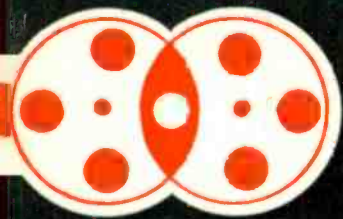


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TAPE RECORDING



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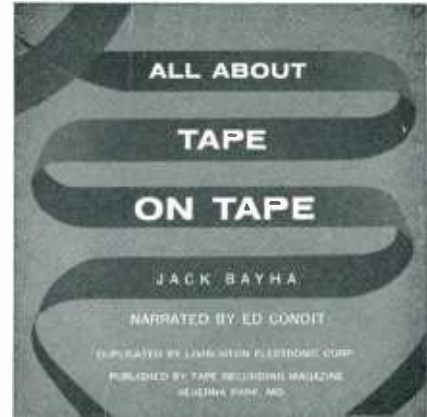
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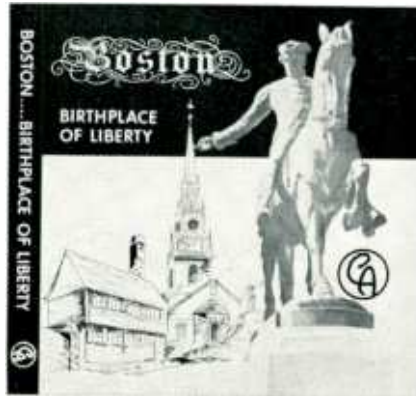
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HOW TO GET THE MOST OUT OF TAPE RECORDING

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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.

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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.

5 1/2" x 8 1/4" — 190 pages — **\$2.95**
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by Harold D. Weiler

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HOW TO MAKE GOOD TAPE RECORDINGS

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. 5 1/4" x 8", 150 pp., paper bound. **\$1.50**
illustrated

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.

5 1/2" x 8 1/4", 177 pp., paper bound, **\$2.75**
illustrated

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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TAPE RECORDING MAGAZINE

Severna Park, Md.

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NEW TAPES

★—Fair

★★—Good

★★★—Very Good

★★★★—Excellent

CLASSICAL

Reviewed by Robert E. Benson



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

MAHLER: Symphony No. 4 in G Major
Sylvia Stahlman, soprano; Amsterdam Concertgebouw Orchestra conducted by Georg Solti

LONDON LCL 80075

4-track, 7½ ips

\$7.95...54 mins.

Early this year the London (English Decca) engineers ventured to Amsterdam for the first time in about ten years to record once again the great Concertgebouw Orchestra. Two performances were recorded—Mahler's *Fourth Symphony* conducted by Solti, and highlights from Tchaikovsky's *Swan Lake Ballet*, with Anacleto Fistouleri conducting, the latter not yet available on four-track tape.

In the late forties, London issued a long series of Concertgebouw recordings, monophonic of course, which even by today's standards are superb recreations of the sound of this wonderful orchestra playing in the unmatched acoustics of its own hall. The orchestra has been recording for Epic (Philips) since leaving London, and although there are some notable exceptions, a majority of the orchestra's Epic recordings are quite inferior technically, hardly presenting an accurate tonal portrait of it, so it was with great anticipation that this new tape was received.

From a technical standpoint, this is stunning, although with a bit more hall sound it would be even better. There's plenty of left and right, enormous dynamic range, and very low tape hiss. Orchestral playing is superb; no other orchestra plays Mahler as well as the Concertgebouw, and one might single out the magnificent horns and glorious woodwinds. Solti is one of the most versatile of today's conductors and his sympathies include Mahler's music; this version is preferred over its four-track rival with Fritz Reiner and the Chicago Symphony (RCA FTC 2027, \$8.95) and it costs a dollar less. Sylvia Stahlman's bright soprano and accurate intonation are ideal for the Angelic solo in the last movement. After this auspicious start, we look forward hopefully to a long and continuing series of Concertgebouw recordings on the London label.



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

STRAUSS: Don Quixote, Op. 35
Pierre Fournier, cellist; Cleveland Orchestra conducted by George Szell

EPIC EC 815

4-track, 7½ ips

\$7.95...40 mins.

Don Quixote is a symphonic poem for solo cello and orchestra based on the Cervantes figure, and consists of an introduction, theme with ten variations representing the various adventures of the *Don*, and a finale. Strauss's score is one of his most intricate, a showcase for the magnificent Cleveland Orchestra, which is now second to none in the United States.

George Szell might be called a "cold-blooded" Strauss specialist; *Don Quixote* could use more sentiment than he provides. However, his sure command is ever apparent, and it is unlikely there will be a better performance for some time to come. Pierre Fournier is today's leading interpreter of the cello solo representing the tragic figure of *Don Quixote*, and now his performance has been immortalized in stereo; an earlier monophonic recording with Clemens Krauss and the Vienna Philharmonic has been deleted.

Epic's sound is exemplary, with resonance, warmth, depth and plenty of zing. The only possible disadvantage to this release is that the music is interrupted for the tape turnover. Too bad this couldn't have been coupled with another of the Strauss major symphonic poems of similar length, with each uninterrupted. Regardless, this is a tape to cherish.



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

RAVEL: Daphnis and Chloe (complete ballet)

New England Conservatory Chorus; Boston Symphony Orchestra conducted by Charles Munch

RCA FTC 2089

4-track, 7½ ips

\$8.95...56 mins.

It's interesting to note that this is Munch's second stereo recording of this music; his earlier one, also with the Boston Symphony Orchestra, is available only on a 3¾ ips cartridge. This new performance is, of course, superb, but if I had to make a choice between the two versions, I would chose the earlier one, because it has better sound.

Perhaps some listeners will like the kind of reproduction on this new tape. It is remarkably transparent, and of wide dynamic range. However, the Boston Symphony sounds colorless as recorded here, with a distant pickup, and tympani that sound all out of proportion to the

rest of the orchestra. The Boston Symphony surely deserves better than this.

Tape hiss is very low, but there is some print-through of the overly-prominent tympani. The Monteux-London Symphony version on London L 80034, \$7.95, is preferable to this, but we must still wait for a truly great recording of this music.



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

BEETHOVEN: Wellington's Victory Symphony, Leonore Overture No. 3, Prometheus Overture

London Symphony Orchestra conducted by Antal Dorati, with cannons, howitzer, muskets, and spoken commentary by Deems Taylor

MERCURY ST 9000

4-track, 7½ ips

\$7.95...43 mins.

The musical interest of this tape is negligible; *Wellington's Victory* is a minor work of Beethoven to say the least, and Antal Dorati is hardly at his best conducting his music.

However, if you want a tape to stun your friends, this will serve the purpose nicely. There are no less than 188 cannon blasts imposed on the music, plus various muskets, producing an extraordinary amount of noise. Mercury obviously intends this to be the successor to their enormously successful recording of Tchaikovsky's *1812 Overture*. If you're interested in this sort of thing, you must have this tape.

Morton Gould's Victor tape (FTC 2006, \$8.95) of *Wellington's Victory* is rather tame going by comparison, but perhaps a better buy as it is coupled with Grofé's *Grand Canyon Suite*, recorded with some rather unusual spacious effects.

SEMI-CLASSICAL



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

GAITE PARISIENNE (OFFENBACH)

Gayne Ballet Suite Khachaturian
Boston Pops Orchestra/Arthur Fiedler
RCA FTC-2045

4 track, 7½ ips

\$8.95...36 mins.

When the Boston Pops and Arthur Fiedler combined their efforts on "Gaité Parisienne," there could be only one result—"Pops is Tops." Offenbach himself, would applaud the lively, spirited treat-

ment that emerges from Fiedler and his baton, as he leads the orchestra merrily along through a colorful interpretation of this classic of all concert programs.

While this offering has appeared sometime previously in a 2 track version (RCA, ECS-15), it is just as sparkling and pleasant on the 4 track medium, and just as desirable. However, I wish the engineers had found a better place to end the "A" side than the abrupt stopping in the middle of a musical passage.

The Khachaturian Ballet Suite, while tacked on somewhat as an afterthought to fill out the tape, gives a splendid account of itself, through the Fiedler interpretation and, of course, is a welcome addition to an already pleasing tape.—*F. N. West.*

SHOWS



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

MUSIC FROM EXODUS AND OTHER GREAT THEMES

Main Theme From Exodus, Karen, Theme from A Summer Place, The Green Leaves of Summer, Song Without End, Seventy-Six Trombones, Theme from The Sundowners, Irma La Douce, I Love Paris, Mr. Wonderful, The Carousel Waltz, The Sound of Music

Mantovani and His Orchestra
LONDON LPM 70042
4 track, 7 1/2 ips
\$6.95 ... 36:10 mins.

You never have to wonder whether a Mantovani tape will be good—you just know it will pay rich musical dividends. This tape begins with the title and theme music followed by the folk tune "Karen," both from the film "Exodus."

It continues through some of the best themes from recent movies and shows and, combined with the deftness which is a Mantovani trademark, becomes 36 minutes of delightful listening. Among other things, it is a real delight to hear music as he plays it, rather than have it distorted by electronic magic into a musical checkerboard, which seems to be the vogue at present with so many recordings.

An excellent investment for your library.—*F. N. West.*

POPULAR



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

FOR THE YOUNG AT HEART

Sequence A: When You and I Were Young, Maggie, Young at Heart, I Was Young and Foolish, Too Young, You Make

Me Feel So Young, Like Young
Sequence B: Hello Young Lovers, Especially for the Young, Too Young to Go Steady, While We're Young, Young Love, When Hearts Are Young

Perry Como with Mitchell Ayres and His Orchestra
RCA FTP-1071
4 track, 7 1/2 ips
\$7.95 ... 31 mins.

Listening to Perry Como sing can produce a feeling of complete relaxation because his natural, easy-going style makes his singing so enjoyable. With the aid of Mitch Ayres Orchestra and a choral group, both of which are superb, Perry weaves a fascinating pattern of "young" rhythms into a connected theme that is sure to please both old and young.

It's all tied together with a little swinging beat throughout, but on the sweet side. Sound is rich, vibrant and well recorded.—*F. N. West.*



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

INFINITY IN SOUND, VOLUME 2

Sequence A: Jalousie, Time on My Hands, Bye Bye Blues, Baia, Who's Sorry Now?, Anna

Sequence B: Espana Cani, Sentimental Journey, Cherokee, Lullaby of Birdland, La Bamba, Limehouse Blues

Esquivel and His Orchestra
RCA FTP-1060
4 track, 7 1/2 ips
\$7.95 ... 31 mins.

The success of Esquivel's Volume 1 was no fluke—it was genuine; it practically insured there would be a sequel, and that it would be successful.

Characterized by crisp, clear, well defined separation, together with the current trend of mixed channel tom-foolery, the product is very listenable.

Musical ingenuity abounds in every number, from the highest highs to the lowest lows, and you can be sure if your hi fi system comes through this test O.K., it's really a good one. Voices, chorals, whistles and a variety of out-of-this-world musical sounds all come in prominence in this tantalizer—it's infinity, surely enough.—*F. N. West.*



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

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TAPE

RECORDING MAGAZINE

7 Tudor St., London, EC4, England

Someone To Watch Over Me, Don't Bring Lulu, Sweet Georgia Brown, Clap Hands! Here Comes Charley, Do-Do-Do, It Had To Be You and others

Music from the TV show; songs by Dorothy Provine and the Music of Pinky and her Playboys

WARNER BROS. WST-1394

4 track, 7 1/2 ips

\$7.95 . . . 36 mins.

Very young people sometimes wish they were older. Older people are always wishing they were younger. The reason for this must be the music of the Twenties. Who wouldn't want to have lived during this period and who wouldn't wish to go back and relive it.

Dorothy Provine (Pinky), The Chorus Girls and The Trio have accomplished this miracle and for the price of this tape you too can have your wish.

Thirty authentic tunes of the times sung and played with all the realism and feeling as only an old timer can vouch for.

To the vast TV audience Dorothy needs no sales pitch and this is not a sales pitch — just an enthusiastic invitation to enjoy this Warner Bros. contribution to the musical history of the Twentieth Century. —*C. Parody.*

PERCUSSIVE OOMPAH

Beer Barrel Polka, Liechtensteiner Polka, Pennsylvania Polka, Too Fat Polka, Good-bye, Trink, Trink, Bruderlein, Trink, O Du Lieber Augustin, The Happy Wanderer,



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

Auf Wiederseh'n Sweetheart, Mack the Knife, Accordion Joe, In Munchen Steht Ein Hofbrauhaus

Rudi Bohn and His Band

LONDON LPL 74009

4 track, 7 1/2 ips

\$7.95 . . . 27:35 mins.

The Phase 4 technique makes the old time German Band take on a new modern sound, with Bongos and Maracas added to enhance the percussive effect. This colorful tape has Rudi Bohn and his excellent musicians romping merrily along through a group of old country favorites in a rollicking, beer garden style.

Marches, polkas and drinking songs are dispensed in happy, foot tapping rhythms that will appeal to everyone.

The entire tape is a barrel of fun whether you want to sing, dance, or just listen. —*F. N. West.*



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

MELODY & PERCUSSION FOR TWO PIANOS

Unforgettable, Secret Love, To Each His Own, Ruby, April in Portugal, My One and Only Love, Autumn Leaves, Misty, Golden Earrings, Young At Heart, April Love, The Gypsy

Ronnie Aldrich and His Two Pianos

LONDON LPL 74007

4 track, 7 1/2 ips

\$7.95 . . . 32:50 mins.

In this tape of "Melody and Percussion for Two Pianos" effective use is made of the Phase 4 recording technique in overcoming the difficulties of properly recording the piano and the result is an album of twin piano music of amazing clarity and balance. Ronnie Aldrich, a superb artist, knows his way around two keyboards as he weaves the various moods of a dozen popular melodies in a charming program.

He is supported by a percussive group that supplies the tonal effects which do not intrude upon the music but, rather, support the firmly placed left and right pianos.

The sound is rich, warm and brilliant. —*F. N. West.*



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

PERCUSSION IN THE SKY

You Are My Lucky Star, The High and The Mighty, Don't Let the Stars Get in Your Eyes, I've Got the Sun in the Morning, Blue Moon, Look for a Star, Moonlight Becomes You, Over the Rainbow, I'm Sitting on Top of the World, The Moon Was Yellow, Stairway to the Stars, When You Wish Upon A Star

Werner Muller and His Orchestra

LONDON LPL 74008

4 track, 7 1/2 ips

\$7.95 . . . 34:25 mins.

Werner Muller and his orchestra take on a celestial sound in this tape as he creates a sky mood with songs of the sun, moon and stars.

Through the medium of London's phase 4 sound, his imaginative scoring and arrangements create new and exciting impressions of old standards such as "Sun in the Morning," "Blue Moon," "Stairway to the Stars" and others.

The strings and brass as well as the rest of the orchestra are balanced against each other as they go into orbit and flit back and forth across the speakers to create a spacious hi-flying sound. —*F. N. West.*



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

TONY BENNETT SINGS A STRING OF HAROLD ARLEN

When the Sun Comes Out, Over the Rainbow, House of Flowers, Come Rain or Come Shine, For Every Man There's A Woman, Let's Fall in Love, Right as the Rain, It Was Written in the Stars, What Good Does It Do, Fun to Be Fooled, This Time the Dream's on Me, I've Got the World on a String

Tony Bennett; songs arranged and conducted by Glenn Osser

COLUMBIA CQ 356

4 track, 7 1/2 ips

\$6.95 . . . 45 mins.

Tony sings a dozen songs by Harold Arlen, some that are not too well known, but most of them here written for stage or screen. He sings in a straightforward style but after a few songs all done in the same tempo, the listening becomes monotonous. One of Tony's best characteristics is sincerity and he really gives in this one. His fans will love this effort.

Columbia's recording is bright and clean. Glenn Osser brings the musical background to top height in brilliance and fullness. If you like Tony Bennett, you'll like this tape. —*F. N. West.*



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

PIANO ITALIANO

Side 1: Three Coins in the Fountain, Arrivederci Roma, O Sole Mio, Mattinata, Love Theme From La Strada
 Side 2: Funiculi Funicula, Come Back to Sorrento, Theme from La Boheme, Volare
 George Greeley, guest pianist with the Warner Bros. Orchestra
WARNER BROS. WSTC-1402
 4 track, 7 1/2 ips
 \$7.95...30:50 mins.

This album is really a sentimental repetition of concerts George Greeley played with his father thirty years ago. Displaying faultless piano technique, he is supported by the Warner Bros. Orchestra and Mandolin Choir. This group, of course, provides the flavor which sets the stage for the rendition of these great Italian melodies. All beautifully performed with good stereo separation, exceptionally clean recording and sparkling arrangements. First rate listening!—*F. N. West*



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

SKIN TIGHT

Sequence A: Perdido, Allah's Holiday, Caravan, Lover, Song of India, You're Just in Love
 Sequence B: Hindustan, Dry Bones, How High the Moon, Opus One, Hawaiian War Chant, Jungle Drums
 Marty Gold & His Orchestra
RCA FTP-1043
 4 track, 7 1/2 ips
 \$7.95...32 mins.

There is real significance to the title—Skin, in this instance, means drums, several dozen of them, including one dozen kettle drums tuned to provide a range of two complete octaves. This happy percussive family is used, not to produce a collection of dull thuds and bangs, as you might suspect, but to make music!
 The result is surprising. Of course, the drums are prominent, because this is a percussion tape, but not to the exclusion of the melody. It's different and lots of fun to listen to, especially if you are drum enthusiasts. A good recording with plenty of stereo separation.—*F. N. West*



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

GOLDEN HIT INSTRUMENTALS

Side 1: Bonanza, Apache, Ja-Da, Wheels, Ram-Bunk-Shush, Pepe, Calcutta
 Side 2: Wonderland by Night, Hearts of Stone, Bounty Hunter, Asia Minor, Honky Tonk
 Al Caiola Guitars with Orchestra
UNITED ARTISTS UATC 2229
 4 track, 7 1/2 ips
 \$7.95...28 mins.

Attention rock and rollers—this is strictly for you. Most of these tunes were, or are still, very popular with the teenage R & R's.

The beat is definitely, but definitely, there. Any teenage gathering will want to play this again and again.

One particular song on this tape really sends yours truly. It is the one slow selection in the group—Wonderland by Night. Its appeal goes beyond the teenagers and reaches those of us who like a slower rhythmic tempo.

Al fingers his guitar like it was made just for him, and he uses a bassy string effect that adds a little extra to each rendition.

Every twanggggg is perfectly reproduced which is only natural, cause after all folks—it's on tape!—*J. M. Cover.*

SEASONAL



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

A CHRISTMAS OFFERING

Silent Night, Hark! The Herald Angels Sing, We Three Kings Of Orient Are, Angels We Have Heard on High, O Tannenbaum, God Rest Ye Merry, Gentlemen, It Came Upon A Midnight Clear, Vom Himmel Hoch, Sweet L'il Jesus, Ave Maria, O Holy Night, Alleluja
 Leontyne Price (soprano); Herbert Von Karajan conducting members of The Vienna Philharmonic Orchestra
LONDON LPM 70049
 4 track, 7 1/2 ips
 \$6.95...60 mins.

We just received this lovely Christmas tape and although this is our January issue, it is distributed in December, so we decided to include this seasonal tape review.

The combination of soprano Leontyne Price and Herbert Von Karajan conducting members of the Vienna Philharmonic is a happy one indeed. Each thoroughly appreciates the artistry of the other and thus each strives to enhance the other's contribution. By so doing, they have come up with a recording which glides smoothly along, and is a pure delight to listen to or, if you wish, to sing along with.

The crystalline voice of Miss Price is predominant above the choral backing. It is powerful, but never harsh.

Most of the selections for this release are of the inspirational type rather than the newer bouncy, swinging Christmas ditties.

Everyone participating in this recording seems to effect the harmony which surrounds the Christmas season, not excluding the engineers who have flawlessly reproduced the sound.

This tape is well worth its economical cost.—*J. M. Cover.*



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CROSSTALK

from the Editors

THERE IS ONLY one word that can be used to describe the future of magnetic tape and that word is "Fabulous".

* * * * *

EVERYTHING NOWADAYS IS expanding at an exponential rate. In the years past, the growth curve of births, developments, industrial production and other things showed a steady slope upward. But indications are today that the curve is climbing almost vertically.

* * * * *

WE ARE NOW talking in terms of a population explosion, the more people who are born in turn produce still more people. Or take the matter of speeds. For centuries man's speed was limited to how fast he could run. Then came the horse which advanced his speed to about thirty miles an hour. Then the train which went up to sixty, then the automobile which jumped the speed to the neighborhood of three hundred, this was followed by the airplane with current speeds in the four-thousand mile range and this by the rocket with speeds up to 25,000 miles an hour. Each of these developments took far less time than the one preceding and was accomplished in a shorter number of years. Thus any curve showing the growth of speed would become steeper and steeper as the changes became not only greater from step to step but the time interval also became shorter.

* * * * *

A LOT OF PEOPLE have for years talked about the growth of the tape recorder and, while sales have not gone up exponentially in the past there are some reasons for believing they will do so in the future.

* * * * *

LET'S LOOK AT PROGRESS in the audio field. It was some eighty-five years ago that Edison made the first sound recordings. Fifty-five years later the principles of stereo were laid down. Fifteen years after that the first tape recorders became available. Five years later the microgroove record came about and about one year later the first stereo appeared on tape. As you can see, the advances are coming at shorter and shorter intervals. Since the days of the first tape recorders about fifteen years ago we have seen the recorders go from full track at 15 ips down to four track at 3-3/4 ips with 1-7/8 ips projected but not yet here. Each step has meant that tape has improved in quality and come down in price. Each of these steps likewise has made its use more attractive to the consumer. . . . which meant more recorders could be sold. People who wanted a recorder but felt it was too expensive no longer had this as an excuse for not buying one.

* * * * *

IT WOULD TAKE only more volume to bring the prices of recorded tapes even with or below the prices of disc records. It is already possible in the field of monaural tape using four tracks. A five inch reel of tape can hold two hours of music at the 3-3/4 ips speed—this is equivalent to three or four record albums having a retail value of about twelve dollars or more. We believe the tape could be made to retail at about half the price of the discs. The four-track "twin-pack" stereo tapes now on the market are significantly cheaper than the equivalent time on stereo discs.

* * * * *

THE CURVE of the tape recording business has been a gradual slope upward over the years. We believe that there are now signs that it will shortly reach the exponential point and start upward at an astounding pace. Since there is hardly a facet of life as we know it today which is not progressing at ever increasing speed, there is no reason to believe it will be otherwise with tape.

INDUSTRY NEWS



Stars of "Bachelor in Paradise"—Bob Hope and Janis Paige.

WEBCOR is mighty happy with the fine display of their Regent Coronet recorder in Bob Hope's new picture, "Bachelor in Paradise." Hope acts the part of a researcher and uses the recorder for note-taking on the lives and mores of people here and abroad. Dealers are tying in with promotions when the picture hits town. It was released in the first week in November.

The Kansas City Webcor distributor is promoting a contest to choose Kansas City's most ideal bachelor. The winner will receive an all-expense paid trip to Chicago including tickets to the Bears game and a night on the town. A similar contest is being held in Dallas in cooperation with radio station WBOX.

If you want a good laugh, see the picture when it comes your way.

H. R. (Bud) LETZTER, former Webcor vice president and general sales manager who recently left the firm, has been named national Sales Manager of the Hammond Organ Company. He had been with Webcor since 1948.

SUPERSCOPE, marketers of the Sony line of recorders, has issued a 16-page catalog of their tape recorder and microphone line. It gives full specifications and a copy may be had on request to the firm at Sun Valley, California.

ARMOUR RESEARCH FOUNDATION is suing 3M Company for royalties it claims are due under a patent license contract. 3M has asked for dismissal of the suit on the basis that the patent has been declared invalid.

The MAGNETIC RECORDING INDUSTRY ASSOCIATION will again sponsor the San Francisco Home and High Fidelity Show, according to James Logan, director of the event. The show will be held March 7 to 11 in San Francisco's famed Cow Palace. The attendance at the 1961 show topped 37,000.

BETTER BUSINESS BUREAU—MRIA booklet on tape recorders will soon move into a second printing bringing the total up to over 100,000 copies. The booklets are available through local BBB offices and through shops selling recorders.

THE 1962 NAVA convention will be extended by another day. This was an-

nounced by Executive Vice President Don White after a count of ballots by exhibitors revealed they favored the extension by a vote of 52 to 36. The NAVA convention has grown steadily in importance over the years and will become increasingly important as schools up their use of teaching aids. The 1962 convention is scheduled for the hotel Morrison in Chicago, July 21 to 23.

NORELCO, 230 Duffy Avenue, Hicksville, L. I., has just issued a colorful brochure on their line of recorders and speakers. Copies may be had on request. It features a buyer's guide and condensed applications chart for all Norelco recorders.

AMPEX AUDIO, 1024 Kifer Road, Sunnyvale, California, has added two new tape recorders to its line. The units are known as the "Fine Line" series and will both record and play 4-track stereo.

INSTITUTE OF HIGH FIDELITY MANUFACTURERS has instituted an advertising campaign in some general magazines extolling the virtues of components over "package" goods. This is the first time the organization has undertaken such an effort to reach a broader segment of the public.

ROBERTS ELECTRONICS, INC., is now merchandising its own brand name of raw tape and has designed an attractive display rack for dealer use. The firm is at 5920 Bowcroft Street, Los Angeles 16, Cal.

GEMA, the German musicians and composers society, has won a legal victory in its campaign to collect royalty payments from tape recorder owners in Germany. The West Berlin court ruled that mere ownership of a tape recorder is evidence of intent to tape music! Following this line of reasoning, the court declared that GEMA is justified in demanding an annual royalty payment from each tape recorder owner on the premise that he is taping music controlled by the society.

If the recorder owner refuses to pay then he must furnish proof that he is not taping music and that he will not tape music for the rest of the year. The court has thus shifted the burden of proof from GEMA to the tape recorder owner. The annual royalty would amount to about \$2.50.

Actually the legal victory is a rather empty one since there is no practical way of enforcing the decision. GEMA could set up a sleuthing arm but the cost would be prohibitive.

GEMA has also been thinking of demanding that tape recorder manufacturers keep lists of purchasers of their equipment and turn these over to GEMA. This would require another court decision since the manufacturers refuse to do it. Another possibility lies in levying a fee on each recorder made which the manufacturer would pay and pass along to the purchaser. Manufacturers likewise take a dim view of this scheme.

Now, with the court decision, the society has visions of annual royalties—the problem is how to collect them.

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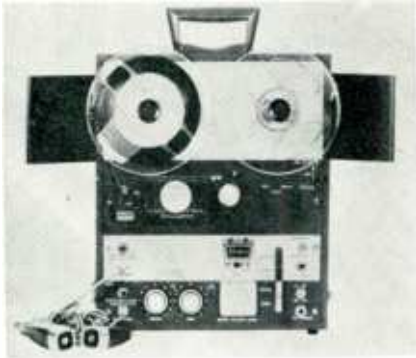
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NEW PRODUCTS

ROBERTS STEREO RECORDER



Roberts Electronics, Inc., 5920 Bowcroft Street, Los Angeles 16, Calif., has announced its 1040 stereo tape recorder. This machine can record FM multiplex stereocast; it features 4-track stereo and monaural record/play; 2-track stereo and monaural play; sound-with-sound using either track as a basic track; dual self-contained power stereo amplifiers and dual built-in extended range stereo speakers. Tape speeds are $7\frac{1}{2}$ ips and $3\frac{3}{4}$ ips and 15 ips with conversion kit. Other 1040 features include dual microphone inputs, dual phono-radio inputs; dual pre-amp and external speaker outputs, push-button function switches, automatic shut-off, automatic muting on rewind, professional edit lever, professional VU meter with channel switch, professional index counter and dual concentric volume and tone knobs with clutch controlled balance. The price is \$299.50. Write for further information.

EKOTAPE 500 SERIES



Webster Electric Co., Racine, Wis., has introduced the new 500 Series transistorized portable Ekotape A-V and tape teaching recorder, which is designed to meet the weight and physical requirements of some schools and the armed forces. It weighs only 22 lbs. and includes such features as three heads in the recording mechanism; a special recess for the microphone; a slide type selector switch, with two positions which allow the student to monitor his own voice as it is being recorded and to pretest final record-

ing; plug-in jacks for microphone, headsets, etc., located at rear of unit; slide-type pause control switch; separate volume controls for recording and playing back, and a newly-designed reel shaft assembly which assures more positive holding of tape reels in position. The Ekotape 500 is a $\frac{1}{2}$ track monaural recorder and records in either of two standard speeds, $3\frac{3}{4}$ or $7\frac{1}{2}$ ips. Price and additional information can be obtained from the manufacturer.

NEW MINIFON DISTRIBUTOR



The new exclusive distributor in the United States for Minifon portable recorders is International Telephone and Telegraph Corp., 320 Park Ave., New York 22, N. Y. This equipment is produced in Hamburg, Germany by Protona GmbH. The Attache, shown above, offers features aimed at general business and commercial dictating requirements. All models are battery-powered and fully transistorized, weighing as little as one pound, 12 ounces. For information on this line, you can now write to ITT Distributor Products Division at the above address.

CROSBY MULTIPLEX ADAPTER



Crosby Electronics Inc., Syosset, L. I., N. Y., is marketing the MX-101 stereo FM multiplex adapter. This adapter, when attached to the multiplex output of the tuner, will provide full stereophonic effect even in fringe areas, according to the manufacturer. It has a "Dimension" control knob which

can vary the stereo separation from monophonic to "extended stereo." A special noise filter makes satisfactory reception possible in fringe areas. The front panel of the Crosby MX-101 also has a selector switch with "Stereo" and "Stereo Filter" positions, a push-push on/off power switch and a pilot light indicator. The adapter sells for \$69.95. Write to manufacturer for additional details.

NEW FERRODYNAMICS TAPE



The FerroDynamics Corp., Lodi, New Jersey, has announced the introduction of a new magnetic recording tape, which the manufacturer claims is new and improved as "a result of the application to the regular production line of techniques learned in the company's pilot plant operation." The new tape will be marketed under the same "Brand Five" label previously used for the company's line of moderately priced recording tape. It will be in a completely redesigned package of bright orange with a large, white numeral "5." It will be available in all standard combinations of reel size, tape thickness, and base materials, including acetate, Mylar, and tensilized Mylar. According to the manufacturer, one of the most important technical improvements in the tape is a newly developed dry synthetic lubricant that eliminates squeal and gumming of recording and playback heads and reduces head wear. It also has a harder scratch resistant formulation that prevents flake-off and peeling or deposit on guides or heads.

NEW BELL CARTRIDGE RECORDER

The Bell Sound Division of Thompson Ramo Wooldridge Inc., 555 Marion Road, Columbus 7, Ohio, recently exhibited its new tape cartridge recorder. It is no larger than a woman's vanity case, plays and records stereo and weighs less than 18 lbs. Model 601 is a completely monaural record playback machine, slated to sell for \$139.95; Model 602 is equipped for stereo recording and playback through a second amplifier-speaker system, and it will sell for \$169.95; Model 603 will record and play stereo through its own built-in stereo amplifier and is scheduled to sell for less than \$200. All models will have two speeds— $3\frac{3}{4}$ and $1\frac{7}{8}$ ips. For complete details on this new cartridge, contact the Bell Sound Division of Thompson Ramo Wooldridge.

"WHY MY RECORDER IS IMPORTANT TO ME" CONTEST

WIN A REEL OF TAPE. Tell us in your own words why your recorder is important to you, not why it could be important to someone else. Entries will be judged on the basis of their usefulness to others and on the uniqueness of the recorder use. No entries will be returned. Address your entry to: Important Recorder Contest, Tape Recording Magazine, Severna Park, Md.

Dear Editor:

My tape recorder is important to me in many ways: it plays music for me, it brings my friends into my home for visits, but that isn't all, it works for me. My husband and I are both blind and we operate a concession stand in a large hospital under the Business Enterprise Program for the Blind, which is state supervised. It is necessary for us to keep accurate records of purchases and sales and to turn them in to the program supervisor each month. At the beginning of each month, when I total the sales and purchases, which I have kept in Braille up to this point, I read the records to my tape recorder at a speed at which I can type them. Then I play them back and type them as the recorder reads them to me. It is much easier and much faster than reading Braille and typing the material.

We are members of the Voicesspondence Club and have made some very good friends through it and our tape recorders, of which we have two.—*Mrs. Eileen Pendleton, Mobile, Alabama.*

Gentlemen:

I became interested in the recording and amplification of sound when it was discovered that our little granddaughter was deaf.

My recorder is very important to me as an instrument to capture common household sounds, car motors and horns, planes, trains, etc., and to amplify those sounds through a "training unit" employing sound compression and dynamic ear-phones so that our granddaughter may become acquainted with such sounds, many of them being danger signals.

It is also very important to me for keeping an accurate record of the progress made in her lip reading and speech.

In addition to this I use it as a music system in our restaurant and have organized a worldwide tape exchange.

In short, my tape recorder is my contact with the world.—*Marion Chism, Carlinville, Illinois.*

Gentlemen:

Some two years ago I became blind and had to quit work. I am not looking for sympathy. The reason I write is to prove how important my recorder has been to me.

The Association for the Blind here in New Hampshire contacted me and asked me if I would like to make use of a tape recorder. I had no knowledge of a recorder at the time, but today I have.

When I became blind, I couldn't correspond with my friends and relations any more because handwriting was impossible

for me, so some of my friends I knew had tape recorders and I joined the Voicesspondence Club of Noel, Virginia and through voicessponding, all the depressed, discouraging feeling I had disappeared. Now I always voicesspond with my friends through tape. It would be lonesome for me day in, day out otherwise. It is most interesting.

Another reason is that it is very educational. I have learned all kinds of subjects from my recorder correspondence that I had never heard of before. To tell the truth, today I know more than I did before I lost my sight.

Another reason my recorder is important to me is that although I am not a musician I like music and my voicessponding pals have been furnishing me with a library of music on tape. They either send me a tape, or I send them a tape of my own and they fill it up with music for me.

Another thing is the sound effects I get. They are most interesting and they too go into my library.

Another reason is that I learned to type through my recorder. This is one of the greatest things, because now I can type letters to my friends and relations who do not have a recorder.—*Joseph N. Bilodeau, Nashua, N.H.*

Dear Editor:

Having a very large number of correspondence contacts all over the world, even in such faraway countries like Madagascar, Mozambique, Iran, Borneo, Siberia (Soviet Union), etc., exclusively in Esperanto (the international language), I am also tapesponding with my Esperanto friends, wherever that is possible in order to learn about their ability for mastering and using this future universal language of the human race. With my Ampex 970 I am able to tapespond with an Esperantist of whatever nationality, exchange useful ideas with him in ONE language common to both of us without any help by an interpreter and all this just for the cost of the tape and the postage for mailing it. The only other means to accomplish this could be done by spending thousands of dollars for traveling to all corners of the world. For me my tape recorder and Esperanto go together for one purpose, getting an international conference into my home, listening to tapes recorded in Esperanto from Japanese, Hungarian, Estonian, Swedish, French, etc., etc., tapesponders.

I have been also using very effectively tape recorded Esperanto lessons in correspondence courses for my students living in isolated places of the U.S.A. and Canada. That almost equals private tutoring, enabling the students to listen and

practice the spoken language. Readers who are interested in Esperanto and in getting in contact with Esperanto tapesponders in foreign countries will be advised "kun plezuro" (with pleasure) by the local groups of the Esperanto League for North America, or by the writer of this entry.—*Ralph R. Bonesper, 1793 Riverside Dr., Apt. 3-J, N. Y. 34, N. Y.*

Gentlemen:

My tape recorder is important to me as an instrumental music teacher in several public schools which have small orchestras, because through tape these orchestras can practice "together" in preparation for combined concerts. Then by taping the concerts I can provide a full orchestra for the separate groups to play in later.

