  
750 watts. Moderately priced.

**STEREO TAPE RECORDER.** Compact and powerful. Choose from: Monaural, Stereo or  
the new Stereo Electronic Control that plays continuously, repeats any portion, turns  
off by itself. Plays all the latest 2 or 4 track stereo tape releases with second channel  
directly through radio, TV or hi-fi for magnificent 3rd dimensional sound. Simplified  
keyboard controls, dual speeds, unique "Balanced-Tone" hi-fidelity. Light enough to  
carry anywhere. Hear a Wollensak at your dealer... check the features and low prices.

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Fidelity pure as the white snow.

## JAZZ



### THE SUBTERRANEANS

Why Are We Afraid?, Guido's Blackhawk,  
Two By Two, Bread and Wine, Coffee  
Time, A Rose and the End, Should I,  
Look Ma, No Clothes, Things Are Looking  
Down, Analyst, Like Blue, Raising Caen  
Original movie sound track, featuring Andre  
Previn, Gerry Mulligan, Carmen McRae and  
others  
MGM STC-3812  
4 track, 7½ ips  
\$7.95...40 mins.

The Subterraneans is a dramatic love  
story whose background is the New Bo-  
hemian (Beatniks to some) way of life in  
San Francisco. This way of life would be  
incomplete without the cool intellectual  
progressive jazz these offbeat humans enjoy  
so much.

Andre Previn is a master with arranging

any type music and when he intersperses  
jazz solos with symphonic sound, the result  
is different and exciting. This he has done  
on some of these selections. Others are pure  
jazz and some of the well-known jazz en-  
thusiasts are soloists, such as Gerry Mulli-  
gan, Red Mitchell, Shelly Manne, Art Pep-  
per, etc.

Jazz lovers will love this tape. Unless you  
do like this type music, however, I suggest  
you give it a try before putting out cash.

## NEW TAPES RECEIVED

### REEL TO REEL

Bel Canto, ST-112, Benny Rides Again, The  
clarinet, orchestra, and quintet of Benny  
Goodman, 4 track, 7½ ips.

Capitol, ZP 8326, Concertos Under the  
Stars, The Hollywood Bowl Symphony  
Orchestra, 4 track, 7½ ips.

Dot (Bel Canto), DST-25263, Together,  
Louis Prima, Keely Smith, 4 track, 7½  
ips.

Liberty (Bel Canto), LT-7151, The Franz  
Liszt Story, The Piano and Orchestra of  
Harry Sukman, 4 tracks, 7½ ips.

London, LOH 90002, The Pirates of Pen-  
zance, The D'Oyly Carte Opera Company,  
4 track, 7½ ips.

Mercury, STB 60068, Oldies but Goodies,  
Griff Williams and his Sweet Music, 4  
track, 7½ ips.

# CROSSTALK

from the Editors

"THERE MUST BE SOMETHING WRONG with the promotion of recorded tape." This remark was made by a man who is well acquainted with the virtues of tape and, in fact, has a radio show devoted to classical music. He continued with, "I know one store that has a very adequate stock of tapes, yet they do not move the way records do."

\* \* \* \* \*

WE REMINDED HIM THAT if more musical programs from the radio stations were played from tape, this would be one thing that would help to spread the word. We suggested that he switch to tapes on his own show.

\* \* \* \* \*

IT DEVELOPED that he was already using tape almost exclusively and when we brought up the point that he seldom, if ever, mentioned it on his show, he acknowledged that this was so.

\* \* \* \* \*

BEST OF ALL, he was going to take the matter up with the station management to see if tape might not be mentioned where mention was due. What the outcome might be we do not know.

\* \* \* \* \*

THIS SAME SCENE probably could be reenacted in many, many places, especially where radio stations have stereo programs. We think it only fair that when a tape is played it be identified as such, otherwise the public will think they are hearing a disc recording.

\* \* \* \* \*

IT SEEMS TO US that the MRBA should take steps to call this to the attention of the broadcasters. This would put an industry behind the move rather than one individual company. While they are at it, the archaic "electrical transcription" bit might also go by the boards. This term was a hangover from the days when tape was but a gleam in the inventor's eye. When a program is played from tape, the radio station should so state.

\* \* \* \* \*

THIS WOULD NOT BE ASKING any favors of the broadcast industry. It would merely be setting the record straight. The benefit that would accrue to tape would be a handsome one. Considering the wide use that radio stations make of tape—and some stations can even be completely automatic running entirely from tape—if it were but properly given credit when due, over the air, the constant mention of tape would gradually sink into the public consciousness. When the public hears its music from tape—and knows it—they will probably figure that if the broadcast industry prefers tape, then it must be good.

\* \* \* \* \*

ANOTHER FACTOR is the current trend in almost all lines of products to give good guarantees on products. Automobiles are now guaranteed for a much longer period than formerly, and the same is true of many other products.

\* \* \* \* \*

THE WEARABILITY OF TAPE as contrasted to the wearability of stereo records has never been plugged as it should be. The recorded tape slogan "Music Sounds Best on Tape" is 100% correct but maybe it should read "Music Sounds Best on Tape—Forever."

\* \* \* \* \*

THE STORY USED TO BE that if you made a better mousetrap the world would beat a path to your door. This old adage probably now reads "If you build a better mousetrap the world will beat a path to your door—if you publicize it enough."

\* \* \* \* \*

THERE IS A LOT OF MENTION due tape. Why not take steps to see that it gets it?

# INDUSTRY NEWS

MICHIGAN MAGNETICS, manufacturers of tape recorder heads has become a subsidiary of Voi-Shan Industries, Inc. with headquarters in Los Angeles, according to Charles F. Murphy, president.

Voi-Shan are processors of exotic metals and their experience, plus the added facilities, will enable Michigan Magnetics to serve their customers better.

There will be no change in the MM organization nor in the personnel as a result of this move. Chuck Murphy will continue as MM president and as a substantial stockholder in the firm.

MRIA sponsored Home & Hi-Fi show to be held in San Francisco Cow Palace March 15 through 19 will have a coordinating committee of top bay area hi-fi equipment manufacturers, according to James C. Logan, executive director of the affair.

MINNESOTA MINING has dropped the price of their high-output tapes to the level of standard tapes because of improved production economies in the manufacture of the tapes.

AUDIO DEVICES has appointed Dr. Orlando O. Schaus as manager of research and engineering.

REEVES SOUND CRAFT has appointed Edward Schmidt as Vice President in

Charge of New Product Development.

JAPAN sends 70% of its tape recorder exports to U. S. and Canada, according to a recent report. The total is expected to come to approximately 170,000 units. Starting in April, the tape recorder manufacturer's trade groups will set quality inspection standards for recorders destined for export. Most of the recorders exported were the small transistorized type selling for low prices.

ROBERTS ELECTRONICS is building a new building of 50,000 square feet at a cost of \$1,000,000 according to E. J. Freeman, vice president. He also said sales were running 98% over projected sales for the year.

Larry Post, Sales Manager of ROBINS INDUSTRIES in a recent memo to sales reps and distributors pointed out the futility of manufacturers securing sales leads through advertising only to have them go to waste through inefficient follow-ups and inadequate stocks. Robins is instituting a new procedure which will assure reps and distributors of advance notice on all advertising so adequate stocks can be maintained for customer service.

DAVE HUBERT, founder of Omega-tape is now sales manager of Concord Electronics, Los Angeles firm.

# BOOK REVIEWS

*Tape Recorder Manuals, Vols. 1 through 5, 8 1/2" x 11", paper bound, 144 pages each, \$2.95 each. Published by Howard W. Sams, Indianapolis, Indiana.*

Each of these volumes covers a number of recorders giving pictures, exploded views, schematic diagrams and parts numbers for each machine covered. Also included is trouble shooting data giving possible causes of specific malfunctions.

Vol. 1 (TR-1, 1958) covers the Ampex 612, Bell RT-75, Columbia 560A, Ekotape 250, 251, 252, 253, 254, 255, 260, 261; Ellamac Language Master Magnecord F-25B, Silvertone 7074, V-M 710, 711, 750 and Wilcox-Gay 651, 674.

Vol. 2 (TR-2, 1958), Bell 204, Crescent TR-672, 673; DeJur TK820, TMB820; Knight 96RZ940; Magnecord S-36B, RCA 7TR2, 7TR3, 8STP1, 8STP2; Silvertone 6074; Symphonic R1200, BR1200 and Webcor 2718, 2719.

Vol. 3 (TR-3, 1959), Ampex A122, A124, A-621, A692, Geloso G255S; Knight, 99RZ177, 99RZ936; Magnecord PT6-J, PT6-6J, PT6-6A; RCA 6-HTT1, Revere T11, Silvertone 8070, 8072, Webcor 2812, 2816, 2822, 2892, 2896; Wilcox Gay 375, 750; Wollensak T-1500.

Vol. 4 (TR-4, 1959), Bell and Howell 770, 775G1, 775G10; Bell BT2051B, BT2050B; Grundig Majestic TK5, TK8, TK8/3D, TK8E, TM8, TM8E, TM8U; Knight KN4010, KN4020; RCA 8TR2,

8TR3, Ch. RS156F, H, TR2A1-2; Revere T-700D, TR800D; Sylvania 4901, Telectro 1960, Tower 4691.

Vol. 5 (TR-5, 1959), Ekotape 270 and 280 series, Norelco EL-3516; Pentron NL-1, NL1S, NL2, NL2S, NL3, NL3S, TM1, TM4; Revere T1100, T1120, TR1200, Silvertone 528.58000, 528.58001, 528.59000, 528.59001; Telectro 1970; Webcor 2811, 2821, 2891; Wilcox-Gay 772.

All are excellent and complete, are a must for service people and anyone wishing to trouble-shoot his own recorder.

*The 1961 Audio-Visual Equipment Directory, Seventh Annual Edition, 8 1/2 x 11, paper bound, profusely illustrated, 289 pages. Published by the National Audio Visual Association, Fairfax, Va., \$4.25.*

The annual issues of this volume have practically become the "Bible" of the audio-visual field. The present edition has more than 650 photos of equipment plus complete specifications on equipment in 53 different classifications including new sections on Educational TV Receivers, Closed Circuit TV, Teaching Machines and Classroom Radios. Also included are Still and Movie Projectors, Tape Recorders, Automatic Projectors, etc.

For anyone interested in A-V equipment this book is a must and it is highly recommended; an excellent work.



## RECORD & PLAY WHILE AWAY...

WITH **terado** POWER CONVERTERS

PROVIDE HOME ELECTRICITY FROM THE STORAGE BATTERY

Now you can record or play your tapes anywhere . . . in car, boat or plane. Terado Converters change the 6 or 12 volt battery current to 110 volt, 60 cycle A.C., making your recorder and other electronic equipment truly portable. Models from 35 to 200 watts, all filtered for radios and tape recorders. List prices start at \$23.95.

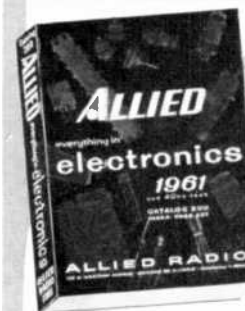
See Your Electronics Parts Dealer, or Write:

**terado COMPANY**  
1063 RAYMOND AVE.  
ST. PAUL 8, MINNESOTA  
In Canada: ATLAS RADIO CORPORATION LTD., Toronto

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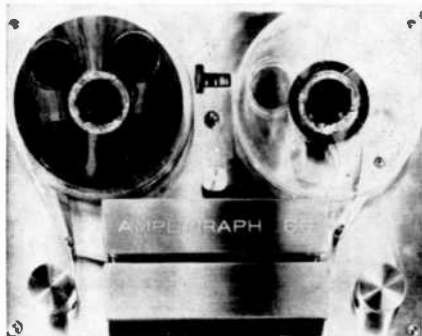
# NEW PRODUCTS

## BELL & HOWELL RECORDER



A new four-track portable stereo tape recorder has been introduced by Bell & Howell Company, 7100 McCormick Road, Chicago 45, Illinois. The model 785-4TS contains two 5¼ inch speakers; has five-way push button control; a monitor control for listening while recording, remote control for professional type editing; speeds of 3¾ and 7½ ips; a recording level guide; and a 72 inch output-input cord. Frequency response is plus or minus 4 db from 50 to 13,000 cps at the faster speed; total overall distortion is less than one per cent at normal levels; signal to noise ratio is in excess of 40 db minimum; wow and flutter are less than 0.35 RMS maximum at 7½ ips. A special pause control permits professional-type recordings by instantaneously stopping and starting the tape. The 785-4TS is priced at \$259.95.

## AMPLIGRAPH DECK



The Ampligraph Corporation has introduced its Model 66 stereo tape deck, which is available as a quarter track playback machine or for the full combination of record-reproduce services. It has speeds of 7½ and 3¾ ips, frequency response of 30-20,000 cps at the faster speed, wow and flutter less than 0.15%, and timing accuracy is within plus or minus 5.7 seconds for a standard 1200 foot reel. Other features include automatic stop, virtually noise-free mechanical operation, a large dynamically balanced flywheel, and a unique torque drive and braking system which minimizes tape stretch. A stereo recording preamplifier on a single chassis is available separately. Write to Box 103, Sudbury, Massachusetts, for the Model 66 brochure, price, and delivery information.

## TURNER MICROPHONE



The Turner Company, 909 17th St. N.E., Cedar Rapids, Iowa, has announced the addition of two new microphones to their line. These are Models 304X and 202D. Model 304X crystal microphone has a response of 60-10,000 cps and an output level of -50 db. In matched pairs the 304X comes in an impact proof plastic case with jet black finish. Designed in the popular slender style, the mike is complete with desk stand, stand adaptor and lavalier assembly and is equipped with a 12 foot cable. It is also available as a ceramic unit (304C) which can be used for any and all recording set ups. The price is \$16.50.