Recently a unique use for my stereo recorder occurred when two distant schools demanded demonstrations for their P.T.A. meetings to be held at the same time. The problem was solved by recording my remarks to the parents on one channel, which was fed into the school's P.A. system. On the other channel, which fed through a small speaker located among the young players on the stage, I gave them instructions, counting the rhythm to start them playing and filled in the piano accompaniment and missing instruments. Meanwhile I was free to appear in person at the other meeting. On the recording I told the parents that my heart was really with them because of my enthusiasm for tape recording and at that moment they actually heard my heart beating! Everything worked successfully and afterwards they told me that they paid even better attention than if I had been there myself. Fellow music teachers, beware!—*Jack Dalby, Portland, Oregon.*

Gentlemen:

My tape recorder is important to me because it has faithfully recorded our children's voices since they were tots through their senior high bands, choruses, plays, and church activities. This gives a record of growth, development, joys and sorrows which can be preserved also for them in later years which cannot be duplicated. Our tape recorder has proved invaluable in speech therapy, book reviews, oral school and church work of all types. Every family should have a recorder to catch moments of their family life on tape, that, as every family knows, comes only once in a lifetime. Your recorder will keep alive forever for you the shouts of the children coming home from school, their initial efforts on musical instruments and will follow their progress as they advance. It will preserve happy holiday family gatherings, it will recall for you at the push of a button your son's jubilant reaction the day he passed his driver's test. And it will keep all this for you always, even when your children are no longer home, and, in our case, the oldest son was stricken fatally with cancer in 1958. It goes without saying that the seventeen years of recording we did with and for him is one of our most precious possessions now.

Keep your memories—forever—on tape.—*Lorna Seibert, Norwalk, Ohio.*

FEEDBACK

Excerpts from readers' letters will be used in this column.
Address all correspondence to: The Editor: TAPE RECORDING, Severna Park, Maryland

Dealers Have Problems Too

To the Editor:

In reading your Feedback column, I notice that some of the readers think the dealers should demonstrate recorded tapes—and evidently the dealers don't do this.

I wonder if it would be of interest to your readers to read of the experiences which we have had in handling pre-recorded tapes, after having been in this business for about ten years. About a year or so ago, some of the dealers here in Fort Worth were throwing their pre-recorded tapes on the market, cutting prices. The writer has done the same thing, but, instead of throwing them on the market with a big ad and a big price cut, I decided to leave my tapes available on hand here and let my customers have the benefit of the cut prices. Seven-dollar tapes we sold for \$3.50 and \$9.00 tapes for \$4.50. We still have a few left. For the past year, we have been studying the recorded tape situation again. We had stocked about \$2,000 worth and found that when we demonstrated a tape, it rarely was purchased, with only perhaps 10% buying. It was noticed, however, that when the movie "Around the World in 80 Days" was so highly publicized, many customers would come in and buy that tape—which shows that publicity can help sell a recorded tape.

One incident which was a deciding factor on discontinuing the sale of more tapes happened when a prospective buyer came in and indicated that he wanted to buy a couple of recorded stereo tapes. We were handling Livingston, Omega, and several others. He had a pretty good choice from which to select. After playing several tapes for better than two hours to this undecided customer, he finally decided that he didn't want any. That was the last time we demonstrated a tape until we had another customer come in sometime later and ask to try a tape. I replied, "No, if I tried it, you wouldn't buy it." Nevertheless, we put it on and after playing it for a short while, he said he would take it. After his departure, it was noted by several customers who were in the shop that we pretty well put him on the spot. He almost had to buy the tape. So, until we get another idea of some sort, I don't believe we will demonstrate any pre-recorded tape.

For the benefit of your readers, I might also mention that about six or seven years ago, we allowed our customers to try out machines. Believe it or not, one young couple managed to wrap the tape around and underneath the reels on *three* machines. I kind of kept my eye on them when the young man said to the little bleached blonde, "I think we had better go." So they left. That also cured us of the idea of letting customers operate the machines. I noticed that sort of thing happened to other dealers, also. Now we show a machine if the persons are seemingly interested in buying it; but I cannot understand why a person who earns

\$3 or \$4 an hour will go into a dealer's place of business and expect that man to average \$1.50 an hour, which is what I would say they would clear. I defy any small dealer to show a bigger profit than \$1.50 an hour.

We have here in our business an unusually good class of customers, perhaps because we are not downtown in the business area, where at one time we had our place of business. Our customers have formed the habit of buying stereo machines that will either play and/or record stereo. The customers get together with a neighbor or at a club or they go to a library. There they can copy records or rent records for copying. They can copy one another's pre-recorded tapes, getting together about a night a week, (and they tell me it goes into the wee hours of the morning) having the fun of making their own recordings. The big cut-price houses are moving in around here, and the little concerns are going out of business. I could write you a story about that, too.

We are also answering Mr. J. Frydman of Montreal, Canada, whose letter was published in your October issue.

We would appreciate your publishing our name and address also, hoping that other dealers in the United States and Canada will also contact us . . . and we promise to answer every letter.—George F. Bischof, 1503 E. Vickery Blvd., Fort Worth, Texas.

Dealer Wants Promotion

To the Editor:

In September I wrote you regarding exchanging ideas with other dealers. To date I have received replies from three dealers in the U. S. This, of course, made me happy, as they seemed keen. However, I was hoping for a much greater response.

In any case, I now realize that more must be done to improve our sacred profession. I would like to voice a strong protest against the big (and small) manufacturers of tape recorders and accessories for not promoting the whole tape recording field and for not educating the public in this intricate but rewarding business. Many people before me have said the same, and I am sorry I was not fast enough to join in and register my vote of agreement.

I would like to see TAPE RECORDING tickle the big ones, shake them off their high seats, lower their noses to the level of the everyday, off-the-street customer and try to promote tape recording as many other fields do. (Photography contests, Ham's ham-fests, car racing, etc.) The only absolute must is that they do it willingly without thought of personal advertising and purely for tape recording's own sake.

In my opinion, your effort in "Why My Recorder is Important to Me" is the first, real great effort in the right direction. As a dealer I read every word; I admit I learned more from these few letters than any other form of literature.

I would like also to point out that your magazine is very good in its other articles. As a matter of fact, I give this magazine free to all would-be customers to convince them of how important a tape recorder can be. In many cases this was the decisive factor for a sale.

To summarize, I feel that your magazine is in a good position to promote and have others promote tape recording more effectively, and I hope to see TAPE RECORDING Magazine grow.—J. Frydman, Tape Recording Center, Inc., 5239 Park Ave., Montreal, Quebec, Canada.

It is possible that the lack of industry-wide promotion is due to the fact that the industry is so young. Photography has been around for more than 50 years and hamming ever since the days of the old spark transmitters and auto races likewise date back to the early years of the century.

Perhaps one of these days soon the leaders of this industry will catch the same sort of vision that you and the industry's customers have. We can see no other logical reason for the lack of push on an industry-wide basis.

As we have mentioned editorially, perhaps part of the difficulty lies in the habit of looking at the tape recorder strictly as a competitor to the phonograph and its prime use as a music playing instrument. This is a passive use for the instrument in contrast to its creative use—as with a camera, ham rig or the care and feeding of a racing car. It is our opinion that this must come about before tape recording can reach its full stature.

Actually there are very few dealers who depend upon the sale of tape recorders and tape as their prime business, so perhaps the small number of replies you received is not surprising. Dealers themselves have been very remiss in the promotion of tape. If they were all like you, business would be booming. We're glad to learn that the magazine is of help to you and to your customers.

Good Suggestion

To the Editor:

I placed an ad in a recent issue of Tape Recording stating that I was interested in swapping folk music tapes with other collectors. The response was excellent and I have acquired several new tape exchange friends. The thought has occurred to me that probably your magazine could perform a fine service to tape exchangers by publishing a list of names and addresses of persons interested in swapping taped music or speech. Each name could indicate the type of material and the recording speed and configuration. This should be very helpful to all concerned.—John W. Beal, U. S. Naval Station, Navy #537, c/o FPO, New York, N. Y.

See page 16—Ed.

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TAPE CLUB NEWS

Interpreted Exchanges

As European Director of Stereo International Magnetic Tape Club, Roy V. Huddleston is endeavoring to put the club on a broader language basis. His plan is to have a member in country A speak his own language on the top track of a stereo machine in between stereo music, effects, experiments, etc. This member then sends the tape to an interpreter of the language spoken who records a translation of the speech on the bottom track in the same direction of tape travel. The interpreter then forwards the tape to its destination where the member in country B can listen to the stereo offerings and turn down track one to listen to the translated message.

This method would be a great help in learning various languages.

Mr. Huddleston is seeking persons who can record stereo and are bi-lingual or multi-lingual, from all parts of the world. Anyone interested in aiding this project is requested to contact him at 9 College Avenue, Melton Mowbray, Leicestershire, England.

CTRI Cooperates With Broadcast

Several members of Catholic Tape Recorders, Inc. in the USA and other countries will participate in a series of radio broadcasts, "A Nation in Prison." The broadcast is aired weekly over one of the major radio stations in Washington, D. C. and treats mainly the themes of crime and social problems. Director of the program is Rev. Nicholas R. Reed, O.P., one of the Catholic chaplains for the government of the District of Columbia.

CTRI members will act as correspondents for the weekly broadcast. They will interview notable persons in the field of crime and social problems, using their tape recording equipment to do so.

Father Nicholas has expressed his appreciation to CTRI and its members for the speedy cooperation and enthusiasm toward this broadcast series.

CTRI will make announcements later as to members participating and the time of broadcasts.

Voicespondents Visit European Members

For a long time we have been suggesting that tape recording has a special place in education. And often the best way to make full use of it is through the personal contacts offered by voicespondents. Mrs. Edwina Luévanos, high school language teacher of Dunedin, Florida, recently carried with her to Europe a group of her language students so that they might meet in person the other members of The Voicespondence Club over there with whom they had been exchanging tapes. In addition to this "in person" visiting new programs of tape exchange were set up and methods of teaching languages were discussed with other

JOIN A CLUB

TAPE RECORDING Magazine assumes no responsibility for the management or operation of the clubs listed. This directory of clubs is maintained as a service to our readers. Please write directly to the club in which you are interested regarding membership or other matters.

AMATEUR TAPE EXCHANGE ASSOCIATION
Ernest Rawlings, President
5411 Bocage Street
Cartierville, Montreal 9, P. Q., Canada

AMERICAN TAPE EXCHANGE
Cortlandt Parent, Director
Box 324
Shrub Oak, N. Y.

CATHOLIC TAPE RECORDERS OF AMERICA, INTERNATIONAL
Jerome W. Ciarrocchi, Secretary
26 South Mount Vernon Avenue
Uniontown, Pennsylvania

CLUB DU RUBAN SONORE
J. A. Freddy Masson, Secretary
Grosse Ile, Cte, Montmagny,
P. Que., Canada

INDIANA RECORDING CLUB
Mazie Coffman, Secretary
3612 Orchard Avenue
Indianapolis 18, Indiana

MAGNETO-VOX CLUB
J. M. Roussel, Sec.-Exec.
8140, 10th Avenue
Montreal 38, Que., Canada

ORGAN MUSIC ENTHUSIASTS
Carl Williams, Secretary
152 Clizbe Avenue
Amsterdam, New York

STEREO INTERNATIONAL
O. B. Sloat, Director
1067 Flatbush Avenue
Brooklyn 26, N. Y.

TAPEWORMS INTERNATIONAL TAPE RECORDING CLUB
Marion Chiam, Co-ordinator
129 South Broad Street
Carlinville, Illinois

THE VOICESPONDENCE CLUB
Charles Owen, Secretary
Noel, Virginia

UNION MONDIALE DES VOIX FRANCAISES
Emile Garin, Secretary
886 Bushwick Avenue
Brooklyn 21, N. Y.

WORLD TAPE PALS, Inc.
Marjorie Matthews, Secretary
P. O. Box 9211, Dallas 15, Texas

OVERSEAS

AUSTRALIAN TAPE RECORDISTS ASSOC.
John F. Wallen, Hon. Secretary
Box 970. H., GPO, Adelaide, South Australia

ENGLISH SPEAKING TAPE RESPONDENTS' ASSOCIATION
Robert Ellis, Secretary and Treasurer
Schoolhouse, Whitsome By Duns
Berwickshire, Scotland

TAPE RECORDER CLUB
A. Alexander, Secretary
123 Sutton Common Rd.
Sutton, Surrey, England

THE NEW ZEALAND TAPE RECORDING CLUB
Kenneth M. Tuxford
P. O. Box 7060
Auckland, W. I., New Zealand

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

European language teachers. Not the least of the highlights of the trip was a TV program at Frankfurt, Germany, planned by Voicespondence member Gerd Nieckau. In addition to helping with the study of languages, voicespondence is also helping to extend "magnetic recorded friendships" throughout the world.

ATE Seeks Publicity Manager

The American Tape Exchange is in need of a publicity manager. They are looking for a "live wire" member volunteer. Anyone interested can send their offer of help to Cort Parent. An example of the type of work this person would be doing follows:

Mr. Jim Ownby, who owns station KN-DI, Honolulu, Hawaii, writes that he would like to develop a program from members of tape clubs around the world, to be aired as a public service or non commercial program, in Hawaii. He would like a selected number of ATE club members to supply 2 or 3 minute reports, once a month. It could be an interview with a well known person, a travelogue type report on your area or anything of interest to listeners in the state of Hawaii. In exchange for helping to arrange the series, station KN-DI will give the ATE as much publicity as possible.

If ATE is to participate in this program, it needs someone to handle the club's promotion. Once the club has its volunteer, it will print the information necessary for members to become reporters on the show, which is tentatively titled "America Talks on Tape."

World Tape Pal Member Forms Freedom Crusaders

The Freedom Crusaders, an informal, international organization about 150 strong, are swapping tape recordings on what personal freedom means to them.

This group was formed by and is run by J. Lawrence De Laney of Los Angeles. He got the idea from being a member of World Tape Pals, whose motto is, "World peace is a matter of understanding."

Mr. De Laney is spending a year in Las Cruces, N. M. While there, he hopes to obtain personal freedom recordings from Spanish-speaking people to be exchanged with Latin Americans to help combat the spread of communism in those countries. Any persons interested may contact him at 1042 West Van Patten in Las Cruces.

The Russians started pen pals in South America, which have led to numerous trade concessions, and Communists agents, both Russian and Chinese, have infiltrated throughout South America.

"If we don't act," De Laney declared, "we are going to lose Latin America to the Reds."

The tapes of the Freedom Crusaders try to stick primarily to what freedom in religion, politics, and the press, mean to them. The Crusaders have two Russian members, and De Laney said blank spots in their recordings indicate censorship.

Keep up the good work, Mr. De Laney.

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 question will be used in this department.

Multiple Questions

Q—I am a comparative newcomer to the field of tape recording and quite naturally I have many questions on the subject. However, instruction booklets and store personnel leave much to be desired in the way of clear explanations to even simple inquiries. I have heard this complaint from many other people. Sometime, at your convenience, would you answer the following:

1—I have a two-speed, two-track recorder which records monaurally and plays back either two or four-track stereo as well as monaural. Now, by playing back a four-track stereo tape on a four-track recorder, what advantage is gained over playing it on a two-track unit which has two channels?

2—Why should music be recorded at $7\frac{1}{2}$ ips rather than $3\frac{3}{4}$ ips—or does it matter very much?

3—What can be done to avoid tape squeal? Does the quality of the tape make a difference?

4—Is it or is it not advisable to use a cleaning tape occasionally until such time as a more thorough cleaning of the recording heads is necessary?

5—When recording directly from a TV speaker by means of alligator clips and a phono plug, I get the following results—when going through the mike jack by means of an adapter the excess power tends to cause distortion, when utilizing the smaller input jack by means of a plug with no adapter reproduction is not loud enough. What do you suggest?—A. J. M., Jersey City, N. J.

PS: I receive your magazine by means of recorded tape, thanks to the kind efforts of Mr. Edgar Violette of Hartford, Conn., who performs this service for a large number of sightless persons throughout the country. A word of appreciation is in order both to him for his generous efforts and to you for allowing him to do so—thank you.

A—1—If your recorder will record monaurally on two tracks and also play back four-track stereo tapes then it is not equipped with a dual track head but it actually is a four-track recorder. In recording or playing back monaurally you are using the two outside quarter tracks on the tape. In playing stereo you use one outside track and one inside track. Four-track tapes cannot be played on a two-track, two-channel machine because it would then play two tracks on each channel—which sounds awful, especially since one is backward in relation to the other.

2—The higher speed permits recording the maximum frequency response of which the machine is capable. Because the tape is traveling at higher speed the magnetic patterns have more room to spread out hence higher frequencies can be recorded. This applies to any sound, not just music. However, in many cases the $3\frac{3}{4}$ ips speed is adequate. The cartridge machines use

this lower speed and there is even a cartridge under development which will use the $1\frac{1}{8}$ " per second speed. As tape and heads have been improved the speeds have gradually gone down, while the quality has gone up. The thinking today is that the $7\frac{1}{2}$ speed is best for finest fidelity and the $3\frac{3}{4}$ ips speed is adequate for most uses.

3—Tape squeal is generated by the momentary sticking and release of the tape on the heads, guides or other parts of the recorder with which the tape comes in contact. This, in turn, is usually the result of a tape losing its lubrication or of dirt on the recorder parts. The latter is especially true of the pressure pads which hold the tape against the heads. Regular cleaning is the answer. Poor quality tape will show a greater tendency to tape squeal than that of good quality.

4—Anything you do that helps keep the recorder clean should be done. The use of a cleaning tape should help in this regard.

5—Using the phono input with no adapter from the speaker terminals should give you sufficient volume for recording, if not then we would suggest you have it checked by a serviceman. To use the mike input, you will have to put a resistor in the line to cut down the amount of current going into the input.

We are glad that Tape Recording is available to those with sight handicaps.

Rewind Tape

Q—I have a Revere tape recorder. When I play a reel of 1200 ft. of tape I rewind by taking the tape out of the track and rewind with the tape going to the rewind reel directly.

I can't see why I should rewind the tape while it is in contact with the heads which I think wears out the heads more quickly. I rewind from one reel to the other directly. A radio salesman says this is wrong and the rewind should stay in the same position as when recording.

Does it hurt the machine if I just rewind as I do or should I leave the tape in the same position as when playing or recording?

Does it hurt the recorder if I play it continually for three or four hours or should I give it a rest now and then so it does not get so hot?—J. D., Jamaica Plain, Mass.

A—It is really not necessary to remove the tape from the slot when rewinding since the tape merely rides past the heads and is not held in contact with them by the pressure pads. We do not recall if the Revere recorder has a tape lift feature which lifts the tape completely clear of the heads on rewind. It does no harm to rewind directly as you are doing.

All recorders will heat up to a certain degree when used but once they reach running temperature they should not become any warmer. Make sure you do not block any of the ventilation holes provided so there will be a good passage of air through the machine. The recorder will play for as many hours as you desire and there is no need to shut it down unless the temperature rise becomes excessive, in which case it should be checked by a repairman to determine the cause of the excessive heat.

Spare Time Income

Q—Is it possible to earn spare-time income with a tape recorder?—E. G., East Hartford, Conn.

A There are a number of ways in which a recorder may be used to earn extra income. In making straight recordings it is possible to earn money by making recordings of conferences, meetings, etc., and then selling the tape. Further money may be made if you can transcribe the tape to paper. Weddings also offer an opportunity. Arrangements should be made with the couple prior to the wedding and the recording set-up should be in place and checked out before the wedding begins. The church authorities should also be consulted and they can be very helpful in alerting you to the best spots to make pickups where the participants will be the closest to the mike.

If you have a portable, or have an inverter in your car you can produce tapes for radio stations (these must be recorded one track only). Such things as interviews with well known people, sporting events and man-on-the-street tapes could be made. Taking inventory for stores and typing off the inventory from the tapes is another way that extra money may be earned. We are sure you can think of still more.

SOMETHING NEW WILL BE ADDED

Beginning next month we will run a new monthly column for those seeking tape correspondents, looking for swaps of tapes, etc. This service will be free. If you wish your name listed send us the following information on a postcard: 1—Name, 2—Mailing Address, 3—Kind of recorder, speed and number of tracks (for example: Wollensak, $7\frac{1}{2}$ or $3\frac{3}{4}$ dual track), 4—Subjects on which you want to respond or items for which you are looking. 5—Indicate whether you are an adult or teenager. Listing will be run two months and then dropped to make way for new listings. Address your postcard to: TAPERESPONDENTS WANTED, Tape Recording Magazine, 101 Baltimore-Annapolis Blvd., Severna Park, Md.

TAPE IN EDUCATION

Robert C. Snyder

ONE of the more dramatic advances made by tape over the past few years has been its increasing use in the field of education.

A good part of this was brought about by the growth of the language laboratory. Starting first in specialized schools for armed forces personnel, the language laboratory has grown in numbers with startling rapidity.

Where there were formerly only a few of these installations, there are now an estimated 2500. Not only are they found in the colleges, which quickly followed the armed services lead in language teaching methods but they are now in high schools across the United States.

Much of this growth was made possible by the National Defense Education Act of 1958 with its emphasis on the teaching of science, math and modern foreign languages and which also provided matching funds to the states for the purpose of purchasing materials, training teachers, etc., to further the objectives set forth in the bill.

But we are wondering if the term "Language Laboratory" is not too restrictive. Would it not be better to call these installations "Learning Laboratories"? There is not good reason why their use need be restricted to the teaching of foreign language, especially if the school schedule is such that full use is not being made of the installation.

These labs are expensive pieces of equipment and their full value to the taxpayer can only come about by the fullest utilization.

Practically all of them operate on the dual track principle with one track being in the play position when the second is in record. Thus a student can imitate what he hears from the first track; then later, compare his recording with the master.

This is most effective in the teaching of languages where the correct imitation of a native speaker of a foreign language is the best way to learn to speak the language correctly.

But might not this same principle also be applied to other fields? It would be interesting, for instance, to apply it to anything that must be memorized, from a poem in the English class to the periodic table in Chemistry.

Basing the tapes on the principle of the teaching machine, that is by presenting the material and immediately questioning the student on it, the proper reinforcement could be achieved. Any points missed could be covered by the student simply by re-winding the tape to the point where the weakness occurred and going over the material again.

Since each student works more or less alone in his own booth and with his own headphones and machine, those capable of rapid assimilation of the lesson material could advance at a fast pace while the slow-

er students would not be embarrassed or left behind.

Many language laboratories are equipped with a teacher's console which permits the teacher to talk directly to any student without the others hearing, or the teacher may talk to the entire class at once.

Some laboratory machines also work on the principle of providing a copying channel where the master material is copied at each position from a master played on the console.

It would thus be possible, in this type of operation, for the teacher to prepare a lesson tape on a regular good quality recorder and, using the copying type of lab. to have each student have his own copy to work with during the class.

The same technique that is being used in industry to train assembly line employees might likewise be transferred to the learning laboratory, thus freeing the teacher from repetitive work and permitting him to devote his time to helping the students over the rough spots.

In the subject of Plane Geometry, for instance, the tape could very easily, and step by step, give the directions for constructing the necessary diagrams. The tape could likewise explain the significance of what was being done and present the theorem. If the student should come to a spot which was not as understandable as it might be he would, after a replay or two, call the teacher on the intercom and ask for help on that particular point. This help could then be given privately back over the intercom or the teacher could come to the student's position to see what might be done to help.

This technique would free the teacher from standing at the blackboard, chalk in hand and drawing the diagrams a step at a time while the class copied them down on paper. The machinery would take care of this, increasing the student's ability to listen and follow directions from the spoken word, an art on which there cannot be too much emphasis.

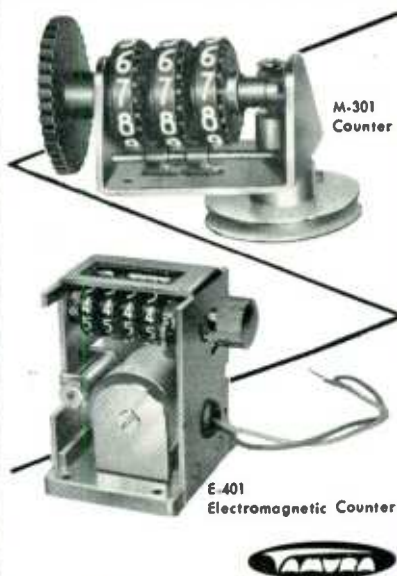
Similarly, the learning laboratory might be used by the physics teacher when dealing with sound and its propagation and nature. There is no better way to teach sound than by means of sound and the laboratory with its tape machines would provide a ready means of instructing the class.

The beauty of the learning lab lies in its making possible almost individual instruction of each student in contrast to the general classroom situation where all must proceed at the same pace.

Further, as we have noted, it provides a means of freeing the teacher for the type of creative work for which he was trained.

We are sure that the more imaginative teachers can see applications of this technique to their own situations and it might turn out too, that the firms which supply course materials might also do some thinking along these lines.

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How Your Recorder Works

by Mark Mooney, Jr.

PART I OF A SERIES

Motors and Tape Transports

ANY tape recorder is an electro-mechanical device. Like the hyphenated word which describes it, the recorder can be broken down into two principal parts. One is the tape transport and the other is the electronics.

The Tape Transport

Tape transports have but one function, no matter how complicated they may be, and that is to move the tape. For play or recording, the tape must be moved in a constant and unvarying manner past the heads. If it does not move as uniformly as possible, then wow and flutter are introduced which causes a wavering of pitch in the recorded material. Any change in speed, even if the change is a steady one, will affect the pitch of the material recorded on, or played back from the tape.

The tape handling function on most recorders also includes a fast-forward mode in which the tape may be rapidly shifted from the feed reel to the take-up reel and rewind which rapidly spools the tape back on the feed reel.

Tape transports are not all alike and several different types have emerged suited to special purposes. The transport which handles the RCA type cartridge is essentially the same mechanism which is used in reel-to-reel recorders; however, the position of the various elements has been

altered to fit the cartridge. Both the RCA and Bell machines, which use the cartridges, will also accept small reels of tape.

Another broad type of tape transport are the units designed for playing continuous loop cartridges. These include the Viking, Cousino and Orr machines. In these the tape is on a hub and, as the machine plays, the tape is drawn from the layer nearest the center of the hub and, at the same time, the tape is wound up on the outside edge of the pack.

Another type of tape transport is that developed by CBS Labs under a contract with Minnesota Mining and Manufacturing and which may be on the market next year. This likewise employs a cartridge, but it differs from both the RCA, Cousino and Viking types in that the cartridge is actually a housing holding a quantity of tape on a hub. The end of the tape is attached to the hub.

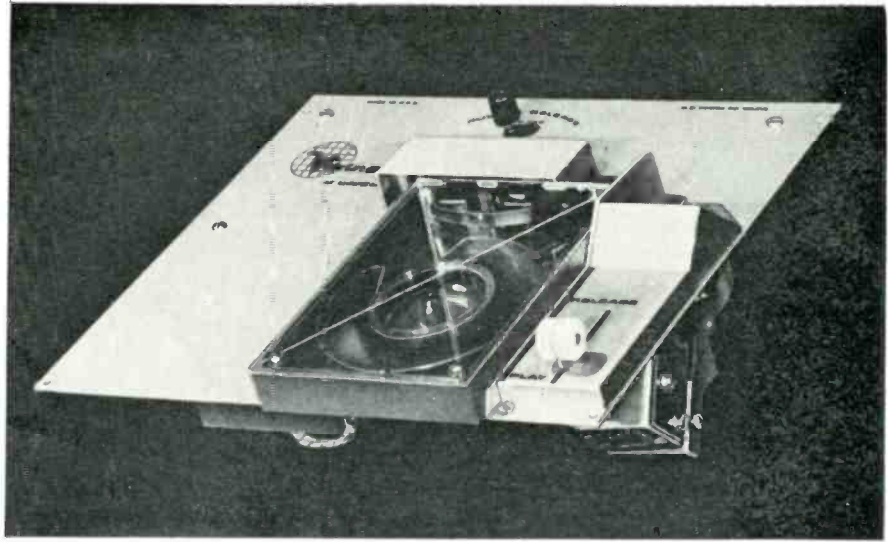
In operation, the leader in the machine engages the tape in the cartridge and draws it out over the heads, winding it upon a take-up reel. When the tape comes to the end it stops and is then automatically rewound into the cartridge by the machine and the next cartridge advanced to playing position.

The Armour Research Foundation also developed a machine for playing tapes which employs a reel with flanges



Left: the typical home tape recorder is exemplified by this V-M model having two reels and using a capstan and roller tape drive. Right: the Magneticon, a machine designed for school language labs uses the RCA type cartridge. The principle is still reel-to-reel.

The Viking cartridge unit has a continuous cartridge in which the tape is drawn out from the center of the hub and continuously wound up on the outside. It has a capstan and roller drive, the roller coming up from below the deck to press the tape against the revolving capstan.



and a wide leader strip with a hook on the end. The wide leader binds under the reel flanges and holds the tape in place. When inserted in the machine, the hook is engaged by an eye and the tape drawn across the heads as in the 3M machine. It is then rewound by the machine at the conclusion of the playing or recording.

The machines mentioned so far employ a capstan and roller which, when pressed together with the tape between them and driven by a motor, cause the tape to move.

Some self-powered portables and dictating machines offer still another form of transport in that they do not employ a capstan and roller drive but instead simply pull the tape by powering the take-up reel. This, of course, means that the speed of such units varies as the diameter of the tape on the take-up reel changes. Tapes made on these machines cannot be played satisfactorily on regular recorders since the latter have a steady speed. This would result in the first part of the tape being played too fast

and the last part too slow. Only in the middle of the tape would the speeds match and the reproduction be true.

Some instructional machines, such as the Litton Industries unit for teaching factory assembly procedures also employ this system of a driven take-up reel but they use an RCA type cartridge instead of reels. Tapes made for this machine must be made on the machine or with a special unit having a similar tape transport mechanism.

Most of the specialized machines such as the video recorder and instrumentation recorders employ the reel to reel principle using a capstan and roller. These machines are designed for starting and stopping in incredibly short times and the data processing machines also are capable of moving the tape at high speed, much higher than even professional audio recorders. Needless to say, their cost is compatible with their capabilities. A video recorder will run from \$24,000 up and the computers and data handlers may run into hundreds of thousands of dollars.



Even though this recorder costs in the neighborhood of \$24,000 it still is a large-sized version of the regular tape recorder employing the same kind of capstan and roller drive. It does have revolving heads to enable the recording of television frequencies which range up to 4 megacycles per second.



The Cousino machine uses a Cousino cartridge which is a continuous loop of tape. Up to an hour of playing time may be had. A capstan and roller furnish the drive.



The Grundig portable has a DC motor and moves the tape by powering the take-up reel. It has no capstan and roller. This makes the speed of the tape vary, depending upon the amount on the take-up reel. It records and plays back satisfactorily, but its tapes cannot be played on standard machines.

Drive Motors

There are three principal types of motors used in tape recorders. The average quality home-type machine is most often powered by a four-pole, shaded-pole motor. The recorders used in radio stations and the top quality advanced amateur machines are powered by hysteresis synchronous motors. The self-powered portables, which are battery driven, have small direct current motors as their motive source.

The motor is one of the most critical parts of a recorder for on its performance depends the operation of the machine. A motor for tape recorder use must hold a constant speed, for any variation will show up in the recorded sound. It must also be reliable, not heat up excessively and be quiet running. It must also be fairly well

shielded so that stray magnetic fields will not be generated.

The shaded-pole motor is found in most machines of the home-type. It meets the requirements very well and, in addition, is small and can be made at a reasonable cost. It will also tolerate periods of stalled operation, if something jams on the recorder, without damage to itself.

In the shaded-pole motor the armature (the revolving part) attempts to keep up with the changing polarity of the alternating current from the power lines.

The speed with which it turns is dependent upon the number of poles in the motor. A two-pole motor will turn at about 3600 rpm whereas a four-pole motor will turn at half that speed or 1800 rpm. An eight-pole motor will turn at 900 rpm.

Because of the "slip" in the motor, the shaded pole motor never can reach the speed where it matches the change in the current and this slip may go as high as 40%, the amount depending upon the load and the friction in the drive system.

The other type of motor, the synchronous motor runs exactly in time with the alternations in the current (60 cycles per second) because of its internal (and more expensive) construction. It has the advantage that it will never vary in speed, running at a constant 3600 rpm.

The synchronous motor is not perfect, however. It has a tendency to "hunt" for the common speed and thus can introduce some wow or flutter into the recordings. Tape recorder engineers use flywheels or other means to smooth out this characteristic so that the drive to the capstan is smooth and steady.

The speed of the motor shaft must be translated into inches of tape per second and this is accomplished on a direct drive machine by machining down the capstan to proper size to give the speed desired.

Any tape recorder may be speeded up by making a sleeve for the capstan which is of larger diameter than the capstan shaft. In fact, some recorders use this method as a speed change.

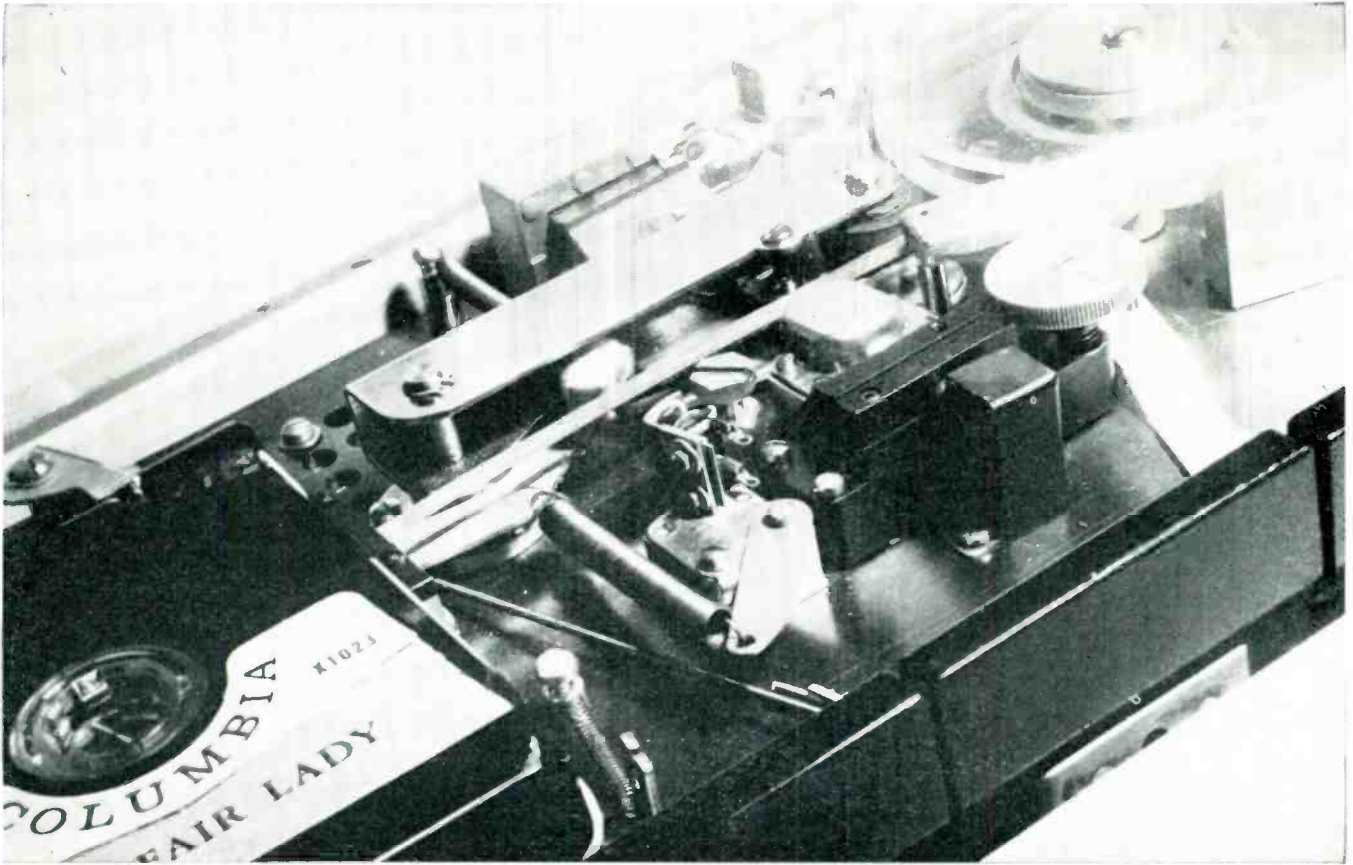
If it is not possible to directly drive the capstan from the motor shaft, then belts or drive pucks may be inserted to get the desired speed at the capstan.