Model 202D dynamic type hi impedance microphone has a response of 60-10,000 cps, and an output level of -53 db. It comes complete with stand adapter and twelve foot cable and sells for \$41.00. Contact Turner for more details.

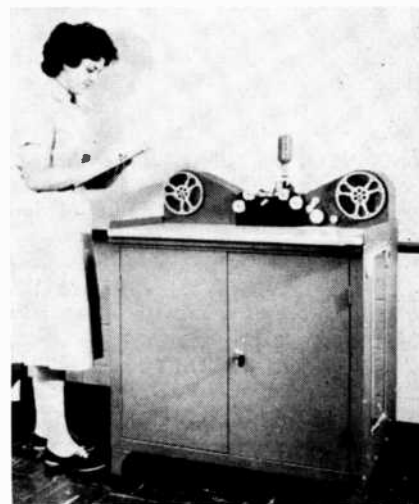
## NORELCO 300



North American Philips Co., Inc., 230 Duffy Avenue, Hicksville, Long Island, N. Y., is marketing the Norelco Continental 300. This machine plays back standard 4 track stereo tapes, and records and plays back monophonically. It has speeds of 7½, 3¾ and 1⅞ ips; a frequency response of 50-16,000 cps at the faster speed;

wow and flutter of 0.15% at the faster speed; modulation indicator; pause button; provision for sound on sound recording; automatic stop; and it is provided with input jacks for recording from microphone, tuner or phonograph, with facilities for mixing. It has a self-contained phono/p.a.; self-contained preamplifier, amplifier and speaker. It is priced at \$269.50. For complete details, write to the High Fidelity Products Division of Norelco.

## REEVES STRIPER



Reeves Soundcraft Corporation, Great Pasture Road, Danbury, Conn., has introduced a new commercial 8mm Magna-striper machine. The 8mm Magna-striper machine is similar in design and operates on the same principle as Soundcraft's 35mm Magna-striper, the same unit that has striped every foot of every Cinemascope motion picture produced by major producers since the introduction of that process. According to the manufacturer, the Soundcraft 8mm Magna-striper machine for the first time makes professional 8mm stripping available at the local level. It should take less time to have a film striped than it does to have the same film developed. Photo finishers and others interested are requested to contact Mr. Deacy at the Reeves Soundcraft offices in Danbury, Conn.

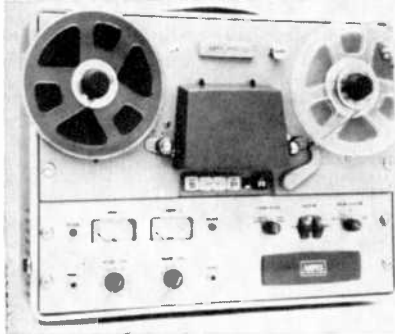
## ATR PROTECTOR

American Television and Radio Co., St. Paul 1, Minn., is marketing protectors designed to protect all electronic tubes in TV or hi-fi sets, amplifiers and similar electrical equipment. According to the manufacturers, the protectors will double or triple the normal life of such tubes. They come in two models—the wall model for use where the instrument can be plugged directly into a wall outlet, and the floor model (with 6 feet of cord) for use where the instrument is located at a distance from a wall outlet. Both types are suited for use



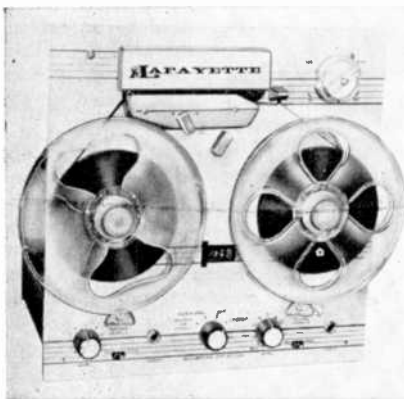
with any equipment having an input wattage of 100 to 300 watts, are fuse protected, ruggedly built, and enclosed in a golden-brown hammerloid finished metal case. Prices: Wall model—\$3.95; Floor model—\$4.95. Contact manufacturer for additional details.

### AMPEX PR-10



Ampex Corporation, Redwood City, Calif., has introduced the Ampex PR-10 professional two channel combination stereo/monophonic recorder, which is available for rack or portable use. Among the features and accessories available are 4-position head assembly, 4-track stereo playback, all new compact electronics, automatic threading, and complete remote control of all functions. The PR-10 series includes a monophonic recorder at \$895 and a combination stereophonic/monophonic at \$995 (portable versions). Both units are two-speed and available at 7½—15 ips, or 3¾—7½ ips. For details, write the Ampex Corporation.

### LAFAYETTE DECK



Lafayette Radio, 165-08 Liberty Ave., Jamaica 33, N. Y. has introduced a new precision tape deck, The RK-107, which features separate recording preamplifier with individual VU recording level meters integrated into a single compact unit. Frequency response at 7½ ips is 30 to 17,000 cps. At 3¾ ips it is 40 to 15,000 cps. There is less than 0.2% rms wow and flutter; signal-to-noise ratio is 55 db or better; total harmonic distortion is less than 1.0%. Other features include digital tape counter, short gap, double coil leads for extended frequency response and low hum



LOUIS ARMSTRONG uses two NORELCO 'Continental' Tape Recorders at home and always takes them with him on his world-wide concert tours. Says LOUIS, "I tape phono records and airshots all the time and if I'm in the room talking with friends, my NORELCOs keep right on copying with the volume turned down." Louis also finds the choice of three speeds convenient, using the slowest, 1½ ips for interviews and speech recordings, the 3¾ speed for some music, and the 7½ speed for live recording. He says, "I've tried lots of tape machines since I got my first one in 1948, but NORELCO is the one for me." Recently he picked up two NORELCO 'Continental's in Copenhagen. Set to run on the European power frequency of 50 cycles, they were reset for 60 cycles when he returned to the United States. Like all NORELCO recorders they can be set in a few minutes for any power voltage requirement anywhere in the world; from 110 to 250 volts. The NORELCO 'Continental' is a product of North American Philips Company, Inc., High Fidelity Products Division, Dept. IP3, 230 Duffy Avenue, Hicksville, Long Island, New York.

pickup, recording preamplifier function switch for monaural, stereo and sound on sound recording (cross channel), etc. For complete details and price, contact Lafayette.

### ADJUSTABLE BOOM



The O. C. White Co., 15-21 Hermon Street, Worcester 8, Mass. is marketing an adjustable boom, Style M2MD-U, which will hold a microphone up to 3¼ lbs. This model has 12" upright to raise bottom joint of arm to level of top of console; screw attachment base for horizontal surface; extreme extension 33"; is supplied with No. 8411 Belder cable, less connectors; and is finished in gray enamel lacquer with nickel plated working parts. This style arm is priced at \$18.00. For additional information, contact the above firm.

## ROBINS TAPE BOOK SHELF



"Television Tape Recording" by George B. Goodall, 48 page illus. (TE-48). A semi-technical book by Robins on methods and techniques in the amazing new field of video tape recording, just published Price \$1.00.

"How To Get The Most Out Of Tape Recording" by Lee Sheridan. For the non-professional recordist, this book tells about how to buy and operate a tape recorder, developments in stereo, legality of tape recording, making money with a tape recorder, etc 128 pages illus. (TE-128) \$1.00. (shown in illustration)

Another Robins book "Tape Editing and Splicing" TE-24, 24 pages illus., 35c.

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# FEEDBACK

Excerpts from readers' letters will be used in this column.

Address all correspondence to: The Editor: TAPE RECORDING, Severna Park, Maryland

## More Creativity

To the Editor:

As a means of increasing the effectiveness of *Tape Recording*, I should like to propose an issue devoted to microphones. Included would be an up-to-date listing of specialized equipment (contact and miniature mikes, parabolic reflectors, electronic mixers, filters, etc.) along with the scoop on those often pictured but seldom described microphones such as Telefunken, Stevens and RCA. This directory bolstered by supporting articles that delve more deeply into microphone usage and the somewhat baffling aspects of interpreting microphone specifications would be a welcome addition to the tape enthusiast's literature file.

In a more recent issue of *Tape Recording*, editorial and "Feedback" comments have implied that the time is ripe for tape recording to emerge as a serious hobby. I quite agree. However, for a hobby to be removed from the novelty class, it must not only impart personal satisfaction, it should be intellectually challenging and highly creative as well. Tape recording has immense potential in all three of these areas but the potential has to be developed.

To the owner and moderate user of a tape recorder, your magazine is ideal. To the established hobbyist with a considerable investment, it leaves something to be desired. I will concede that the latter individual does not comprise a majority of the readers of this magazine. In fact, this percentage may be rather small. But it is upon this vanguard of experienced hobbyists that the future of tape recording as a creative and richly satisfying avocation depends. If you fail to challenge this group, they will become stagnant and eventually drift into more promising fields.

I feel that the needs of the advanced hobbyist could best be met by the addition of enriched articles and the establishment of an outlet for creativity. The suggestion made by a reader for a national tape recording contest may well be the answer to the problem of stimulating creative tapes. This contest could be set up in such a way that it would tax the talent and equipment of all the contestants. Stimulated and challenged, I believe that this minority group would make a major contribution toward the expansion and development of this fascinating hobby.—*Philip C. Rush, Bristol, Pa.*

*Thank you for your comments. We will see what can be done toward something more concrete and detailed on microphones. Our "Sound Stories" offer an outlet for some creative work with the recorder and we will be glad to consider such sound stories at any time from our readers. The written story should give the details on how the tape was made and the tape should be approximately 8 minutes in length so that it can be placed on a 3 inch reel, dual track.*

## Flats

To the Editor:

A month or two ago, your magazine printed an article describing a method of remote control recording using a motor cut-off switch. This article has been brought to my attention by tape corresponding friends and I feel it my duty to expound upon the dangers involved in this type of remote control.

In the vast majority of home-type recorders there is no provision for disengaging the idler mechanism of the machine when the motor current is disconnected. Because of this the entire mechanical coupling of the motor to the tape suffers from the stalling of the motor during recording. Rubber wheels are left engaged in compressed positions, belts unbalanced in forward stretch and the tape is left squeezed between the pressure roller and the capstan. To leave a machine in this condition certainly contributes to increased wear and loss of operational life. Let the user of the machine with factory installed remote controls know they do not operate in this slipshod manner. Proper remote control should consist in complete disengagement of the mechanism when tape stoppage is desired.

I am confident that users of professional equipment would not subject same to the punishment you so confidently describe to your readership. In hopes this letter saves one tape machine from wows, flutters and distortions resulting from stalled operation, I am—*Michael Rice, Kustom Records, Ann Arbor, Mich.*

*In the article mentioned, the author specifically advises against leaving the recorder in play or record stalled position for any length of time which would tend to cause flats on capstan and drive rollers as mentioned in your letter. Of course, the ideal way to have remote control is by means of solenoids which will engage or disengage the mechanism by remote control. Some recorders start and stop the tape simply by pulling back pressure roller from the capstan which continues to rotate, the motor not being stopped.*

## Skips

To the Editor:

In your March 1960 issue one of your readers asked about the cause of "recording skip." Your answer was most informative and seemed at the time to be complete, as your answers usually are.

Because I had had no trouble along this line, I simply filed the matter at the back of the "old subconscious."

Recently, however, the thing cropped up at a gathering of recorder friends and here, for what it is worth, are our conclusions.

In playback or recording the tape is being wound under a slight but definite tension and the winding is smooth, even and compact.

In fast forward or rewind, the tape may

still wind smooth and even but it will no longer be so compact and when stopped suddenly there is a slight shifting along the tape causing a small area of very loose or tight (relatively speaking) tape, a sort of pocket. When recording this pocket slips past the head so fast it does not register and sounds, on playback, exactly like a loose connection. The time element is so short there is no wow apparent to the ear. It might show up on a flutter meter.

It seems to happen to those who made short and frequent rewinds for erasing and the tape on their reels was wound very rough and irregular.

I do not do much erasing or rewinding and fast forward so perhaps for this reason I have not had this trouble—yet.—*G. F. Hollington, Breckville, Ont.*

## Reel Idea

To the Editor:

Here are a few things which might be of interest to other recordists.

I find that when using the 3" reels (for tapespondence) that when one comes towards the end of the recording or playback and there is very little tape left on the supply reel there is a tendency for the recorder to slow up and cause a wow. This seems to be caused by the small size hub on such reels and the resulting increase in tension on the tape. This can be overcome by placing an empty 7" reel on top of the 3" supply reel, letting it revolve at will. Try it.

I had a habit of leaving my Wollensak T1500 turned on, especially in daylight as it is difficult to note the illuminated dials at any distance. To overcome this I installed a small pilot light jewel directly in front of the pilot light in the instrument. It is very easily done and gives an immediate warning that the recorder is turned on. The Wollensak firm has done this on the T1600 series.

I also find that if the motor is kept very clean the recorders both run exceedingly cool. To clean the motor I use a rubber spray nozzle of a bath spray with a metal piece removed and placed on the end of my vacuum cleaner hose.

One more—I purchased four rubber tips that are made to put on the end of crutches, etc., and placed them over the rubber feet of my recorders so that it increased the height of the instrument from the table and find that this also helps greatly in keeping the recorders running cool. Keep up the splendid *Tape Recording Magazine*.—*Pat Malone, New York, N. Y.*

*Thanks from our readers for some very practical hints.*

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**TAPE RECORDING**  
Severna Park, Md.

# QUESTIONS AND ANSWERS

Questions for this department may be sent by means of a postcard or letter. Please Address your queries to "Questions and Answers." TAPE RECORDING, Severna Park, Maryland. The most interesting and widely applicable questions will be used in this department.