The induction motor of the shaded-pole variety, because of its slippage in trying to keep up with the rotating magnetic field, will slow down according to the load or if the current drops in the line. These variations are minor but are enough to throw synchronization off should the tape recorder be used in conjunction with a movie projector, or another tape recorder that is driven by a constant speed motor. In copying tapes, for instance, the turning on of some heavy current drawing appliance in the home might slow one recorder while another with a synchronous motor would hold to speed. Two machines with identical type motors would, of course, both drop in speed at the same time.

Since there are no sliding metal contacts in either a shaded-pole or synchronous motor, there is nothing to wear except the bearings, and the motors are very trouble free. All will warm up while operating.

It is possible to burn out a motor by the application of DC to it, hence a tape recorder should never be plugged into anything but AC. Once the coils are burned out it is most often best to replace the entire motor rather than attempt having the coils rewound.

Many of the motors are lubricated for life and other



The CBS-3M machine holds the tape in the cartridge visible at the lower left of the photo. The tape is drawn through the machine by a leader strip. After playing, it is automatically rewound and the next cartridge is brought into position. It is not yet on the market.

than an occasional cleaning to remove dust and dirt sucked into the machine through the ventilation holes, need no attention. The instruction book will delineate any motor maintenance items.

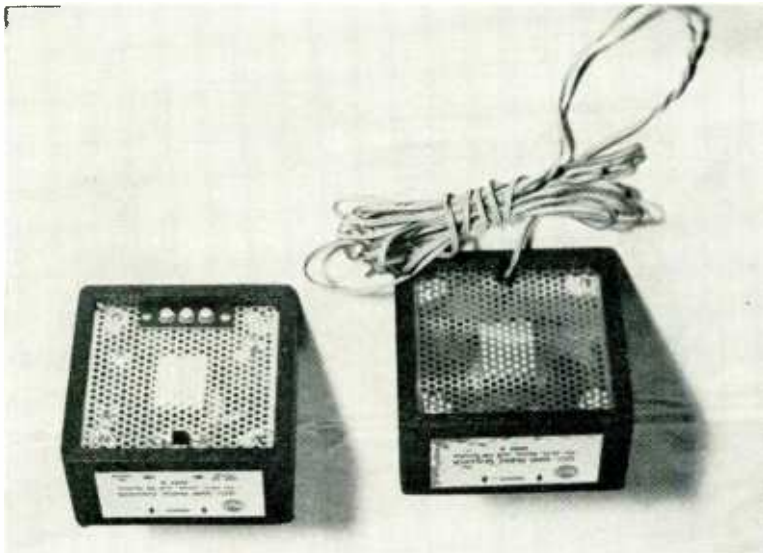
By introducing a small amount of DC current into the motor it is possible to brake its action and even complete-

ly stall it. This method is used in some recorders having a motor for each reel plus a motor for the capstan. The braking action is used to control tape tension and the complete stall to achieve a quick stop.

(Next month—Recorder Drive Systems)



This machine was developed by the Armour Research Foundation but so far has not seen any commercial use. The tape is held on the reel by means of beaded flanges and a wide leader strip attached to the end of the tape. The strip has a hook on it which engages an eye on the machine which then threads the tape past the heads. Rewind is automatic.



The RCA Phase Checker consists of these two units, one of which is placed in front of each speaker and the output measured by means of a voltmeter.

Balance and Phase Your Speakers

by Clif Parody

. . . new RCA kit enables you to check speaker phase quickly and accurately.

THERE are many important design requirements for a good stereo system.

Two of the most important are correct speaker phasing and balanced amplification. Correct speaker phasing simply means connecting the voice coils in the same polarity so they both move in the same direction when the same signal is applied to the input of the amplifiers.

Balanced amplification means that both voice coils move the same distance when these similar signals are applied. Neither of these requirements is a problem to the designer, but they become mighty big problems to the person installing the equipment.

They become big problems because there is no really foolproof way to tell when either is correct the first time you listen to a stereo recording on a new system. This is because phasing and balance affect only the stereo depth and separation, not the musical quality. Stereo depth and separation varies with the recording techniques and subject matter. It is rather hard to tell how much you are missing because of improper equipment adjustment and also how much just isn't in the recording.

Until the introduction of the R.C.A. Phase Checker most methods of phase and balance checking depended upon listening tests to determine correctness. Although fairly good results can be obtained by an experienced listener, it is, at best, someone's uncertain opinion. Not too exacting to satisfy most of us.

A more exact method of balancing amplifiers is by using an output balance indicator which is a zero center voltmeter. When the output voltage is zero for a balanced input voltage, then we know the amplifier gains are balanced. This method is fine if the two speakers are identical, but meaningless otherwise.

The R.C.A. WG-360A Phase Checker provides a simple means of dynamically checking both phase and balance of a stereo system in a simple and straightforward manner. Every component in the system is included in the check,

from the input source to the sound energy output of the speakers.

The Phase Checker consists of two four inch dynamic loudspeakers. They are of the permanent magnet dynamic type with high impedance, 50 ohm voice coils. Frequency response is from 40 to 4,000 cycles. The speakers in this application are used as sound powered microphones, generating a voltage proportional to sound intensity. When properly connected the voltage generated by the speakers is used in determining proper phase and balance.

The units are identical electrically, but differ physically. Unit "A" contains a speaker and a fifteen foot extension cord to which is attached a standard R.C.A. phono plug. Unit "B" contains a speaker, a double pole-double throw slide switch, a crystal diode (1N60), a step-up transformer and a phono jack into which the other speaker is plugged.

The voice coils and the primary of the transformer are all connected in series. The double pole slide switch is used to reverse the polarity of the voice coil of unit "B."

To avoid confusion, R.C.A. refers to the units as "receptors," rather than speakers, which they resemble, and "Receptors" is the word used from now on.

All that is necessary to ready the Phase Checker for use is to plug the extension cord of unit "A" into the jack of unit "B" and connect a volt-ohm-miliammeter to terminals numbered 1 and 2 at the rear of unit "B." The meter should be set to the 50 micro-ampere scale. The photo at top of page 23 shows the set up.

If an oscilloscope is available it can be used in place of the meter and connected between terminals 1 and 3. These are the secondary terminals of the step up transformer.

To check for proper phasing, the receptors are placed over the low frequency speakers of a multiple speaker assembly or over the center of the baffle opening of a single speaker unit. Be sure that both receptor units are in the same relative position to each speaker. The photo

below, left, demonstrates a good way of accomplishing this. Both speakers are turned on their backs and the receptor units are then placed on top of the appropriate opening in the grill. The appropriate opening is, of course, the one in front of the bass unit.

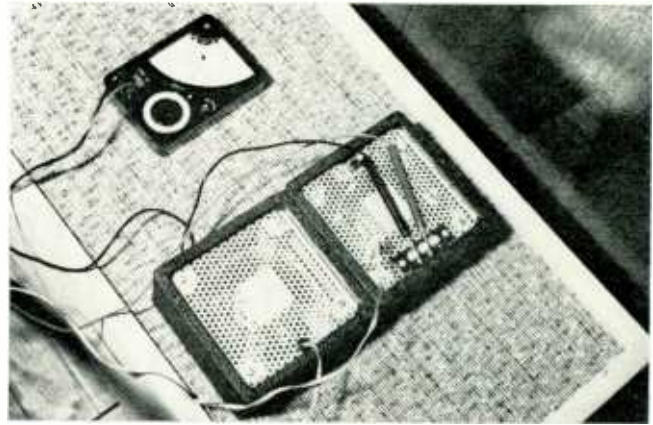
A signal is applied to the input of the amplifiers which preferably should be a single low frequency tone of about 100 cycles, although a tape or disc containing low frequencies can be used. It is important that the amplifiers be set up for monophonic operation which is accomplished on most pre-amps by setting the mode switch to Mono A+B.

The balance control should be set at center or, if two separate gain controls are used, they should be set for approximately equal gains on both channels. The volume should be adjusted to obtain a comfortable voltmeter reading, about half-way up the scale.

Now move the slide switch on unit "B" back and forth. In one position the voltmeter reading will be highest. If this reading is obtained with the switch in the "in phase" position, you've been lucky and your speakers are in phase. If the highest reading is obtained with the switch in the "out of phase" position, all you have to do is to reverse the connections to one speaker only. It doesn't make any difference which speaker, and stereo should sound a lot better.

Once the voice coil connections have been properly made, checking balance is very simple. Using the same set up, merely throw the switch to the "out of phase" position and adjust the balance control for a minimum reading of the voltmeter. Now the sound output from both speakers is equal and opposite in polarity resulting in a lower reading on the voltmeter. Theoretically, the meter should drop to zero, but this will not be true in all cases because of slight differences throughout the system. The balance thus obtained is far more exacting than can be obtained by ear.

If you find that balance is obtained with the balance control far off center, say a quarter turn either way, it would be worth while checking tubes in the channel being favored as this would be an indication of more than



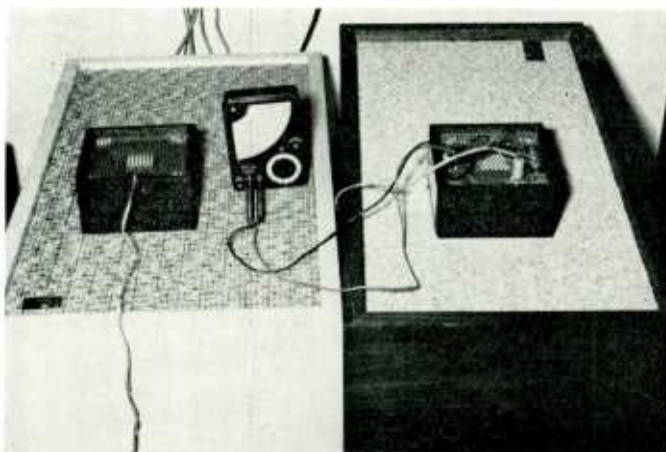
The Phase Checker and voltmeter showing the connections made between the two pickup units and the meter. Each unit contains a 4 inch dynamic speaker with high impedance voice coils.

normal gain difference. However, if you are using two different speakers this much compensation by means of the balance adjustment might be required.

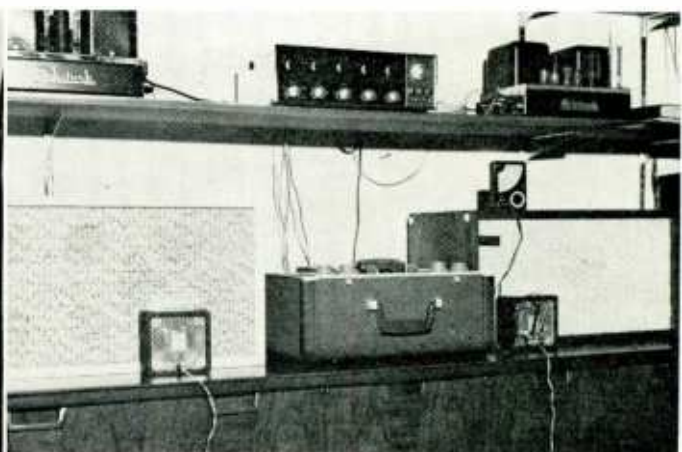
If your stereo system has separate power amplifiers with individual gain controls, have them set full on when making the foregoing adjustments. Minor variations in gain can then be made by decreasing the gain of the favored amplifier to bring the balance control to center. Again, however, if it is necessary to reduce the gain by more than a quarter turn of the control, check the tubes in the other channel.

There are other uses to which this equipment can be put. Unit "B" can be converted to a sound level meter by inserting a shorting plug into the jack normally used for the other speaker. This shorting plug can be easily made by soldering a wire between the center post and outer shell of a standard phono plug. With the voltmeter connected, this single receptor can be used to determine the relative output of different speakers. With the shorting plug in place unit "B" can also be pressed into service as a dynamic microphone with high impedance output.

Of all the possible uses, however, the most popular is bound to be the balance check of a stereo system providing assurance to the owner of the best possible performance.



RIGHT: The Phase Checker units must be accurately positioned over the cone of the loudspeaker in the cabinet or false readings may be obtained. Do not put it over bass ports nor over tweeters; make sure it is over the principal speaker.



WRONG: Merely placing the Phase Checker units in front of the speakers as shown in this photograph will not give you the best results. Easiest method is to lay the speakers on their backs, as shown in the photo at left. This makes proper positioning easy.

Delay Relays & Timer Clocks & Solenoids

by Tommy Thomas

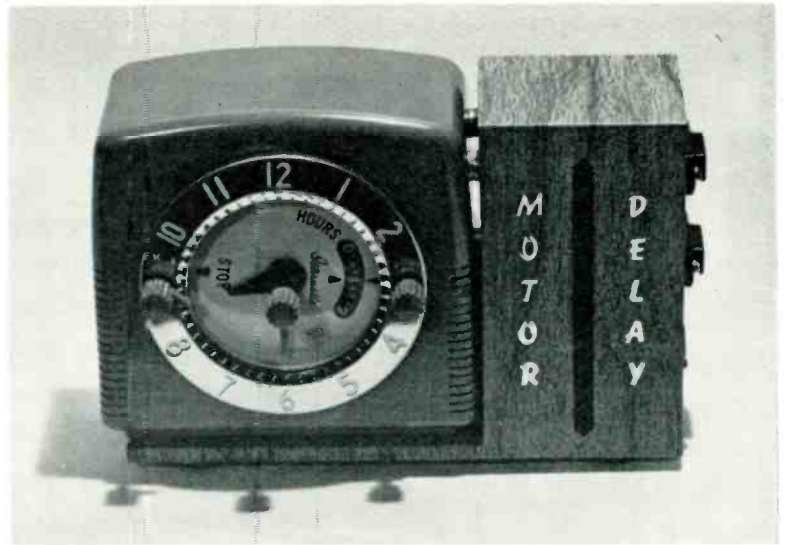


Fig. 1, above, right: Usually, when auto-starting a tape recorder, the timer clock starts everything up at once. You can get more on your tape, though, if a simple MOTOR DELAY is added to the timer circuit, to allow the electronics to warm up before engaging the tape drive.



Fig. 2: The "heart" of the unit is this Amperite thermostatic delay relay which comes in tube form. The relay is hermetically sealed in a glass envelope, with SPST normally-open 3 amp. contacts that close automatically by heater action after a delay of so many seconds. The tiny 2-watt heater element works off 115-volts AC-DC.

DELAY relays, which fortunately can be both inexpensive and easy to use, offer many intriguing possibilities in supplementary tape recording circuits. And though the little Amperite units shown here come encased in a 9-pin, radio-type tube and have the fancy title of "relay," actually they're hardly much more than a simple SPST switch that has a delay-action as part of its function. You close or open the switch (via the heater control) but nothing happens for a few moments. Then the switch works, either to turn something on or off, depending on which type relay you're using. It's as simple as that, and just as simple to put to work for you. Hooked up to an automatic timer clock and a recorder, one of these delay relays can be used to "hold up" the starting of the tape until the recorder has first warmed up, thus saving you a half minute or so of otherwise "wasted" tape. Or, hooked into the solenoid "Disengager" system described last month, you now can have a means of turning off the solenoid immediately its job is done, without the need of an auto-timer.

The *Amperite Thermostatic Delay Relay* sells for \$2.35 at almost any local radio supply store, or you can order it from one of the mailorder companies such as Allied Radio, Lafayette, etc. You'll also need a 9-pin miniature tube

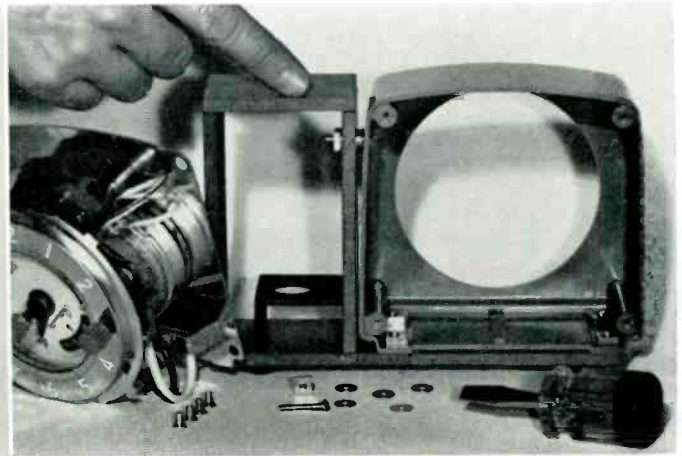
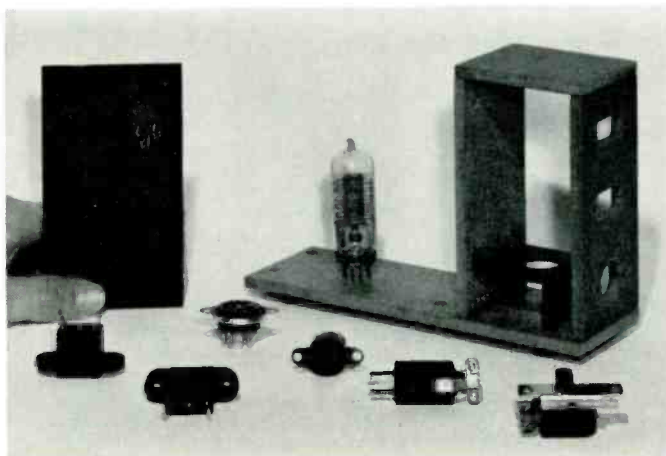


Fig. 3, left: Here are the basic parts, including (lower right) the special plug and slide-switch necessary for the hookup to the recorder motor. The simple housing is of ordinary 1/4"-thick Masonite glued together, and includes a little "shelf" for the delay tube socket. Also, at far left, you'll need a panel to close up the front later. Fig. 4, right: The timer clock should be bolted directly to the Masonite housing, and this is best done after first removing the four corner screws that permit easy removal of the complete works. Note that besides the four machine screws and nuts at the bottom of the plastic timer housing, side screws (at finger) add to the rigidity.

socket to go along with it, as it's not advisable to solder the wiring directly to the tube pins themselves. Actually, these delay relays come in two sizes, but as there's no special advantage in the larger size for our purposes here, be sure to get the miniature model as shown in the photos. Hermetically sealed inside the glass tube is a SPST (single-pole, single-throw) switch that is controlled by a tiny 2-watt heater element. When 115 volts AC or DC is applied to this heater it slowly warms up and thermostatically bends over to close or open the switch contacts. Depending upon the relay you're using (they're not individually variable at this low price), you can have either a normally open or a normally closed switch that automatically closes or opens in anywhere from 2 to 180 seconds.

An easy way to understand the working of this delay relay is to concentrate on just four of the tube "pins" or contacts. In fact, to make your wiring and soldering easier, you can actually cut off the tube *socket* terminals marked 2, 3, 5, 7 and 9 as they won't be needed. Of the remaining four terminals, "1" and "6" go directly to the heater element. It is necessary to wire your circuit so that 115 volts AC or DC is applied directly to this heater via the "1" and "6" pins. That is what is done in both the timer clock and the solenoid circuits shown in Figs. 7-b and 12. Now, though the switch (whose contacts are represented by tube socket terminals "4" and "8") is *controlled* by the heater element, actually there is no further connection. Pins "4" and "8" are switch contacts only. The power necessary to actuate the device being controlled by these switch contacts (here, either the recorder motor or the solenoid) is supplied separately, and does *not* come from the heater element electricity.

WITH THE TIMER CLOCK:

As I mentioned before, these relays are not variable. You decide just which type of switching you want, normally open (N.O.) or normally closed (N.C.) and that's the type relay you buy. Also decide exactly how much de-

Fig. 6, right, center: Fasten the various parts securely in place, making sure that there is room for everything, including the wiring which must not be allowed to touch the hot tube. Then, remove everything again so you can glue on the front panel, sand it down neatly to size, and perhaps cover it all with appropriately patterned contact plastic.

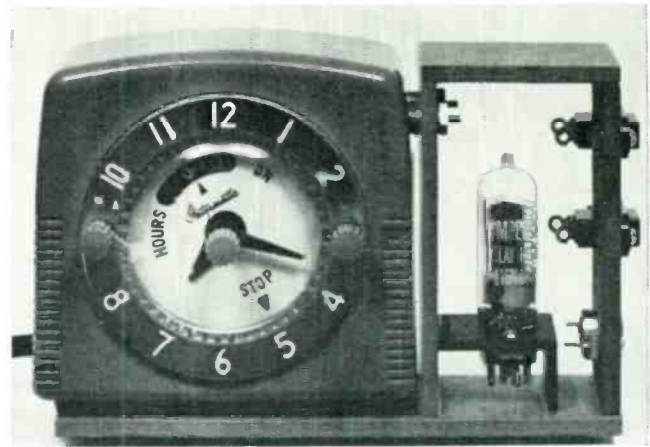


Fig. 5: Although the exact shape and size of the little housing is not too important, be sure to leave adequate room around the relay tube to allow for proper ventilation. The upper two receptacles are regular solder-lug AC chassis sockets, while the lower one is purposely different as it connects directly to the recorder motor.

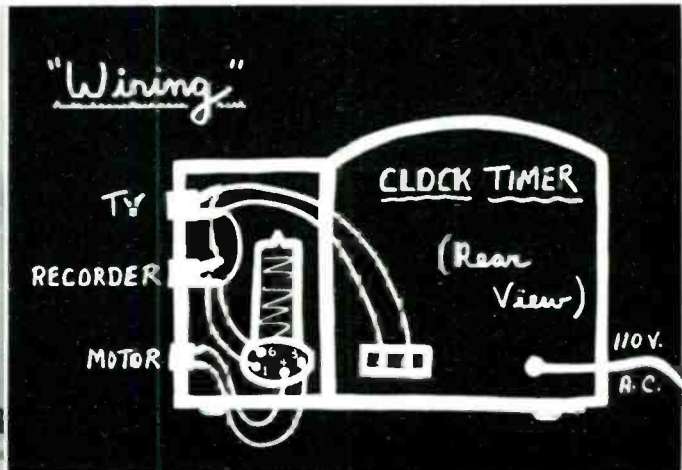
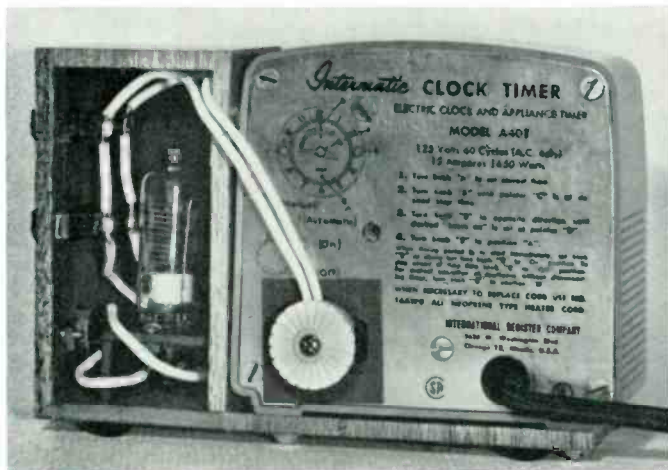


Fig. 7-a, left: At the rear of the timer clock is a 115-volt a.c. receptacle where the units to be controlled plug in. So, hooked up in parallel are the two AC chassis sockets for the TV (or whatever) and the tape recorder, plus the hookup to the relay's heater. Fig. 7-b, right: This blackboard sketch diagrams the simple wiring necessary. The numbers below the tube correspond to the numbers on the miniature tube socket and should be wired exactly as shown. Numbers "4" and "8" represent the contact points of the SPST relay switch.

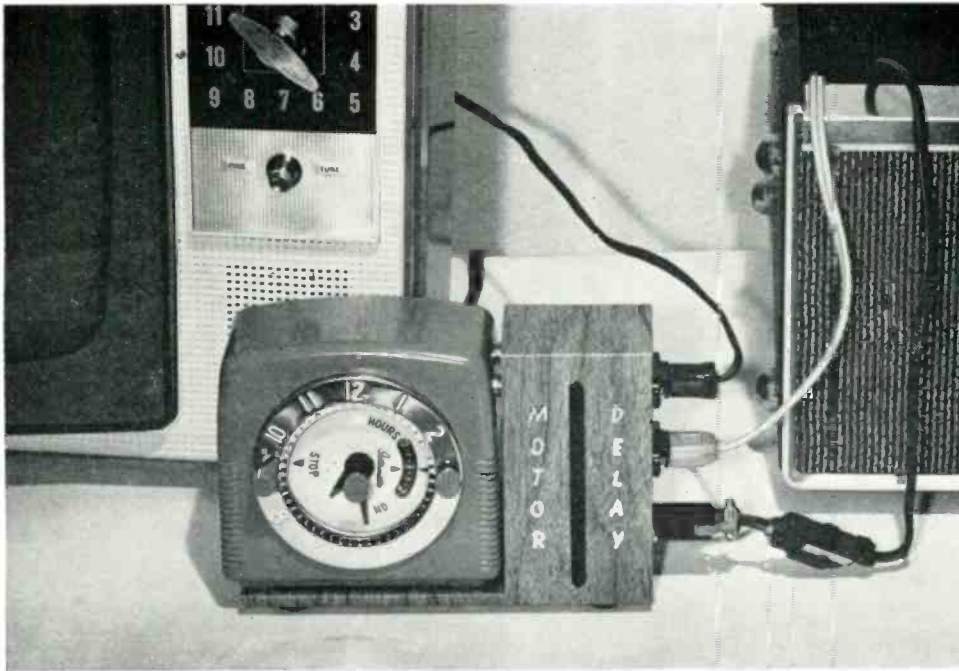


Fig. 8: All "plugged in" and ready to go. Both the TV and the recorder, via the auxiliary AC chassis sockets, plug directly into the timer clock control, as does the heater (only) of the relay tube. When the clock turns all these on, the relay switch delays the starting of the recorder's motor for approximately thirty seconds.

lay you need, and get the relay that has that much delay figured into the thermostatic control. But a word of "caution" here! Only \$2.35 for a time-delay relay is not very much money. You could easily spend ten or twenty times that much. So don't let it come as a great surprise to discover that the *accuracy* of these ingenious little Amperite relays isn't too great. For example, the N.O. relay I use in my timer circuit (Amperite No. 115N030T) is rated as a 30-second-delay relay but it actually *and consistently* closes after about 23 seconds. Since my recorder warms up in 14 seconds and our TV gets going in 19, that's just about perfect for the auto-timer system I use. I just wanted to point this out to you so you won't be unnecessarily disturbed if the particular delay relay you get is "off" somewhat. It's to be expected and really shouldn't make any great difference at all. And of course you can always "play it safe" by getting a relay with a somewhat longer-rated delay than you actually need. Or perhaps you can even talk the store into letting you try several different (but rated the same) relays until you come across the "closest" one?

Actually incorporating one of these delay relays into your timer-clock circuit is a simple matter, as shown here. If the clock you're using is the same one (see Nov. '61 article for complete details on this special "Intermatic" timer), then you can follow the photos exactly. Otherwise, with another timer, make the necessary minor changes along the way. The outer dimensions of the Masonite housing shown here are 7" wide, 4 $\frac{3}{8}$ " high and 2 $\frac{1}{8}$ " deep (with the actual tube housing being 2 $\frac{1}{2}$ " wide). Besides the Amperite Delay Relay and a corresponding 9-pin miniature tube socket, you'll need two AC chassis sockets with solder-lug terminals and a Cinch-Jones Series 300 2-contact chassis-mounting socket (Type S-302-AB). Other type sockets will work as well, but be sure that the lowest socket, which is only a *switch* connection, is one that will NOT accept a regular AC line plug.

Notice, as is pointed out in Fig. 4, that the plastic housing of the timer clock is fastened at the side as well as at the bottom. Because of the sloping sides of the clock, use long machine screws here and fill the "between

spacing" with a few washers. This extra rigidity is necessary because quite a bit of strain is put on the Masonite housing each time the TV and recorder line plugs are pushed into or pulled out of the upper two receptacles. Finally, if you wish, you can *paint* the Masonite, but covering it neatly with patterned self-stickum plastic (about 49¢ a yard in most 5 & 10 or hardware stores) will make

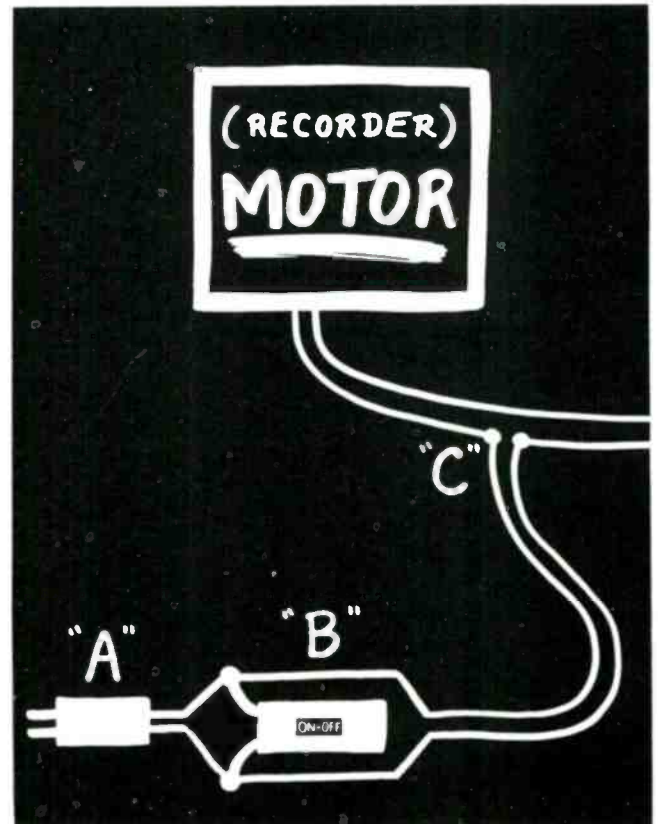


Fig. 9: Hooking up to the recorder's motor is simple as A-B-C, where "A" is a special Cinch-Jones plug. "B" is the SPST slide or toggle switch that closes the contact when the timer clock is not being used. And "C" is where one of the motor wires is cut and the two ends soldered to the zip-cord wiring coming from "A" and "B."

it look more attractive. And you can even "title" it in front if you wish, to further handsome it up.

Also shown in Fig. 3 are the Cinch-Jones Series 300 2-contact cable-clamping plug (Type P-302-CCT) and the slide-switch (any convenient SPST slide or toggle switch will do) used to connect between the timer clock and the recorder motor. The exact hookup is shown in Fig. 9, with switch "B" being left in its "ON" position whenever the timer clock is not being used. This entire cord—plug, switch and all—is just rolled up and stuck inside the storage space of the recorder when not in use.

WITH THE "DISENGAGER" SOLENOID:

Last month we discussed a *universal-type* solenoid system for disengaging your recorder's rubber idler wheel. This is used in auto-timer recording, to remove the pressure on the idler wheel after the tape has finished running, to prevent flat spots from possibly developing if allowed to "sit" too long. As described, the solenoid remained on until it was finally turned off by a timer clock.

Even better than having a timer clock shut off the solenoid, is utilizing one of these little Amperite Delay Relays in a special shut-off circuit (Figs. 10 to 12). Hooked up as shown here, the solenoid shuts *itself* off just two seconds after it goes on. This means that you can put this solenoid conveniently to work for you whenever you wish, to disengage the idler wheel automatically any time you have to go away from the recorder before the tape reaches the end. (Quite often, for instance, I leave the recorder playing background music for the family when I go out and work in my shop. And almost as often, during parties I let the recorder run out of tape without even noticing it until an hour or more later.)

Last month I advised you to be sure and get a *continuous-duty* solenoid. This type can be left on for any length of time without damaging the solenoid. Even without a timer clock to shut it off soon afterwards, it can be used to disengage your recorder's idler wheel. Then, the solenoid would be left "running" indefinitely until you arrived back to shut it off. Not good practice, exactly, but it'll work okay. Unfortunately, using a continuous-duty type solenoid is done at the expense of necessitating an extra large size solenoid (to absorb the heat produced).



Fig. 10: Another use for a delay relay is in shutting off a "disengager" solenoid immediately after it has done its job, eliminating the need for a timer clock for this function (as described last month). The complete unit, which also includes a tape shut-off switch, is quickly put into use and is just as quickly removable.

Much neater—when you can use it—is the intermittent-duty solenoid, SINCE A SMALLER UNIT WILL EXERT THE SAME PULLING FORCE. Shown here is a Disengager System "personalized" for a specific recorder. Instead of needing the large Guardian Type-14 115 VAC *continuous-duty* solenoid of last month (with its 65 oz. pull), I experimented with a small pull-scale and discovered that this particular Knight recorder only required a 26 oz. pull to activate the Stop Lever. So I used a Type-2 *intermittent-duty* solenoid (which is appreciably smaller than the other) with a 27 oz. pull . . . and teamed it up beautifully with a Type-115C2T Amperite Delay Relay that switches the solenoid to "Off" in two seconds. These two units, plus the necessary tube socket and wiring, are mounted on a little Masonite framework that holds the solenoid "aimed" right at the Stop Lever of the recorder. And because of the light pull of the solenoid, a steel *cushioning* spring was not needed to absorb the solenoid's sudden shock each time. Another mounting possibility, which some of you may wish to consider, would be to permanently mount a solenoid on your tape deck, always available for instant use. The Amperite Delay Relay and the remaining wiring could be hidden away conveniently somewhere *inside* the recorder, to make an extremely compact installation.

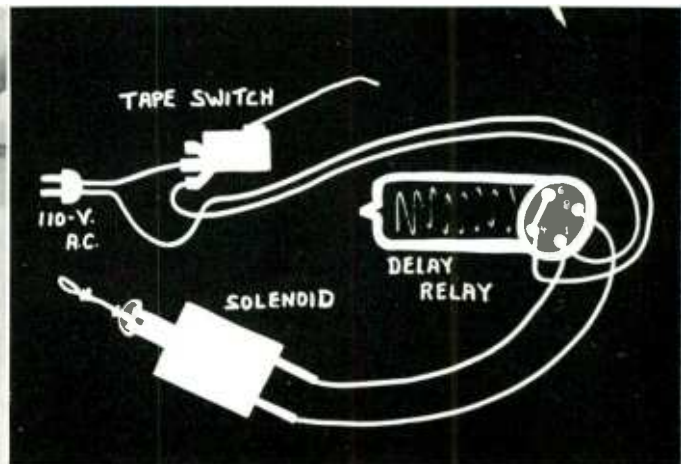


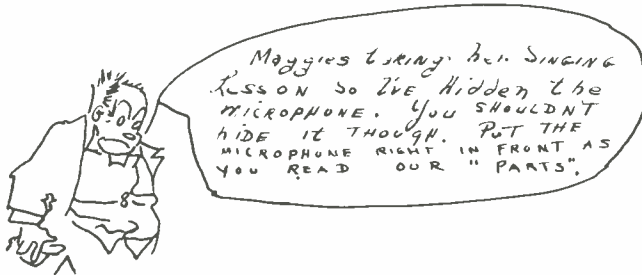
Fig. 11, left: Exactly how you construct the solenoid shut-off device will depend on the recorder you have. All you need, actually, is a support that will hold the solenoid in correct position for working the "Off" lever or knob to disengage the idler wheel, as well as necessary support for the delay relay tube and the needed wiring. Fig. 12, right: When the tape runs out, the tape switch immediately actuates both the solenoid and the heater element of the relay. First the solenoid acts to remove the pressure of the idler wheel and then two seconds later the relay turns the solenoid off. In this case, a delay relay that "opens" instead of "closes" is used for the job.



COMICS on TAPE

by Sheldon O'Connell

... pen and brush strokes come to life on tape.



LI'L ABNER is comin' over the brow of the hill, and right after him is Daisy Mae, Blondie and Dagwood, together with a host of other cartoon characters that are familiar visitors to American homes every weekend. That's the time when the paper is scattered around front living rooms, with a different section for each age group. Don't know why it is, but Pop usually ends up with squares missing from the recipe-backed Sports page.

If there was a formula to guarantee peace and plenty, of the Sunday paper, that is, would you be interested? A tape recorder, one that is easy enough for a youngster to operate, and most of them are, plus the colored comic section of the paper, make a prize-winning combination to keep the youngsters happily occupied for a full afternoon, right from the headlines to the want ads and back.

Recorder and comics might be assigned any room, other than the one you've commandeered, and there a child can play happily, though somewhat noisily, reading dialogue balloons and describing the action on to tape. If there is a younger brother or sister it makes playtime even more

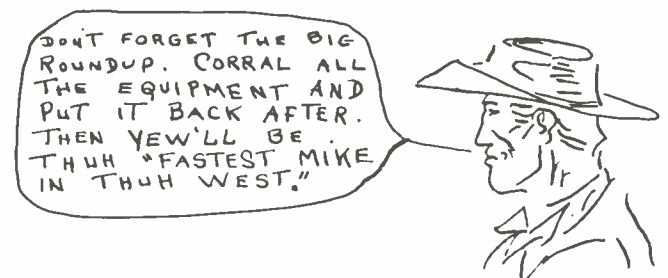
fun, each can take one or a handful of parts in domestic dramas from the Dagwood family circle to Terry and the Pirates and Orphan Annie.

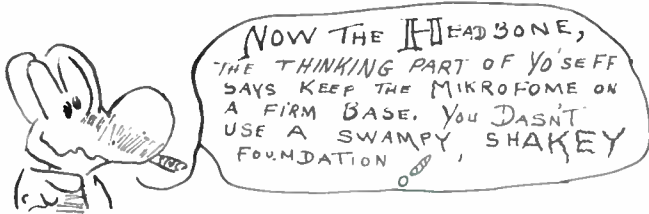
Do these comic strips have any plot, something to hang a story from? Many of them do, are self-contained playlets in themselves with an introduction, dialogues which give these tiny dramas pace and identity and closing scenes.

The ability to read aloud with expression is developed mostly through practice, educators recommend that this be done apart from class study groups, but it is rarely done on so voluntary a basis as an afternoon with the recorder, Li'l Abner and his friends.

Variations on straight taping of the comics can be managed the next time there's a classroom project, response would be enthusiastic, and serve as a gentle introduction to the drama clubs and theatre groups of later academic life.

The one occasion when taping the comics would interfere with the serious work of consuming mounds of cookies and candy is the junior age birthday party, when





strawberry ice cream goes to war against Flash Gordon.

Like tape recorders, the comic section of the Sunday paper isn't restricted to one age group, but to many, and there are a variety of tastes covered between their pages, Mary Worth, who captains the gossip squad, has all the drama and pathos any human could wring from a handkerchief, Dick Tracy and his entourage of hairy, shifty, stripe suited villains, Mandrake the Magician, Archie the teen King, and several more. Next time you're casting about for material that would record well in a mature party skit, just check the Sunday supplement for adult Westerners . . . adult westerns . . . that's where the cowboys don't do no shootin' to kill, just talk some, then blast away afore yew kin check the whites of their hats. If you want to read less than your neighbor, latch onto a black hat part, the black hats usually get shot up mighty fast and die quickly with a minimum of histrionics, just a gasp and a cough. White hat parts call for real acting ability, as every western addict knows, they just don't git kilt, frequently jumped by an unruly mob, or winged but not killed. The finish finds them on their feet, dusty but



game, with a bandage about the head, or croonin' a lullaby to their hoss.

You might divide the party guests into groups and after each records their comic skit, play them all back to the group as a whole and let them choose the best performance. A small prize for the winning team would make the entire "game" all the more fun.

Comics are not just restricted to the newspapers, of course, and another handy source, which makes just as good reading, are comic books. Many of the familiar newspaper characters are also found in comic books. In fact, today there are so many well known characters on TV, special adaptations of them into comics have been made, such as Cheyenne, Wyatt Earp, etc.

This type can make especially good reading fun, as the children become familiar with the mannerisms and dialogue of their favorites as they watch them on the TV screen and then try to imitate them when reading comic

books. In these instances, the children have actually heard and watched a real-live TV characterization of their hero and now they can better portray him as they read through a comic book adventure.

To make this interesting pastime even more fun, you can have each character identify himself by some small homemade trademark, such as a paper sheriff's badge, a cardboard gun, paper hat, cotton beard, etc. Dagwood's enormous before-bed sandwich would not only be fun to eat, but fun to make and it would fit in perfectly with a children's reading of the Bumstead comic character.

The possibilities are endless and all the happy sound

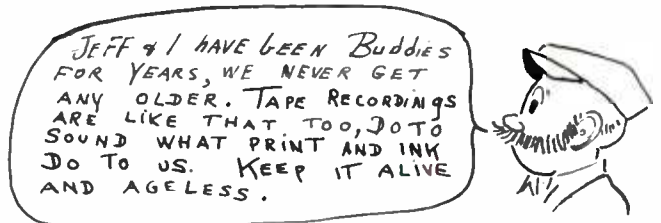


is captured on tape to be played back whenever wanted or to be filed away to be played some day when sis or junior are grown and the wonderful joys of childhood are lived again on tape.

Of course, the tape can also be erased and used again and again as desired.

It's an economic advantage to use the slower speed when recording material of this kind, since it covers the full frequency of the speaking voice. Microphones being what they are, will pick up the sound of papers or books rustling as each page is turned and brushed flat. This crackling can be irritating and a distraction to listen to on playback. When youngsters are reading they usually have the printed matter spread on the floor, this classic pose won't be changed by the introduction of a microphone on the scene. This should be kept off the floor, either suspended from a nearby table or placed on a hassock, to overcome the sound of excessive paper rattling and thumps from young elbows and feet.

No matter what your purpose, reading comics on tape is a new, all useful, all fun-filled diversion for today's eager, active youngsters. Most of us adults have tried our hand at script reading, now it's the children's turn, and what child doesn't enjoy the humorous, sometimes true-to-life shenanigans of comic characters. Why not have your offspring try it today, or next weekend, when all hands reach for the Sunday paper, try letting the junior editions run a pickup on Orphan Annie and gallop the Lone Ranger past the recording head for an afternoon of tape entertainment!



NEW RCA CARTRIDGE MACHINES



1961 ROUNDUP

As is usual at this time of year we like to look back and see what the old year brought to us in the way of developments in the field of tape recording.

Two trends were evident during the year. These trends are in their beginnings at the present writing but should develop and become a factor in the future.

One was the approval by the FCC of FM multiplexing, which has been renamed FM Stereo because the various trade associations concerned thought the former term to be too confusing to the public when it came to selling the equipment.

It got off to a slow start. At year's end there were only about 30 radio stations which had put FM Stereo on the air and these were doing it on restricted schedules. Many more stations are expecting to broadcast in this fashion and perhaps would be doing so now had equipment been obtainable from the manufacturers of transmitters.

Another factor in the slow start was the age-old "which came first, the chicken or the egg" complex.

Why should a radio station spend the money necessary to get on the air with FM Stereo when there were so few people equipped to receive it? Why should a person invest in the necessary gear for receiving it when there were so few programs for their sets to pick up. And so it went.

Radio stations felt that the manufacturers of FM Stereo receiving equipment should provide the sponsorship of the programs since they would be the ones to profit the most from it financially.

A second development that we feel

certain will increase both in volume and importance is the wedding of sound with both movies and slides.

V-M and Webcor, in the tape recorder industry both made available popular priced synchronizers which would operate any automatic slide projector from signals on the tape. Other synchronizers were made by firms in the photo field, such as Kodak and Bausch and Lomb, among others. Thus the two fields, photography and recording came closer together on these points.

Another wedding of photography and sound recording is coming about in the field of 8 mm movies for home and school. This was evident from the increased number of projectors becoming available which used 8 mm magnetically striped film and also the issuance of machines to apply the sound track to the film.

Fairchild Camera and Instrument Company had on the market a camera which recorded the sound as it took the pictures. The sound stripe was applied to the raw stock before exposure.

In the other method, the films are shot in a silent version, the film sound striped and then the sound added by means of the magnetic projector.

It is felt that there is a very great future in the wedding of sound and sight for home and school use.

Another development that may be the beginning of a wave was the increasing numbers of battery-powered portables both domestic and imported. This trend may mean the beginning of the use of the recorder as a creative instrument in this country as it is abroad. Being able to bring back the sounds of trips, etc., should make the hobby more appealing.

M.M.&M. SENSING TAPE



NEW SARKES TARZIAN TAPE



WEBCOR SLIDE SYNCHRONIZER



FUJIYA JAPANESE RECORDER



ORRTRONIC TAPEPLAYER



Further evidence of the growing "togetherness" of sight and sound was the issuance by Webcor of a free booklet describing the many ways in which a tape recorder could be used in conjunction with a camera or projector.

The MRIA in cooperation with the nation's Better Business Bureau also brought out a booklet giving the details on tape recorders and explaining four-track, how recorders operate, servicing, etc. This was made available through stores and from local better business bureaus across the country.

There was a dramatic increase in the use of tape for teaching in the public schools, especially in the matter of language instruction. At year's end there were some 2500 language laboratories installed in schools across the nation. Much of this was made possible through the National Defense Education Act which provided matching funds for states.

In the field of tape manufacture, several new firms got their products on the market including Burgess Battery and Sarkes-Tarzian. Reeves Soundcraft brought out their Hi-Fi line and also made available a striping machine for putting the magnetic track on 8 mm film. Minnesota Mining and Manufacturing opened its new tape plant at Freehold, New Jersey which increased the company's capacity to make tape by 150%.

Other tape companies continued with their research and development programs and most expanded as demand for raw tapes for all uses continued to grow. The long circulated rumor that Eastman Kodak would begin the manufacture of tape became reality. Their first production was for professional and computer use.

During the year, despite all the talk and advertising of stereo, the production of monaural machines continued

to outpace the stereo units, giving some substance to the feeling in some quarters that the purchase of a recorder does not necessarily indicate that it will be used for music.

Livingston Audio Products brought out a line of 10 monaural tapes on 3 inch reels, the first issue of monaural tape for a number of years.

Total tape recorder production was variously estimated since the industry collected no production figures of its own. An educated guess placed the total at about 750,000 units of which almost half were imports, most being the small Japanese portable units selling for under \$100 and many of them in the under \$30 class. This year's sales puts the total number of recorders now in use somewhere in the neighborhood of five to six million.

Production of four track musical tapes continued through the year building the catalog to about 1,000 titles.

Cartridges were produced at a slower pace but some step-up was indicated toward the end of the year by Bel Canto, a subsidiary of Bell Sound who, with RCA were the principal producers of cartridge machines for general use. In the fall RCA brought out a new cartridge machine which was priced at about \$100 and which was much smaller and more compact than their former unit. This was expected to spur sales.

An increasing number of tape decks came on the market including those by Sony, Ampex and Tandberg. These were designed for people who had record playing equipment but who wished to take advantage of tape's superior playing and lasting qualities.

In the tape industry, 1961 was a relatively quiet year with no startling changes, unlike some previous years which had seen such changes as the switch from two to four track, etc.

REEVES STRIPER



V-M SLIDE SYNCHRONIZER



BURGESS BATTERY RECORDING TAPE



CONCERTONE REVERSE-O-MATIC



TANDBERG TAPE DECK



MULTIPLEX ADAPTER



NEW PRODUCT REPORT

STA **OK** STED



BELL MODEL T-338 TAPE TRANSPORT

THE Bell Tape Transport is a two-speed, three motor unit that may be built in as a part of a hi-fi system or, if placed in the available accessory case may serve as a portable record or playback machine for stereo when connected to a power amplifier and speakers.

Since it is powered by three motors instead of the more usual one motor, it has no belts, pulleys or drive pucks. One motor is used for the feed reel, one for the takeup reel and one for the capstan. The motors are four-pole shaded-pole types. To stop the tape, electro-dynamic braking is used. This provides smooth and positive stopping through motor control rather than mechanical linkage.

The tape motion controls are on the right hand side of the deck and are of the piano key type. Speed selection is provided by two keys, one for the $3\frac{3}{4}$ ips speed and one for the $7\frac{1}{2}$ ips. The next key is the power off key which shuts the unit down. Next is the run key which puts the machinery in motion and next to that is the rewind, followed by the fast forward. The last key is a standby key which serves to turn the power on from the mains and also opens the head mechanism to receive the tape.

On the left side of the deck are the electronics controls including input for two mikes, record/play switches, push-to-release record interlock, record/play volume controls, two recording level meters, record/play indicators, which show whether the amplifier is set for recording or playback, and the 2 track-4 track head selector switch. A tape counter is provided on the right side of the deck.

The Model T-338 which was used for test consists of the T-333 deck with the RP-320 stereo record/play stereo amplifier attached and the whole enclosed in the 300-CC case.

Because all the units are separate a number of various configurations are possible from two-track monaural record and play (using the RP-321 monaural preamp) to the four-track stereo record and play represented by the T-338.

All models are identical mechanically, the only differences being in the head arrangements desired. The various preamps are designed to mount on the basic deck and become an integral part of it.

Since the unit ends at the preamplifier stage, a power amplifier and speakers are necessary. For stereo, a stereo amplifier and two speakers are

*Product: Bell Model T-338
Tape Transport*

*Manufacturer: Bell Sound Division,
Thompson, Ramo,
Wooldridge, 6325 Huntley
Rd., Columbus 24, Ohio*

Price: \$246.65

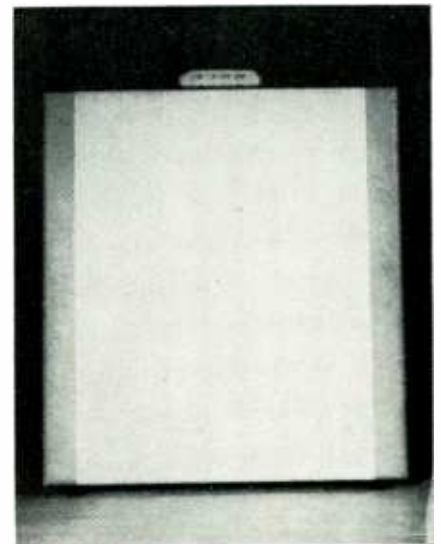
needed.

The transport includes a tape lifter which lifts the tape from the heads during rewind or fast forward and it also has an end of tape shutoff device.

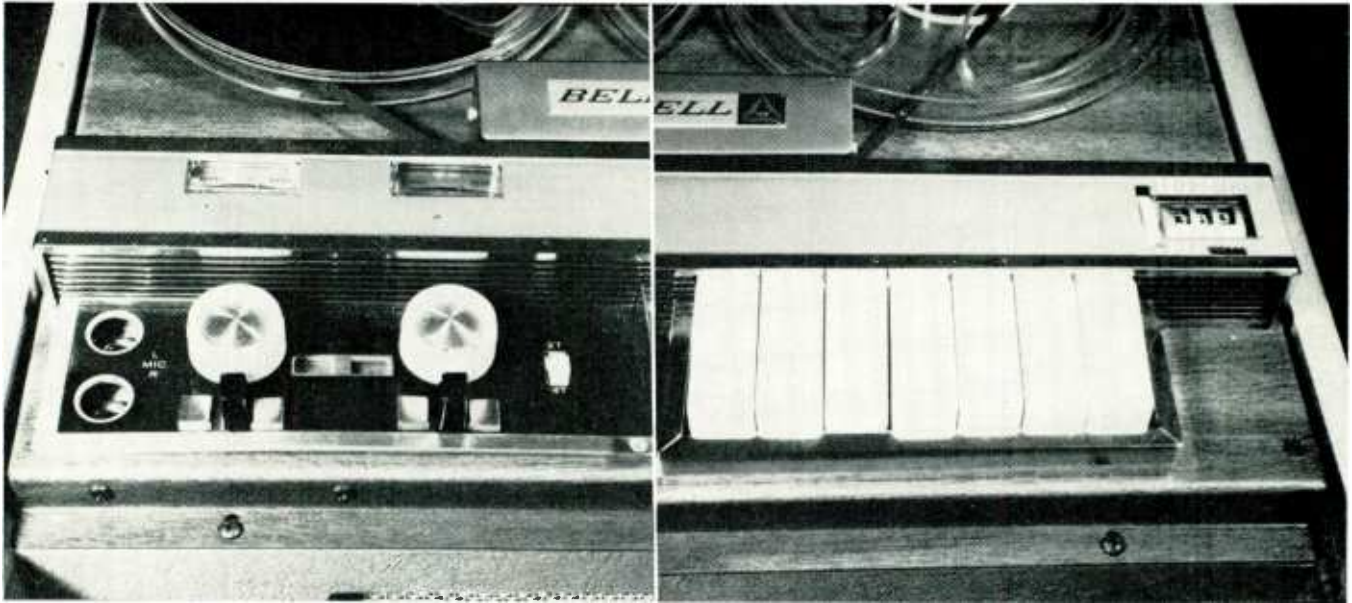
The tape feed is straight line and the standby key must be depressed in order to open the head assembly for the tape.

High impedance microphones may be plugged into the two jacks on the deck. Provision for recording from other sources has been made by jacks on the rear of the unit. A monitor jack for use during recording or playback is also provided and high impedance stereo phones (5000 ohms or more) should be used.

It is important to always make sure that the amplifier is in the mode in which you wish it. This is shown by the indicators provided. For playback the preamp should be in play, for if it is in record, the tape can be erased. The selector switch should always be checked with a glance before tape is run.



The case closed and in carrying position. The case is a useful accessory if it is desired to record away from home or if the deck cannot be built-in at home.



The left side of the transport has the record level meters, inputs for two mikes, Record/Play indicators, Push-to-Release Record Interlocks, Record/Play switches, Volume controls and Head Track selector switch. All tape motion is controlled by piano key type switches which from left to right are: 3¾ and 7½ selector keys, power off key, play/record, rewind, fast forward, standby (power on). The odometer type tape counter can be seen above keys at the right.

The two level meters will show the relative output for each channel and may be used to balance the feed into a stereo amplifier, in addition to their primary function as record level indicators.

There is one other caution and that is when going from fast forward or rewind to run, the standby key should be depressed and the tape allowed to come to a complete stop before depressing the run key.

The unit performed very well under test. As part of the test a dub was made from another tape and on an A-B test on playback it was impossible to discern any difference between the original and the tape made on the Bell Transport.

The piano type control keys were found to be convenient and they were likewise positive in action in all

modes. The tape braking action was found to be excellent and fast.

The frequency response on recording at the slower speed was excellent (as it was also at the 7½ speed) and the results obtained at the 3¾ ips speed were equal to or better than some machines at the 7½ speed.

The record equalization is automatically switched when the speed selector is positioned at the speed desired.

The transport is very well built and shows care in assembly. No trouble was experienced on its operation during the test.

The associated stereo preamplifier likewise performed very well and its moving coil meters were convenient to use and accurate.

We feel that this unit is worth your consideration.



Top: rubber reel locks are provided so that the reels will stay on when the deck is used in the vertical position. Lower: inputs and monitor jacks are on rear of deck. The transport may be used either horizontally or vertically.

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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.

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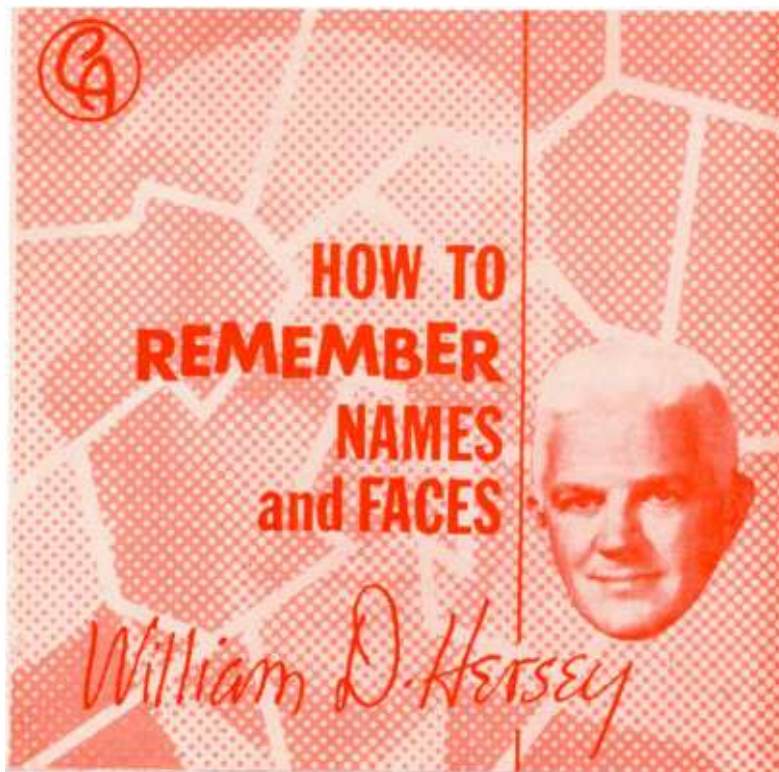
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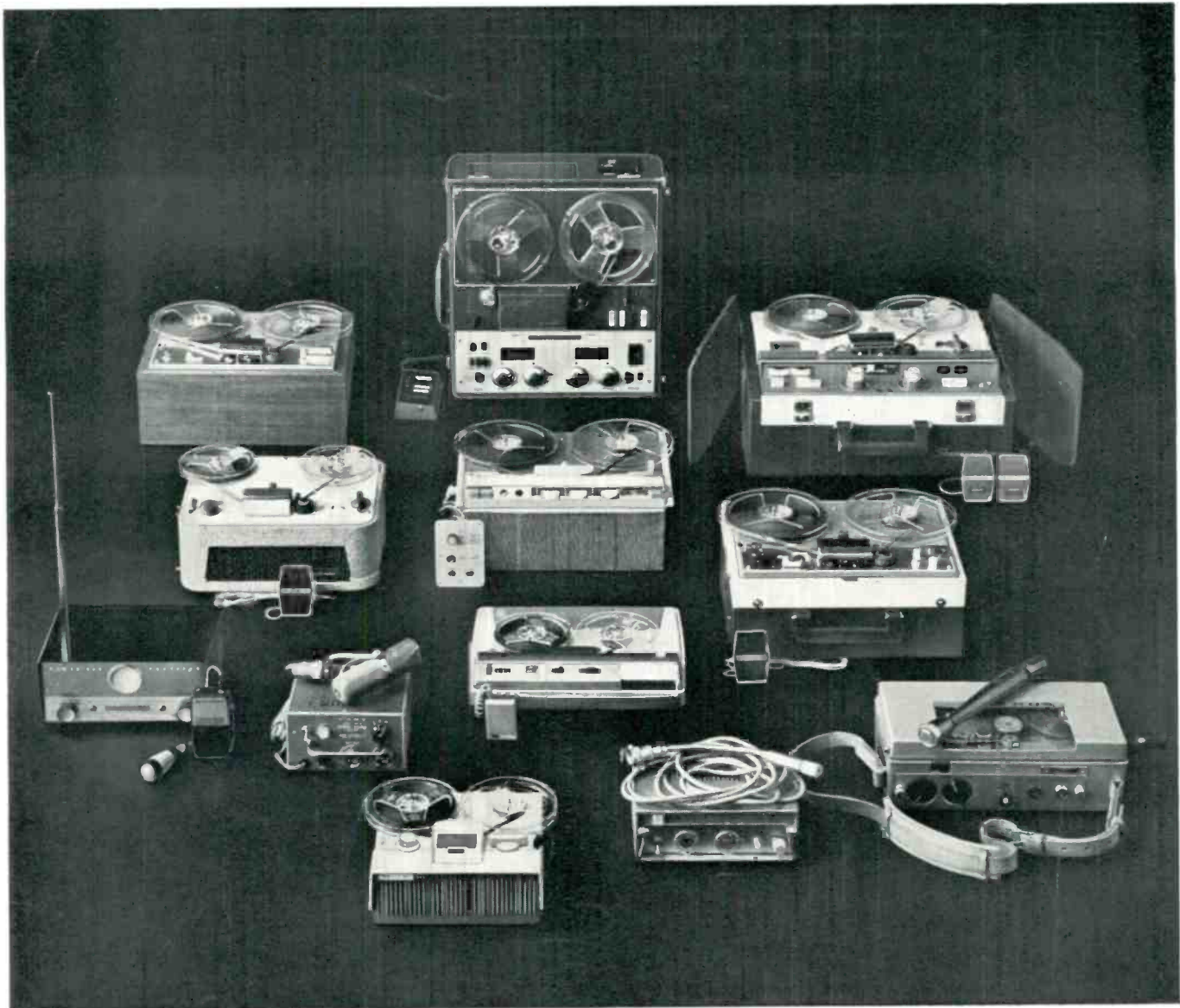
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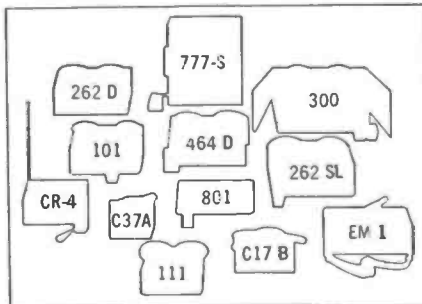
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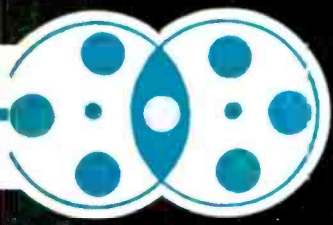
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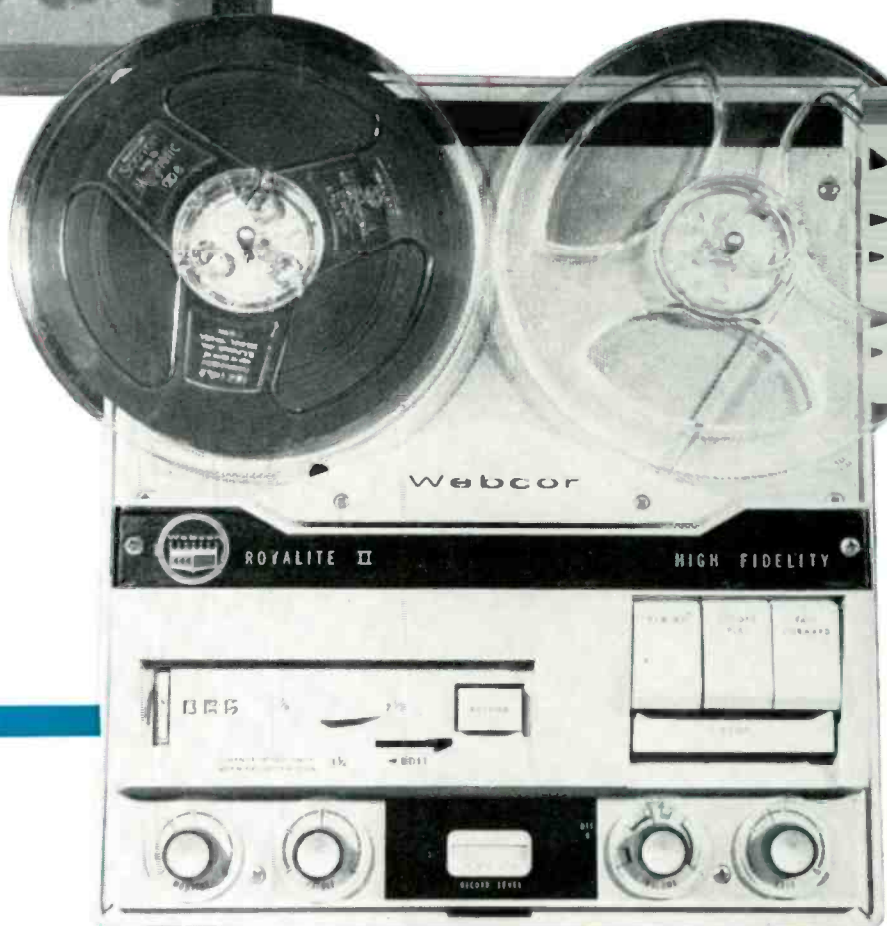
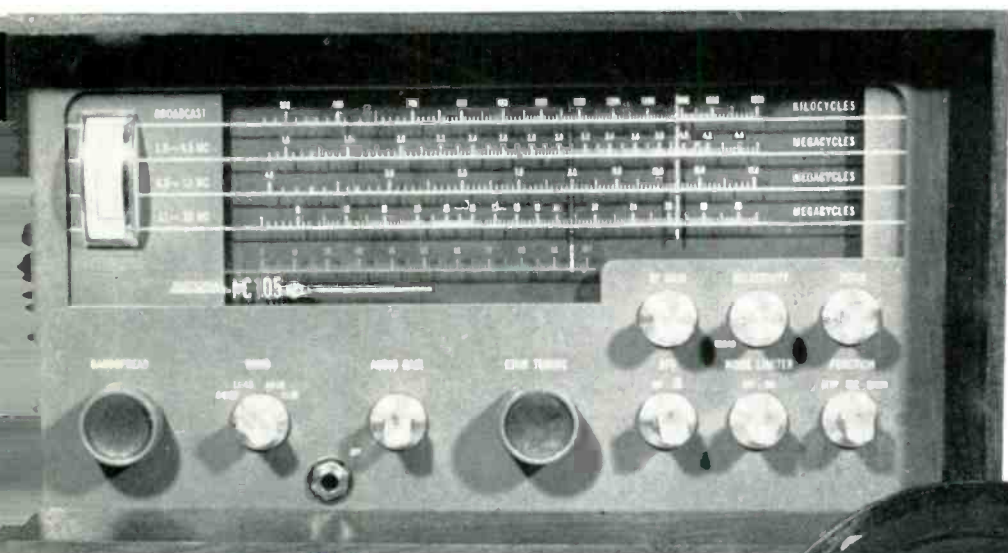
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TAPE RECORDING

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**April, 1962
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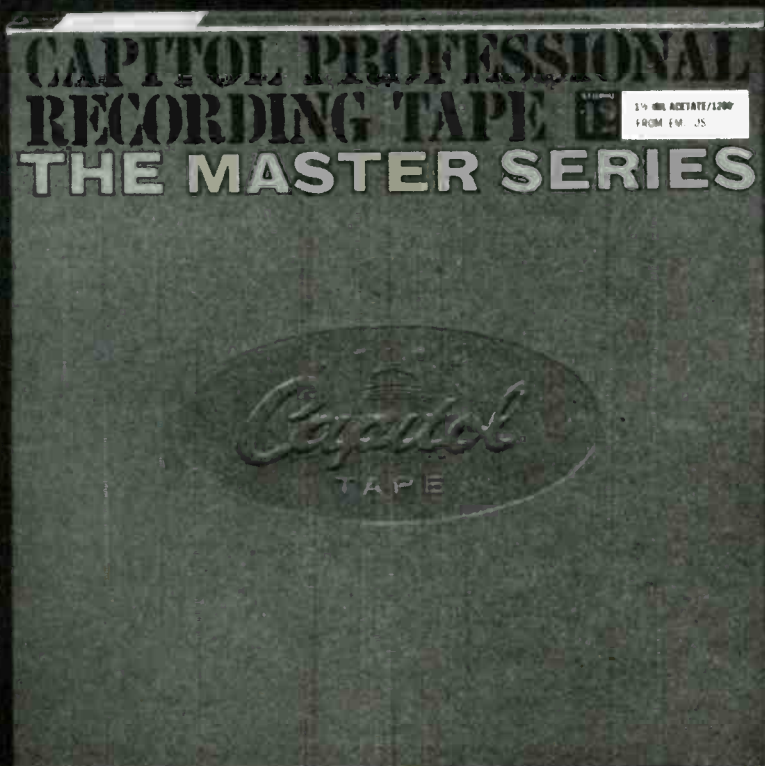
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TAPE RECORDING

VOL. 9 No. 5

APRIL 1962

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NEW TAPES

★—Fair

★★—Good

★★★—Very Good

★★★★—Excellent

CLASSICAL

Reviewed by Robert E. Benson



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

BRAHMS: Symphony No. 2 in D, Op. 73
Pittsburgh Symphony Orchestra cond. by
William Steinberg
COMMAND 11002
4-track, 7½ ips
\$7.95... 37 min.



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

RAVEL: Daphnis and Chloe Suite No. 2
Alborada del Gracioso La Valse
Colonne Orchestra conducted by Pierre
Dervaux
COMMAND 11005
4-track, 7½ ips
\$7.95... 38 min.

COMMAND has had extraordinary success with their popular releases, and now they have ventured into the classical field. The results, as evidenced by the above two tapes, vary greatly.

First of all, the basic quality of sound of the two orchestras involved is vastly different. The Colonne organization has typically French sound, with nasal woodwinds, weak brass and light strings. The Pittsburgh Symphony, on the other hand, has a more robust Germanic sound, with solid strings, strong brass and rich woodwinds.

The *Symphony No. 2* of Brahms receives a beautiful performance from Steinberg, although it would benefit from a more flowing interpretation. Sound is the highpoint here, and the transparency and immediacy of the reproduction is quite extraordinary. This close pickup results in some rather strident high strings but the over-all effect is quietly sensational. Dervaux offers a very fine performance of *Alborada del Gracioso*, but *La Valse* is turgid, and *Daphnis* is just too much for this orchestra. As it isn't mentioned on the label, it comes as a surprise to hear a chorus at the end of the *Daphnis*. For this recording, COMMAND utilized a rather distant pickup for the orchestra, and there is surprisingly little spectacle. All in all, this tape is a disappointment both in performance and sound.

If COMMAND wants to go all out in the classical field, why not record Leopold

Stokowski with a pick-up orchestra in some of his remarkable specialties; for example, Stokowski's arrangement of *Pictures at an Exhibition*, with COMMAND's best sound, would be a stunner.



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

CANTELOUBE: Songs of the Auvergne
Netania Davrath, soprano; Orchestra con-
ducted by Pierre de la Roche
VANGUARD
4-track, 7½ ips
\$7.95... 47 min.

Joseph Canteloube's settings of selected folk songs of the Auvergne region of France have long been a favorite with record collectors since the time of the early Columbia recording by Madeleine Grey on 78's, years ago. The songs selected are primarily love songs, mostly of a rather sad nature, and there are a few rollicking Bourées to offset the generally serene nature of the collection. Now we have not only all of the songs previously available, but many others, all recorded with gorgeous sound, performed by Netania Davrath, an Israeli soprano, who displays consummate artistry and whose pure soprano is just right for these incredibly beautiful songs. The orchestra isn't identified, but it plays wonderfully, with the many important woodwind solos managed with ultimate finesse.

Since receiving this tape I've played it more than any other tape I have. It is a positive *must* in any tape collection, and is guaranteed to provide lasting satisfaction.



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

RESPIGHI: The Birds and Brazilian Impressions
London Symphony Orchestra conducted by
Antal Dorati
MERCURY ST 90153
4-track, 7½ ips
\$7.95... 39 min.

This is the finest tape I have ever heard from Mercury, despite occasional slight low-frequency cross-talk. *The Birds* is a five-movement orchestral suite derived from English and French composers. The *Prelude* is followed by musical descriptions of the dove, the hen, the nightingale and the Cuckoo, with a brief reprise of the *Prelude* at the conclusion. The three movements

of *Brazilian Impressions* are entitled *Tropical Night*, *Butantan* and *Song and Dance*, and were written as the result of a trip Respighi made to Brazil in 1927. Both of these suites abound in orchestral color, although they do not require the vast orchestral resources of the same composer's three best-known symphonic poems, *The Pines of Rome*, the *Fountains of Rome* and *Roman Festivals*, and as a result there are no big, shattering sonic displays. What there is, however, is the finest reproduction I've ever heard from Mercury, with smooth, silky highs and deep, satisfying bass. There is slight occasional low-frequency cross-talk, but not to the point of distraction. The tape is stunningly packaged—the color photograph on the tape box is extraordinarily effective. Let's hope we'll have more tapes like this from Mercury.



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

BARTOK: Concerto for Orchestra, Dance Suite
Amsterdam Concertgebouw Orchestra con-
ducted by Bernard Haitink
EPIC EC 814
4-track, 7½ ips
\$7.95... 53 min.