**Q**—I have encountered a problem concerning magnetic recording for which I am unable to find a solution.

I have a couple of reels of acetate tape that have been in use for a year or so. The first hundred feet, more or less, of each of these reels has been recorded and erased at least 60 or 70 times as I used the first part of these reels for recording practice. This section of tape now will play back only very distorted recordings. In the middle of the reels the recorded playbacks are as good as ever.

I am quite confused by this situation as I have read several times in reliable publications, such as your magazine, that magnetic recording tape can survive thousands of such recordings and playbacks.

I certainly would appreciate any helpful information you might send me.—F. W., Providence, Rhode Island.

**A**—As we have mentioned before, tape may be used for thousands of playings for there is no physical change in its makeup and the wear factor is negligible. The difficulty you are having stems from incomplete erasure. As the tape is recorded, erased and recorded again and again, if the erase current is not sufficient to erase the peaks, where the magnetism on the tape is very heavy, then this residual magnetism will gradually build up and the tape becomes noisy and because of the magnetism present, will not be able to accept new recordings.

The answer, of course, is to apply a heavy enough erasing field to overcome the residual magnetism now present on the tape. This may be done by means of a bulk erasure, that cleans a whole reel at a time. You might also have your machine checked to see that the proper amount of current is going into your erase head. If this is weak, then the complete erasure of the tape before recording will be impossible.

**Q**—I have a problem which may be of interest to others learning a language.

I have a V-M 714 and the directions state that the stop button must always be pressed down when not in use in order to protect the idler mechanism. I use earphones and listen to the tape while in bed. When the tape comes to the end the machine stops but I have to get out of bed to push the stop button. I don't know what an idler is but is there some way I can protect the idler without getting out of bed to push the stop button?—C. C., Los Angeles, Cal.

**A**—The idler is a rubber rimmed wheel in the recorder and if the pressure is left on it in one spot it will develop a

"flat" and make the recordings vary in speed producing a wow. The only thing we can suggest is that you move the recorder closer to the bed for we know of no practical way to modify the recorder to accomplish the release of the pressure on the idler.

**Q**—I am interested in securing tapes by the Lenny Herman Orchestra. Could you tell me who he records for on tape and where I can secure these tapes. Also if he records on two track and four track both, or on just one of these?—F. M. McC., Annette Island, Alaska.

**A**—Lenny Herman records for Livingston Audio Products, 147 Roseland Ave., Caldwell, N.J. Tapes are available either in the two or four track variety, we are sure. We suggest you contact them directly for prices.

**Q**—Please tell me how to take the warps out of my reels. I have stacked them in boxes along the walls on shelves but when they are stacked so high there is always the problem of weight and the stacks leaning in some direction. Taking the warps out of disc records is easy. Please tell me of some method for tape reels that have warped that is simple for a warped reel is useless either for playback or recording. My records are stacked flat and level with a 12 x 12 board between each 15 to 20 records but I do not know how to stack tape without the reels warping. I have too many reels to buy to suggest buying new reels.—R. A. H., Springfield, Ill.

**A**—Reels should not be stacked one atop the other as you have done with the records. The weight imposed on the bottom reels will tend to bend them out of line. Tape reels should always be kept on edge.

Another factor in warping reels is a recorder which winds the tape on them too tight. If the internal pressure against the hub is more than about 10 ounces, it will deform the hub and the reel flanges will get out of line. Tape for storage should be wound rather loosely so that changes in humidity, which cause acetate tape to swell or shrink, will not impose strain on the hub.

As to how to straighten your old reels, there is only one way to try, and it works most of the time.

Make up a U shaped metal piece .310 (about 5/16") inches in width and force this under the low spots in the reel. Then immerse the reel in hot water for about 30 minutes. Remove it and let it cool, then remove the metal spacer. The plastic should stay in its new position.

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YOU like how-to-do-it articles for home fun and—

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YOU enjoy reading about the experiences of amateur and professional recordists all over the world and—

YOU follow consumer reports on equipment tested by our staff—

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# TAPE CLUB NEWS

### Voicespionage Cohen Honor Fund

Last November The Voicespionage Club announced the formation of the Cohen Honor Fund, named for VS-er Melvin D. Cohen because of his fine services to the blind via tape, and administered by the Secretary in cooperation with Ways and Means for the Blind, Inc. The Cohen Honor Fund distributes each year completely without cost several tape recorders, each with a supply of tapes and a one-year membership in The Voicespionage Club, to worthy blind persons.

Distribution is made shortly after the first of each year. To choose those blind members to whom the distribution is made, the club asks its members to submit the name and address of anyone they think should be considered. Details of the personal circumstances of the folks under consideration must be submitted, explaining why they cannot afford a recorder and why their need is great. Or, a member may have his friend write directly to the club. Preference is given where there are two or more blind persons living at the same address who can share the recorder.

This is just another of the fine services The Voicespionage Club contributes for the good of its fellow men (and women too).

### Club Gets New Spiritual Advisor

Catholic Tape Recorders, International will have a new spiritual advisor for 1961. Reverend Father Joseph Debergh enthusiastically accepted to act as spiritual advisor for the club. Father directs the Pro Maria Committee in Lowell, Mass., an organization which spreads the true story concerning the apparitions of Our Lady of Beauraing to five children during 1932-33.

Two recorded tapes concerning this have been contributed by the Pro Maria Committee for distribution to anyone interested in learning more about the apparitions.

### Tape Exchanges Between Classrooms

Tape exchanges between classrooms of Johannesburg, South Africa, and classrooms in other English-speaking countries is being promoted through the World Tapes for Education Program of World Tape Pals, Inc. WTP Headquarters in Dallas, Texas, is making arrangements with teachers in the U. S. and Canada for these exchanges. WTP representatives in other English-speaking countries are handling the set-up in their own countries. Further information on this project may be obtained from WTP Headquarters.

### New President Lauds PTP Program

". . . A new chapter in American History," is the description given to the People-to-People Program by President John F. Kennedy in a letter addressed to the October planning meeting of the leaders of the PTP Conference. Tape Recording Exchange is an important phase of PTP activity, and is headed by Harry Matthews, P. O. Box 9211, Dallas 15,

Texas. Tape exchange organizations everywhere are urged to send news of their People-to-People participation to Harry for a report to the People-to-People Program.

### Visit Tape Pals

Glenn and Keith Martin, young WTP's of Montreal, Canada, who began the "Crusade for Peace" February, 1959, recently visited their tape pals in California. Their hosts included Harry Tuckey of Walnut Creek, John Cummings of San Mateo (new Teen-Pals Director), and Sy and Jill Miller of Beverly Hills, authors of WTP's official song, "Let There Be Peace on Earth."

### W.T.P. Reel #3

A new recording club has been formed in New York under the Charter of World Tape Pals, Inc. It is known as New York Tape Recording Society, Reel #3, W.T.P.

For further information write to the secretary, Alan J. Broder, 98-33 64th Avenue, Rego Park 74, N. Y.

### JOIN A CLUB

#### AMERICAN TAPE EXCHANGE

Cortlandt Parent, Secretary  
 Box 324  
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Rene Fontaine, Secretary  
 1657 Gilford St.  
 Montreal 34, P. Que. Canada

#### CATHOLIC TAPE RECORDERS OF AMERICA, INTERNATIONAL

Jerome W. Ciarrocchi, Secretary  
 26 South Mount Vernon Avenue  
 Uniontown, Pennsylvania

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J. A. Freddy Masson, Secretary  
 Grosse Ile, Cte, Montmagny,  
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#### ORGAN MUSIC ENTHUSIASTS

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 152 Clizbe Avenue  
 Amsterdam, New York

#### STEREO INTERNATIONAL

c/o Roland Hahn  
 2001 W. Devon Ave.  
 Chicago 45, Ill.

#### THE VOICESPONDENCE CLUB

Charles Owen, Secretary  
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#### WORLD TAPE PALS, Inc.

Marjorie Matthews, Secretary  
 P. O. Box 9211, Dallas 15, Texas

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 Schoolhouse, Whitsoe By Duns  
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#### TAPE RECORDER CLUB

A. Alexander, Secretary  
 123 Sulton Common Rd.  
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Murray J. Spiers, Hon. Secretary  
 39 Ponsonby Road  
 Auckland, W.I., New Zealand

Please enclose self addressed, stamped envelope when writing to the clubs.



# TAPE IN EDUCATION

Robert C. Snyder

THIS column is the first in a series on teaching machines and the newly-developed techniques of programmed learning which make them possible.

However, before we can discuss the machines and techniques, we should understand something about the requirements for them, what they can do, and what makes them of tremendous potential value to a dynamic system of education in a democratic country.

Today, everyone recognizes that there is a great shortage of qualified teachers. Almost every school district has difficulties each year trying to recruit an adequate teaching staff. There simply are not enough trained competent teachers available for the number of students in schools.

Many suggestions are made to solve this problem. Often it is suggested that higher salaries for teachers would solve the problem. Obviously this is not so, upon careful examination, simply because there just are not enough qualified teachers in existence to fill all the classrooms regardless of how much you pay them. Then comes the reply, "Yes, but, if you pay higher salaries competent people will be drawn to teaching in larger numbers and will remain in the field, so you will have enough teachers in time if you only raise salaries high enough."

Unfortunately, this reply overlooks the large number of other factors which cause professionally qualified persons to leave teaching or even to refrain from considering it as a possible career.

A couple of years ago I heard a superintendent of schools deliver a talk to a civic group. It happened to be a year in which teacher organizations had mounted a tremendous drive for sharply increased salaries. At the end of his talk, the superintendent got in a plug for the cause by saying, "... And, we certainly should increase salaries for our teachers, because if salaries weren't too low, more of you would be encouraging your children to go into teaching as a career."

At first this may sound logical, but is it? What is the real reason why most of us would not recommend to our children that they go into teaching as a life work? Isn't it because in most states they would almost have to go to teachers college in order to be certified? And, aren't we generally inclined to acknowledge that most teachers colleges are second rate schools with lower entrance requirements and lower academic standards than first class liberal arts colleges? Don't most of us consider that the introduction of large amounts of required methods courses in the undergraduate program prevents the teachers college student from receiving sufficient subject matter instruction so that he can be said to have an adequate college education when he graduates?

And, don't people drop out of teaching not only because of low salaries, but because of the endless impossibility of doing a truly professionally competent job of teaching a classroom full of students when the teacher must spend hours each day on clerical or

other non-professional work?

Recent studies have estimated that approximately 26% of a teacher's time at school (or about 40% of the teacher's total working time if overtime work after hours outside school is counted) is spent on non-teaching chores.

The teacher who is expected to be not only professionally competent but also a paragon of virtue in the community must also spend a tremendous amount of time "... watering plants, cleaning blackboards, monitoring lunchrooms, policing playgrounds, putting on children's leggings, filling out elaborate attendance sheets, collecting class funds . . .", and so on.

If we were to raise teachers' salaries until we pay as much for teaching as the job should be worth, wouldn't professionally competent people still leave the field and go to other work that offered more dignity and satisfaction, a greater hope of professional promotion, and fewer aggravations?

Moreover, so long as teaching jobs involve so many non-professional hours, how can the teacher ever be paid the kind of salary which would be appropriate if the teacher's full time were utilized professionally in strictly teaching activities?

A good many books are now being published which make this very point. Teachers can not reasonably be expected to establish and maintain the desired standards of knowledge and professional competence unless and until they are able to work under professional conditions that are equal in personal dignity, satisfaction, and tangible rewards to those they find in fields such as government, research, industrial management, and so on.

But, how can teaching conditions be changed to provide the "prestige, fulfillment, advancement and recognition in the profession" required to bring qualified persons into the teaching field and keep them there?

In next month's column we will summarize for you some of the ideas presented in the newer books and show how these relate to the emergence of teaching machines and programmed learning principles.

*(To be continued next month.)*

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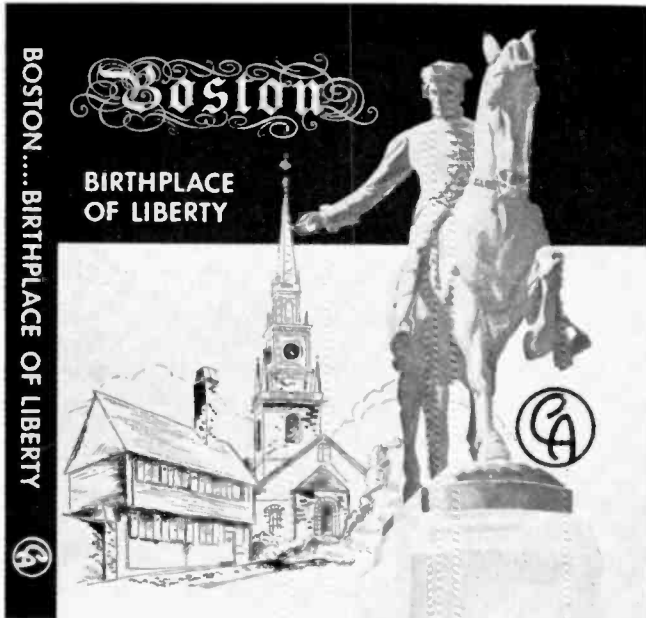
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**T**HE project appeared simple enough in outline; was complicated and time-consuming translating into actuality. With an increasing interest and awareness in our free enterprise system and heritage—and a rapidly developing market for educational tapes in schools and homes—we wanted to take advantage of our location in Boston. Boston people and places, after all, have been the raw materials of history and liberty since the city's founding in 1630. Our thought: to place on tape a one hour documentary tour of Boston's historic shrines. Any creative project of this

# THE SOUND IS BOSTON

by  
Sidney A. Dimond,  
*President, Creative Associates, Inc.*

... valuable lessons on the creative use of the tape recorder are in this interesting article on the creation of a documentary tape.

magnitude and scope inevitably involves a number of rather difficult steps:

1. The brooding about the concept.
2. Outlining of possible content.
3. Dry run field trips, including making of contacts.
4. Development of budget and timetable.
5. Field recording.
6. Developing and editing of basic material.
7. Writing of the script.
8. Studio production and integration.
9. Final editing.
10. Duplication, distribution, and promotion.