This performance of the *Concerto for Orchestra* is superlative, with the new young co-conductor of the Concertgebouw Orchestra in his most effective idiom. Reproduction is of the best Epic has achieved with the Concertgebouw, and, with the addition of a robust reading of the *Dance Suite*, this tape is unqualifiedly a best buy.

Although the Hollreiser version on Vox 704 was a highly commendable enterprise, now for the same price one has a better performance, with the added bonus of the *Dance Suite*. The Ansermet-Suisse Romande version on London K 80068, \$11.95 (coupled with the same composer's *Music for Strings, Percussion and Celeste*) simply isn't in the same class.

OTHER CLASSICAL TAPES IN BRIEF

From Mercury comes a new tape release of the Philharmonia Hungarica Orchestra conducted by Antal Dorati performing music of Bartok—the *Dance Suite*, *Two Portraits*, *Op. 5*, and two excerpts from *Mikrokosmos* (ST 90183, \$7.95, playing time 34 min.). The close-up recording isn't very flattering to the sound of this orchestra, and the new Epic tape of the *Dance Suite* reviewed herein, which also includes the *Concerto for Orchestra*, is a much better buy in all respects. From Victor there's a collection of more or less familiar piano works of Chopin played by

Van Cliburn, featuring the *Polonaise in A Flat*, *Fantaisie in F Minor*, *Scherzo No. 3* and other shorter works (RCA FTC 2091, \$8.95, playing time 52 min.). Performances are rather pedestrian, and piano sound somewhat emphasizes the bass, but the tape is good value in playing time. Victor has also released a third "electronic stereo reprocessing" of an older recording by Arturo Toscanini with the NBC Symphony Orchestra—Respighi's *Fountains of Rome* and *Pines of Rome* (FTC 2083, \$8.95, playing time 36 minutes). As in the previous two releases of music of Dvorak and Moussorgsky, high frequencies are distorted and stereo effect confused. Another Mercury release entitled "Bouquet de Paray" features Paul Paray conducting the Detroit Symphony Orchestra in familiar warhorses—Rossini's *William Tell Overture*, *Danse Macabre* by Saint-Saens, Weber's *Invitation to the Dance*, and Liszt's *Mephisto Waltz* (ST 90203, \$7.95, playing time 38 min.). Performances are adept, but reproduction exaggerates the bass, and there's a lack of the natural resonance of a good concert hall.

SEMI-CLASSICAL



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

CLASSICS BY CHACKSFIELD

Side 1: Claire De Lune, Minuet in G, The Swan, Salut D'Amour, Valse De Fleurs, Liebestraum
 Side 2: Melody in F, Morning Song, Humoresque, Air on a String
 Frank Chacksfield and His Orchestra
 RICHMOND (London) RPE 45025
 4-track, 7 1/2 ips
 \$4.95... 41 mins.

Frank Chacksfield has compiled a group of classical selections that provide a program of beautiful melodies. "Claire de Lune," "Melody in F," "Waltz of the Flowers" and "Liebestraum" are examples of time-honored favorites which never lose their appeal.

He features the high strings in a way that is typically his own. These numbers, while recorded at a lower than average level, nevertheless provide a welcome relief from the pop and percussion so prevalent today. This tape is recommended for those who ordinarily do not care for classical music. Stereo effect is well defined.—F. N. West.

SHOWS



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

CARNIVAL

Opening-Direct From Vienna, Mira, Sword,

Rose and Cape, A Very Nice Man, I've Got to Find A Reason, Yes, My Heart, Humming, Theme From Carnival, Grand Imperial Cirque De Paris, Her Face, Yum, Ticky, Ticky, Tum, Tum, The Rich, Beautiful Candy, Everybody Like You, I Hate Him, Her Face, It Was Always You, She's My Love, Theme From Carnival

Original Broadway Cast
 MGM STC-3946
 4-track, 7 1/2 ips
 \$7.95... 43 mins.

Like most original cast recordings, this tape will have the greatest interest for those who have seen the Broadway production and know what it is all about.

For the uninformed, Carnival is a love story about a charming country girl who discovers love in a little French carnival. Based on the cinema production of "Lili," it stars Anna Maria Alberghetti and a large cast of performers who do exceedingly well by the Bob Merrill score.

Good voices, delightful love songs, a touch of humor and human interest throughout. Broad stereo effect and excellent recording give it a theatrical quality that reflects the life and love of this magic world of show business.—F. N. West.



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

CARNIVAL

Side 1: Opening-Direct From Vienna, Very Nice Man, I've Got To Find A Reason, Mira, The Sword, The Rose, and the Cape, Yes, My Heart
 Side 2: Golden Delicious, Yum, Ticky, Ticky, Tum, Tum, The Rich, Beautiful Candy, Her Face, It Was Always You, She's My Love and Finale
 Orنادel and The Starlight Symphony Orchestra
 MGM STC-3945
 4-track, 7 1/2 ips
 \$7.95... 34 mins.

If you prefer the instrumental version of the score from Carnival, you will thrill to the music of the Starlight Symphony Orchestra conducted by Cyril Orنادel.

This is an exceptional, melodic, symphonic rendition that does much to enhance and establish the fine musical properties that are not as pretentiously presented in the original cast version.

Orنادel's treatment of the music from "Carnival" is just as enjoyable as his recent album of "Camelot," (reviewed here December 1961). Sound quality is first rate.—F. N. West.

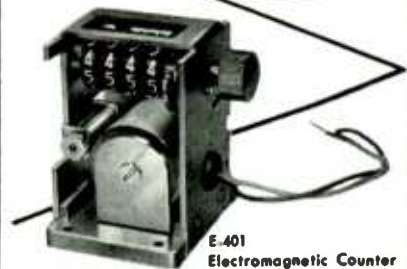


Music ★★★★★
 Performance ★★★★★
 Fidelity ★★★★★
 Stereo Effect ★★★★★

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CARNIVAL AND OTHER GREAT BROADWAY HITS

Side 1: Theme From Carnival, I Feel Pretty, You Are Beautiful, Shall We Dance, Till There Was You, I Know About Love
 Side 2: Do-Re-Mi, Till Tomorrow, So In Love, Ascot Gavotte, If Ever I Would Leave You, My Heart is So Full of You
 Mantovani and His Orchestra
 LONDON LPM 70047
 4-track, 7 1/2 ips
 \$6.95... 35-45 mins.

The title of this album is somewhat misleading, for only the "Theme From Carnival" is included. The other numbers are selected from eleven more award win-

ning musical shows spanning the period from 1948 through 1961. Mantovani has imparted to all of them his distinctive arrangements, and, with his skill in capturing even the most subtle nuances of the highest string passages, created a thing of infinite charm and appeal.

London's superb sound makes for enjoyable listening.—*F. N. West.*



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

STEREO ACTION GOES BROADWAY

Sequence A: Heat Wave, Seventy-Six Trombones, Keep-A-Hoppin', Bali Ha'i, It's Legitimate, Slaughter on Tenth Avenue
Sequence B: Hernando's Hideaway, I Got Rhythm, Camelot, Show Me, The Sound of Music, El Sombrero

Dick Shory's Percussion and Brass Ensemble
RCA FTP-1087

4-track, 7½ ips
\$7.95... 35:30 mins.



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

STEREO ACTION GOES HOLLYWOOD

Sequence A: Around the World, The Children's Marching Song, Song of the Barefoot Contessa, Song From "Moulin Rouge," The 3rd Man Theme, Gigi
Sequence B: Colonel Bogey, Moonglow and Theme From "Picnic," The High and the Mighty, Tara's Theme, Baby, It's Cold Outside, Invitation

Marty Gold and His Orchestra
RCA FTP-1088

4-track, 7½ ips
\$7.95... 32 mins.



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

THE MUSIC GOES 'ROUND AND 'ROUND

Sequence A: The Music Goes 'Round and 'Round, Dancing Tambourine, Let's Take a Walk Around the Block, The Doll Dance, Don't Fence Me In, Stumbling
Sequence B: Love Is Just Around the Corner, Then I'll Be Happy, Would You Like to Take a Walk, Elmer's Tune, I Found a Million Dollar Baby, You'd Be Surprised

Leo Addeo and His Orchestra
RCA FTP 1076

4-track, 7½ ips
\$7.95... 30 mins.

To quote the descriptive folder with these tapes—"Stereo Action is a revolu-

tionary new concept of stereo recording in which instruments, singers, whole sections, and even full orchestras are placed into movement so that the listener has, literally, music his eyes can follow."

All of this results in a new listening experience as RCA engineers create novel, amusing and interesting electronic effects while Dick Schory performs the musical acrobatics on a brace of Broadway show tunes. His arrangements take full advantage of the moving sound medium and the introduction of sound effects in the musical selections makes a lively and realistic program.

In "Stereo Action Goes Hollywood," Marty Gold gives a new dimension to a group of movie sound track themes that readily lend themselves to stereo in motion arrangements. "Around the World," "Third Man Theme," "Gigi," and "Tara's Theme" are among the familiar numbers that certainly sound different here.

In "Music Goes 'Round and 'Round," Leo Addeo adapts Stereo Action to a group of old standbys such as the title song, "Doll Dance," "Elmer's Tune" and "Then I'll Be Happy." He features the harmonica, accordion and ocarinas with his orchestra.

All three tapes are well played, beautifully recorded, with, of course, tremendous stereo effect.

To the audiophile, Stereo Action is not disturbing or confusing—it is something novel and stimulating—a phase in the ever growing process of stereo reproduction of sound. These tapes will provide a good test of your stereo system.—*F. N. West.*

POPULAR



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

THE SHAPE OF SOUNDS TO COME

Side 1: I've Got You Under My Skin, I've Heard That Song Before, All the Things You Are, Theme From "The Ingates," More Than You Know, Tony's Wife, Get Out of Town
Side 2: Ain't Misbehavin', You Stepped Out of a Dream, Jackie's Tune, Rain on the Roof, Arkansas Holler

Larry Elgart and His Orchestra
MGM STC 3896

4-track, 7½ ips
\$7.95... 32 mins.

Larry Elgart's concept of the "Shape of Sounds to Come" is to use electronics to achieve realism and true musical sound uncluttered by dazzling effects. With this in mind, he, assisted by his wife and his regular staff of arrangers, has combined talents to bring new life and verve into some of our standard all-time favorites, such as "I've Got You Under My Skin," "Ain't Misbehavin'," "More Than You Know" and others. That they achieved their goal can be ascertained with the

playing of the first number. The Elgart sound is unique and stereo effect is well defined, but not extreme. One small complaint, however, the second side of this tape has only five numbers, leaving about five minutes of blank tape that could have been filled out with a few more selections.—*F. N. West.*



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

CONTINENTAL HOST

Side 1: Under Paris Skies, La Vie En Rose, The poor People of Paris, Mam'selle, The Maxixe, Darling Je Vous Aime Beaucoup
Side 2: Arrivederci Roma, Fascination, Mattinata, Anna, Come Back To Sorrento, Funiculi Funicula

Raoul Meynard and Orchestra
WARNER BROS. WSTC 1424

4-track, 7½ ips
\$7.95... 32:40 mins.

Raoul Meynard creates a mood of soft candlelight, good wine and sweet music in this tape which features the favorite melodies of the French Riviera on one side and the Italian Riviera on the other.

He uses a typical continental cafe orchestra, in which the strings, of the plucked variety, predominate in catchy rhythms which we all know so well.

The recording is faultless, with exceptionally clean and crisp sound that is free of any recording noise or tape hiss.

This is good music for dining, dancing or just listening.—*F. N. West.*



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

BONANZA

Side 1: Journey of the Hopefuls, Hoss, Annie O'Toole, Gypsy, Ponderosa, Bonanza, Hoe-Down

Side 2: The Balloon Riders, Legend of Sam Hill, Silent Thunder, Horseless Carriage, Fury in Old Mexico

David Rose and His Concert Orchestra
MGM STC 3960

4-track, 7½ ips
\$7.95... 33 mins.

Even if you aren't a habitual TV watcher of the Bonanza series, you will appreciate the concert orchestra's rendition of these beautiful themes. All but one of these was composed and orchestrated by David Rose. While some of them were written for short scenes, he has now fully developed them so that they comprise a series of musical vignettes. The moods and themes are varied, and the result is good stereo listening. The music is certainly a grade above the average TV musical score heard today, and it is all done in the best David Rose style.—*F. N. West.*

"WHY MY RECORDER IS IMPORTANT TO ME" CONTEST

WIN A REEL OF TAPE. Tell us in your own words why your recorder is important to you, not why it could be important to someone else. Entries will be judged on the basis of their usefulness to others and on the uniqueness of the recorder use. No entries will be returned. Address your entry to: Important Recorder Contest, Tape Recording Magazine, Severna Park, Md.

Dear Editor:

My recorder is important to me because I am in the United States Air Force.

Before the service I had about five tape pals all over the land but for some reason I let the taping to them fade away. When I joined the Air Force I was at a large base for over a year and of course there were a million things to do all the time.

But now I am one of the lucky ones to be assigned to a detachment away from a base; it's important work, but it gives you more spare time to fill. I am not the type that can find fun in doing nothing so I decided to start taping again. I read in your "feedback" column one day about Tom Bradford that wanted to help people get started. I wrote to Tom and he sent me a letter with names of people interested in gaining new friends too. Now I have happy evenings again taping with people all over the land. I think now I will keep at it because I know how much it means to me NOW!

I really need my tape recorder (your magazine too!!) to take up some of my spare time and it sure is fun in other ways but this is my main reason. Well that's why my recorder is important to me. — *A2C Richard Dewese, Douglas, Wyoming.*

Gentlemen:

A great deal of time, in the insurance business, is spent in counseling with clients about the distribution of life insurance estates, after the death of the wage-earner. Hidden away in my files are several "Letters to My Wife" written by different clients, to be handed to the family, only after death. Since I've had my tape recorder, these Letters to the Family have been put on tape.

Can you possibly imagine the emotions of a recently bereaved family, when they sit down in a quiet room and hear the voice of husband and father saying "My Darlings, always remember how much I love you and have tried to take care of you. . . ." and then, of course, "Our dreams can still come true. . . ."

My tape recorder, to me, is a way to make new friends, it's a lot of fun, and a way of "armchair travelling" through tape letters around the world. But when it can ease the rocky path for families, to provide a guiding voice of love, along with the steak, shingles and shoes which an adequate insurance estate provides, then my tape recorder really becomes an important part of my daily life!—*Mazie Coffman, Indianapolis, Indiana.*

Gentlemen:

My tape recorder is important to me as a professional harpist. I play for weddings, for important religious services, and other private or public functions.

Often I cannot locate a harp arrangement of a piece of music I desire to use. So I write off a suitable version from a piano, organ or violin score. I even have written down the music of a folksong which I have heard, and for which no printed score exists. This is not difficult for one who has had the training necessary for piano or harp composition.

Often I devise a supplementary part for a violinist, and sometimes for a cello or clarinet, so that I can present a group with music otherwise unobtainable.

After the arrangements are all on paper, I play them to my Ampex recorder, and then listen to the playback. As I listen I think of changes and discover errors. If I have an accompanist, he also can be coached with the aid of playbacks. This enables me to obtain unique and superior results.

I also record children's tunes for my two children to sing with. They like to sing with mamma's harp, but mamma is not always able to sit down and accompany them. At any time I can record any tune desired on the tape, and I can set the tempo, key, and harmony as I wish. Then with a little oversight, they can play the piece over and over as much as they wish. I can even record their childish singing and send it to a couple of doting grandparents who live far away and also have a tape recorder!

We have about 150 reels of tape of music which we have loved and recorded ourselves, from various sources: live, radio, phono, and TV. — *Mildred J. Harris, Gloversville, N. Y.*

Gentlemen:

Here are two unusual ways I have used my record.

One is as an aid while developing film in the darkroom. I made a tape with spoken timing signals each 15 seconds. With the tape playing, I do not have to depend upon a timer or clock. Background music makes the time pass more enjoyably also.

Another use is to make verbal notes while working on any type of equipment that requires being put back together as it came apart. Just describe what you did step by step and if your memory fails, the tape will not.—*Carl Bonzo, Jr., Portsmouth, Ohio.*



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 300 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

Gentlemen:

My tape recorder is important to me because being 65 years of age, wife deceased, children married and relocated in New Jersey, Utah, and California, it has become my most helpful companion at home to record, for future pleasure, opera, old and new songs from radio and T/V.

In addition, the tape recorder has become a patient secretary, making recordings of sales presentations I work up. On the play-back, when I act the part of a prospect, shows whether it is OK or faulty. If the latter, corrections are easily made. This help has been worth more to me than what the recorder cost.

When friends visit, the tape recorder hidden, records the latest gossip, which is supposed to be confidential. When I replay the recording, the expression shown on their faces—words cannot express. A bit of fun for me. Erase the recording before their eyes to put them at ease. A lesson for these friends—not nice to talk or criticize others until they screen themselves first.

Had been taking language lessons, via short wave radio from Voice of Germany, and Radio Moscow, when reception was good. Making recordings of my lessons and my pronunciations of words in these lessons, on replay showed up my errors which I would not have noticed without my patient recorder.—*William J. Lennartz, Beacon, N. Y.*

CROSTALK

from the Editors

SOME COMMENTS BY two representatives of the British tape recording industry, as reported in the trade press, might well engender some thoughts on this side of the ocean.

* * * * *

FOR ONE THING, they stated that England has the highest per capita ownership of tape recorders in the world, with West Germany in second place. They felt that this was odd considering the fact that the United States buying power was so much greater.

* * * * *

WORTHY OF NOTE is the fact that sales of tape recorders in England last year were some 250,000 machines in a population of 50,000,000. The United States, with a population of 180,000,000 was nowhere near the more than three times that figure that might reasonably be expected.

* * * * *

AS WE HAVE NOTED in these columns before, the British are far ahead of us in the use of tape recorders as a hobby. Overseas they have a goodly number of tape clubs that meet in face-to-face fashion, rather than by correspondence. They produce dramatic and other shows and the use of the recorder for vacation recording, sound collecting and the like is far ahead.

* * * * *

THE TWO GENTLEMEN, Harry Lubin, president, and Thomas Thomas, V.P. in charge of sales for Elizabethan Tape Recorders, Ltd. felt that the market for tape recorders in the United States was unlimited and that the surface has hardly been scratched.

* * * * *

THEY ALSO STATED that the U. S. market appears to be about four years behind the British market in the matter of education of the public in matters of tape recording.

* * * * *

THE ENGLISH apparently have taken a different tack on tape recorder sales, also. The most popular type of British machine is a straight 3% ips model which sells for about \$60. It has no frills and no gimmicks and its main feature is that it is uncomplicated and can be operated by anyone. This has made it a home entertainment instrument.

* * * * *

STEREO SEEMS NOT to have caught on overseas and, consequently, neither has four track. One reason is that the stereo units cost about five times as much as the monophonic and about three times the cost of a three speed mono recorder.

* * * * *

WE DO NOT KNOW why the U.S.A., long the leader in numbers of bathtubs, telephones, automobiles and a thousand other things has fallen so short in the matter of tape recorders. In this promotion-minded nation it may simply be a lack of the kind of promotion that reaches people and convinces them that tape recording is fun. Perhaps so versatile an instrument as the recorder has been detrimentally tied to music reproduction, which demonstrates only a small part of its capability. Industry people might well give some quiet thought to these problems.

* * * * *

WE ARE HAPPY to see one of the large firms, Webcor, in conjunction with Warner Bros. and The Richards Music Co., embarking on a contest of national dimensions with 18,000 prizes worth some \$162,000. The contest is restricted to youngsters from 8 to 18 who can make a free contest recording at any participating dealer's store of himself playing any recognized musical instrument. The recordings will be entered in national competition, with prizes to the winners and also to the winner's schools.

* * * * *

ACTIVITIES SUCH AS this contest are good, not only for the sponsors, but for the entire industry. We wish Webcor well with their contest and we hope the idea catches on.

INDUSTRY NEWS

AUDIO DEVICES has named Herman Kornbrodt to the post of vice president and General Sales Manager by William T. Hack, president. Bryce Haynes becomes a member of the board of directors and will devote his time to developing new markets and sales planning. Mr. Kornbrodt has also served as secretary of the Magnetic Recording Industry Association since its founding.

ALLIED IMPEX, importer of the Miranda camera line has entered the tape recorder field with a two speed portable. The unit operates at $3\frac{3}{4}$ and $1\frac{7}{8}$ ips and uses four dry cell D batteries for power.

EASTMAN KODAK has entered the consumer tape market with "Kodak" Sound Recording Tape. Just a few months ago they introduced their "Eastman" tape for professional use. According to Eastman president William S. Vaughn, the tape will be marketed through photographic channels and with Kodak's 12,000 dealers will make the tape readily available anywhere. The company states that there is little difference in making photographic film and tape insofar as the maintenance of close tolerances, cleanliness, uniformity and inspection are concerned and that the Kodak line of tapes will reflect their fine quality control.

The tapes will be available on 3", 5" and 7" reels on a triacetate base material which, the company states, will be good for 1000 years. It will be spooled on one-piece reels which contain a molded-in splicing block on both sides. The tape will be available in $1\frac{1}{2}$ and 1 mil thicknesses.

Kodak's French affiliate Kodak-Pathé has been making magnetic tape since 1945 and its experience in the field was drawn upon by the Rochester factory.

"MADMAN" MUNTZ of TV fame is going into the manufacture of tape cartridge units for automobiles which may also be used in the home. The units will be unveiled in mid March in the Los Angeles area. Plans call for introduction then in Texas and Florida. The players measure 8 inches square by $3\frac{1}{2}$ inches high and are completely transistorized. Tape speed will be $3\frac{3}{4}$ ips, four track. The units are being manufactured by Viking for Muntz.

MINNESOTA MINING reports a record year in their annual report. The Magnetic Products Division continued to show gains on all fronts and shortly will open a stereo tape duplication center at the Hutchinson plant to turn out the new cartridges, marketing plans for which are to be announced this month. An iron oxide manufacturing unit will be in operation this year at Hastings, Minn.

BELL SOUND has filled four posts. William W. Westfall has been named manager of marketing services, Russell Mock succeeds Andrew Lorant as advertising manager, Herbert Mayer was named Bel Canto tape sales manager, succeeding Pete Fabri and Al Baumeister has been appointed new product manager.

RCA has created a new department; Educational Services. Harold Metz will head up the new division which will provide

a variety of services in all fields of education, formal education, industrial and government education, and home study. The new division incorporates the long established RCA Institutes which is made up of technical schools in Los Angeles and New York. A tape-slide "Auto-Guide" will be used in some of the courses.

WORLD'S FAIR OF MUSIC AND SOUND will be held in Chicago, August 31 to September 9, according to Aaron D. Cushman, fair president. It will embrace all segments of the music and sound industry and will be both a dealer and consumer show. It will be held at McCormick Place.

SOUND CORPORATION OF AMERICA, Silver Spring, Maryland has been formed to manufacture and distribute a line of continuous magnetic tape cartridges, recording and playback equipment. Richard P. Ellison will head the firm. The offices are at 9162 Brookville Road.

SHERWOOD ELECTRONICS, Chicago, is offering \$1000 reward for information leading to the arrest and conviction of thieves who broke into the I.L.&C. terminal and stole 97 pieces of Sherwood merchandise. It was valued at \$14,000 and consisted of FM receivers and tuners, amplifiers and FM stereo multiplex adapters. General Manager Edward S. Miller cautions dealers and distributors to be on their guard for any Sherwood units offered them at unusually low prices or sold by unauthorized individuals. The serial numbers are on record.

MUSICTAPES, INC. is the name of a new firm set up by Peter Fabri, formerly director of marketing and sales for Bel Canto. The firm has exclusive agreements with United Artists, Vee Jay and Starday. The tapes will be marketed through record, phonograph and electronic distributors according to present plans.

AUDIO-VISUAL COUNCIL ON PUBLIC INFORMATION, 1201 Spring Street, Fairfax, Va. has issued a booklet "Has It Made Any Difference" which covers the use of audio visual materials in churches. Single copies are 25 cents each with lower prices on quantities for dealers who might want to distribute them to church customers.

TELEPROMPTER CORPORATION, originators of mechanical TV prompters has purchased Weathers Industries, makers of hi-fi products. The firm will develop and market an expanded line of audio-visual products including large screen TV and slide projection equipment.

WBCOR, INC. has developed a new recorder for the Federal Aviation Agency which will monitor 22 simultaneous conversations on a single tape. The unit is designed to help solve a critical air traffic control problem. The vastly increased sound storage capacity will cut in half the storage space formerly needed and even the recorders themselves take but two-thirds the space of four channel units now used by the agency. The tape speed is 15/16 inch per second.

REVERE CAMERA COMPANY will

market its Wollensak tape recorder line direct to dealers through its own sales force instead of the eight distributors it formerly used, according to J. C. Landen, Revere's director of marketing. The switch will not take effect until August 1962.

AMERICAN CONCERTONE DIVISION of Astro-Science Corporation has announced the appointment of Albert C. Sofe as chief engineer of audio products. He has been associated with magnetic recording for 13 years.

PITTSBURGH CORNING CORPORATION, 1 Gateway Center, Pittsburgh 22, Pa. has issued a booklet "Geocoustic" describing their cellular glass sound absorbing materials. The booklet should be of interest to those who are concerned with studio design for recording purposes.

ORR ENTERPRISES, Opelika, Alabama, has announced that Russ Molloy, former president of Bel Canto, has joined the firm as Marketing Manager for the Orrtronics Division which manufactures the modular tape player. He will direct the sales of both the player and the music in cartridge form for it.

AMPEX CORPORATION has realigned its nationwide field organization by appointing seven new regional managers. All company products, including memory devices for instrumentation, computer, video and audio use, and magnetic tape will be handled by the regional managers. Previously, district managers were responsible for individual product lines.



ONLY THE ROBERTS 1040 4-TRACK STEREO TAPES RECORDER Combines these Advanced Features:

Unique "listen-to-yourself" feature • Records new FM MULTIPLEX STEREO CASTS • 4-track stereo and monaural record/play • 2-track stereo and monaural play • Sound-with-sound, using either track as basic track • Dual, self contained power stereo amplifiers • Dual, built-in extended range stereo speakers • Automatic shut-off. **\$299.50**

ROBERTS ELECTRONICS, INC. Dept. TR-4-L
5920 Bowcroft Ave., Los Angeles 16, Calif.
Please send me:

Roberts Stereo Tape Instruction Manual containing stereo and monaural applications. I enclose 25¢ (cash, stamps) for postage and handling.

The name of my nearest dealer.

Name _____

Address _____

City _____ Zone _____ State _____

LETTERS

Excerpts from readers' letters, including questions and answers, will be used in this column.

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

Matching

To the Editor:

From reading the "Questions and Answers" section of your magazine it is quite apparent that much confusion and misunderstanding exists regarding the subject of impedance mismatching.

The prevailing misconception seems to be that when connecting a signal from a program source of a given output impedance to a tape recorder with a much different input impedance, that this so-called "impedance mismatch" will somehow cause distortion or some other deterioration of quality. Such is not the case, as will be seen.

The important thing to keep in mind when connecting a given program source, such as an FM tuner, TV set, or microphone, to the input of a tape recorder, is the concept of "low level" and "high level" signal voltages. A "low level" source is considered to be signal voltages in the order of 5 to 20 millivolts. Microphones and magnetic phono cartridges are low level sources. A "high level" source is one with output signal voltage in the vicinity of .5 to 1 volt. Examples of typical high level sources are FM tuners, TV sets, and crystal or ceramic phono cartridges. Most tape recorders will have input provisions for both low and high level signal sources. These inputs can be in the form of two separate jacks, one for low level and the other for high level. The low level jack is usually marked "microphone" and the high level jack may be marked "radio-phono" or similar designation. Other recorders may utilize only one input jack but will provide for high and low level inputs by choice of two different plug configurations.

It is extremely important to use the appropriate input on the recorder to suit the signal level of the program source. For example, if a high level source is connected to the recorder low level input, the pre-amp in the record amplifier will be overloaded causing serious distortion in the recording. Conversely, should a low level source be connected to the recorder high level input, it will not result in distortion but rather in an extremely weak recording. Therefore, the important consideration is that of matching program source signal voltages with correct recorder input and it is *not* a matter of matching impedances. It is also important at this time to emphasize that high level outputs can exist from either a very low impedance source or from high impedance source. Likewise, a low level output can exist from either low or high impedance sources. Therefore, there is no particular relationship between signal level and impedance.

Consider the following condition: It is desired to record from a TV set by connecting directly across the voice coil speaker terminals. With the TV volume turned up to a comfortable listening level, a high

level signal source exists. Since the speaker impedance is around 4 to 8 ohms this would be an extremely low source impedance. However, we would now connect this to the high level input of the recorder which may have an input impedance as high as 1 megohm. This obviously constitutes a very large degree of impedance mismatch but there is no reason why this would cause any distortion providing we remember to connect to high level recorder input. If we had made a mistake and connected to the microphone input, considerable distortion would have resulted from voltage overloading at low-level input *but not because of impedance mismatch.*

The only time impedance matching becomes important is in applications involving the transfer of power such as matching a speaker of proper impedance to a power amplifier. A mis-match in this instance could result in increased distortion and loss of power output.

Referring to the question and answer section in February, 1962 issue of "Tape Recording," the answer to the first question again confuses the issue by use of the term impedance mismatch, implying that this is the cause of the trouble and not just input voltage overloading. Furthermore, as a remedy for this "impedance mismatch," it was suggested that a transformer with an 8 ohm primary and 100,000 ohm secondary be connected with the low side to the phonograph speaker and the high side to the recorder. One must remember that a transformer, in addition to being an impedance transforming device, is at the same time a voltage transformer. With the particular transformer recommended and the suggested method of connection, the phono speaker signal voltage would be stepped up roughly 100 times! This means that certainly over 100 volts would be fed to the recorder input obviously overloading the pre-amp into intolerable distortion. This case is an excellent example of the disastrous results when attempting an impedance match while at the same time completely overlooking the signal voltage levels involved.

I hope this letter will serve its intended purpose to clarify this subject so that by understanding these basic techniques, satisfactory results can be obtained by all in the home recording field.—David C. Menzel, Homewood, Illinois.

Eliminating Pops

To the Editor:

I just discovered that there is another way to use the mike input to gain volume from the TV and still retain the listening volume at normal level. This was derived from your suggestion of using a resistor in the circuit. Well, I know that a pot is a resistor and most pots are of the 100K ohm variety, and so I asked myself why

couldn't I use my little Switchcraft mixer. I tried this and it works. By placing the TV at normal listening volume and plugging the voice coil tap cable into the mixer and then from the output of the mixer into the mike input of the recorder and adjusting the recording level and then advancing the pot to about 1/3 of its capacity—in other words actually reducing the pot resistance, one can get a very clear recording volume by this method. Perhaps the transistorized mixer is better for this but I was going by the least expensive route. I imagine that there are other mixers of like caliber (I know Olson Radio has one for about \$6.95). But I still maintain that for a truer tone, it is best to channel through a preamp and use the phono input. Of course, there are some recorders that have only one input jack like the Webcor (but has two circuits functioning through a three contact jack).

Now, in response to the question of E.O.S. of Muscatine, Iowa in the October issue (I save my back issues) you suggested the use of a mixer to avoid the pops in the recording when switching from mike to phone or when stopping and starting later. May I suggest a much simpler method which will work on nearly all tape recorders. As you know the "pop" is the result of the activation of a switch and that switch is the record switch. The record switch is the safety lock button which is pushed to record before the tape is set in motion. If further recording is to be done and a smooth track is wanted, then when stopping the machine, make sure that your finger stays depressed on the record button when shutting the machine motion off—this will keep the record circuit engaged. This will work with nearly all machines except those that have piano type keys with a separate record and play key. It takes some skill to do this, but with practice it becomes second nature. This works beautifully with the Ampex. With the Webcor the record button has a slide action to it to keep it locked into place. By experimenting one can determine the best method by which this can be accomplished.

Now, may I ask another question? Do you have a simple suggestion for starting a tape recorder with narration and an 8mm film so that they will jibe? I don't mean to get into fine clap board and lip sync. A slide show is cued (manually or automatically), but is there a simple way to start the tape and film running at the same time. Should one make a brief "speech" at the beginning of the tape, with the notation to play the tape first?—Rexford F. Mortimer, Altus, Okla.

Punch a hole in the film leader just prior to the first frame. Put a mark on the tape at some point. Line up the film in the projector with the hole in the gate and line up the mark on the tape with a point on the record. Start both machines at the same time, or as near to it as you can come. Throughout the film you should have "check points" such as changes of scenes, etc. which should occur at specific spots on the tape. Slow or speed the projector between check points to keep it in step. Lip sync is practically impossible without having the soundtrack on the film.

NEW PRODUCTS

WIRELESS MICROPHONE SYSTEM



The new Victoreen wireless microphone system Model 421D is based on the patented Victoreen method of operating crystal-controlled oscillators at high frequencies and directly frequency-modulating them. Transmitter weighs only 10 oz. including mercury batteries good for 30 hours' continuous use, and it requires only short, soft antenna wire easily carried in clothing. Omni-directional high quality dynamic button-mike leaves user's hands completely free. According to the manufacturer, reception on the system receiver is sharp, clear, high fidelity, without mike noises or interference. Model 421 has F.C.C. type acceptance for licensed use in specific commercial applications; also is certified under Part 15 of F.C.C. rules for operation without a license. Another unit, Model 421A, has F.C.C. Type Acceptance for use on public safety frequencies and operates within the new, narrow-band regulations. Write for complete specifications on Mike-Caster System 421 to Federal Manufacturing & Engineering Corp., a division of Victoreen Instrument Co., 1055 Stewart Avenue, Garden City, New York.

TAPE-ATHON TAPE PLAYER



A unique tape player for background music presentation has been announced by Tape-Athon Corp., 523 South Hindry, Inglewood, California. This new player operates at a speed of 2 ips, which was the

speed selected on the basis of the best response at a speed allowing the most music on a single tape. According to the manufacturer, the most "comfortable" listening range for continuous background music is in the area of 50 to 6000 cycles. The 2 ips speed was chosen since it satisfied the response requirements, and also allowed 16 hours of music to be packaged into a single 10" tape reel. This new player is available in 1 $\frac{7}{8}$, 3 $\frac{3}{4}$ and 7 $\frac{1}{2}$ ips as well as the 2 ips version. For all details, contact Tape-Athon.

MICHIGAN MAGNETICS HEAD



Michigan Magnetics, Inc., Vermontville, Michigan, has introduced the 7H17 half track monaural tape recording head, which the manufacturer claims is based on performance-proven principles, and because of exceptional production and quality controls, will offer unusual fidelity and reliability. In addition, 100% functional flush-face shielding makes tape starting easier, while contributing toward still greater reliability. For complete technical information about the new 7H17 monaural head, write Michigan Magnetics, Inc., above address.

RECORDER CARE KIT



The latest tape recorder care product from Robins Industries Corp. is the TK-6, a kit containing a two-ounce bottle of head cleaner

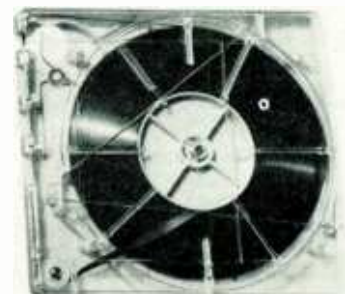
with applicator and a two-ounce bottle and applicator of lubricant for the recording head and tape guides of a recorder. This kit is priced at \$2.00. Cleaner and lubricant are also sold individually at \$1.00 each. Write to Robins Industries Corp., 15-58-127th Street, Flushing 56, N. Y., for information on this and their other tape recorder accessories.

COSMOPOLITAN RECORDER



A new portable tape recorder has been introduced by American Concertone. It is designated as the Model 400 Cosmopolitan, a recorder-radio combination. The power source for this machine can be either four 1.5V flashlight batteries or external AC. Its speeds are 1 $\frac{7}{8}$ and 3 $\frac{3}{4}$ ips. Fully transistorized, the complement includes 12 transistors plus diodes and rectifier. The Cosmopolitan's head complement consists of two heads, the record-playback unit and the erase head. Other features include arbitrary counter, dual meter to monitor audio level and instantly show the condition of the batteries, plus the use of 5 inch reels. The Cosmopolitan can be carried on the shoulder strap provided for in-field interviews, laid on the seat of a car or airplane for dictating while driving or flying, or used in an infinite number of ways in the office or at home. For free information, write American Concertone, 9449 West Jefferson Blvd., Culver City, Calif.

FIDELIPAC CARTRIDGE



The Fidelipac cartridge, manufactured by Conley Electronics Corp., 1527 Lyons Street, Evanston, Illinois, is a continuous self-contained single reel tape magazine. It is available in three sizes: Model 300 has up to 300 feet of tape; Model 600 has up to 600 feet and Model 1200 has up to 1200 feet. Complete information and prices available from Conley.

TAPE CLUB NEWS

Tape Triangle

The American Tape Exchange club urges its members to use an arrangement whereby three people tapespond with one reel of tape. The first person records track one, the second person track two. The third person listens to both tracks, then records on track one in place of the first person's message and then sends the tape on to him. From here on, each person receiving the tape will hear messages from the other two tapespondents. Remember, to make room for your message on the tape triangle, always erase the voice of the person to whom you are sending the tape by putting your voice on instead.

The ATE Director, Cortlandt Parent, Jr., is on one tape triangle with tape pals in Willowdale, Ontario, and Calgary, Alberta, and he reports that it has worked out very well.

WTP Readers for the Blind

The WTE services for the blind, directed by Bob Brunson, also WTE director, recently helped set up a plan whereby the World Tape Pals Club of Bayless Elementary School, of Syosset, New York, will assist the director of the Children's Department of the Library for the Blind in New York City, and also Miss Georgia Caldwell, teacher of blind children in Oklahoma City, Okla.

WTE services for the blind is specialized. Mr. Brunson points out, in that it aims only to furnish readers for blind students and professional people. He emphasizes that not everyone can, or is willing, to read lengthy and technical textbooks needed by students, especially those in college; and a good backlog of willing readers is especially needed by this group.

Neither reader nor student need be a member of World Tape Pals, says Mr. Brunson, in order to participate in this.

Club Tutors

The Union Mondiale Des Voix Francaises club has started a new activity. It is called "Service de Tutelage Franco-American." This service will enable American members to improve their French pronunciation through tape exchange with voluntary "tutors" in France and Belgium.

This service is free for club members. Only a 25c "tutelage-coupon" has to be sent with each tape in order to cover the mailing expenses of the French "tutors."

This is one of the most worthwhile services we have heard of in any club and the club is to be congratulated on its inception.

Voicespondents Meet

Just recently, two girls from Wallingford-on-Thames, Berkshire, England, arrived at Logan International Airport in Boston, Mass. where they were welcomed into the U.S. by Mr. Paul Harlow. They were Miss Mary Butler and Miss Margaret Merchant, both members of the Voicespondence Club. Paul, also a member of the club, has been voicesponding with Mary for a little over a year.

JOIN A CLUB

TAPE RECORDING Magazine assumes no responsibility for the management or operation of the clubs listed. This directory of clubs is maintained as a service to our readers. Please write directly to the club in which you are interested regarding membership or other matters.

AMATEUR TAPE EXCHANGE ASSOCIATION
Ernest Rawlings, President
5411 Boccage Street
Cartierville, Montreal 9, P. Q., Canada

AMERICAN TAPE EXCHANGE
Cortlandt Parent, Director
Box 324
Shrub Oak, N. Y.

CATHOLIC TAPE RECORDERS OF AMERICA, INTERNATIONAL
Jerome W. Ciarrocchi, Secretary
26 South Mount Vernon Avenue
Uniontown, Pennsylvania

CLUB DU RUBAN SONORE
J. A. Freddy Masson, Secretary
Grosse Ile, Cte, Montmagny,
P. Que., Canada

INDIANA RECORDING CLUB
Mazie Coffman, Secretary
3612 Orchard Avenue
Indianapolis 18, Indiana

MAGNETO-VOX CLUB
J. M. Roussel, Sec.-Exec.
8140, 10th Avenue
Montreal 38, Que., Canada

ORGAN MUSIC ENTHUSIASTS
Carl Williams, Secretary
152 Clizbe Avenue
Amsterdam, New York

STEREO INTERNATIONAL
O. B. Sloat, Director
1067 Flatbush Avenue
Brooklyn 26, N. Y.

TAPEWORMS INTERNATIONAL TAPE RECORDING CLUB
Marion Chism, Co-ordinator
129 South Broad Street
Carlinville, Illinois

THE SOCIETY OF TAPE HOBBYISTS
Ralph Holder, General Secretary
116-06 139th Street
South Ozone Park 36, N. Y.

THE VOICESPONDENCE CLUB
Charles Owen, Secretary
Noel, Virginia

UNION MONDIALE DES VOIX FRANCAISES
Emile Garin, Secretary
886 Bushwick Avenue
Brooklyn 21, N. Y.

WORLD TAPE PALS, Inc.
Marjorie Matthews, Secretary
P. O. Box 9211, Dallas 15, Texas

OVERSEAS

AUSTRALIAN TAPE RECORDISTS ASSOC.
John F. Wallen, Hon. Secretary
Box 970. H., G.P.O. Adelaide, South Australia

ENGLISH SPEAKING TAPE RESPONDENTS' ASSOCIATION
Robert Ellis, Secretary and Treasurer
Schoolhouse, Whitsons Bay Duns
Berwickshire, Scotland

TAPE RECORDER CLUB
A. Alexander, Secretary
123 Sutton Common Rd.
Sutton, Surrey, England

THE BRITISH AMATEUR TAPE RECORDING SOCIETY
Ted Yates, Secretary
210, Stamford Road
Blacon, Chester, Cheshire, England

THE NEW ZEALAND TAPE RECORDING CLUB
Kenneth M. Tuxford
P. O. Box 7060
Auckland, W. I., New Zealand

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

While in the United States, Mary and Margaret visited Mr. & Mrs. R. Shea, and Mr. & Mrs. D. Reid of Beverly, Mass. Paul introduced them to some new friends also.

After leaving Mass. they visited John Hohman in Baltimore, Mazie Coffman in Indianapolis, Indiana, as well as a host of other people in Indianapolis. They visited other friends in Ohio and then returned to Mass. before leaving for the return trip to England.

The girls were most impressed by the New England area as well as Indianapolis, and they, together with a third partner, Margaret Clark, would like to sell the record and coffee shop business they have in Wallingford and move to the U.S.

Educational Club Planned

John C. Bobbitt of Tennessee is forming an educational tape club for the purpose of serving those persons whose primary interest in a tape club is for educational purposes. This club will enable them to withdraw tapes from lists without the usual social formalities.

The basic plan is that each prospective member will make a reel of tape concerning his unusual experiences, hobby or subject in which he has a special knowledge. These tapes will state the contributor's name, subject title of the tape, then an instructional, narrative type lecture.

Members will pay initial dues and contribute at least one tape. Members may withdraw tapes for playing and return. These tapes will also be loaned to educational, civic and other groups for playing.

Persons interested should write, enclosing a self-addressed and stamped envelope to John C. Bobbitt, director, Educational Tape Club of America, P.O. Box 7596, Memphis, Tennessee.

Cartridge Correspondence Club

Another new club is in the process of organization also. This is one formed for RCA and Bell cartridge machine owners.

At this time there is no cost to join this club and there are no dues as yet. The purposes of this club will be to create new friends, get more and better use from a tape recorder, become better talkers as well as obtaining the courage to speak before a group of people, and to exchange information on civic affairs and items of interest in your community.

Anyone interested in joining this newly formed club may contact Duane Davidson, RR-12 Box 172, Lafayette, Indiana.

Letter From India

We have received a letter forwarded on to us from Radio & Electronics magazine, in which the writer states that he is in a position to send recorded tapes of Indian music—classical, instrumental or vocal—to any place in the world. He also has sound snaps of Indian marriage and religious ceremonies, Indian villages, Indian streets and ways of Indian cooking.

The writer's name is Ambika Shrivastava, and he is a sound engineer whose address is 30, Pagnis Paga, Indore City (M.P.), India. Mr. Shrivastava has also organized a sort of tape-friendship club in India. Any interested parties may contact him at the above address.

TAPE IN EDUCATION

Robert C. Snyder

It is not unusual for a teacher to assign some television viewing to a class when there is a program on the air which fits in with the lesson plan. Due to the prevalence of TV sets in American homes this is a rather safe procedure and those without TV sets can generally visit with someone who has one in order to see the assigned program.

The day may not be too far off when the ownership of home tape recorders may make a similar assignment possible in relation to the home study of foreign languages or similar "audio" work.

For this purpose, the small, three inch reels might be used with which the student could practice at home on his own recorder.

This would be especially beneficial if the recorder was of the Add A Track type which permits playing one track while recording on the other. This was pioneered in home recorders by the V-M Corporation who have trademarked the term.

The small reels could be handed out to the class and turned back in the next day with the completed work on them. The teacher could then spot check for errors which might be in need of correction.

In addition to the practice of homework on recorded reels, students might also be required, from time to time, to tape something from radio or TV that fitted into the lesson material. An address by a famous person, a dramatic program covering some phase of history, a discussion program covering current events or the actual event, such as spaceship launching are topics which readily come to mind.

With a multitude of "tapers" on the job, the school should rather rapidly be able to gather together a worthwhile library of taped material that, with some editing and cataloging, would be a very valuable adjunct to the book library.

In the case of the recording of actual events and speeches, this material would increase in value as the years passed. The study of history could be made to come alive when the actual voices and sounds of an event in the historical past could be heard.

The teaching of appreciation for English literature would be another subject that would come alive through the medium of tape. The reading of stories or plays by people skilled in the vocal arts would make a far more lasting impression than classroom attempts at the same thing.

With recorders in the homes, the tapes could be borrowed from the school library for home use and study, just as regular books are used today.

Though we are strong advocates of tape as a teaching medium, we are the first to recognize that in some learning situations other media can do a better job. Tape is not the substitute for everything.

However, there are fields in which tape has the most to offer and the greatest progress can be made by putting the most emphasis on those fields.

The language laboratory with its battery

of tape recorders has been acknowledged the best way of teaching the spoken foreign language. There is simply no other media than can compete with it, not only in the matter of being able to record in imitation of native speakers but in being able to make corrections as necessary.

There is a need for more research in the effectiveness of teaching with tape and both the government and some of the foundations might pay more attention to this than they have been. For instance, little or nothing has been done to establish the frequencies needed to teach foreign languages. Some of the sibilants require a high frequency response and must be present to make the language sound natural. How high are they? How good must recorders be for language labs?—We need to know.

Some first glimmerings are also in evidence as to the importance of voice tone as it pertains to the various languages. Some tongues are consistently spoken at a lower or higher pitch than others and this has an important bearing on the naturalness of the speech. More research is needed here also.

We cannot conclude this column without a pat on the back to the National Audio Visual Association for their "Audio Visual Equipment Directory, Eighth Edition." This is a complete guide to current models of A-V equipment and it covers the whole field in a most complete manner.

Included in its 332 pages are specifications and pictures on: 16 mm Optical Sound Projectors, 16 mm Magnetic Sound Projectors, 16 mm Repetitive Projectors, 8 mm Sound Projectors, Filmstrip and Slide Projectors, Opaque and Overhead Projectors, Special Purpose Projection Equipment, Micro-projectors, Automatic Continuous Still Projectors, Sound Slidefilm Projectors, Record and Transcription Players, Tape Recorders and Playbacks, Repetitive Tape Equipment, Language Laboratory Systems, Projection Screens, Projector Tables and Stands, Reading and Tachiscope Devices, Instructional Television, Classroom Radios, Teaching Machines, Misc. Equipment, and in the Appendices such useful information as Trade Names, Where to Buy It, Lamp Tables, Screen Size Charts, Tape Speeds, etc.

Compiled by James W. Hulfish, Jr. of NAVA together with Associate Editor Laurie Shirey, this 8½ x 11 volume belongs on the desk of every A-V director whether in school or industry. It is truly a magnificent example of what a directory should be.

The volume is intended for use of NAVA members, who pay for its publication, and for A-V consumers in churches, schools, etc. It is underpriced at \$5.00 a copy.

Orders for the book may be sent to the National Audio Visual Association, 1201 Spring Street, Fairfax, Virginia and the order should be on the letterhead of the person ordering it.

TAPE RECORDING IN EUROPE

Some of the most interesting developments in tape recording are taking place in old-established factories and laboratories in Europe. The fullest information about them appears regularly in *TAPE Recording Magazine*, published in London, England, since February 1957.

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TAPESPONDENTS WANTED

This listing is for those seeking tape correspondents, looking for swaps of tapes, etc. and it is a free service for our readers. If you wish your name listed send us the following information on a post card: 1-Name, 2-Mailing Address, 3-Kind of recorder, speed and number of tracks, 4-Subjects on which you want to tapespond or items for which you are looking, 5-Indicate whether you are an adult or teenager. Listing will run two months and then be dropped to make way for new listings. Address your postcard to: TAPESPONDENTS WANTED, Tape Recording Magazine, 101 Baltimore-Annapolis Blvd., Severna Park, Md.

Howard W. McClelland, 90. Bryant Avenue, White Plains, N. Y.; Recorder: Wollensak T-1500, 3 3/4 & 7 1/2 ips, dual track; Interests: Military Band Music; Adult.

William R. Piletic, 5050 Broadway, Chicago 40, Illinois; Recorder: V-M Tape-O-Matic 710A, 3 3/4 and 7 1/2 ips, dual track; Interests: Acting, Theatre, Philosophy, Creative Writing; Adult, age 24.

J. R. Quisenberry, 4725 E. 52nd Pl., Maywood, California; Recorders: Ampex 350-2, 7 1/2 & 15 ips, full track, half track, dual track stereo; Interests: wish to exchange music of the 20's, unusual recordings of prominent people, adult humor, etc.; Adult.

E. J. Ellison, Box 171, Summerland, California; Recorder: Ampex, 3 3/4 ips, stereo; Interest: wishes to correspond with fellow tape enthusiasts, especially those interested in exchanging color slides (which would be returned) using the tape as a dialogue explaining the slides, also is a collector of jazz recordings, many of which are old and unobtainable; Adult (38).

Jay Albrecht, 69 8th Ave., N.Y.C. 14; Recorders: Bell, 3 3/4 & 7 1/2 ips, Fi-Cord, 1 7/8 & 7 1/2 ips, both dual track; Interests: Wish tapespondence on poetry, U. S. foreign policy, European common market—from Americans and from Europeans in West and East; Adult (35), writer, single, speak Danish, English.

Heins Bruegmann, 94 Mountview Avenue, Toronto 9, Ontario, Canada; Recorder: Grundig TK-45, 1 7/8, 3 3/4, & 7 1/2 ips, four tracks (stereo); Interests: About anything, music, operas, classics, pops, movies, etc.; Adult (30).

Arthur W Brand, 999 W. Berry Dr., Littleton, Colorado; Recorder: Grundig TK-60, 3 3/4 & 7 1/2 ips, two track; Interests: interested in doing tape recording for the blind, would like to exchange musical tapes, am interested in meeting people of foreign lands by tape and just general chit-chat with anyone interested; Adult (42), married, 3 children.

LCDR John W. Beale, USN, Navy, #537 (Box 8), c/o FPO New York, N. Y.; Recorder: Norelco "400," 1 7/8, 3 3/4 & 7 1/2 ips, four track; Interest: Folk music; Adult.

Evang. Ivan H. Smith, Box #4, West End Station, Colorado Springs, Colo.; Recorders: Webcor, 7 1/2 & 3 3/4 ips, dual track and Bell, 7 1/2 & 3 3/4 ips, dual track; Interests: Bible study, hymns, sermons, camp meetings, church services, preferably from single young people between 20 and 30; Adult (29), single.

John T. Rowlinson, 17 Monadnock Street, Boston, Dorchester, Mass.; Recorder: Wollensak 1500, 3 3/4 & 7 1/2 ips; Interest: Ed Sullivan's Irish program 3/17/61 taped from television at the time (mostly music); Adult.

Russell E. Saffin, 120 Cartier St., Ottawa 4, Ontario, Canada; Recorder: V-M, 7 1/2 & 3 3/4 ips, 4 track; Interests: Would like to swap tapes on Austrian singing and yodeling, and to correspond with people interested in mysticism; Adult.

Ronald Brandys, 808 N. Patterson Pk. Ave., Baltimore 5, Maryland; Recorder: Telectro SA121, 7 1/2 or 3 3/4 ips, dual track; Interests: Different types of modern music and sound effects, or any teenage tape correspondents from foreign countries (English speaking); Teenager (18).

Mr. & Mrs. Robert C. Dare, 8041 Monroe Ave., Munster, Indiana; Recorder: Revere T-2200, 7 1/2 & 3 3/4 ips, 4 track; Interests: Antiques, art, general interests, music, organ, photography, recording, records, travel, hi-fi; Adults.

F. L. Reynolds, 2539—38th Ave., San Francisco 16, Calif.; Recorders: Norelco "400," 1 7/8, 3 3/4, 7 1/2 ips, 4 track, and Concord "401," 3 3/4 & 7 1/2 ips, 4 track; Interests: Classical and popular music, unusual sound effects; Adult (54).

James R. Betancourt, 141 E. Summit St., Harbor Springs, Michigan; Recorder: Norelco #400, 7 1/2 ips, 4 track; Interest: Wanted—someone in Northern Michigan to exchange and copy stereo tapes with; Adult.

Miss G. De Marco, P. O. Box 251, Bronxville, New York; Recorder: Norelco "400," 1 7/8, 3 3/4 & 7 1/2 ips, 4 track; Interest: Tapes of the Literature of Modern Ireland course given on T. V.; Adult.

Randy Johnson, 200 Thomas Avenue South, Minneapolis 5, Minn.; Recorders: Sony 101, 3 3/4 and 7 1/2 ips, dual and Viking "85," 3 3/4 & 7 1/2 ips, 4 track stereo; Interests: Electronics, music, new tape clubs, recording sound effects, hi-fi, just about everything, cars, stamps, records, also want a tape pal in Mendoza, Argentina; Teenager (15).

George F. Stamm, 451 Lindes Ave., Aurora, Illinois; Recorder: Concertone, 3 3/4 & 7 1/2 ips, 2 and 4 track; Interest: Exchange music tapes, classical, semi and popular; Adult (64).

Lance D. Kyed, 70 Congress Avenue, Shelton, Conn.; Recorder: Webcor, 3 3/4 or 7 1/2 ips, dual track monaural; Interests: Letters, music, records, comedy, etc.; Teenager (15).

Sheldon Schoenberg, 1800 Davidson Avenue, Bronx 53, N. Y.; Recorder: Wollensak, 3 3/4 and 7 1/2 ips, 4 track; Interests: Popular, show and classical music, interested in trading 4 track stereo tapes; Teenager.

Joseph Besko, 65-41 165th Street, Flushing 65, N. Y.; Recorders: Ampex 960 & 1270, 7 1/2 ips, 2 & 4 track and VM722, 2 & 4 track and staggered two track; Interest: I would like a tape copying exchange friendship on stereo popular, semi-classical and classical tapes. If you can't copy for yourself I can; Adult.

Wayne A. Sauer, 26933 Elizabeth Lane, Olmsted Falls 38, Ohio; Recorder: Knight stereo play and record, 1 7/8, 3 3/4 and 7 1/2 ips; Interests: Travel, sports, bowling, golf, baseball, football, cooking, music, general conversation; Adult—tapespond as a family also, daughter 12 years old.

J. Malcolm Ross, 360 West 55 St., New York 19, N. Y.; Recorder: Sony SL 262, 7 1/2 & 3 3/4 ips, 4 track stereo; Interests: Metropolitan Opera broadcast, Sat., Jan. 20th, 1962. I need Lawrence Tibbett biography portion only. May I copy your tape please? Glad to defray postage and reciprocate. Name your interest; Adult.

Dr. C. F. Engelhardt, 200 So. Jefferson St., Princeton, Ky.; Recorder: Ampex, 7 1/2 and 3 3/4 ips, 2 track; Interest: Gardening, specialty—roses. Have large collection of talks made at American Rose Society convention. Anything pertaining to the growing of flowers; Adult.

Neil Dame, 4332 Palmer Ave., Jacksonville 10, Florida; Recorder: Ampex 960, 3 3/4 and 7 1/2 ips, 2 and 4 track; Interests: Music, television and radio, outer space, and tape recording; Adult (29).

H. R. Gallant, 3913 Castro Valley Blvd., Castro Valley 90, Calif.; Recorder: Ampex 970, 7 1/2 & 3 3/4 ips, 2 and 4 track; Interest: Overseas, anything of interest; Adult.

Martin Phillips, 1450 S. 52nd Street, Phila. 43, Pa.; Recorder: Norelco 400, 4 track stereo; Interests: Jewish folk music and songs, foreign folk music and songs (German, Russian, Spanish, Italian, English, Norwegian, etc.); Adult.

Barbara Bobbitt, age 12, Susan Bobbitt, age 10, 2442 Rodney, Houston 34, Texas; Recorder: Webcor, 3 3/4 ips, dual track; this listing approved by the respondents' father.

William Dusel, 11907 Maple Ave., Blue Island, Illinois; Recorder: V-M, 7 1/2 & 3 3/4 ips, 4 track and dual track, stereo playback; Interests: happy living, humorous stories, army memories, idea exchange, good food, music, drama,

speeches, slides, writing, English & German; Engineer, Adult.

John C. Bobbitt, P. O. Box 7596, Memphis, Tenn.; Recorder: Webcor, 3 3/4 ips, dual track; Adult.

Edward P. Yerish, 1982 De Biencourt St., Montreal 20, Quebec, Canada; Recorder: Revere, 7 1/2 & 3 3/4 ips, dual track; Interests: General Topics; Married, over 21.

Eugene Steinberg, P. O. Box 87, Rugby Station, Brooklyn 3, New York; Recorder: V-M 720, 7 1/2 & 3 3/4 ips, quarter track (dual track and full track play); Interests: Audio, electronics, flying saucers, high fidelity, hypnotism, classical, popular, and semi-classical music, color—still and slide photography, science-fiction, stereo tapes, sound effects and equipment; Teenager.

Alexander J. Baranyi, 104 Earl Lane, Hatboro, Pa.; Recorder: Concertone, 7 1/2 & 3 3/4 ips, 4 track; Interests: Music and general; Adult.

John Markel, 1235—24th St. N. E., Canton, Ohio; Recorders: Webcor, 7 1/2 & 3 3/4 ips, two track, and V-M, Model 720, 7 1/2 & 3 3/4 ips, 4 track; Interests: Alcoholism and photography; Adult.

John H. Ross, 5217 N. Winthrop St., Chicago 40, Illinois; Recorder: Wollensak, 7 1/2 & 3 3/4 ips, dual track; Interests: Folk Music, Country and Western music, Southern Gospel music; Adult (30).

James Martin, 33 North Western Highway, Blaubeil, N. Y.; Recorder: Norelco, 4 track, 3 speed; Interests: Educational controversy, all subjects on controversy, in science, education, teaching, etc., world affairs, etc.; Adult, college teacher, secondary education.

Sixth Grade Class, Jr. Dept., c/o Donald R. Shue, Teacher, 2nd EUB Church, Queen & South Sts., York, Pa.; Recorder: V-M, 3 3/4 & 7 1/2 ips, dual track, monaural; Interests: Will talk about anything that is of interest to 10-11 year olds; Teacher is Adult.

Herman Bary, 11116-1/4 Camarillo Street, North Hollywood, Calif.; Recorder: Wollensak, 4 track, 3 3/4 and 7 1/2 ips; Interests: Wish to exchange tapes on the subjects of adult comedy, satire, and unusual material; Adult.

Duane Davidson, Pres., RR #12, Box 172, Lafayette, Indiana; Recorders: RCA or Bell cartridge; Interests: Trying to start a tape club for cartridge recorder owners, known as International Cartridge Tape Corresponding Pals, general interest subjects and stereo music; Adults.

Lester Slama, 2351 Wilson Ave., Chicago 25, Illinois; Recorder: Webcor, 3 3/4 & 7 1/2 ips; Interests: Printing, publishing, interesting topics, sound effects, stock market information; Adult.

Miss Verda Brønner, 215 Louvaine Dr., Kenmore 23, New York; Recorder: Norelco, 1 7/8, 3 3/4 & 7 1/2 ips, dual track; Interests: Religion, recorders, diabetes, general topics; Adult.

I-n Purves, 552 Huron St., Toronto 5, Ontario, Canada; Recorder: V-M, 7 1/2 or 3 3/4 ips, dual track; Interests: Country blues, folk music; Adult (24).

Steve Buggie, 2421 Garfield Ave. South, Minneapolis 5, Minn.; Recorder: Norelco Continental 400, 1 7/8, 3 3/4 & 7 1/2 ips, 4 track, stereo, monaural; Interests: Hi-fi, stereo, audio, science-fiction, good music, sound effects; Teenager (15).

Sammy Amsler, 802 Elk Ave., Midland, Texas; Recorder: Wollensak T-1500, 7 1/2 & 3 3/4 ips; Interests: Information from owners of Wollensak T-1700, Struzzi Magnet and Concertone TR100 Transcorder portable tape recorders, developments in Videotape for home TV, electronic data processing—primarily accountants who are studying or working in E.D.P. applications, hearing from anyone who has traveled to Europe on a moderate budget, hearing from those who have had experience in portable tape recording; Adult (31), single.

Ronald Schadegg, 58 Liberty Street-Apt. 6, San Francisco, Calif.; Recorder: Revere, 7 1/2 or 3 3/4 ips, dual track; Interests: Movies, musicals, coin collecting, antiques, tape recording in general, foreign lands.

William E. Welch, 312 Manton Avenue, Providence 9, Rhode Island; Recorders: Wollensak 2 track and Revere 2 & 4 track, 7 1/2 ips; Interests: Wanted—Early Ted Heath Orchestra (1945 to 1950, preferably broadcasts), any material by following bands (live or commercial issues): Ken Mackintosh, Squadronaires,

Northern Dance Orch., Harry South Orch., Kenny Baker. I have 4000 discs (78's, LP's and ET's) of American swing bands which I will swap (on tape) for above items. Also, I have 60 reels of tapes of American bands (1935 to '55) including broadcasts. I have been collecting since 1940; Adult (37).

Thomas D. Crumpler, 1602 Holladay Street, Portsmouth, Va.; Recorder: Ampex 960, 7 1/2 or 3 3/4 ips, 2 and 4 track; Interest: Stereo pipe organ with close miking. I have recorded many pipe organ recitals in Virginia and North Carolina; Adult (45).

Hans H. Wurm, 17119 Park Ave., Lansing, Ill.; Recorder: Tandberg, Model 5, 1 7/8, 3 3/4 & 7 1/2 ips; Interests: Exchange of Metropolitan Opera Broadcasts, Looking for good copy of: "Romeo & Juliet," Bioerling 2/1/47, "Simon Boccanegra." Tibbett 2/16/39; Adult.

John P. Winchell, P. O. Box 408, Court Station, Kalamazoo, Michigan; Recorder: Knight KN-4000 Transport and KP-70 record-playback preamp, 2/4 track monaural or stereo; Interests: I would like to correspond with people from other countries and make new friends through this correspondence. I am just starting into tape recording; I am 23 and would like to correspond with those of any age.

Carl Williams, 152 Clizbe Ave., Amsterdam, N. Y.; Recorders: 3 Reverses, 1/2 and 1/4 track, 3 3/4 and 7 1/2 ips; Interest: Would like to exchange with persons having a love for organ music. Will answer all tapes sent; Adult.

Jacquell Terns, 1936 Venice, Dearborn 8, Mich.; Recorder: Webcor, 7 1/2 or 3 3/4 ips, dual track, monaural; Interests: Can I help anyone, Exchange of ideas with any English speaking persons of any country; Adult.

Russ Bothie, 4119 N. Pittsburgh Ave., Chicago 34, Illinois; Recorder: Ampex 970, 2 or 4 track and/or Webcor 2150, 2 or 4 track, both 7 1/2 or 3 3/4 ips; Interests: Wanted—Ballet, musical comedy, or long hair tapes. Comment on audio problems; Adult, professional musician and audio engineer.

R. L. Hawks, 814 N. Main St., Wichita 3, Kansas; Recorder: Bell, 3 3/4 or 7 1/2 ips, 2 or 4 track; Interests: Poetry and organ music such as Moon River, Ted Malone, Carl Zomar, etc. My collection available, no charge.

Gus DeRidder, 34 Winton Lane, Dolgeville, New York; Recorder: Magnecord 728, 7 1/2 ips, monaural, dual track; Interests: Pre-war big swing band broadcasts & air checks; Adult.

Craig Umberham, 18706 East Chapman Avenue, El Modeno, California; Recorder: Wollensak, 7 1/2 or 3 3/4 ips, dual track; Interests: Learning about electronics, records and recording. Wishes to correspond with someone about 17, 18, or up, boy or g.r.l. Loves music—all kinds; Teenager (18).

Robert Simonton, c/o Nat'l. Theatres & Television, 9570 Wilshire Blvd., Beverly Hills, Calif.; Recorder: Recordio, stereo, 7 1/2 or 3 3/4 ips, 2 & 4 track; Interests: Motion pictures, photography, most popular and classical music, want tape respondents male or female, anywhere, any age; Adult (28).

Howard H. Rice, 143 Bernard Drive, Buffalo Grove, Illinois; Recorder: Viking 85 deck and RP-62 record/playback preamp, 7 1/2 and 3 3/4 ips, monaural, half track; Interests: Want to swap tape dubs of classical recordings withdrawn from Schwann LP catalog, classical music from FM delayed "live concert" broadcasts not available on LP records. Monaural only. Prefer 7 1/2 speed; Adult.

R. W. Harmon, 6502 Buena Vista Dr., Vancouver, Washington; Recorder: Norelco "400," 1 7/8, 3 3/4, 7 1/2 ips, 4 track; Interests: Jazz and/or percussion, humorous dialogue; Adult.

Jim Moulder, 3102 Seever's, Dallas, Texas; Recorder: Ampex 960, 3 3/4 & 7 1/2 ips, record—half track mono, 2 track stereo, playback—half track mono, two track stereo, four track stereo; Interests: Old radio programs from 1930's to early 1960's, drama (Lux, etc.), comedy, mystery and such. No music and dance bands, etc.; Adult.

W. Don Curtis, Route 2, Box 280, Denham Springs, Louisiana; Recorders: Roberts 990, 3 3/4 & 7 1/2 ips, quarter track, will also record monaurally, and Sony 262-D tape deck, 7 1/2 & 3 3/4 ips; Interests: Drama, theater, stereo, U. N. Stamps, Photography, travel; Adult (32), single.

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Ed Miles, 2738 Maxwell St., Phila 36, Pa.; Recorder: Telecro, 1 7/8, 3 3/4, 7 1/2 ips, four track, plays stereo; Interests: Coin collecting, Dixieland-jazz, ham radio; Adult (31).

Ray Galloway, your musical host, with recording studios located at 714 Stadium Place, on the "Banks of the Beautiful Wabash" in Logansport, Indiana; Recorders: Norelco, 1 7/8, 3 3/4, 7 1/2 ips, Crown Broadcaster, 3 3/4, 7 1/2, 15 ips, dual track, monaural; Interests: Wants music of the swing era, sounds of the great bands recreated in hi-fi, and those who have a collection of Eddy Howard recordings. Desperately need copy of "A Million Dreams Ago," by Eddy Howard. Also would like to contact someone in Palm Springs, Calif. and Honolulu; Adult.

Lawrie C. Perera, Apt. 10, 470, Albert Street, Ottawa 4, Ontario, Canada; Recorder: Grundig TK8, dual track, 3 3/4 and 7 1/2 ips; Interest: Jazz, small group; Adult.

Malcolm H. Bender, 1234 Donna Dr., Richardson, Texas; Recorder: Sony Sterecorder, access to others, can cover any standard speed, 2 or 4 track; Interests: Symphonic and March music, semi-classical, high fidelity; Adult.

Earl Linder, acting secretary, Christian Bible Classes, Inc., 2521 N. W. 23 St., Miami, Fla.; Recorders: Norelco, Wollensaks, & Webcor, 1 7/8, 3 3/4 and 7 1/2 ips; Interests: harmonizing, true scripture, true science, true history, tapes exchanged.

Lorraine Sele, 4325 W. 104th Street, Inglewood 2, Calif.; Recorders: Viking 75 deck, Heathkit Electronics, 3 3/4 and 7 1/2 ips, dual track; Interest: want tapes of LP's by Edith Piaf (current and catalog deletions); Adult.

Sam Gish, 2411 Jefferson Street, Wilmington 2, Delaware; Recorder: Pentron Astra-Sonic II, monaural record and playback, 3 3/4 and 7 1/2 ips, dual track; Interests: Photography, stamp collecting, model building and music; Teenager (14).

Paul Nagle, 815 Terrace Ave., Dayton, Kentucky; Recorder: Norelco Continental "400," 1 7/8, 3 3/4 & 7 1/2 ips, 4 track; Interests: Exchanging stereo music of big bands. I am also interested in 8mm movies and travel; Adult (31), single.

Wilfrid C. Kennell, 2723 East Shields Avenue, Fresno 3, Calif.; Recorder not listed; Interest: Wants copy of Camera Three broadcast for 2/18/62. Can anyone help?

Jim Moulder, 3102 Seever's, Dallas, Texas; Recorder: Ampex 960, 2 track stereo, 3 3/4 and 7 1/2 ips; Interests: Old radio programs (comedy, drama, mystery, musicals); Adult.



Fig. 1: Don't do it! Don't sell or trade in your old monaural recorder when you buy a new stereo machine. A second recorder, like a second car or TV, has many uses. So, if yours is in good condition, then by all means hang on to it for special-purpose usage.

Don't Trade In Your Old Recorder

by Tommy Thomas

... an outdated recorder is by no means useless—read this before you decide whether or not to discard it.

DON'T TRADE:

THE big thing now, as we all know, is four-track stereo. With the new machines on the market today you can record in stereo (on some), play in stereo (on all) and also record monaurally on each of the four tracks, thus doubling your mono-recording capacity. Add to this the exciting fact that commercial 4-track stereo tapes are on the music markets in abundance, and it's easy to understand why more and more of us have become somewhat dissatisfied with our "old-fashioned" non-stereo machines. If you can afford to switch to stereo, I certainly recommend it . . . but I also want to put in a good word or two in behalf of your "Old Faithful" machine before you sell it or trade it in toward a new recorder.

I definitely suggest *that you keep your old recorder*. There are just too many good uses for a second machine, for you to give it up. This article can't possibly cover all of these uses, but let's give it a try.

In the first place, deserving important consideration, there are all your old tapes to think about. Most of us have a collection of personal tapes made through the years, and these are precious to us and we certainly don't intend to give them up, non-stereo or not. In fact, for many practical purposes of home recording, monaural recording is just as popular as ever. Only now, with a 4-track machine, we can get twice as much on the same tape. And not only that, but if your first machine is an old one (and over five



Fig. 2: Imagine the money saved by using three-fourths of this tape over again. Here is a precious personal collection of monaural, twin-track tapes recorded at $7\frac{1}{2}$ ips. A new recorder can re-record these onto four tracks at $3\frac{3}{4}$ ips with very little loss in quality, "condensing" everything down to a mere one-fourth in space.

years old is rather old in this fast-progressing field) it's a good bet that a new machine will not only record on twice the number of tracks, but it will also record at $3\frac{3}{4}$ ips as well or better than your old machine did at $7\frac{1}{2}$ ips. That means that you can now get FOUR TIMES as much recording on the same length of tape. Still further, thinking retroactively, it means that everything you have taped so far at $7\frac{1}{2}$ ips (Fig. 2) can be "condensed" down to just one-fourth the space. It's merely a matter of playing the tapes on your old machine and plugging the output (as shown in Fig. 3) into the new machine for copying. Also, along the way, you can do a bit of judicious editing and volume balancing, to end up with a really excellent collection of nostalgia, fully compatible with 4-track machinery. And then, of course, there's that wonderful Bonus: since you'll be transferring all your old tapes to one-fourth their former space, that means (oh lovely thought) that *three-fourths of the tape will be left remaining, all ready to be used all over again.* How about that.