Let's discuss each of these steps in brief detail.

## BROODING ABOUT CONCEPT

After eleven years of active production in tape documentaries we have finally arrived at what we consider an abiding truth. If first things are to come first, and if progress is to be *made* rather than *imagined*, the concept of a project must be the starting point. From concept comes the overview of objectives; determination of content and intended audience. Only after this work is done are we in a position to think seriously about technique and dramatic devices. And of all the tasks and headaches involved, the easiest, perhaps, is the concept. For concept brooding involves mostly dreams and little investment of money and time. Our basic theory, and it's part of the concept, is that the magnetic tape recorder is sheer *magic*. Imaginatively used, its implications for service are unending and remarkable. So our concept finds vigor in the fact that the tape recorder *can* and *should* be used for new and different creative adventures. The mere knowledge that something has never been done before isn't a deterrent to us; it is, rather, part of the charm and the challenge.

Top of page: the finished tape ready for sale, the result of hundreds of man-hours of recording and careful editing. Left: a familiar sound to Bostonians, coins being fed into a subway turnstile is recorded by Dennis Oppenheim, production coordinator of Creative Associates.



There's more to this point of view. We believe that too many promising ideas are assassinated blindly in their conception period by *too much* caution and an overabundance of "re-thinking." We're interested in why we *can* do things rather than why we *can't*. We'd rather take advantage of every physical and mental resource to make our mistakes in *movement*, rather than stagnate. Boldness—but not foolishness—is the lot of the pioneer.

We believe those men who pioneered in the isolation of the factors of freedom, people like Paul Revere, the Adams family, John Hancock, Robert Treat Paine, Wendell Phillips, Edward Everett, and all the others, were first and foremost *human beings*. Human beings with ideas and thoughts of imperative importance to us in the crisis which is today. And in any history-type project we're interested in portraying these patriots from the point of view that history is *people*; that history is *now* as well as *then*, and that history is *us*, as well as *they*. "There are dreamers who dream dreams," the man said, "and there are dreamers who dream practical." These men dreamed practical, and so, in a later day, must we. This, then, is part of the message to be conveyed by the final tape production. *They* had values many years ago which can give us kinship and courage.

#### THE AUDIENCE

All of this, however, means little if there is an absence of multitudes who can and will *listen* to the tapes. Of necessity, then, part of the concept must be *who's* going to listen. Or even *why* should they listen? Or, more important from an economics point of view, *who's* going to *want* to listen enough to plunk down hard cash for the finished product? After all, this is a competitive society and there are many pleas to the ears and pocketbooks of all of us.

The answer to this problem? Provide a product with a worthwhile purpose. A product which takes full advantage of one of the great virtues of tape: the ability to stimulate the imagination appetite. Take advantage of the opportunity for the listener mentally to build his *own* images and descriptions. Build into the script structure the three "C's" of successful dramaturgy: character, contrast, and conflict. Brood enough about these things, your mind momentarily uncluttered by specific details, and you have the foundation on which to build a successful service to the listener. A service which he can appreciate and will buy. Whether he's a teacher looking for classroom aids, a tourist passing through town, or just an ordinary guy looking for additional information on his native background.

#### OUTLINING CONTENT

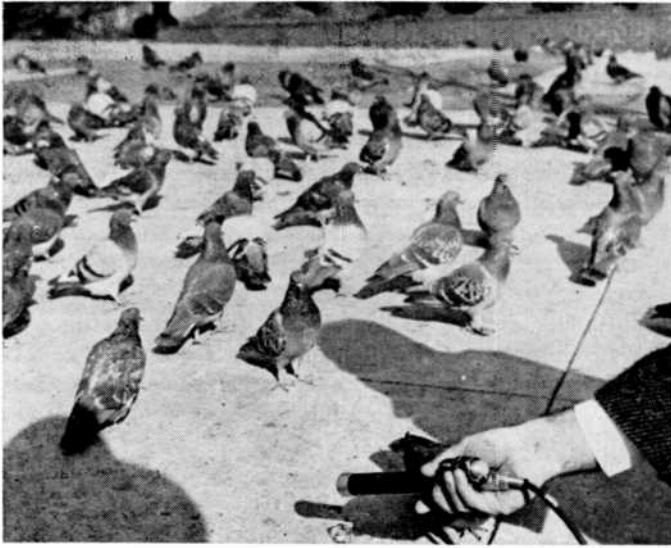
Our tape on historical Boston began to take tangible shape. We had in hand a rough outline of content. There is, in Boston, an established "Freedom Trail," well marked by signs and directions. You can travel the trail by bus or by foot. On the "Freedom Trail" there are fifteen historical sites. There are optional side trips to such famous spots as Bunker Hill Monument and Boston Common. Stick to the basic trail itself and you'll visit the Park Street Church, Old Granary Burying Ground, King's Chapel, the site of the first public school, the statue of Benjamin Franklin, the Old

North Church, from which Paul Revere warned the country of the approach of the British by signal lanterns. The steeple has been restored after the original was felled by hurricane Carol in 1954. It is along the Freedom Trail covered in the tape.

Corner Bookstore, the Old South Meeting House, the Old State House, the Boston Massacre site, Faneuil Hall, Paul Revere's House, the Old North Church, Copp's Hill Burying Ground, Boston Stone, and Province Steps. Properly done, with time to invest and investigate, this tour alone would take several days. Many tourists do it in half a day. Your task on tape: to crowd into a brief fifty-seven or eight minutes the "alive" high spots of such a tour, in sound and narrative. The *starting* step? The starting *step*, of course. You *walk*, in detail, the entire route. Three of us did this. Meeting guides, asking questions, securing all available literature, making voluminous notes on interesting sounds and available, cooperative personalities. Back in the office, feet blistered but minds agile, we made our outline more specific.

Whom had we "found?" Well, we had discovered young J. Murray Marshall, assistant minister of the Park Street Church, who was willing to tape an ad-lib interview. Pixie-like Harold J. Haynes, verger of Kings Chapel, was also available, as was Charles Loring, consulting architect for the Old South Meeting House, an elderly gentleman with a mammoth sense of humor. Hector Campbell, superintendent of Faneuil Hall, was interested. Garner Corson, for a quarter of a century the custodian of the Paul Revere House, would go along. And the Reverend Howard P. Kelleet, Vicar of Old North Church of Paul Revere fame, was most enthusiastic. We were well on our way to contrast. Each of these men had a distinctive voice and manner of speaking. Each was authentic. Each would lend character and characterization. Each could secure for us, from the appropriate authorities, permission to record not only their words, but the more interesting available sounds. And each





Left: these pigeons at Boston Common made the United Press headlines when they refused to cooperate in a tape recording session. They cooed willingly enough but with not enough volume to overcome nearby traffic noises. Right: Hector Campbell, superintendent of Faneuil Hall plays its famous Westminster Chimes as Dennis Oppenheim takes a level check. Opposite page, a reproduction of part of the actual script for the tape.

could indicate something of the conflict from which sprang the roots of the nation.

We had tangibles now. We put together a tentative budget and production timetable. Started making arrangements for our field recordings.

#### FIELD RECORDING

Field recordings were made, obviously, at the convenience of our subjects, and not in the order in which they would appear in the final show. We taped first a long interview with Mr. Marshall at the Park Street Church. He described the origin of the song "America," first sung in the Church; William Lloyd Garrison's first anti-slavery address, and told us why the spot has long been known as "Brimstone Corner." (Brimstone for gunpowder was stored in the cellar during the War of 1812.) Later we trudged up a crude circular stairway into the heart of the steeple to record at close range the ticking of the tower clock and the tolling of the church bell. We used an Ampex 601 and a Turner Dynamic 57D pencil mike with excellent results. We took several cuts in varying perspectives, and probably confused the pedestrians on Boston Common since the bell was rung for us several times on cue, and off its regular schedule. Fortunately, there was an available AC power supply plug high in the steeple. We also took numerous cuts of Boston traffic from various windows in the church and parish house, recorded the cooing of pigeons on Boston Common, and subway cars arriving and leaving at the Park Street station nearby.

In the weeks which followed we taped interviews with the other gentlemen noted above, and a wide variety of sounds (some of which we later re-recorded to gain additional presence) including the Kings Chapel bell, labeled by its maker, Paul Revere, as his "sweetest," a complete Sunday service at the Old North Church, for which we used two Ampex machines, a 600 and a 601, and RCA 77 mikes. We made one cut from the perspective of the balcony, near the choir, and the other from the vicinity of the pulpit. In total we built an inventory of perhaps two dozen separate sounds, historical and contemporary. We rang smartly the ship's bell on the U. S. Frigate *Constitution*,

"Old Ironsides." With our Tapak Newscaster we toured Boston's market district to trap the verbalizations of its peddlers. We recorded, in complete detail, the anthological patter of a professional bus tour driver. On this we cheated just a bit. During the entire exercise the bus, the driver, and taping crew were parked comfortably in a convenient spot. Just outside the bus garage.

At Faneuil Hall we ran an abundance of power cord to the nearest available outlet which was, naturally, some distance from where we needed it. In each case we checked carefully our power supply source, for Boston is sprinkled with DC current, and few laymen seem to know the difference between AC and DC. (But our tape recorders do!) Five months later we had acquired all of our basic material. In total listening time it ran to perhaps twelve to fifteen hours. From this we were to use about thirty-five minutes in our final show.

Worthy of passing mention are what we call the "fate factors." The unplanned, unexpected, for which you couldn't possibly prepare, no matter how clairvoyant you might be. Fate factors can be rough, *i.e.*, the tube which blows at a strategic moment, a never again available recording lost. We had few fate factors agin us on this project. Rather, fate was good to us. By sheer coincidence we happened to find exactly the *right* people to interpret creatively the history we wanted to present.

#### PROCESSING BASIC MATERIAL

As the writer on the project I listened to the tape. *All* of it! Made many notes. Began to write the rough script in individual sections, one for each major point visited. As rapidly as I turned out material Dennis Oppenheim, our production coordinator, and Jim Loomis, our technician, stripped the called-for excerpts, using Editall splicing bars, an Ampex 351 and a Magnecorder PT6J. Then we recorded the sections in crude form, utilizing connective narration, to get an idea as to pace. For in the pacing of an hour show lies much of the answer to listener retain-ability. This process took over a month, sprinkled itself into our production schedule for regular clients. The first draft of the show ran



NARRATOR: The spire of the Park Street Church is one of only two of the period which still stand today. The rest have fallen victim to hurricanes and no'easters which rage up the East Coast. Within this spire, many feet above the congested street outside, a large clock calmly speaks in muted, unannoyed tones.

SOUND: TICKING OF CLOCK. UNDER LIGHTLY.

NARRATOR: (WITH CLOCK) Tick tock tick tock tick tock. The sound is exactly the same as it was a century and a half ago, when the clock was installed.

SOUND: CLOCK UP AND UNDER AND OUT.

NARRATOR: And inside the rugged, tested steeple there hangs, also, a famous and equally durable bell. Its tone is friendly, familiar . . . as it echoes across Boston Common.

REV. MARSHALL: We have a bell which was cast in England in the early 1800's. It was brought here and installed in this tower and it tolls on Sunday mornings announcing the service of worship.

SOUND: BELL. START UNDER MARSHALL ABOVE AND THEN UP. ESTABLISH. OUT UNDER.

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(Interview with Mr. Harold J. Haynes, verger of Kings Chapel. They discuss the history of the building and its contents.)

NARRATOR: How do you feel about people like Paul Revere, and the others of his period. Do you think of them as human beings, or just as dim historical figures?

HAYNES: No, I think of them as human beings. I feel they're still around in the spiritual world. Now and then I feel the old gentlemen are watching the rest of us here at the Church. I feel that way anyway.

---

(Interview with Mr. Charles Loring of the Old South Meeting House. The quote is about some of the articles of interest on display within Old South.)

LORING: Perhaps the most unique specimen is a letter from George Washington to his dentist. It's about the way the dentist made his false teeth and how the false teeth should have been made. You look at a picture of Washington and you can understand the—you'll pardon the expression—mug on him when you figure his false teeth didn't fit. And then there are costumes on display as well as a copy of Ben Franklin's baptismal certificate. He was baptized here.

---

(Interview with Hector Campbell, superintendent of Faneuil Hall.)

NARRATOR: The phrase "Cradle of Liberty" originated with John Adams . . . was later used by Daniel Webster. Around the walls . . . portraits also of Warren, Knox, Commodore Preble, Governor Caleb Strong, Edward Everett, and other notables of the past.

CAMPBELL: And you look over there and you see a painting of Abraham Lincoln which is my favorite. It was done by Ames. If you look at the look in Lincoln's eyes you can appreciate what a great job in portraying the man that the artist did.

NARRATOR: What is there in Lincoln's eyes which strikes you?

CAMPBELL: Anguish.

NARRATOR: His heart was broken by the Civil War . . .

CAMPBELL: That's right.

NARRATOR: And all the conflict he'd been through.

CAMPBELL: That's right.

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(Interview with Garner Corson, custodian of the Paul Revere House.)

NARRATOR: Paul Revere and Adams were buddies, then.

CORSON: Oh yes, they were buddies. He hobnobbed with all the big politicians.

NARRATOR: He had many facets in his life, personality and background . . . this man Paul Revere.

CORSON: He did lots of different things. He made false teeth, did printing . . . He made the teeth out of whalebone mostly. Had some way of fastening 'em with wire.

---

well over two hours. We started slicing back. Arrived at an hour and a half. From that point on every phrase, every word which was cut, was sheer agony. The Great Day finally arrived to call in our narrators. For this task we selected

Bob Walsh, a young professional who has great flexibility and enthusiasm in his voice, and Donald Born, a fellow Boston University professor, whose voice is deep-pitched, rich in resonance and authority. The interplay of this com-



Foreground: part of the tape recording equipment used by Creative Associates, the machine at right, front, is a Tapak Newscaster. In the back can be seen the master file containing several hundred sounds of Boston and New England and master tapes of broadcast projects based on them.

bination gave us additional contrast. Cumulatively, the recording of the narrative and integration of edited basic material took approximately twelve to fourteen hours in our studio.

## FINAL EDITING

The end—or the beginning—was now in sight. We had an hour and twenty minutes of material. With the caution of a surgeon and the love and tenderness of parents we went to work on our new offspring. (After first making a protection copy.) A presentation like this can gain additional life or become deceased in the final editing. The master was recorded at 15 ips to give us more editing control. We culled to an hour and ten minutes; an hour and five; perspired backwards toward our limit of fifty-seven minutes. Fifty-seven minutes. The partial return for a year of brooding and planning, six months of actual activity on the project, and uncounted, uncountable nights of full and concerned consciousness.

This particular journey, in its creative aspect, is concluded. John White and his fellow geni at National Tape Service have run the copies and delivered them. You look at the cartons and wonder if you're going to agree with Henry David Thoreau. He once said, you may remember, something to the effect that he had a library of *thousands* of books. *Every one of which he'd written!*

We may end up with a library of thousands of tapes, every one of which we've produced. But aside from the regrets at not having done even a better job of interpreting "Boston—Birthplace of Liberty," we have great consolation. The satisfaction of a difficult assignment attempted and completed. The utilization of the tape recorder for its proper purpose: adding to available tape, documents based on a big hunk of our culture, tradition, and heritage. With a style and technique and result which only *we* could achieve. Therein is the nub of the satisfaction to the creative mind, whether there be monetary reward or not.

No one else could have done this particular thing in this particular way.

Whether or not this is fortunate remains to be seen.



Tapes recorded in the field are carefully audited and discussed, prior to editing on this console Ampex. Note splicing plate mounted above heads for convenience in making rapid splices as editing proceeds. The author is at right of the recorder.

# TAPE TESTS ROCKET PARTS

by  
Herbert E. McLean

. . . Rocketdyne develops method of stressing rocket components to avoid failures on firing.

**U**LTRA hi-fi tape recordings are being used in one of the most unique rocket engine test programs ever undertaken, according to engineers of Rocketdyne, a division of North American Aviation.

The engineers are using tape recordings of actual rocket engine runs to attack problems of stress in more advanced models. The program is helping to speed development of America's biggest rocket booster, the mammoth 1.5 million-lb. thrust Saturn.

The nation's leading producer of high thrust rocket engines for space flight, Rocketdyne produces engines for the Saturn and a host of other space engines.

According to Senior Engineer Jud Ferentz of the Canoga Park, California, concern, the "Sounds of Saturn," are actual tape recordings—with a wide range of frequencies—measuring the vibrations of components of Rocketdyne H-1 engines, eight of which make up the big Saturn cluster.

Recorded during test runs of the H-1 at Rocketdyne's nearby Propulsion Field Laboratory, the tapes are played back to engine components mounted on an extremely sensitive "shake table."

"As far as we know this is a first in the business," says Ferentz, a member of Rocketdyne's Engineering Development laboratory, who conceived the idea. "We are able, for the first time, to duplicate the exact vibrations that components undergo every time they come to life in a rocket

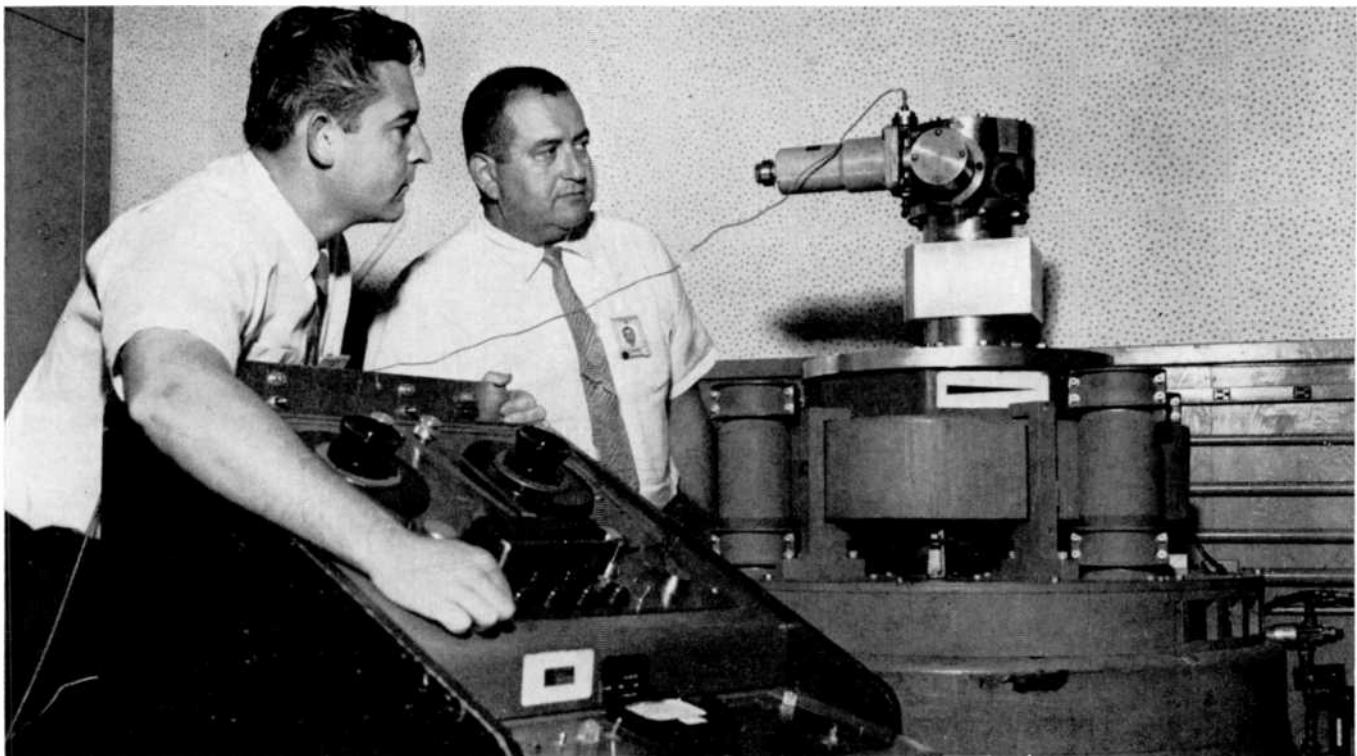
engine. Understanding the tremendous stresses generated within our big rocket engines is a key to making them reliable."

The technique has another advantage in addition to sonic realism: using the magnetic tapes, engine "starts" can be simulated time after time on a closed loop, thus exposing the rocket engine components to the stress of repeated engine operations. Such stress had never before been accurately measured; it was always a matter of slide rule guess work.

"One of the engine components we used had 11 actual "starts" mounted in a rocket engine at the Field Laboratory. Using our tape, we took the component out of the engine, mounted it on our shake table and simulated another 75 starts. This is far more than any Rocketdyne engine would ever have to make in the field.

"By increasing the vibration levels we are also able to simulate actual missile 'lift-off' conditions," Ferentz added. "We can thus pinpoint possible weak areas in our engine hardware during early stages of development, saving thousands of dollars by preventing missile failures later in the game. We expect this program to have an important effect on the nation's rocket engine reliability program."

The Rocketdyne test group uses a standard Ampex magnetic tape recorder in the program.



Senior engineer Jud Ferentz, right, and technician W. E. Perkins conduct rocket engine test program using tape recorder and shake table. Program is first of its kind and is helping to advance the Saturn space program. Amplified recordings from the tape are used to drive motors which cause the table to vibrate exactly as did the rocket from which the recording was made.

# THE STORY OF TAPE

## Part II

### Bases, Oxides and Binders

by

Mark Mooney, Jr.

*. . . a tape can be no better than the materials from which it is made*

**P**OPULAR writers on the subject of tape recording have been in the habit of calling tape "a ribbon of plastic coated with iron rust." While the description is true, it might be termed the understatement of the year for there is quite a bit more to it than that.

The tolerances allowed, not only in the thickness of the base material, but in the size of the "iron rust" particles and their composition, border on the fantastic. Even the thickness of a human hair is a gross standard of comparison for tolerances on the order of one one hundredth as thick are not uncommon.

All tape, from the familiar audio tape which is used on tape recorders in the standard  $\frac{1}{4}$  inch width to the

wide video and instrumentation tapes are composed of three principal parts: 1—the base, or support upon which the iron oxide is coated, 2—the iron oxide particles which hold the magnetic recordings and 3—the binder which holds the iron oxide to the base. The only exception to this is the homogeneous type of tape wherein the oxide is mixed in with the base but this method of manufacture is not used in this country.

#### BASE MATERIALS

The earliest commercially available tapes made were on a base of kraft paper (the familiar brown wrapping paper) which had been super-calendared to give it an



Samples of acetate film manufactured by Celanese Plastics Company at Newark New Jersey, are constantly tested on this automatic gauge recorder. The Celanese manufacturing process provides a film of exceptionally uniform gauge, with a tolerance of .00003 of an inch, being maintained. Any variation in the thickness of the film has an effect on the final oxide coating. The tolerance is only one hundredth the thickness of a human hair.

exceptionally smooth finish. The production of paper tape was discontinued some years ago but paper did have a few advantages in that it was easy to mark, it did not stretch and did not become brittle very readily. It did have some serious drawbacks, however, in that it tore easily when nicked and also was noisy, because of surface unevenness.

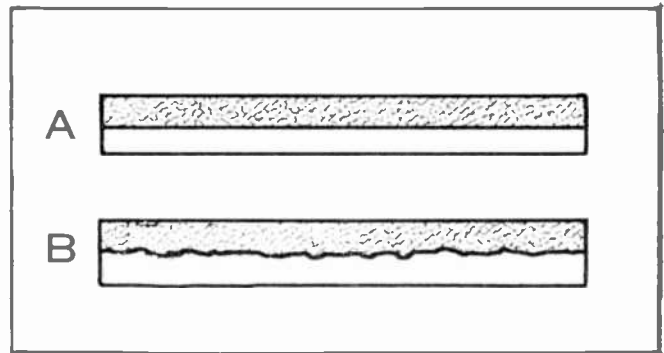
Since many of the qualities of the finished tape are dependent upon the base materials, the characteristics are very important.

Among the factors determining the quality of a base material are these: it should be inexpensive, should not support fungus growth, should be non-inflammable, should be capable of manufacture to very close tolerances, must be flexible to the point of limpness both before and after coating, the surface should be perfectly plain and free from imperfections, and should be of a high gloss, it should be able to be made in thicknesses from 1/2 mil up, it should not retain strong electrostatic charges, it should not swell or contract with changes in humidity and should keep in storage. It should be capable of withstanding more stress than the stresses imposed by tape recorders, and should be of such nature that the oxide coating can be keyed into the base and not flake off. It should not readily tear, nor should it elongate and remain stretched under normal stresses.

These are the ideal specifications and no one film known today can meet them all completely.

#### ACETATE BASE

Cellulose acetate is the most widely used base material. This is made by reacting highly purified cellulose with acetic acid to join acetyl groups along the cellulose polymer chain in exact percentages. After being compounded with stabilizers and plasticizers, and dissolved in solvent, the acetate is fed onto large highly polished revolving wheels. When sufficient solvent evaporation has occurred, the film is removed from the wheels and fed



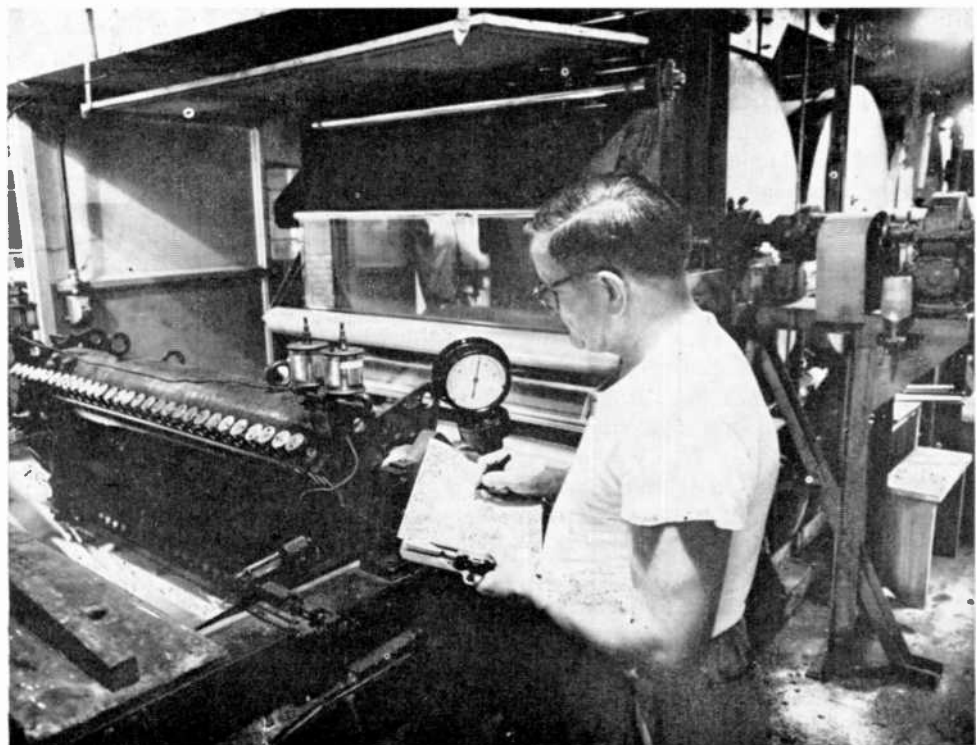
The importance of the base material is shown in this illustration. In A, the oxide coating is of even depth because the surface of the base is smooth. In B, variations in the surface (in this case paper base) permit varying thickness of oxide. Even though the top surface of the oxide may be flat and true, the variations in depth will introduce noise and variations in magnetism when recording is done on such a tape.

through drying ovens to complete the process.