Therefore, with this in mind and even if I don't quite convince you further along that you should keep your old machine permanently, at least consider making a "deal" when you make your trade-in. Get the dealer to let you keep your old machine for at least an extra week or so, to give you time to make this important copy-transfer of your old tapes to "new."

SPECIAL-PURPOSE USES:

By buying a *converter* for your recorder, you can operate it in your car off the regular 6 or 12-volt car battery. This isn't anything new, of course, but now (with a second recorder) it becomes really practical. Instead of putting the recorder precariously on the seat next to you, you can "build it in" as illustrated in the last November issue of this magazine. A converter is expensive, and building the whole works into your car takes time, so when you've finished you're most likely going to want to leave it there, readily available any time you use your car. With a second recorder, this is no problem!

By buying a *timer clock* for your recorder (Fig. 9), you can put it to good use as a musical alarm clock by your bed . . . or maybe you'd like to experiment with Sleep Learning by having your recorder play through a pillow speaker several times during the night. The big problem here is that using a timer clock with your recorder involves leaving your recorder's rubber pressure capstan constantly against the drive shaft during the night. This, of course, means that soon your capstan will develop "flats" which will make it all but useless for regular recording. Having a second, "expendable" recorder on hand will make this less of a problem. (And naturally, even so, it might be a good idea to have your dealer get you another rubber pressure wheel for when you "go back" to regular recording with this recorder.)

RECORDING FROM TV:

A special fondness of mine is collecting TV music. This is all monaural, of course, so on a seven-inch reel I am able to get (on 1-mil tape, using four tracks at $3\frac{3}{4}$ ips) over six hours of music. I use this music mainly for background effect, "piped" around the house to built-in wall speakers, so the slower speed is plenty ample for these purposes. My main worry here was in the 4-track *editing*. I just wanted the music, and nothing else. My final solu-

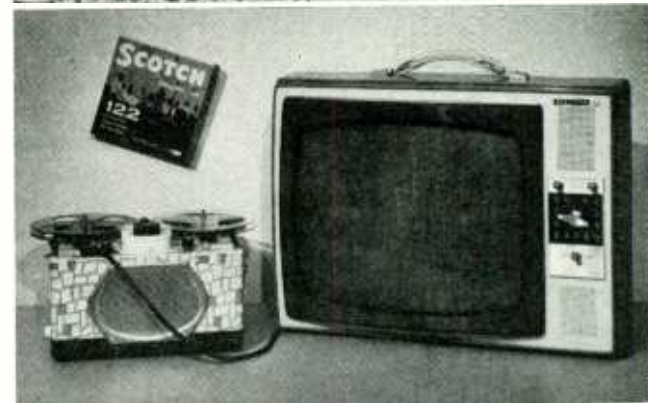


Fig. 3, top: To re-record (copy) a tape, plug the output of one recorder into the input of the other. This makes tape editing a simple and pleasurable task. When copying, the new tape can be balanced in volume, deletions can be made where wanted, and various selections can even be "reshuffled."

Fig. 4, middle: If it ever becomes necessary for you to go into the "mass production" of tapes, an extra recorder will cut your work in half. By use of a simple "Y-Connector" cable coupling, it's easy to divide the signal from the record player (or TV, radio, etc.) into the two recorders, so you can make two original tapes simultaneously.

Fig. 5, bottom: Here's a great combination for a special purpose: the collecting of "selected" monaural TV music on 4-track tape. First record the complete TV musical program on your old recorder at $7\frac{1}{2}$ ips, using High Output Tape (for a better signal-to-noise ratio). Then copy only the selections you want to keep onto the 4-track tape.

tion, and it's working out quite well, is to originally record the music on my old machine at $7\frac{1}{2}$ ips . . . and then afterwards to transfer (re-record) the music via my new 4-track machine, at the slower speed and with all the commercials and other non-essentials edited out. That way, I can fill up reel after reel of 4-track tape with "pure" music, and editing is no big problem at all.

Also, in order to squeeze the last bit of quality possible

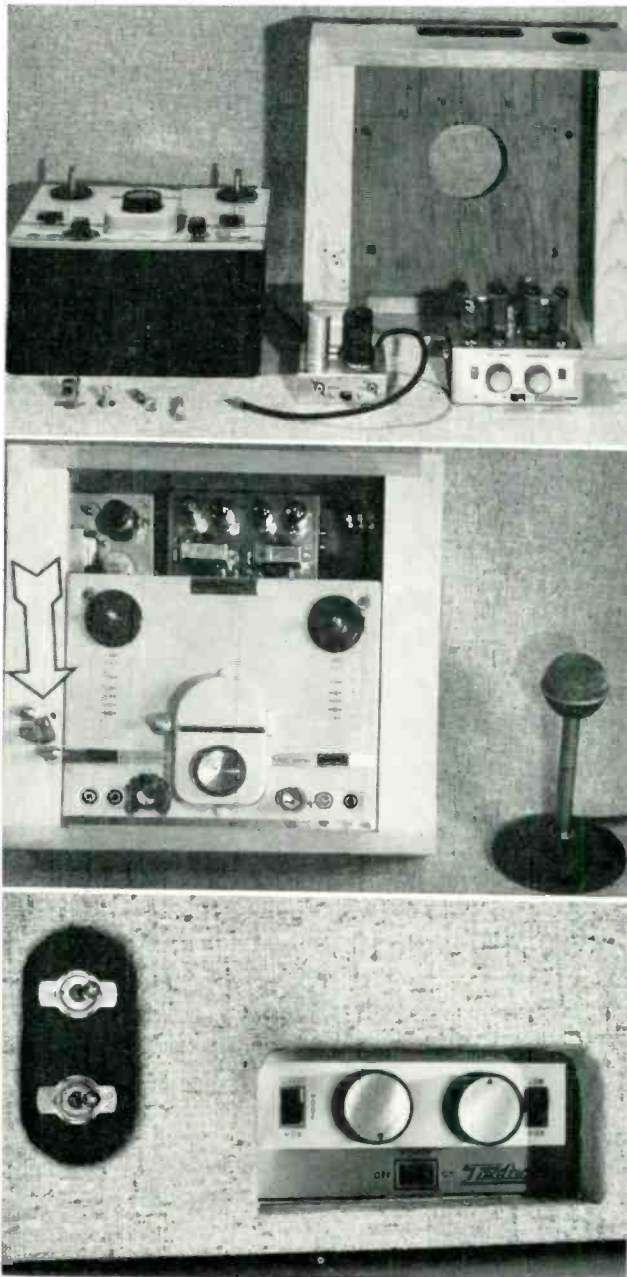


Fig. 6, top: Spruce up your old recorder with a new cabinet. Here, by making the wooden cabinet large enough to also hold an auxiliary preamp and a little power amplifier, a completely self-contained "Echo-Master" unit was the result. Inexpensive upholstery plastic, used as a background here, makes an excellent finish cover.

Fig. 7, middle: Note how compactly the various units fit into the cabinet. It was made just barely large enough to hold everything, yet I was careful to leave plenty of room for ventilation. The arrow points out the "built-in" auxiliary tape-head, guide-post assembly. Perforated peg-board will cover the rear units, neatly and "airily."

Fig. 8, bottom: At the rear of the new cabinet (now covered with the plastic material) two openings allow access to the auxiliary controls. For "Echo Master" recording, toggle switches turn on the extra units, and also switch the recorder's speaker into connection with the little power amp, substituting a "dummy load" resistor in its place.

out of my old timer, I use *High Output Recording Tape* for the original TV recordings. This permits me to record at a higher signal level than normally possible with my old recorder, so I can play it back (re-record it) at a lower level, hence eliminating most of the unwanted background noise and hum. High output tape is a bit expensive com-

pared to regular recording tape, but since I keep using the same reels over and over again for the original TV recordings, this is not really an important consideration. Check with your dealer, though, to make sure you can use this tape to advantage on your particular machine.

A RECORDER FOR YOUR PARENTS:

Something that I can personally recommend quite highly is *Letters On Tape*. Not only with your far-away friends who have tape machines, but with your own folks if they also live far away. So much more can be expressed on tape that it is a most marvelous means of keeping in touch with those you love. Since moving away from my own folks about five years ago, tape recording has performed valiant service in keeping us in almost constant touch with each other. *Warning!* Older people automatically resist "new-fangled" gadgets such as tape recorders, I quickly discovered. With my own mother and father, it took quite a bit of doing, talking them into using a tape machine. Now, though, we exchange tapes on a regular bi-weekly basis and we would feel very lost if we didn't "hear from home" all the time. What we say isn't too important, but hearing each other's voices *is*.

SOUND-ON-SOUND:

By now I believe I've tried all the different systems of producing multiple recordings at home, and I like doing it with two separate recorders best of all. Done this way (Fig. 11) it's an extremely simple matter to make a first recording, and then add subsequent recordings by re-recording from one machine to the other, and at the same time adding the new "addition" via a microphone. And best of all, if you should goof anywhere along the line, it isn't necessary to start *completely* over again, since you won't be erasing the previous recording each time (as we did last month). Also, for those of you who might enjoy experimenting with the "Alvin Effect," it's a simple matter with two recorders, by running each at a different speed. That way, you can combine souped-up "fast talk" with regular-speed talk (and/or singing) for many novel renditions.

By the way, there's another system of sound-on-sound-recording which you might enjoy hearing about. I like to take my recorder down to a bowling alley, to a carnival, to a basketball game or even out in a thunderstorm, etc., *and*

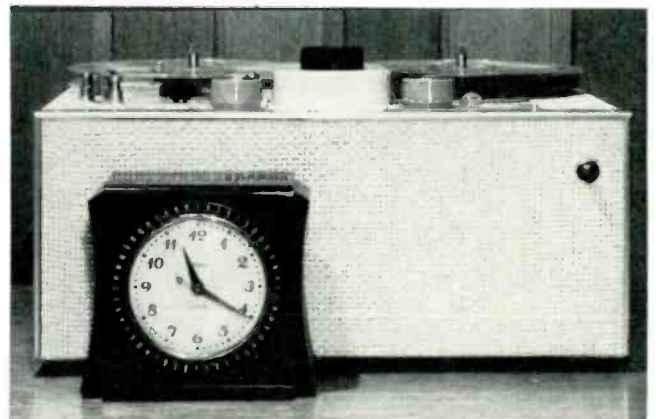


Fig. 9: The completed unit, attractive enough now to fit into any surroundings. By adding auxiliary equipment for special-purpose recordings, here is a machine that doesn't have to "compete" with the new recorders, but has a function uniquely its own. Other equipment, such as this Timer Clock, will extend its special usage still further.

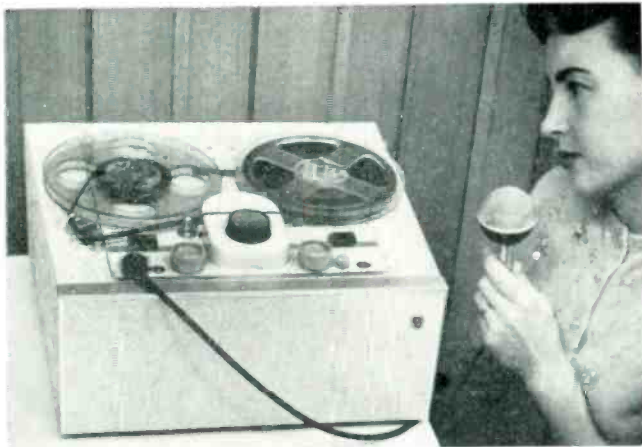


Fig. 10: The "Echo Master" ready for action. Or, if you'd rather have a Stereo Tape Editor instead, then use a similar unit arrangement but with a stereo play head in your auxiliary assembly. And "pipe" both stereo tracks through the recorder's single speaker, which will be plenty adequate for monitoring the tape while editing.

let it record the general "noise" for twenty or thirty minutes. Home again, I catalog these reels and save them for special occasions. Then, any time I want to have some fun with someone I'm sending a tape to, I play one of these background tapes on one recorder (across the room, and set at a low volume so it won't overpower my talking into the mike) and actually do my recording on another recorder. This way, I can pretend that I'm really at a local bowling



Fig. 12: "STEP RIGHT UP, LADIES AND GENTLEMEN, AND RIDE THE FABULOUS GHOST TRAIN." You, too, can be a carnival barker (or anything else) right in your own home in another version of sound-on-sound recording that involves the use of special "background" tapes. Played on a second recorder, they can make you appear to be anywhere you please.

alley, say, making the recording. Though I'm actually at home, my second recorder picks up (from the recorder across the room) all the general *background* sound effects such as balls rolling down the alleys, pins flying, people talking, etc. And I defy anyone to tell that it doesn't sound real. I'm not quite sure what all the possibilities are here, but it's an idea you might enjoy exploring?

"REBUILD" YOUR OLD RECORDER:

This can do much to improve the "prestige" of your old machine. I'm not much on cabinetry myself, wood-working and such, but I discovered a way to disguise this fact. There are so many wonderful new *flexible sheet plastics* on the market today (in dime stores, hardwares and even in yardage departments) that you can make almost any wooden cabinet you put together look pretty handsome by covering it afterwards with this special upholstery-type plastic. It comes by the inexpensive yard, in almost any color and in some very attractive embossed patterns. Then, to finish the job, put a piece of loosely woven and attractive cloth across the front of the cabinet (if that's where the loudspeaker grill is cut out), trim neatly with aluminum molding from the lumber yard, and gadzooks, you've created a minor masterpiece.

Also, you might wish to build your new cabinet large enough to contain *extra equipment*, as shown here. My "Echo Master" system of recording (described last January) turned out to be such a party favorite that I decided to make it all one attractive unit. I built my new cabinet large enough to also hold both the auxiliary preamp needed and a little power amplifier that I happened to have on hand. (It was a stereo-mono job, which I used in its mono setting.) Then, by running the tape around the auxiliary tape playback head that I had included atop the machine (Fig. 10) and using a switching arrangement that enabled me to use the normally silent (during regular recording) recorder's loudspeaker, I had an all-in-one unit. A similar arrangement—but with a *stereo* playback head and with a stereo preamp and power amplifier—could be used to make your second recorder into a very efficient *Tape Editor* for your stereo editing. Editing is hard on a recorder, so this system would do much to save the wear and tear on your good machine.

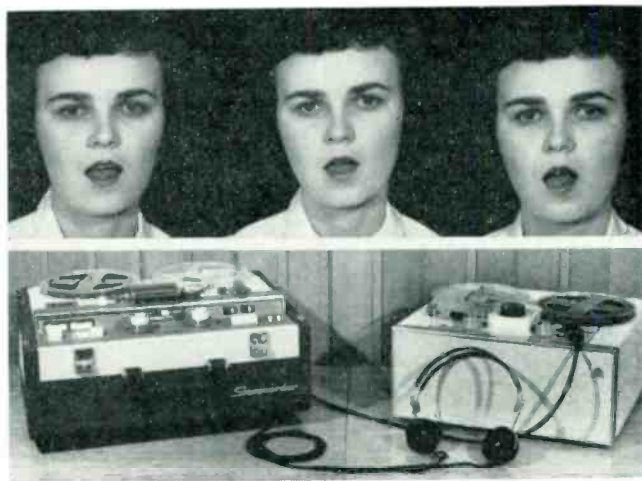
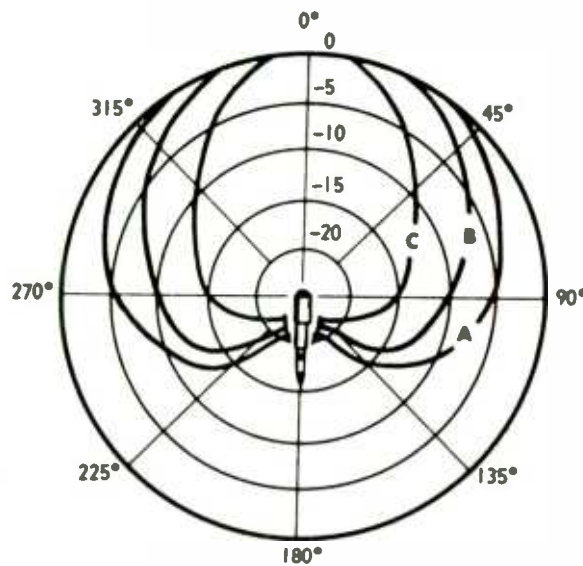
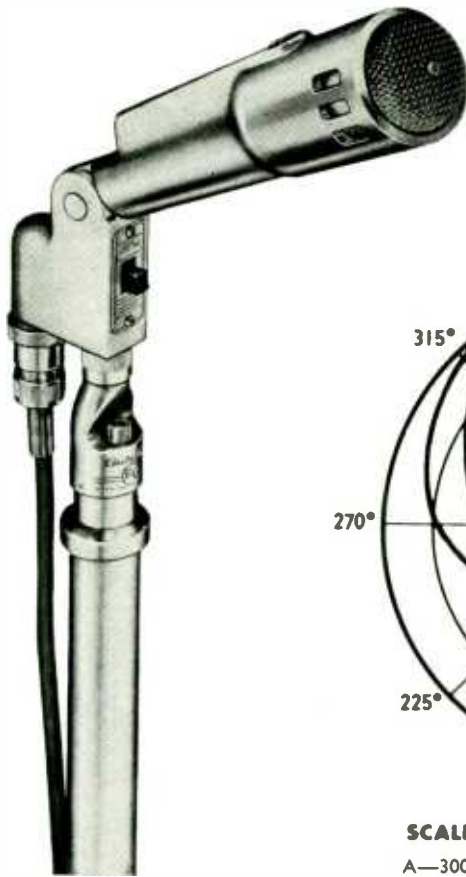


Fig. 11: Sound-on-sound recording is simple with two recorders, and offers variations and effects not easily attainable otherwise. By going back and forth, first recording on one machine and then the other, each time also adding (re-recording) the previous tape while "keeping in time" via headphones, many combinations are possible.

HOW'S

by L. L. Farkas



SCALE: 5 DECIBELS PER DIVISION

A—300 cps B—5,000 cps C—10,000 cps

Electro-Voice Model 664 microphone (cardioid dynamic) and its directivity pattern. A good dynamic microphone will pick up tones to around 15,000 cycles, and it is much less directional than any of the other mikes.

YOU sometimes hear people say: "My tape system is flat across the band; I can really make hi-fi recordings." They generally mean that their tape recorder can pick up tones from 30 to 15,000 cycles per second, that they have an expensive speaker system that reproduces all these frequencies, and that they have a microphone with the same rating. But here is the weak point. They usually don't realize the extent of the frequency discrimination of their microphone, nor of its frequency response in the place where they do most of their recording.

What are some of the characteristics of the best known microphones, and how can you determine those of the one that you are using? A few years ago the most common microphone was the carbon mike. With an air-damped duraluminum diaphragm it has a uniform response from 70 to around 10,000 cycles, with a peak around 7,000 cycles. But its response to high frequencies, as soon as their source moves away from directly in front of the microphone, drops off fairly rapidly, so that at an angle of 90 degrees there is a loss of 9 decibels from 1,000 to 5,000 cycles. However, the greatest fault of the carbon microphone is its high noise level, or microphone hiss, and for that reason it is not recommended for high fidelity usage.

The condenser microphone can be made fairly linear in response by placing the resonant frequency of its diaphragm outside of the audible range, but at this point the microphone is quite insensitive. To counteract this condition, current condenser microphones have their resonant diaphragm frequency set within the audible range. This results in a rise in output below 100 cycles, and in a peak at around 4,000 cycles, but it improves the overall sensitivity of the microphone to practical limits. Below 500 cycles the condenser microphone is practically non-direc-

tive; its directivity increases above 2,000 cycles.

The dynamic microphone is a general purpose unit. It has fairly high sensitivity, and while its frequency response is not quite as good as that of the condenser microphone, a good dynamic microphone will pick up tones to around 15,000 cycles. A grid is usually placed in front of the diaphragm to prevent any resonance above 8,000 cycles. As to directivity, it drops off slightly at the higher frequencies coming from the sides of the microphone, but it is much less directional than any of the other microphones.

The microphone mostly used with tape recorders is the crystal microphone. It has an average response, ranging roughly from 60 to 8,000 cycles, and as indicated on the polar diagram, it is fairly directional at the higher frequencies. This has the effect of eliminating the low tones except those originating directly in front of the microphone, and accentuating the highs. It is a good all around microphone for general tape recording, but it does not have the full pick-up scope needed for real high fidelity.

In some cases you will need highly directional microphones and this is where the ribbon type and the cardioid microphones come into use. The ribbon type consists of a corrugated ribbon hanging in a magnetic field. And since this ribbon is small and cannot pick up from its edge, it is affected only from tones originating either in the front or the rear of the microphone within roughly a 60 degree angle. This is useful if you want to group an orchestra on both sides of the microphone and to place the heavily booming instruments on the dead sides of the microphone. The cardioid type eliminates the back pick-up by a phase cancellation of the sound waves arriving from the rear of the microphone. Here also you will note the directivity at the higher frequencies. Both of these microphones have good

YOUR PICKUP????

. . . . you can improve all your recordings by completely knowing the virtues and faults of the microphone you use.

response from low frequency, 40 cycles, to around 15,000 cycles. They are expensive units, costing \$50 and up, and are mainly used for professional work.

There are other types of microphones, most of which are used for special purposes. One example is the contact microphone used to amplify the sound of musical instruments. One interesting type is the glow discharge microphone in which the resistance of a spark varies as the sounds strike the spark. It is fairly sensitive, but as its electrodes must be replaced frequently, it is not very practical for the home recorder.

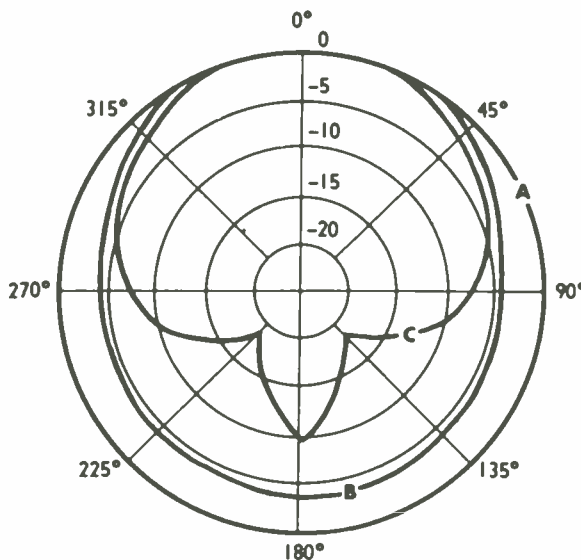
Thus you see that microphones have different characteristics. By knowing these we can place people and instruments in the best location for a high fidelity pick-up. You would naturally place a musical instrument with certain tones in the area designated by the response pattern where such tones will be picked up without attenuation. Conversely, if you want to reduce the output of a particular instrument, you can place it in a spot which is outside of the pick-up pattern for its characteristic frequencies. Thus you can reduce the pick-up from a flute by simply placing it toward the side of the microphone, in the pattern area

responding mainly to the lower frequencies. This low frequency response also explains the fact that sometimes, even though you place a bass instrument to the side of the microphone, its tones still come pounding in.

Another effect frequently overlooked is a decrease in high frequency response with distance and conversely an increase in low frequency pick-up with a reduced distance of the source. You may have noticed this by the thin quality of a distant band pick-up, or in the booming of a speaker's voice when he came too close to the microphone. Actually the closer the speaker is to the microphone the more output will the unit have in the 40 to 200 cycle area, thus those frequencies in the speaker's voice will be amplified more than the higher frequencies.

Of course the environment affects the frequency response of the microphone. You probably have discovered that when you pick up music in one room, the recording is bright and live, while in another it sounds dead. This is caused by the different amounts of reflected sounds which in turn affect the high frequency characteristics of the room. Now you can easily tell which type of room you are using by clapping your hands and listening to the echo. In a live room you will receive a sharp and distinct echo; in a dead room, the sound will be muffled. This will determine the kind of pick-up and set-up you will need.

At this time you will ask, "How do I go about getting a response pattern for my microphone?" The first and easiest way is to ask for a pattern diagram when you buy the microphone. This should give you a basic pattern as it is determined by the manufacturer using a standard



SCALE: 5 DECIBELS PER DIVISION

A—500 cps B—1,400 cps C—3,500 cps

Electro-Voice Model 911 microphone (crystal) and its directivity pattern. A crystal microphone has an average range response of about 60 to 8000 cycles and it is fairly directional at the higher frequencies.

loudspeaker inside an anechoic (echo-free) room. You must then determine what happens to this pattern when you use it in a particular room.

The simplest way to check the directivity of your microphone is to talk into it from a set distance while someone rotates it through 360 degrees. By recording this and then playing it back, you'll be able to tell how much the volume drops between a front and back pick-up. You can also get an idea of the frequency pattern by repeating the process using the high, medium, and low tones of an instrument.

For more accurate results you will need the recording set-up indicated. The main problem is to insure that the sound emitted by the sound source is maintained at the same level throughout the check. You will need an audio oscillator that can generate tones from around 20 to 20,000 cycles per second. If you cannot obtain such generator, than an audio frequency record and a high quality turntable can be used. Then you will want a good amplifier, one that will amplify all the desired frequencies; an audio level indicator—DB meter, to check your output level and make sure it remains constant for all frequencies; and a good loudspeaker, the better you can have here the better. Now you connect all these units as indicated: oscillator to amplifier to loudspeaker, making sure that all the input and output impedances are matched, and the DB meter monitors the output of the amplifier.

The next step is to set the microphone in the position that you will normally use for recording in the particular room. Then place the loudspeaker six or seven feet away from the microphone and turn on the equipment, quickly checking high and low frequencies to make sure that you will have enough volume both for recording and to maintain a set level on the DB meter.

Starting with 20 cycles, record discrete frequencies like 100, 200, 500, 1,000, 2,000, 3,000, 5,000, 10,000, 12,000, 15,000, and 16,000 cycles if you can go that high. For each of these frequencies make sure that the volume is adjusted so that the DB meter reads the same level. This will give you the frequency response of your microphone, including the frequency characteristics of the room, for

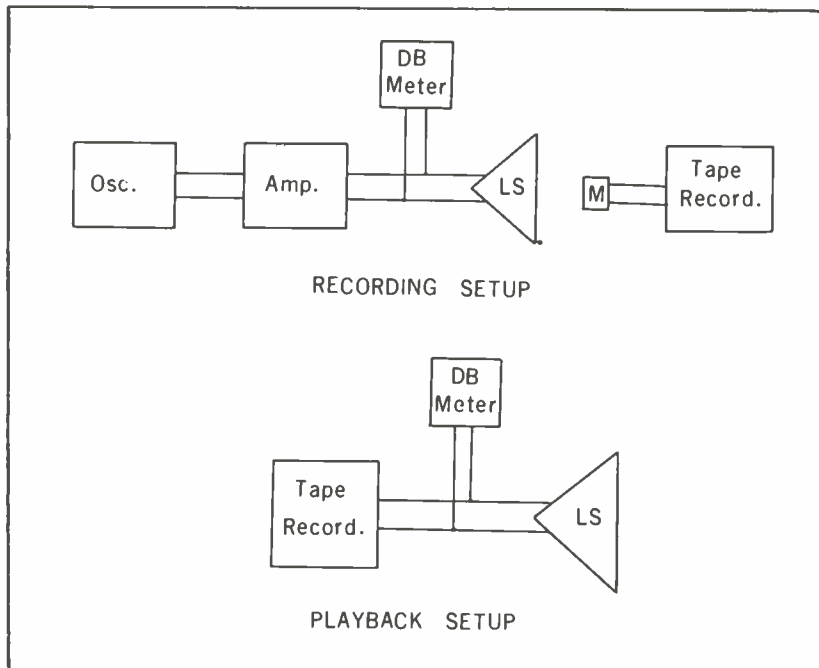
zero incidence, that is, with the microphone receiving the sound from dead center.

To get the frequency directivity, you rotate the microphone through 360 degrees, stopping at say 30 degree intervals, and record the sound at each spot. To facilitate this procedure, you can mark the base of your microphone into 30 degree intervals and then rotate it past a marked spot on the floor. When you play back the results, you can call out the angle each time the microphone is turned, and the frequency each time it is changed.

The playback part is simple. You connect the DB meter on the output of your tape recorder, play back the frequency tape, and just take readings of the DB meter level for each frequency and angle. Plotted on a polar type of graph paper, you will have a response pattern for your microphone similar to the patterns shown, indicating frequency directivity in that particular room.

To check the effect of frequency versus distance a bit more closely, you can repeat the procedure with the microphone at several distances from the loudspeaker. You can do this at several of the high and low frequencies. And while you can interpret this effect from your original directivity pattern, this will give you a better idea of the limits of the room with extremes of frequency—for example, how quickly will bass tones boom, or how high tones will distort with distance.

Now assuming that you have all this information, how do you use it? Well, first, you know that you cannot hear frequencies on your system above those picked up by your microphone. You know the limitations of your microphone. You can place instruments so that their playing range will be compatible with your directivity frequency pattern. You also know how to set your microphone to exclude unwanted noises or frequencies by placing them outside the pick-up pattern. In short, by knowing fully the qualities and faults of your microphone, you can use them to advantage to improve your recording. You don't kid yourself about the overall quality of your high fidelity system. You know exactly how good it is, and what to do to make all your recordings the best possible.





Spring Sound Collection

by Jean Cover

... time to add to your sounds-of-the-seasons tape album—subject, Spring.

SHOULD someone ask me to define "Spring," I could say, it's a season, it's a curly piece of metal with bounce, it's an athletic leap, or I could give the definition I consider best—it's a beginning. And should someone ask me to collect an album of sounds associated with the Spring season, I would build it around "beginnings."

Last Fall we suggested that a four-part series of tapes with sounds of the seasons would make a dandy addition to a creative tape collector's library. At that time we recommended sounds associated with Fall, which we considered a good general basis for such an album. Now our attention is directed to Spring.

We are aware, of course, that Spring throughout our own country and other countries of the world makes its appearance at varied times of the year, and perhaps not at all in some faraway lands. Also, we realize that certain sounds which may be pertinent to one area are unheard of in others.

Spring heralds a multitude of births, as once again in its timeless, perfect fashion, mother earth bears her newborn. Nurtured by the sun's warmth, the rain's moisture and earth's richness, tiny shoots begin to pop up, grass begins to grow, trees begin to bud, everything blooms with freshness.

All of which is not unaccompanied by sound. Because as mother nature bears her young, more often than not they are reared by we less romantic mortals. From the dusty basement closets, or the storage shed, or the garage, or wherever, come an assortment of "rearing" aids such as rakes, hoes, shears, clippers, snippers, fencing, and other sundry gardeners' tools all of which twang, snap, scratch, buzz and scrunch, usually accompanied by most unromantic human mutterings.

Once again the power mower is revved up to see if

it will be in readiness to tackle the coming abundance of growth. By an odd quirk of human behavior, you will find that as soon as the first enthusiastic guy in a neighborhood tries out his mower, or trims his shrubs, or pounds in his fencing posts, it is only a short matter of time before his fellow neighbors follow suit.

When you hear the first thunderstorm that accompanies a spring rain, it is a welcome back sound indeed—an overture to Spring, and your Spring sound album might well use this as its opening.

Just as Spring is the beginning of growing things, so too do we associate it with the beginning of romance. It's much easier to feel romantic without a covering of sweaters, coats, mufflers, gloves and whatnot hiding us from Winter's cold bite and from each other. The sweet fragrance of blossoms and fresh air doesn't hurt the scene any either.

Thus it is that before long as the calendar swings by March 21 we hear a shrill whistle from many a male throat, aptly termed a "wolf whistle." This may well be applied to the same type sound of certain mooning animals and insects, for romance is just about the most universal thing that ever was or ever will be. And many a mating call has been a beginning, no matter what the ending may or may not be.

As warmer climes return in the Spring, so too do birds return to their habitats from whence they migrated for the duration of the cold season. And while it sounds odd to say you heard a "wolf whistle" from a bird, this is exactly what the case may be.

In addition to mating whistles, however, birds warble many other beautiful sounds. Isn't it wondrous to note that each species of bird has its own distinct method of communication, and so it is, not only with birds and other



fowl, but with animals and even insects.

Many folks devote a great deal of time and study to learning about the creatures of nature—their habits, their instincts, their life span, and their communicative sounds. Spring is the time most of these sounds once more begin to fill the air and enthusiastic naturalists begin to search them out.

It unfortunately, but quite naturally, follows that while Spring keeps little Cupid busy, in some instances his aim backfires. So it is that while the sound of mating is prevalent it is sometimes overshadowed by the sound of argumentative retaliation by an unresponsive target, not to mention the interference of a third party.

For instance, if you listen carefully, you would swear two tom cats fighting over a dainty feline were speaking plainly, but with an accent all their own. And chances are too that the cat and dog fight you heard made you think of some two friends, or relatives, or neighbors, or acquaintances of one sort or another.

Spring has another beginning too, which many consider unpleasant, or just a big fat nuisance. It is the beginning of clean-up, fix-up, paint-up, tune-up, check-up time. There comes the sound of windows and doors being opened. Storm windows and doors must be stored away to be replaced by screens; lawn furniture is brought out and brightened up; hoses come into the open and are immediately put to use on windows, furniture, cars and whatnot; house furniture is shoved here and there and there and still there; rugs are cleaned or replaced by lighter warm-weather materials, clothes are given a final airing and are stored under moth protectives; the furnace is given a going over; and on and on. All these Spring chores are not by any means accomplished in silence and while their sounds may make you wince a little, they are nevertheless a very definite part of the season.

To many, the first tinge of Spring weather directs the thought waves toward one beginning only—travel. Time to take off the snow tires, put the family buggy in tip-top condition, and go-go-go.

Of course, the biggest "go" is vacation, but there are lots of weekends and evenings too. And there are more unexplored areas of interest to visit than there is time to see them all, but every trip, every picnic, every planned or unplanned visit can be kept in your memory forever, especially if the sound is recorded on tape.

Needless to say, at least to any boat owner, Spring signals the time to uncover the floating pride and joy and start whipping her into shape—a scraping job here, a bit of caulking there, a replacement or so may be necessary somewhere, and so it goes. Of course, the most pleasing

sound connected with this endeavor is the final one—the splash the craft makes as it is finally launched.

One Spring sound we mostly all are familiar with, and which many look forward to with eager anticipation, is the sound of a bat against a ball. When you think of it, baseball sounds a little ridiculous and terribly simple—people hitting a ball and running—but oh, the enthusiasm, the exuberant joy or wrath it can evoke.

There are other energetic sounds beginning too; roller skates, the chants used for skipping rope, new and old children's games being played outdoors once again.

Adults too find the noise at the Spring race track meets most interesting, if sometimes uneconomical.

There is one event in our town that many look forward to in the Spring, and if your community doesn't have exactly this type affair, you may have one similar. Ours is a May Mart. This is nothing more than an old-fashioned outdoor bazaar. Here you find stands selling flowers, would-be artists selling paintings, homemade candy and cakes for sale, grab-bags, all sorts of merchants peddling their wares, and the thing I enjoy most (and at my age) sucking a lemon through a peppermint stick. This is all done outdoors under gaily decked stands or umbrellas and there is a good deal of bartering and confusion.

Whatever type affair your community may have, these Spring outdoor festivities surely must be looked forward to as warm weather approaches.

These are some of the sounds we associate with Spring, and which we would certainly include in our album. You undoubtedly have many ideas of your own which are not mentioned.

Sounds related to household clean-up should be fairly easy to obtain. A heavy duty extension cord may be necessary to get the recorder outdoors to pick up others. A regular cord may cause a drop in voltage which would be enough to throw the speed of the machine off and make it run slow.

Many outdoor sounds will require a self-contained portable or an inverter in your car, as well as some extra cable, to operate in the open.

We would like to mention one very handy piece of equipment for capturing bird calls. This is the parabolic reflector. Sound hits this reflector, which is aimed toward the bird, and bounces it into a microphone attached to it. The reflectors are obtainable from the C. W. Torngren Co., Inc., 236 Pearl Street, Somerville, Mass. You will have to attach your own mike to the reflector in the manner you deem best.

To wait hour after hour, day after day, for a particular

bird call or song would be a tiring affair. It is well to note that in the Spring a bird will stake out his nesting area by going from point to point and more or less proclaiming to other birds at each point that the area within belongs to him. He will then build his nest somewhere in that area.

If you watch which boundary points the bird lands at you can set up a microphone nearby and be ready to record the next time he seeks out that location, which he most assuredly will do. It might be a fencepost, a particular bush or tree, a large stone, or some other object.

By the same token, you won't find a frog, or a cricket willing to walk up to a microphone and sing out. Rather, you will have to locate a hiding place and await the opportunity of catching a croak or chirp.

In our region we have Peepers, a member of the frog family. This small animal lives in moist, swampy areas and in the Spring he is among the first to sing out. His song is in the form of a whistle rather than a croak. To some folks it is a bothersome sound, while others claim it can lull them to sleep.

If you want on-the-spot authenticity in your sound album, you will seek out some Peepers' habitat, ready your portable recorder, pull on some hip boots and wade right into that watery spot. Upon your approach the Peepers will immediately cease their song, but if you keep still and wait a few minutes they will begin once more.

On the other hand, to get the sound in a much simpler manner, you could simulate the Peepers' habitat in a bowl, catch one, put him in, and wait for him to sing out right there in your own home.

To all those who may attempt to sneak up on some

romantically inclined lovers we must pass along a warning. Such folks want to be alone, and any interfering source may find a mike and recorder wrapped around his head should he be detected. It would be well to choose some other time and place to pick up spring-fever talk, such as perhaps a teenager or adult making a date over the phone. Some of these conversations can be most humorous, especially when you hear only one side.

Once you have your collection of sounds they will not mean much as such. You will have to do a great deal of editing and narrating to finally end up with a smooth, interesting tape.

Listen to what you do have and note those sections you like best and wish to keep on your final tape. The sounds cannot stand alone, they need some explanation to give the tape a continuity.

Jot down notes for a script to follow. Find a theme or story to frame the whole sound picture.

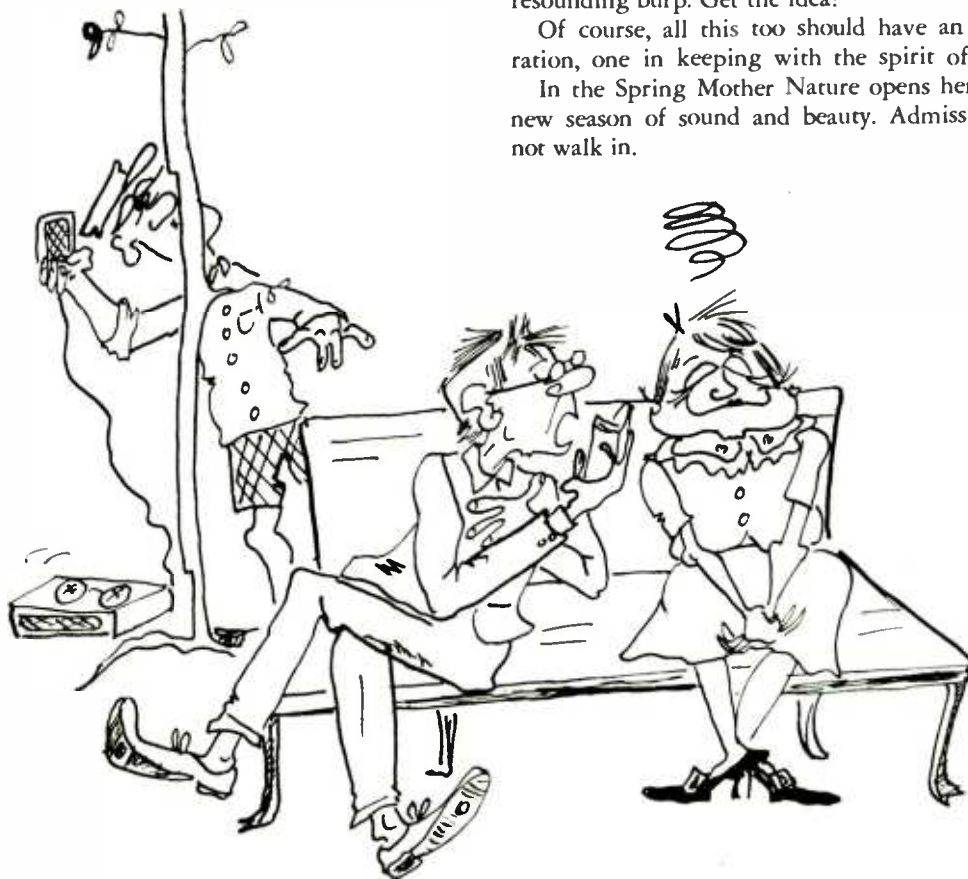
You may wish to intersperse musical backgrounds or bridges throughout the tape. Mendelsohn's Spring Song would be an excellent selection to use on this tape.

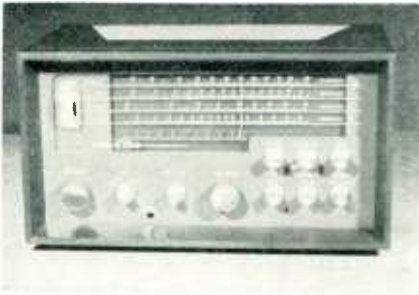
After completion of this tape, for something a bit different, you might try another variation of Spring sounds. By using a contact microphone, simulated sounds, and a witty imagination you can piece together a tape unlike any heard before.

You might include sounds representative of a flower shooting up, such as a slide whistle and then the blossom popping open via a bubble gum snap. Perhaps you would then have the leaves open thanks to the sound of a squeaking door. The sequence could be continued by a butterfly or bee landing on the blossom (tires screeching) and the hungry little fellow sipping nectar (a straw in a just emptied—almost—glass) followed by a resounding burp. Get the idea?

Of course, all this too should have an appropriate narration, one in keeping with the spirit of the whole tape.

In the Spring Mother Nature opens her door to a fresh, new season of sound and beauty. Admission is free—why not walk in.





Recording the Short Wave Stations

by Bart Pierson

. . . Reception and recording around the world is possible on short wave.

BACK in the early days of radio the biggest thrill was to log the reception of far-away stations. Those on the east coast would sit up to all hours of the morning hoping to catch a west coast station before it went off the air. The late hours were necessary because the more powerful local stations frequently masked the far-away stations and it was necessary to wait until they went off the air so that the weaker stations, at or near the same spot on the dial, could come through.

At the bus stops, on the commuter trains, in the offices and shops the conversations sooner or later turned to the stations pulled in the night before. Newspapers even ran DX columns, reporting the reception achieved by readers.

Now-a-days, with vastly improved radios, picking up a station across a continent is easy but the old thrill is still very much alive on the short-wave bands.

The stations which are found in the regular broadcast band, running from 550 to 1650 KC on the dial are long wave stations. Their signals follow the curve of the earth, becoming progressively weaker as the distance from the station increases.

The short wave stations are in the area lying above 1650 kilocycles and run into the megacycle range. Unlike long wave signals, the short wave impulses travel pretty much in straight lines. Some of them shoot right out into space, never to be heard, but others are reflected back to earth by the Heavyside layer, a layer of ionized particles that completely encircles the earth. As they are reflected from this, like light from a mirror, they strike the earth with almost their full intensity. They are again reflected spaceward and again are bounced off the Heavyside layer back to earth. So they travel around the earth being reflected and re-reflected.

If a short-wave receiver is in an area where the wave is striking the earth, reception is excellent. If the receiver is under a spot where the wave is striking the ionized layer high above the earth, little or nothing can be heard.

In addition to the Heavyside layer, such things as meteor showers will also reflect the waves. In fact, some communications systems use these showers for bouncing signals into desired spots. The transmitters are always "on the ready" and whenever a shower occurs, the transmitter turns on and fires its messages with great rapidity, cutting off automatically as the shower comes to an end.

It is this very uncertainty in shortwave communications that brings back the old thrill of chasing DX stations. On some days, or at some hours, Australia or Japan will positively boom through. At other times they are extremely difficult to pick up. Sometimes the signals coming from north or south will be fine while those from east to west are poor. You never know, until you turn on the set what will happen.

Some of the "ham" radio magazines do publish tables giving the probabilities of reception on various bands

for periods of a month. These are of some help in deciding what to seek but they can be upset by unlooked for sun spot activity and other causes.

What this all adds up to is a lot of fun. Until you turn on the switch on the short wave set and start turning the dial you never know what you will be able to pick up.

Short wave receivers come in many forms, from simple units selling for under \$50 to professional gear costing many hundreds. And if you really get serious, such items as rotatable antennas and antennas cut for the best results on certain bands can be added to the gear.

The newest receiver at a moderate price is the National NC-105 and it has a new extra feature—a tuner output that permits it to be connected to a home hi-fi system or a tape recorder. It covers the regular broadcast band plus short wave bands out to 30 Mc. It is also available in an oiled walnut enclosure so it will fit in with the living room decor.

With the receiver hooked up to the tape recorder you will have a means of making an actual record of your DX exploits. You will be able to record Australia, or England or the commies making nasty cracks about us on the news broadcasts.

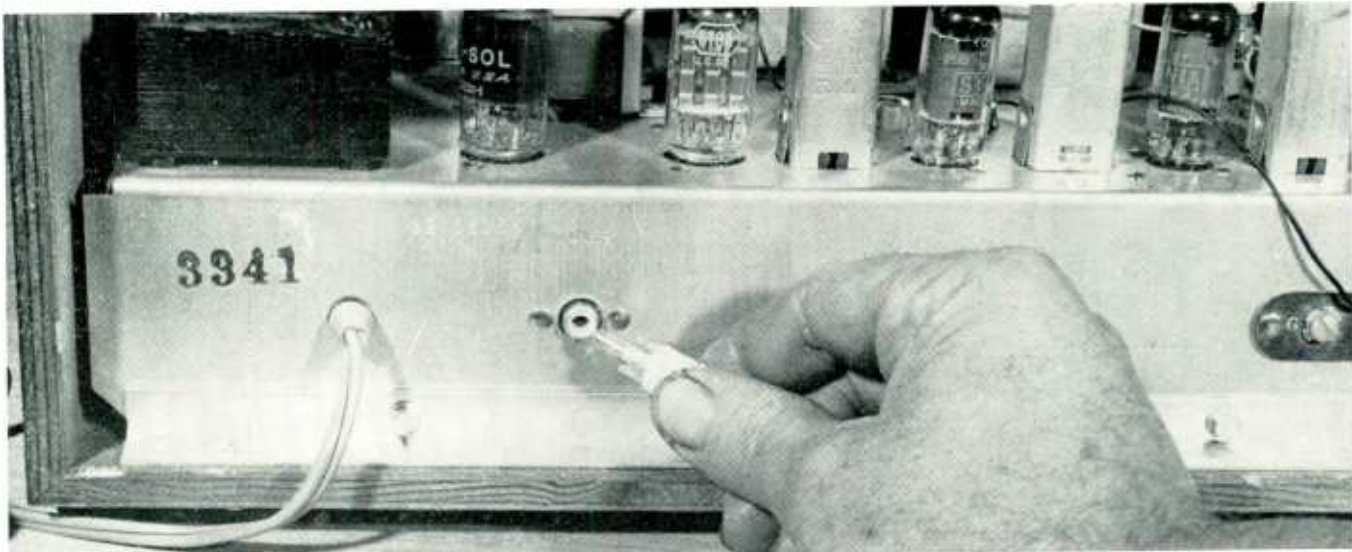
If you are studying a foreign language, recordings from the land where the language is spoken will provide excellent material for language study. The news broadcasts are excellent for this purpose as are the commercials, talks or dramatic programs.

One advantage of making foreign language tapes from the short wave stations is that you are getting the native speech without it being filtered through someone else's accent. Not only that but the announcers, as are our own, are usually picked for their clear enunciation and phrasing—a distinct advantage if your translation speed is not very high to begin with.

Actually we have found the commercials excellent material to listen to, record and use for practice. Next in order would be monologues and discussion programs. Again, as with our own native speakers, some voices are clear and distinct and others are less so. Regional accents are also heard which serve to sharpen the perception of the language.

Many times on short wave broadcasts the fi is not so hi. Atmospheric and other intreferece can garble a transmission very badly at times, all of which, while it may be exasperating, does provide the challenge that makes the game interesting.

A collection of music around the world would make a fascinating reel. As one proceeds either west or east from the United States the differences begin to show. The extreme is music from the Orient where the diatonic scale is used and vocals are strictly out of this world by western standards. In between there is a blending of the cultures musically.



On the rear of the chassis of the National NC-105 is this jack which is used to feed the home hi-fi system or recorder from the short wave receiver. The output is from the detector stage and should be fed into the mike input. If this is unsatisfactory, power may be taken from the headphone jack or from the speaker terminals which are very accessible.

When you make a recording of each of the segments around the world and then splice them together in order, going from east to west or vice versa, you will have a musical travelogue that will prove of great interest.

Because we are so accustomed to our regular broadcast band which appears on all radios, we are inclined to think that this is the beginning and end of radio. Actually the broadcast band is but a very small part of the radio spectrum. Many countries overseas have short wave stations only. Aircraft communications, ham radio, TV, FM, navigational aids and a lot more assorted activities go on in the short wave bands. Lots of these make good listening, and good recording.

Operating a short wave receiver is not like pushing the buttons on your car radio. There are so many stations, in many cases so close together, that careful tuning must be done. The National receiver has a bandspread tuning dial which permits fine tuning the receiver.

The tuner output on the unit feeds from the detector so the amplifier with which it is used should have a pre-amp stage in it. The connection for the tape recorder may be taken from the amplifier. In this way you will be able to hear what you are recording since switching the radio to tuner silences the speaker in the set.

The tuner output is a high impedance output suitable for connection to the tuner or one of the auxiliary inputs on the amplifier. The amplifier gain control should be set to a normal level and the listening level controlled with the AF gain of the radio. It should be plugged into the microphone jack on a recorder.

A low impedance output is available by using the headphone jack on the front panel. This is a 3.2 ohm output and is suitable for feeding into the phono input on a recorder. When a plug is inserted in this jack the speaker in the set is silenced. In order to hear what you are recording, the monitor switch on the recorder must be used.

If your recorder has no monitor switch, power may be taken with alligator clips from the speaker terminals which are very accessible through the rear of the case. When leads from the speaker terminal are used they should be plugged into the phono input on the recorder.

In addition to making tapes of foreign broadcast sta-

tions you can also keep a log of the stations heard, listing the date, time and frequency. Most of these stations like to hear from listeners and mail out colorful cards confirming the reception and providing information about the station and country. The collection of these cards makes an interesting hobby in itself.

If you would like more information, it may be obtained from the following: Official Log, National Association of Armchair Adventurers, National Radio Company, Melrose, Mass., World Radio TV Handbook, World Radio Publications, 47 Mounthaven Dr., Livingston, N. J., White's Radio Log, C. DeWitt White Co., PO Box 142, Bronxville, N. Y. Ham radio magazines such as QST and CQ and government publications are also helpful.

Frequency Allocation Spectrum

100-200	kc.—Domestic Public, Maritime Mobile
200-300	kc.—Aeronautical Mobile, Aeronautical
300-535	kc.—Maritime Radio, Navigation, Direction Finding, Maritime Mobile, Aeronautical Mobile, Mobile Distress
535	kc.-1.605 mc.—Standard Broadcast AM
1.605-3.500	mc.—Police, Public Safety, Maritime Mobile, Homing Signals
3.500-4.000	mc.—Amateur
4.000-7.000	mc.—Aeronautical Fixed, Fixed-Alaska, International Fixed Public, Industrial, International Broadcasting, Marine, Aeronautical
7.000-7.300	mc.—Amateur
7.300-14.000	mc.—Marine, Aeronautical, International Broadcasting, Miscellaneous
14.000-14.350	mc.—Amateur
14.350-21.000	mc.—Aeronautical, International Broadcasting, Marine, Miscellaneous
21.000-21.450	mc.—Amateur
21.450-50	mc.—International Broadcasting, Aeronautical, Marine, Public Safety, Government, Miscellaneous
50-54	mc.—Amateur
54-72	mc.—Television
72-88	mc.—Operational-Fixed, Television
88-108	mc.—Broadcasting FM
108-132	mc.—Aeronautical
132-420	mc.—Government, Public Service, Television
420-470	mc.—Amateur, Miscellaneous
470-1000	mc.—Television, Marine, Aeronautical
1000-2000	mc.—Aeronautical, Amateur, Government, Miscellaneous
2000-2300	mc.—TV Remote Pickup, Studio Transmitter Link-TV, Government, Miscellaneous
2300-3500	mc.—Amateur, Marine, Public Service, Aeronautical Radio Navigation
3500-5650	mc.—Public Service, Aeronautical Radio Navigation, Government, Aeronautical
5650-10,500	mc.—Amateur, Public Service, TV Broadcast, Government, Aeronautical Radio Navigation, Fixed Marine, Miscellaneous
10,500-30,000	mc.—Public Service, Government, Amateur, Fixed Mobile
30,000-100,000	mc.—Experimental and Amateur

THE BIAS OSCILLATOR

by Mark Mooney, Jr.

Part IV of a series

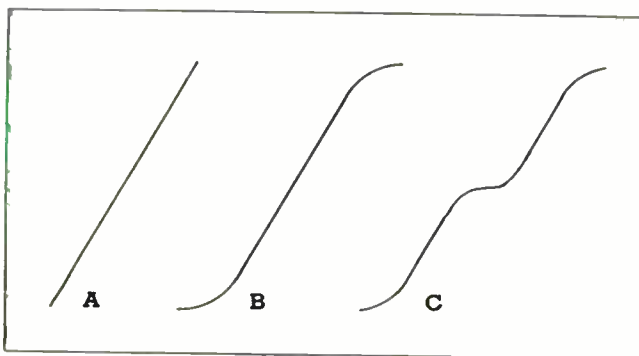
WHEN Valdemar Poulsen invented the first magnetic recorder back in 1893 he had a fine design but not much luck for one of the chief ingredients of successful recording was not discovered until the mid-1920's.

Recordings made on the early machines suffered from distortion, weak signals and a great deal of noise and hiss. The reason lay in one part of the machine—the bias supply. In the old machines a DC bias and erase was used. In modern machines AC bias and erase is employed. This was discovered by W. L. Carlson and G. W. Carpenter of the Naval Research Laboratories who obtained a patent on it in 1927.

Why is bias necessary? Because there is an inherent fault in all magnetic recording media which requires the use of the bias current to correct it.

Tape will not produce a linear response all by itself. A linear response may be defined as one in which you get out of the machine on playback what you put in in the record. For instance, if a signal is fed to the head that is twice as strong as another signal one would expect that on playback the stronger signal would sound twice as loud. If proper biasing is used, it will be twice as loud. If DC or no bias is used you might come up with anything. The signal might even be weaker instead of stronger.

The signal that comes back to us out of the loudspeaker on playback is caused by the remnant flux that is present in the tape. As this passes the head it causes currents to be set up in the head windings that are amplified and



An ideal "curve" for any recording and reproducing process is represented by a straight line signifying that anything you put in comes out the same. Such a "curve" is shown at A. At B is a curve typical of photographic materials. It has a "toe" at the bottom, a long straight-line portion and a "knee" at the top. If you expose film properly all the tones in the picture will fall on the straight-line portion and be properly reproduced in the finished print. At C is shown the response curve for magnetic tape. Note the toe, the short straight-line portion, horizontal middle section, another short straight-line portion and the knee at the top. The swinging back and forth of the bias current shifts the recorded signal to the two straight line portions of the curve to assure proper recording and reproduction, skipping the middle section which would introduce distortion.

produce the sound which we hear.

The remnant flux on the tape is that which is left after the magnetizing force is withdrawn. The recording head magnetizes the tape but the signal which remains on the tape is not as strong as the magnetizing signal. Nor, without bias current, will the signal on the tape be proportional to the magnetizing signal.

While the recording head is called "the heart of the tape recorder" the bias oscillator might rate as the "brain."

In the old system of DC bias, the tape was first passed across a permanent magnet which oriented all the magnetic domains on the tape in one direction and saturated the tape magnetically. In addition a small amount of DC was applied to the recording head along with the signal. The direct current served to put the recording on the linear portions of the hysteresis curve of the tape.

As the tape passed the head, it was actually demagnetized by the signal, which was an alternating current. The amount of demagnetization was determined by the strength of the recording signal.

This method failed to take advantage of the potential degree of magnetization of which the tape was capable and, unless the amount of magnetization from the permanent magnet, and the amount of DC in the head were critically adjusted, distortion of the signal resulted, in addition to a high hiss and noise level. It was these defects which spurred the search for some other method which would realize the full potential of the tape.

The answer was found in the AC biasing method. The need for the bias current has been well established but the "why" of it is still subject to discussion. One theory holds that it is necessary to jar the magnetic domains into an active state so that the audio signal can easily arrange them in the desired pattern. This might be analogous to a locomotive backing up slightly then moving ahead sharply, the resulting jerk getting the cars rolling.

Oddly enough, the bias signal itself, which may be many times the strength of the recording current, is not recorded on tape, it simply serves as a carrier for the audio signal and then disappears. It is somewhat like the propellant in a pressure can which forces the paint or other material out of the nozzle, yet it does not form a part of the finished coating.

The bias current is generated in the recording pre-amplifier by either a single tube or, in the professional recorders, by two tubes working in push-pull to reduce harmonic distortion to a minimum. The grid and the plate of the tube are connected to a capacitor and inductance, the ratings of which determine the frequency of oscillation.

This frequency is rather important and it is determined by the engineer who designs the recorder circuitry. It must be higher than the audio frequency, otherwise it

would record on the tape. Usually a figure of five times the highest audio frequency is used. Thus a recorder capable of handling 10,000 cycles per second should have a bias frequency on the order of 50,000 cps.

The reason for this is to avoid heterodynes, or whistles. In any audio signal, there will be harmonics generated along with the main signal. The second and third harmonics are the strongest and if these "beat" against the bias frequency a whistle will result. For instance, the third harmonic of an 8,000 cycle note would be 24,000 cycles. If the recorder bias frequency were only 30,000 cycles there would be a difference between them of 6,000 cycles which is in the audible range and would produce a high pitched squeal whenever an 8,000 cycle note showed up in the recorder. Present day designs in home type recorders will call for a bias frequency of 40,000 to 50,000 cycles and the designers of professional machines will use a bias frequency of 80,000 cps.

In addition to supplying the bias current to the head, the bias oscillator is also used to energize the erase head to clean the tape of signals before it reaches the record head. As may be imagined, the erase current requires considerable power. Since it is difficult to generate high frequencies having great power, the engineer must effect the best compromise he can. A low frequency of bias current will make it easy to get the required amounts of power to operate the erase head but, at the same time, this may produce a heterodyne if it is too low. There is no upper limit to the bias frequency but the higher it gets, the weaker it becomes and powering the erase head becomes more difficult.

The current required for erasure may be in the neighborhood of thirty times as much as that needed to properly operate the recording head. Most erase heads will need about 4 watts of power to operate efficiently. The design engineer will thus be limited in choosing the bias frequency by the amount of power which the circuit can deliver at that frequency. Fortunately the compromise which must be effected is at a point which will provide sufficient current and a sufficiently high bias frequency.

Of great importance is the strength of the bias current to the recording head. As mentioned earlier, the purpose of this current is to put the audio signal on a portion of the tape response curve which will provide a true playback. If the bias current is too weak the low frequencies will be lost. Also indicative of a bias current which is too weak is the presence of distortion and a loss of signal to noise ratio and the uniformity of the recorded signal may be lost.

If the bias current is too strong, there will be a loss of the high frequencies because the strong current makes the record head act as a weak erase head on the high frequencies. The high frequencies suffer most because they are the weakest signals on the tape and are consequently more sensitive to erasing action.

Again the design engineer is faced with a choice. As the strength of the bias current is increased the low frequencies will become stronger and stronger, reaching a peak and then falling off. The point where the low frequencies are strongest, just before they start to fall off, is known as the "peak bias" point. The ideal point at which to set the bias is at this "peak" since it will provide the best low frequency response and, at the same time, will give the minimum distortion and affect the

high frequencies the least.

Some tape recorders are equipped with an adjustment that permits the bias to be varied after the machine leaves the factory. This permits the owner to get the type of response that seems maximum to him. Machines which have no bias adjustment generally are designed to be slightly over-biased to take care of variation in components in the circuit. This provides a small safety factor but it does cut the output potential very slightly.

The waveform of the bias current, as seen on an oscilloscope, must be very uniform and of good sinusoidal form. This is necessary because of the peculiarities of the tape response curve.

Unlike the response curve of photographic film, which has a rounded "toe," a long straight line portion and a "knee" at the top, the response curve of tape has a toe, a short straight line portion, a horizontal middle portion, another straight line ascending portion and then the knee at the top.

The bias current by shifting back and forth as it alternates, throws the signal on the two straight line portions of the curve, missing the toe, the flat middle part and the knee. A bias oscillator that is putting out a waveform which is larger on one side than the other will throw the signal out of position on the curve and thus create second harmonic distortion.

Unlike AM radio which has a carrier wave that is modulated by the audio signal (it looks something like a pile of hour glasses stacked on one another) the bias current plus the recording current swings from side to side like a snake going across a piece of glass. This side to side shift, as has been mentioned, causes the flat middle part of the response curve to be missed so that the signal falls alternately on the two straight line portions of the tape response curve.

Having so much responsibility for the proper functioning of the recorder, the bias oscillator is a good starting point to look for if something goes wrong. If the recording is weak or distorted or if the machine will not erase properly the odds are that the difficulty is in the bias oscillator.

The oscillator tube or tubes should be checked out first and if they are putting out the proper amount of current then the component parts of the bias oscillator circuit must be suspected. A resistor, capacitor or other part may have changed its value through age or other cause, throwing the oscillator off in either strength or waveform, both of which are of prime importance, as has been explained.

While the strength of the oscillator current may be measured with a good meter, it takes an oscilloscope to get a picture of the waveform.

The oscillator functions only when the machine is in the record position, activating the erase head and providing the necessary bias current to the record head to get a true recording of the sounds entering the microphone or from another source. On playback it is switched out of the circuit since it is not needed. A machine which plays back satisfactorily but which will not erase or record properly most probably has a defective oscillator.

While all parts of a tape recorder are more or less essential to the operation of the machine, some are "more essential" than others. The bias oscillator buried in the "innards" falls into this category.

NEW PRODUCT REPORT

S T A **OK** S T E D



V-M MODEL 730

... a dual track three-speed monophonic recorder of moderate price with excellent characteristics.

THE V-M 730 tape recorder is a monophonic unit featuring three speeds, $7\frac{1}{2}$, $3\frac{3}{4}$ and $1\frac{7}{8}$ inches per second which are selected by turning a knob situated between the reels. The recorder must be on when speeds are changed.

The unit is compact, measuring only $7\frac{1}{2}$ x 13" x $14\frac{1}{4}$ " and weighs approximately 22 pounds, making it easy to transport.

The case is made of high impact plastic with a leather finish in light tan. Trim parts are gold and the deck is dark brown.

We believe that the ladies will be pleased with the appearance of this machine since it has gotten away from the "suitcase look" which has kept recorders out of living rooms for years. The styling of the whole unit and its subdued tones will fit nicely with almost any decor.

The handle for carrying is spring loaded and is held against the case and becomes part of the decoration when not in use.

A red jewel light on the front grille

indicates when the machine is on. Behind the grille is a 5 x 7 inch speaker with a 2.15 oz. Alnico V magnet. The power output is ten watts.

The recorder has a number of features which make life easier for the recordist. One of these is the "Pause" button located on the left side of the deck. When this is pushed backward and to the right it will stop the tape noiselessly in either play or record.

It is useful when recording from radio or TV to get rid of any unwanted parts of a program, such as the commercials. It is also very handy when using the machine for dictation to stop it while collecting one's thoughts.

Next to the pause button is the odometer type counter and to the right of this are the tape motion controls of rewind, stop, play/record and fast forward.

On the right side of the deck is the monitor button, which matches the pause button in appearance. This is used to switch an incoming signal through the recorder speaker. This is

Product: V-M Model 730

*Manufacturer: V-M Corporation,
Benton Harbor, Mich.*

Price: \$169.95

useful when recording from a tuner or other sound source where it is desired to hear the program material as it is recorded.

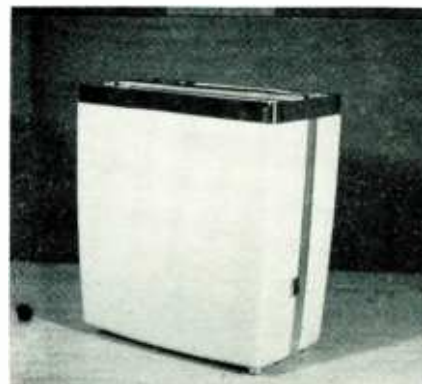
The microphone input jack is located on the right side of the deck at the front where it is readily accessible.

There are two tone controls, one for treble and one for bass. The treble control is effective over a 27 db range and the bass control over a 12 db range. These are effective in playback only. When in record the response is flat.

Our check of the frequency response showed it to be excellent. At 10,000 cycles at the $7\frac{1}{2}$ ips speed the curve was right on the line where it should be and the machine goes out to far beyond this. The results measured by putting a signal on the tape through the recorder and then playing it back again through the machine very closely paralleled the results obtained with a professional test tape.

FM music was recorded using the 730 and this was played back through an excellent home hi-fi system feeding the amplifier from the external amplifier jack on the machine.

The results were of such caliber that the sound from the V-M 730 could not be told from that produced by a machine costing three times as much! Reproduction from the speaker con-



The 730 with case closed. The case is of high impact moulded plastic in light tan. Trim parts are gold, deck brown.

tained in the recorder is very good. The signal to noise ratio is better than 50 db, as are the erase and track separation.

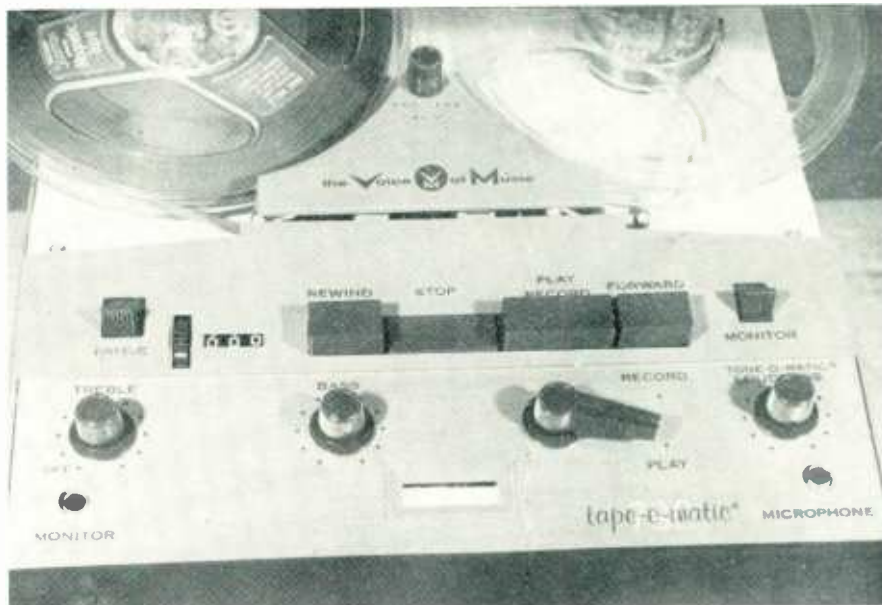
The tape motion controls are all interlocked. To put the machine in the record mode, it is necessary to push the play/record lever to the record position and then depress the record/play button. It will remain in this position until the stop button is depressed whereupon the lever will snap back into the play position.

Since these controls are both large enough to handle easily, in contrast to some machines which have obscure interlock buttons, no difficulty in operation should be encountered by inexperienced persons.

The microphone furnished with the recorder has its own built-in legs which permit the mike to stand up on any flat surface. The legs fold flat against the case for hand held use. A neck cord with clips is also included in the accessory package. When attached to the mike, it may be hung from the neck lavalier fashion, leaving both hands free. The mike cord is eight feet long and has a shielded plug.

To record using the microphone, the plug is pushed all the way in the microphone jack. When recording from radio or TV or from a phono where the output is higher the plug is pushed only half-way in. Pushing it all the way in when recording from a high level source will cause distortion. The phono adaptor plug should be used when making recordings of this type.

The external speaker receptacle on the rear of the recorder does not silence the recorder speaker when it is used. Also on the rear of the machine are found the external amplifier jack,



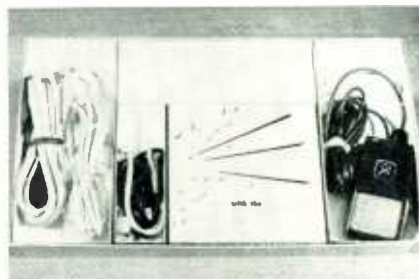
Controls include: speed control (7 1/2, 3 3/4, 1 7/8 between reels at top), pause button, index counter, rewind stop, play/record and fast forward button, monitor switch, monitor jack for headphones. On/off switch and treble control, bass control, recording level indicator, record/play lever, volume control and mike input.

for feeding an external amplifier or hi-fi system and the synchronizer jack. The latter accommodates the sound cord from the V-M 1412 slide projector synchronizer which is used to operate a slide projector from the tape recorder for tape-slide shows.

The unit has six tubes and pulls 120 watts. The power supply is transformer operated employing full wave rectification.

We think it would be a disservice not to mention the instruction book which comes with the machine. It is well designed and well illustrated but what's more important is detailed and complete. Such, unhappily, is not always the case and the tape recorder buyer is left in the dark on many details of machine operation and recording technique.

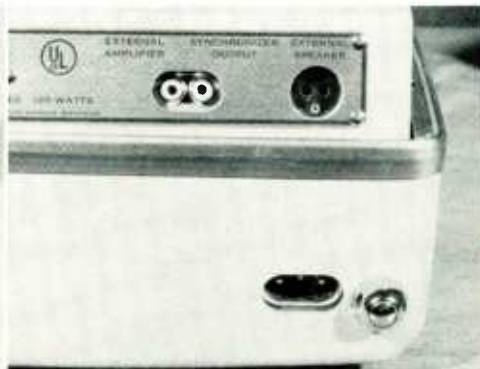
In our opinion V-M has done an excellent job on this machine, both from the standpoint of attractiveness and electronic performance. We think it is well worthy of your consideration if you are planning to buy a monaural machine.



Accessories furnished with recorder include mike with built-in stand and lavalier cord, alligator clips for recording from speaker, audio connecting cords and plugs, external speaker adapter plug, tape, and tape labels.



The microphone has its own built-in stand which holds it in position on any flat surface. A lavalier cord is furnished for hanging the mike around the neck.



On the rear of the case are the external speaker jack, the external amplifier jack, a jack for connection to the VM slide synchronizer and power input receptacle.



The lid has storage space for the microphone and its cord, the cord for connecting to the power supply and pins which will hold two five inch reels in place.

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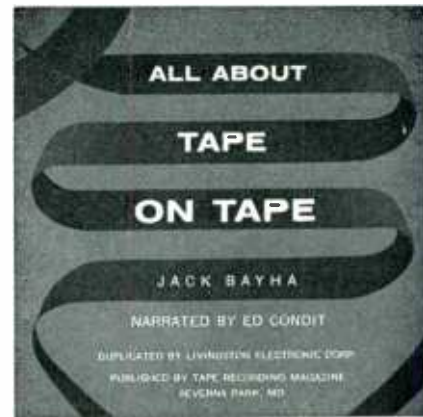
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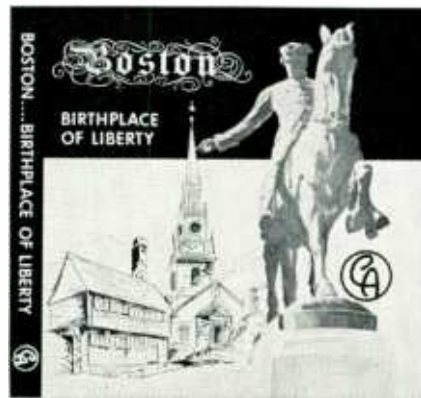
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