The rolls of film are made to the required thickness on the machines. Standard thicknesses for tape use are: 1 mil (1 mil equals 1/1000 of an inch) and 1 1/2 mils. Other thicknesses for special purposes are also made. In the case of Celanese, these dimensions are held within .00003 of an inch through constant testing during the manufacture. This is very important because the thickness of the base, to some extent, has an effect on the thickness of the oxide coating which, in turn has an effect on the recording characteristic of the tape.

The 1 mil thickness is used for the production of the extra-play acetate base tapes and the 1 1/2 mil is used for standard tapes. The rolls of film are furnished in widths of from 6 inches up to a few feet as desired by the tape manufacturers.

The use of highly polished wheels for casting the film give it a mirror finish surface for coating, free from scratches, ripples or other defects.



Celanese acetate is cast on large, highly polished revolving wheels. Here, a production supervisor keeps a close check on one of the film casting machines at the Newark, New Jersey plant at Celanese Plastics Company. The highly polished wheels permit casting a perfect finish on the film to which the oxide will be applied.





The completed rolls of film are delivered to the tape manufacturers after being carefully protected against damage and contamination from dust and dirt in transit.

#### POLYESTER BASE

This is the film to which DuPont has applied the trademark "Mylar." It is polyethylene terephthalate and is formed by a condensation reaction between ethylene glycol and terephthalic acid under carefully controlled conditions. This reaction produces a plastic suitable for a recording tape base among other uses. Since this material is an integral plastic and does not contain any plasticizer to give the film its pliability, there is nothing to change in its composition and the result is a film of high stability and strength.

Polyester is a stronger material than acetate although it can be made to elongate and stay stretched whereas acetate will break. At a temperature of 57° F. and a relative humidity of 50% a .9 mil, 1/4" strip of polyester will yield at 4.2 pounds and break at 7.6 pounds. A 1 mil acetate of the same width will yield at 3.7 pounds and break at 3.9 pounds.

Polyester maintains its strength at high humidity levels and its moisture absorption is extremely low, making it practically impervious to changes in temperature and humidity cycles and thus it requires less care in the matter of storage.

It is manufactured in 1/2 mil, 1 mil and 1 1/2 mil thicknesses for general tape use and in heavier gauges for specialized applications. Its higher strength has made it possible for the tape manufacturers to offer double-play tapes which have 2400 feet of tape on a seven inch reel. Such tape, however, because of its extreme thinness (one-sixth the thickness of a human hair) must be handled with the greatest of care since it is easily damaged.

Mylar is the latest member of the plastic family to be



Left: the basic ingredient of magnetic tape's coating is iron oxide, a very carefully manufactured ingredient held to close tolerances. Photo courtesy Minnesota Mining and Mfg. Co. Above: a photo made through an electron microscope showing the needlelike particles of acicular iron oxide. Magnification is 35,000 times. Courtesy C. K. Williams Company.

used for tape base and is one of the strongest plastics known.

The 1/2 mil Mylar, and just recently the 1 mil Mylar are "tensitized" in manufacture. The process is a trade secret but the result is a tape which has an increased break strength and less stretch. This factor is particularly important in video and instrumentation tapes and is also of some importance to the uses of the thinner audio tapes.

As with acetate, the Mylar film is available in rolls of widths specified by the tape manufacturers.

#### POLYVINYL CHLORIDE

This material has been widely used in German tapes but it has not gained acceptance in this country. It has excellent winding characteristics but is prone to stretch, although it will recover after a period of time. The German Luvitherm is a form of PVC which has been stretched in both directions before use.

#### TENZAR

This base material, brand named Tenzar by Minnesota Mining and Mfg. Company, was developed and is manufactured by them for their #311 tape. It is a plastic of 1 1/2 mils in thickness and, in the 1/4 inch width has a break point of 8.2 pounds. It will stretch but very slightly before breaking. The actual composition and family of plastics to which this base material belongs is a trade secret. It will not absorb moisture nor dry out.

#### THE BINDER

The purpose of the binder is, basically, to hold the iron oxide particles on the base material. The formulation of the binder is a critical step in the making of a satisfactory tape for, if not done properly, the coating

may flake off, the tape become sticky and adhere, layer to layer, the sensitivity may drop and other faults appear.

The binder itself may be any one of a number of compounds such as vinyl acetate, ethyl cellulose, and similar materials. Added to this are, of course, the solvents, and there may be two or more of these, one to provide a thinner for the binding material and the second to attack the base material so that the binder will "key" into it and form a positive bond that will not shed off. The proportion of each must be very exact or difficulty will ensue in the coating and drying part of the tape making process.

In addition to the binder and solvents, a wetting agent is added so that the binder can thoroughly permeate between the oxide particles and produce a smooth mixture. It also serves to shorten the milling time. Since all fine powders tend to stick together and form lumps, and the iron oxide does this, it is vital that they be broken up and dispersed in the mixture. The wetting agent assists in this also.

A lubricant, usually one of the silicones is also added so that the tape will pass smoothly over the head and reduce head wear, and it also reduces any sticking propensities that the binder may have.

A plasticizer is added to make the binder flexible and a resin to add toughness to the coating. The amount of the latter is also critical as too little will cause the coating to flake whereas too much will cause it to be sticky.

#### THE OXIDE

A number of metal families exhibit magnetic properties but iron is the best of all, and iron (ferric) oxide has so far proved the most suitable material for magnetic recording.

As in the case of both the binder and the film base, the oxide manufacturer must take great care to turn out a uniform product. Particle size must be reasonably uni-



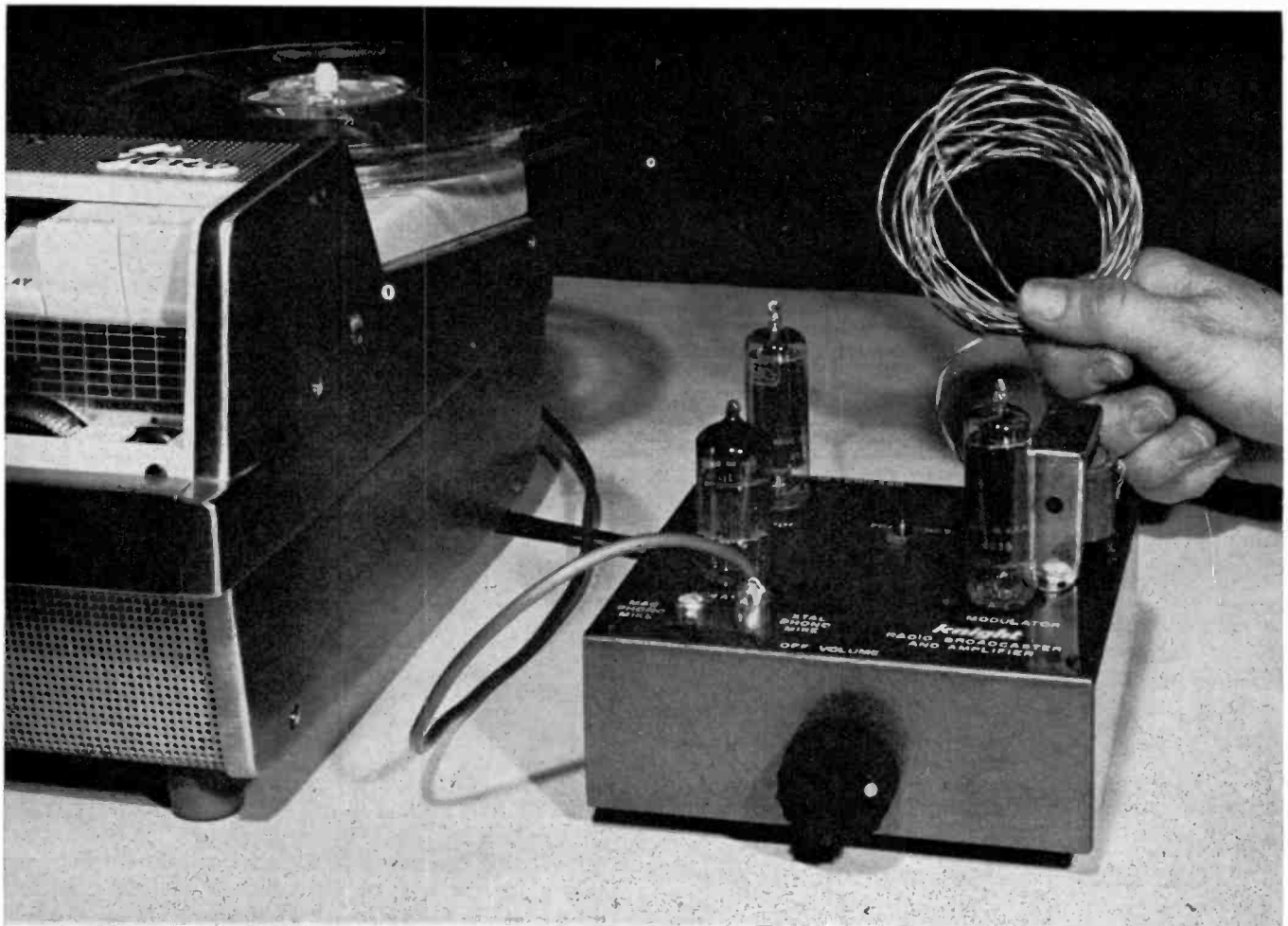
Ingredients such as wetting agents, anti-bloom compounds and binders are very carefully weighed and measured to insure a uniform coating for every batch of tape.

form. If this uniformity is not achieved, then it becomes difficult for the tape manufacturer to produce a smooth coating on the base material which in turn leads to varying high frequency response, noise, a limiting of the dynamic range and variations in amplitude (volume).

*(Next month—more about oxides and how tape is manufactured.)*



Last step before coating is the milling of the oxide and binder ingredients to produce a homogenous mass without lumps. These ball mills are installed in the new plant of the Reeves Soundcraft Company in Danbury, Connecticut. Like the previous steps in the manufacture of tape, this milling is also a rather critical process.



To get "on the air," just hook the Broadcaster up to your recorder, plug the unit itself into a wall socket and stretch out the 10' coil of antenna wire. If you wish, you can first make an "audio check" at this point by attaching a loudspeaker temporarily to the Broadcaster's rear speaker terminals, to see if all is okay.

## USE YOUR RECORDER AS A RADIO STATION

by

Tommy Thomas

... you can work wonders with a small kit broadcaster.

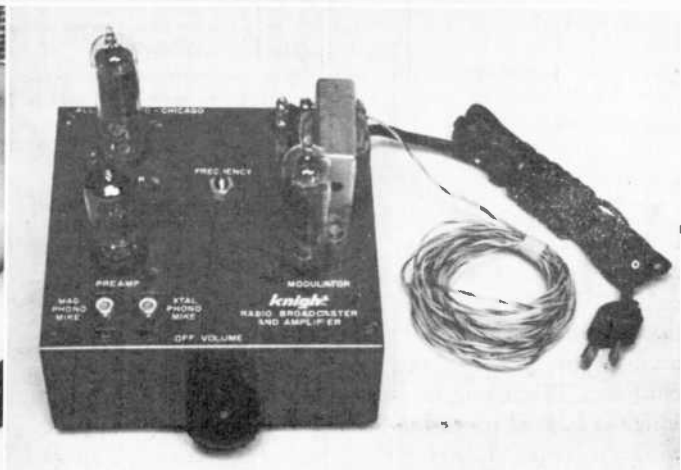
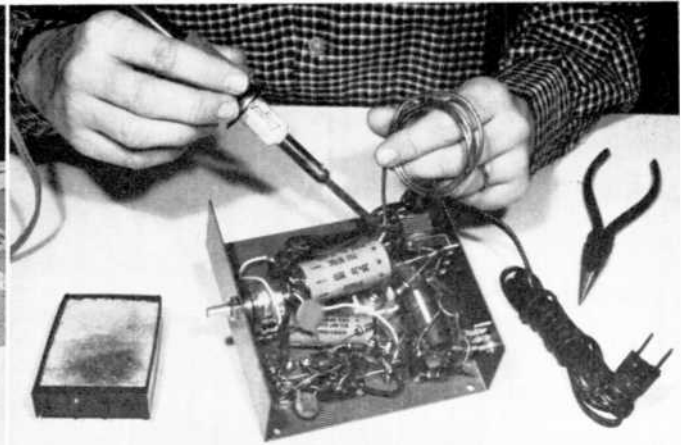
THOSE of you who are interested in getting all possible fun and use out of your tape recorder will find an inexpensive *Wireless Broadcaster* an intriguing item. With it, you can actually turn your recorder into a miniature broadcasting station, capable of transmitting the signal from your recorded tapes to any and all radios anywhere in your house. And nicest of all, aside from its low cost, is that you don't even need a license to operate.

One of the best of the wireless broadcasters is the Knight-Kit "RADIO-BROADCASTER/AMPLIFIER" unit put out by Allied Radio. It's a fun-to-assemble kit that can be used with a record player or with just a microphone (according to the specs put out by Allied). Oddly enough, though Allied devotes almost a full catalog page to describing this fascinating unit, no mention at all is made of its most fabulous use: *with a tape recorder*.

Now, before we get into the actual assembly of this unit, let me whet your appetite with just a few of the possible uses of a personal transmitting "station." In the first place, as originally intended, the Broadcaster can be hooked up so as to broadcast music from a single record player to as many radios as you like. Or a microphone (with nothing

else needed) can be plugged into the unit and you can broadcast your own voice through nearby radios. But the real fun comes in using it with your tape recorder. Used the same way as with a record player, this means that you can now locate your recorder anywhere in the house, and any member of the family can readily *tune in* on the recording. Mom can have it coming through her kitchen radio. Brother or sister can listen in in their bedroom. And even *you*, if you wish, can tuck a tiny transistor radio into your shirt pocket and go out and stroll in your garden while listening to a favorite recording.

Personally, I think it's sensational! And a good bonus effect here is that it's so easy to "blanket" a home with music this way, just by hooking up a single recorder and lots of radios all around. This came in handy for me recently, when some friends asked me at the last minute to furnish music for a big party they were giving at their house. There were to be dozens of people there, upstairs and down, in the kitchen and even out on the back patio. This ordinarily would have meant stringing several hundred feet of annoying speaker wire all around, but I didn't have time to do this because of the short notice. So, I brought along a couple



Upper left: before beginning to assemble even such an easy kit as this, spread the parts out so you can identify them individually. And read through the instruction manual, to fully acquaint yourself with the procedure. After that it's just a simple matter of following the step-by-step directions, checking each one off as you finish it. Upper right: besides screwdrivers and "regular" pliers, a pair of long-nosed pliers are pretty nearly essential in kit building. And a moistened sponge is mighty handy for cleaning the tip of your soldering iron occasionally. Lower left: the Broadcaster transmits a signal over the air, hence it must meet the requirements of the FCC to be operated without a license. This is done automatically by building the unit exactly as specified, and with not more than 10' of antenna connected. Also, it is necessary to glue Allied's certification to the bottom of the set. Lower right: this is the Broadcaster completely assembled and ready to go. No license or permit is required to operate, since the unit has a low output.

of small table model radios and I also asked some of the guests to bring along a few more . . . and in no time at all my single recorder was beaming recorded music to practically every room in the house. It all worked out so easily and well, it even impressed *me*.

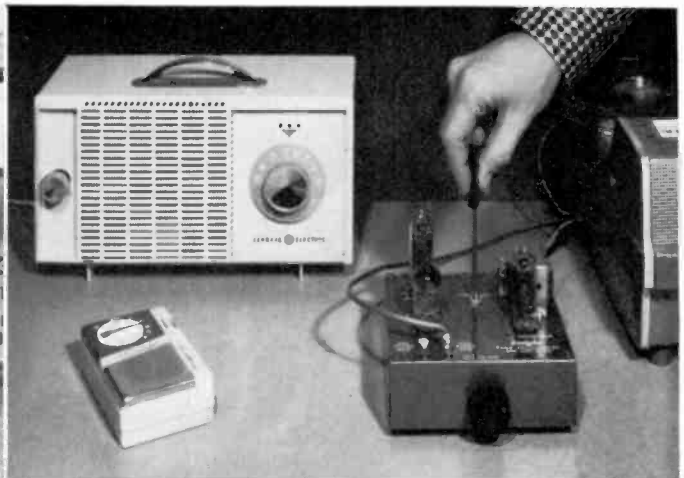
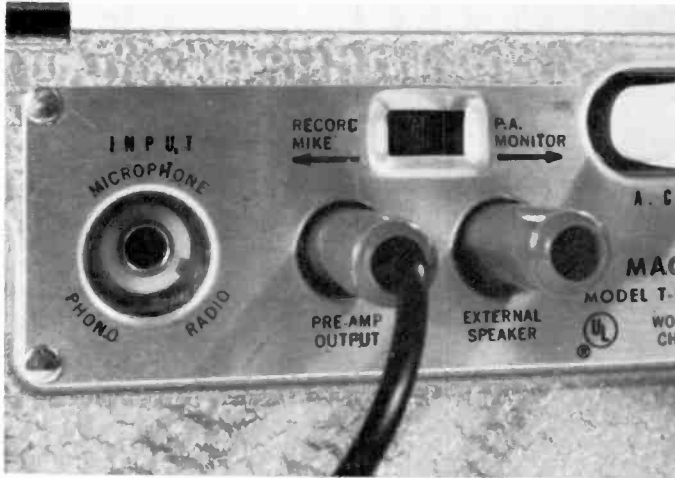
Naturally, it doesn't take long to decide that if transmitting pre-recorded tapes is so much fun, then—heck—why not "go on the air" with a few programs of your own. Let's say you decide to make a tape of yourself as a disk jockey, with a combination of friendly chatter and commercial music. And to do a professional-type job here, let's go about it something like this:

(1) Set yourself up with your recorder, a microphone, a record player and some 45's or LP's, and put together a casual program of friendly chatter, interspaced with the records that you play. If you don't know exactly what to say and/or you don't have a record player and records handy, that's no problem at all. Just record a local disk jockey's radio program and use *that* material. Copy the chatter down and adapt it for your own use, to read over the mike when recording. And remove the musical selections intact (music only) so that you can splice them into your own taped program later—. And it's a good idea to record and use the

regular jock's opening and closing *themes* too, for that professional touch. And also save a couple of recorded commercials to splice in . . . though you can easily do that part yourself, or maybe have your wife or some friend do these for you. So now you have your completed tape, which should be exactly thirty minutes long, say, of well-edited material.

(2) *Now comes the big fooler!* You could play this tape, as is, to your friends and it would very likely be no big deal. Nice, but nothing really great. So you're going to fool them by NOT letting them listen to the recorder, but—with the recorder hidden away so they won't even know it's around and working—you're going to broadcast the program so they will think it's a regular radio broadcast. To make this as realistic as possible, record eight or ten minutes of the *closing* of almost any regular radio program (except a news broadcast, which is "dated") and also record eight or ten minutes of the *opening* of another radio program. Now, on a seven-inch reel (using either 1-mil extended play tape or recording at 3¾ ips so it'll all get on), put this all together with the closing of the regular radio program at the beginning and the opening of the other radio program at the end *and with your own personal disk jockey program sandwiched (spliced) in between.*





Left: you may have to experiment a bit to discover the correct output from your recorder. For the Wollensak shown here, the proper hookup is from the Preamp Output Socket (via shielded cable, of course) to the CRYSTAL input on the Broadcaster. The extra "blank" phone plug is necessary so you can silence the recorder's speaker.

Right: finally, turn your radio on (either the table model or even a tiny portable) and tune from 600 to 1500 kc to find a dial setting where no regular radio station is heard. Then, with the recorder playing a tape, use a screwdriver to adjust the Broadcaster's frequency control until the tape you are playing is heard at the radio.

(3) Your guests are in the living room, you're all sitting around talking, when you "suddenly" remember that you were a guest disk jockey at a local radio station recently and TONIGHT is when the pre-recorded program is due to come on. You tell your guests it's due in just a few minutes, so you go out of the room to get a radio so they all can listen. While out, of course, you start up your recorder which is hooked up to the little Broadcaster and with your specially prepared tape. Without a radio tuned in, all is silent . . . so you grab up a table model radio and go back to your guests and plug it in (see below). The radio warms up, you tune back and forth across the dial, apparently searching for your program, and finally stop on your "own" station. Naturally, since the taped *regular* radio broadcast is still on, this sounds like all the rest of the stations you've been tuning in. Then, a few minutes later the regular program ends and is followed by an announcer who gives the station break which you've previously taped and left in, and then YOU are on the air, with opening theme music and all.

Man, your friends will flip!

### ASSEMBLING THE WIRELESS BROADCASTER

The Knight-Kit "Radio-Broadcaster/Amplifier" is available from the Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill., for \$12.95. Ask for their No. 83Y706, and add postage for 2¾ lbs. shpg. wt. As I mentioned before, this broadcaster can be used by itself, with just the addition of a microphone necessary so you can broadcast to nearby radios. You can use your regular recording mike, or order the inexpensive crystal microphone Allied supplies especially for this use. Their No. 99S519, \$2.95 plus postage on 1 lb. NOTE! Also available, if you'd like further advance information regarding the broadcaster, are the complete plans and assembly instructions for this unit. Send 15¢ to Allied and ask for their Instruction Manual No. 38K297, for their Wireless Radio-Broadcaster/Amplifier. No additional postage is necessary.

It's an extremely easy kit to assemble, and is a wonderful *starter* for anyone who has often thought about saving money by assembling his own electronics kits, but hasn't quite had the nerve to tackle one yet. There aren't very many parts, actually, and the whole unit can be assembled



You and your friends can have many hours of fun with a "Wireless Broadcaster" hooked up to your recorder. This allows you to actually make up and broadcast your own taped shows thru radios located anywhere in the house, with no need for direct connections.





For party fun the Wireless Broadcaster can be a riot. You and a few guests can sing and play-act through the radio from the next room, for the rest to hear. Or you can use a small transistor radio as shown here, with earphone attached for silent listening, to make with a little electronic magic for the mystification of all. Meet Princess Barilone, a stranger to your party guests who looks into her crystal ball and mysteriously tells them all about themselves. But don't tell anyone she has a portable radio concealed under her dress and an earphone in her ear, bringing her the needed "info" from a confederate broadcasting from another room.

and the pre-cut wires soldered in place in a single evening. Follow Allied's explicit step-by-step instructions and you'll have yourself a completed Broadcaster before you know it. And even if you've never soldered before, Allied will show you how easy it is to do. You'll have to buy a soldering iron separately, of course, and I advise spending enough on a good one because as soon as you discover how really simple, and how much *fun*, kit-building can be, you're going to be doing it again and again. I have both a 100-watt soldering *gun* and a 47½-watt Ungar "pencil-type" soldering iron. And of the two, I prefer the chisel-tipped Ungar iron for kit assembly, with an extra long tip-element for reaching into crowded assemblies. But this is a personal preference, so it might be a good idea if you talked to a friend who is adept at soldering (or perhaps to a local electronics dealer or radio repair man) before making your final choice.

**CAUTION!** The kit instructions say to use plenty of heat when soldering, and to keep the wire leads on resistors and capacitors as short as possible. But be careful! It's best to avoid *too much* heat—despite Allied's instructions somewhat to the contrary—and to keep the leads at least one inch long each, to avoid possible overheating of the parts, especially resistors . . . which can change value or even be ruined completely if overheated.

Since the instructions which come with this Broadcaster unit mention nothing at all about using it with tape re-

orders, you may have to experiment a bit to discover the right *output* from your recorder (to plug into the Broadcaster). The *crystal input* on the Broadcaster worked best for me, meaning that the impedance output from the recorder must (at least approximately) match this. Auxiliary speaker output is *low* impedance, so that's no good. Either use the recorder output marked "To Auxiliary Amplifier" or look up in your recorder manual just how to get this sort of output. With my little Crescent recorder, this meant using the regular "Aux. Speaker" output, but with a two-conductor instead of a three-conductor phone plug. The plug wiring was very simple. The Wollensak (in the photos) meant coming out of the "Pre-Amp Output"—of the 1st track, of course, since this is for monaural use—and going to the Broadcaster's "XTAL" input as shown.

**A FINAL NOTE!** It may take a bit of "fiddling" to get the best results from your particular Recorder/Broadcaster combination. You will have to experiment a bit, the first time, to find the best (highest) volume level you can use at the *Broadcaster* so as not to cause distortion in the transmitted signal. At the same time experiment to find the best volume for the recorder. With these once set and noted for future use, you can do your final "listening" volume adjusting at the radios. And when tuning a radio to the frequency you have chosen, see if you don't get a slightly better *tone* when you're a bit "off" from the exact tuning center.

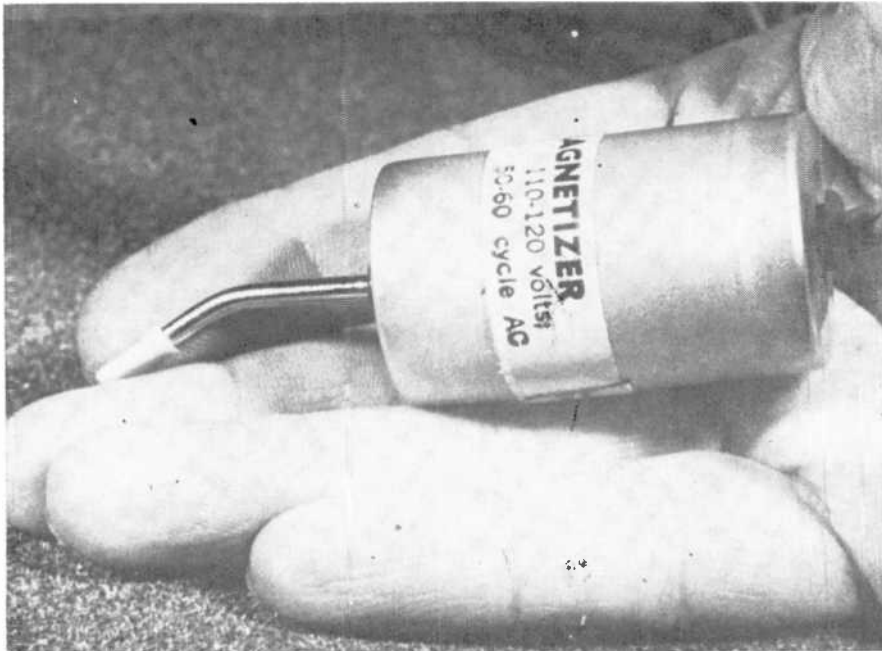
# NEW PRODUCT REPORT

STAFKSTED

**Product: Head Demagnetizer  
HD-3**

**Price: \$5.95**

**Manufacturer: Robins Industries  
Corp., Flushing 54, N. Y.**



## ROBINS HEAD DEMAGNETIZER

*. . . small unit has tip that fits in many recorder tape slots without removing head covers.*

**T**HE Robins Head Demagnetizer HD-3 is one of the smallest units on the market and will take up little space in the recordist's kit. However its smallness, approximately 1¼ inch in diameter by 2 inches long and with a 1½ inch shaft has not impaired its capabilities.

The amount of flux produced at the tip of the shaft is adequate and it is of heavy enough design so that it does not overheat. We left the unit on for six minutes and at the end of that time it was only comfortably warm.

Many heavier degaussers have duty cycles, such as two minutes on, three minutes off, which must be observed to prevent overheating. This usually applies to those units designed to erase a reel of tape.

The tip of the shaft is covered with plastic to prevent accidental scratching of the head when the unit is used.

To perform the demagnetizing of the heads, the tip of the shaft is applied to the head and moved along the surface of the head for a period of from 10 to 15 seconds.

Following this, the demagnetizer is removed from contact with the head and very slowly withdrawn to a distance of three feet before the current is cut off.

The current should never be cut with the demagnetizer in contact with the head as this will tend to magnetize it rather than demagnetizing. This, of course, is true with any demagnetizer.

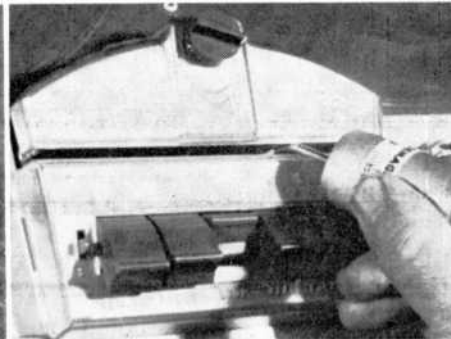
Demagnetization takes place in the head by the application of the alternating current which is gradually weakened by removing the demagnetizer. This "shakes up" the magnetic domains and destroys any magnetism. If the current is cut with the demagnetizer in contact with the head, the final surge of current through the coils will magnetize the head. The slow withdrawal is very important.

Demagnetization of heads at regular intervals (about every 10 hours of playing time) will insure proper high frequency response and also prevent the head from adding any noise to the tapes. Professional recordists will also use a demagnetizer before every recording session.

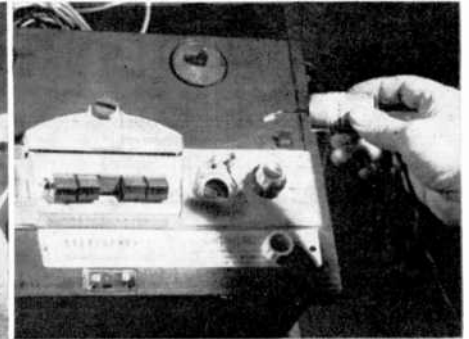
We found this demagnetizer very convenient to use. It was tried on four different brands of recorders and the heads were easily reached on all. Regular head demagnetization pays dividends in recorder performance and with this unit it is very easy to do.



The shaft of the demagnetizer is of small diameter and this coupled with the angled bend makes it easy to reach the heads.



The demagnetizer shaft will slip down between the head covers on most recorders. It should be worked for 10 to 15 seconds.



After the 10 to 15 seconds have elapsed the demagnetizer is withdrawn. Current is not cut off until it is three feet from recorder.

# TAPEBOOKS AND OTHER TAPES

## ALL ABOUT TAPE— ON TAPE

Will give you the information you need about tape recording in sound, not in the written word.

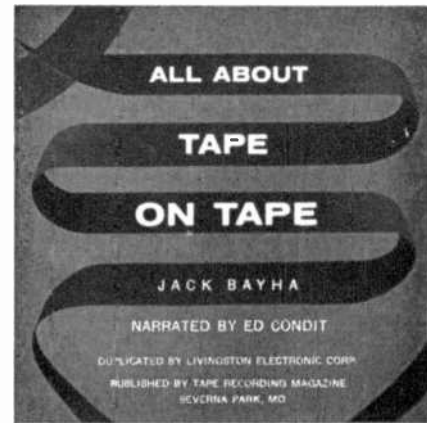
... authored by Jack Bayha ... a book to which you listen ... the first book specifically designed and produced on tape instead of the printed page. ... Now you can actually HEAR what good recording, over-recording, wow, flutter, distortion, wrong mike placement, etc., sound like. A test section allows you to adjust the head of your recorder for best results. Chapters include: How

a Tape Recorder Works, A Demonstrated Glossary, Recorder Operation, Home Recording, Field Recording, Low Impedance, Microphones, Recorder Maintenance and Testing. ... Playing time of the Tapebook is one hour. Accompanying each reel is a 28 page booklet containing 80 illustrations to supplement the spoken word. It is unique, enjoyable and instructive.

7 1/2 IPS, 7" Reel, Dual Track \$6.95

3 3/4 IPS, 5" Reel, Dual Track \$5.95

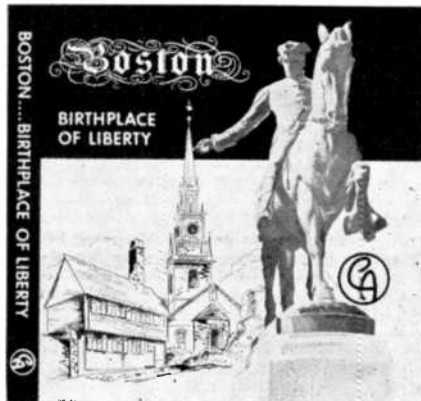
Including a 28 page manual of illustrations



## HOW TO STAY ALIVE ON THE HIGHWAY

This tape may save your life. Contains the actual voices of nearly 40 auto drivers, victims and survivors of highway accidents, police and traffic officials. Portions were secretly recorded in court rooms, on the highway and in police stations over a period of three years. A must for driver education programs. Dramatic, forceful—something you won't forget.

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## ADD-THE-MELODY TAPE

Twelve old favorite tunes for you to sing along with. Specially recorded with the melody missing so you can sing or play with the tape then, on playback hear both parts together. Suitable for use on any recorder with the ability to play the lower track while recording on the upper. Can be recorded again and again without harm to the Hammond Organ accompaniment by Hack Swain. You can get a million dollars worth of pleasure from this tape. \$9.95

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Periodic hearing tests are important because unlike most other ailments, a hearing loss gives little positive warning. Tape contains 33 tone pairs to test your musical discrimination, 75 word pairs to test speech discrimination and 30 minutes of music by the famous Lenny Herman orchestra for screen testing of hearing. Full 7" reel, 7 1/2 ips and booklet giving full directions for use of the tape. \$9.95

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- 4—Jazz—Dickie Thompson Quartet—Laura—What is This Thing Called Love
- 5—Jazz—Dickie Thompson Quartet—Misty, Satin Doll
- 6—Dinner-Dance—Jose Melis—Tonight, Am I Blue, White Cliffs of Dover
- 7—Dinner-Dance—Fred Martin Radio Orchestra—Flamingo, Song of India, Symphony
- 8—Dinner-Dance—Fred Martin Radio Orchestra—I've Got Plenty of Nothin', Ebbside, Autumn Leaves
- 9—Dinner-Dance—Fred Martin Radio Orchestra—Fiddle Faddle, Blue Tango, Serenata
- 10—Hammond Organ—Bill Thompson—Touch of Your Hand, I Won't Dance, Smoke Gets in Your Eyes

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(circle numbers desired)

1 2 3 4 5 6 7 8 9 10

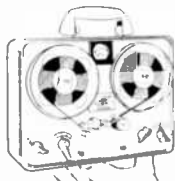
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Your Name .....

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## SHOP OR SWAP

Advertising in this section is open to both amateur and commercial ads. TAPE RECORING does not guarantee any offer advertising in this column and all swaps, etc., are strictly between individuals.

RATES: Commercial ads, \$30 per word. Individual ads, non-commercial, \$.05 a word.

In figuring the number of words in your advertisement, be sure to include your name and address. Count each abbreviation, initial, single figure or group of figures as a word. Hyphenated words count as two words. The name of your city, local postal zone and state count as two words. Maximum caps first four words. Proofs are not submitted on classified ads.

Remittance in full should accompany copy. Ads will be inserted in next available issue. Please print or type your copy to avoid error. Address ad to: Shop or Swap, Tape Recording Magazine, Severna Park, Md.

LEARN HYPNOTISM, SELF-HYPNOSIS from recorded tapes! Other amazing Tapes, Books, Records, Complete Sleep-Learning information! Free Catalog! Philanthropic Library, Drawer TR697, Ruidoso, New Mexico.

READING FOR SPEECHES, TALKS—any kind of reading, even children's stories. Send your blank tape. Herman E. Pawsat, 428 East Second Street, Mayfield, Kentucky.

"LITTLE FLOCK" (Luke 12:32) non denominational Bible Classes (Rev 18:4) with tape recorders, seek faith contacts, Christian Bible Classes, Inc., donations accepted, 2521 N.W. 23 St. Miami, Fla., Phone NE 4-0460.

LEARN WHILE ASLEEP, hypnotize with your recorder, phonograph or amazing Electronic Educator endless tape recorder. Free catalog lists over 200 unusual tapes, records, equipment for experimenters. Sleep-Learning Research Association, Box 24-TR, Olympia, Washington.

TAPES COPIED TO Hi-Fi Discs. Free price list. Vance Studios, 3409 Grand Avenue, Oakland 10, Calif.

TOSCANINI TAPES—interested in trading any off-the-air Toscanini tapes plus other unusual Toscanini fare. Anthony Paterno, 2544 Bronxwood Avenue, Bronx 69, New York or OL 3-2077.

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FOR SALE: Sony 552 stereo tape recorder, Stereo Rec Erase Play, 3 1/4-7 1/2, case, two mikes, headset and other accessories. Like new. Original cost \$525, save \$225. C. Karris, 104-A Claiborn Dr., Smyrna, Tenn.

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FOR THE VERY BEST in tape rentals, at lowest prices. The Stereo Shop, 330 California Ave., Palo Alto, California.

BRAND NEW Roberts Stereo Recorder Model 990—\$275.00; Used Tandberg Stereo Recorder, perfect condition, Model 5-2, with case—\$250.00. Siger's, 127 Main Street, Hudson, Mass.

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WOLLENSAK TAPE RECORDERS Model T 1500, \$149 perfect; Model T-1616 almost new \$220. Electro-Voice Musicaster speaker \$50. Koss stereo headphones \$21. D-izen 2-Track stereo tapes. Write Gerry Chapin, 1001 Kansas Ave., Modesto, California.

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FOR SALE: AMPEX HEAD Assembly, half-track, for Model 350 or 351 recorder. Used less than 150 hours Condition like new. J. M. Edelman, M.D., 700 Commerce Building, Baton Rouge, La., DI 2-6801.

TRANSISTOR "MICROCORDER" BY WEB-COR, 4 pounds; features galore. See September 1960 issue this magazine "New Product Report." Received 2 for Xmas. Lists \$175—take \$139. Harry Volkwitz, 414 E. 59th St., Kansas City 10, Missouri.

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This book is aimed at the new recordist, who has yet to discover the hundred and one unusual, interesting and profitable uses to which a tape recorder can be put . . . with patience, a little imagination, and a few accessories.

Lee Sheridan, who authored this book, is actually two people: Elsie Lee and Michael Sheridan, who comprise one of the most prolific and successful freelance writing teams in the country. They have appeared, with articles and short stories, in many magazines both here and abroad.

6" x 9", 128 pp., paper bound, illustrated . . . . . **\$1.00**

## TAPE RECORDERS AND TAPE RECORDING

by Harold D. Weiler

The latest book by the well known author of "Hi-Fi Simplified" which has sold over 65,000 copies. Written so that anyone can understand it the book covers Room Acoustics; Microphone Techniques; Recording From Records; Radio and TV; Sound Effects; Tape Recorder Maintenance; and Adding Sound to Slides and Movies. Over 100 illustrations and diagrams in 13 chapters of practical down-to-earth suggestions make this book the beginners bible.

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by C. J. Le Bel, Vice President Audio Devices, Inc.

A complete handbook of tape recording containing 150 pages of up-to-the-minute information of practical value to every tape recordist. Easy reading for the most inexperienced of home recordists.

Sections include: How A Tape Recorder Works, Characteristics of a Tape Recorder, Selecting A Tape Recorder, Selecting A Recording Tape, Using the Tape Recorder, Making A Microphone Recording, Acoustically Treating the Studio, Tape Editing, Binaural or Stereophonic Recording, Putting Together A Recording Show, and a Glossary of Tape Recording Terms.

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## TAPE RECORDERS—HOW THEY WORK

by Charles G. Westcott and Richard F. Dubbe

This book is based on the principle that to get the most from a recorder, one must first understand thoroughly how it operates. It contains diagrams and schematics and explains in not too technical language "what's under the cover" of a recorder.

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## TECHNIQUES OF MAGNETIC RECORDING

by Joel Tall

This book translates the complexities of a science into practical, easy-to-follow techniques. It is a book for the professional who wants new ideas, new standards of excellence, and a book for the amateur just introduced to magnetic recording. Beginning with a description of Poulsen's invention of magnetic recording, the author presents a condensed history of developments since 1900. Then he treats the many problems that arise in magnetic recording. Individual chapters are devoted to recording in such areas as medicine, education, and public entertainment and advertising. The inclusion of descriptions written by the originators of various techniques, extensive quotation from the laboratory notes of pioneers, an extensive glossary, and a comprehensive bibliography make this book invaluable to the amateur and to the professional.

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