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March 1963
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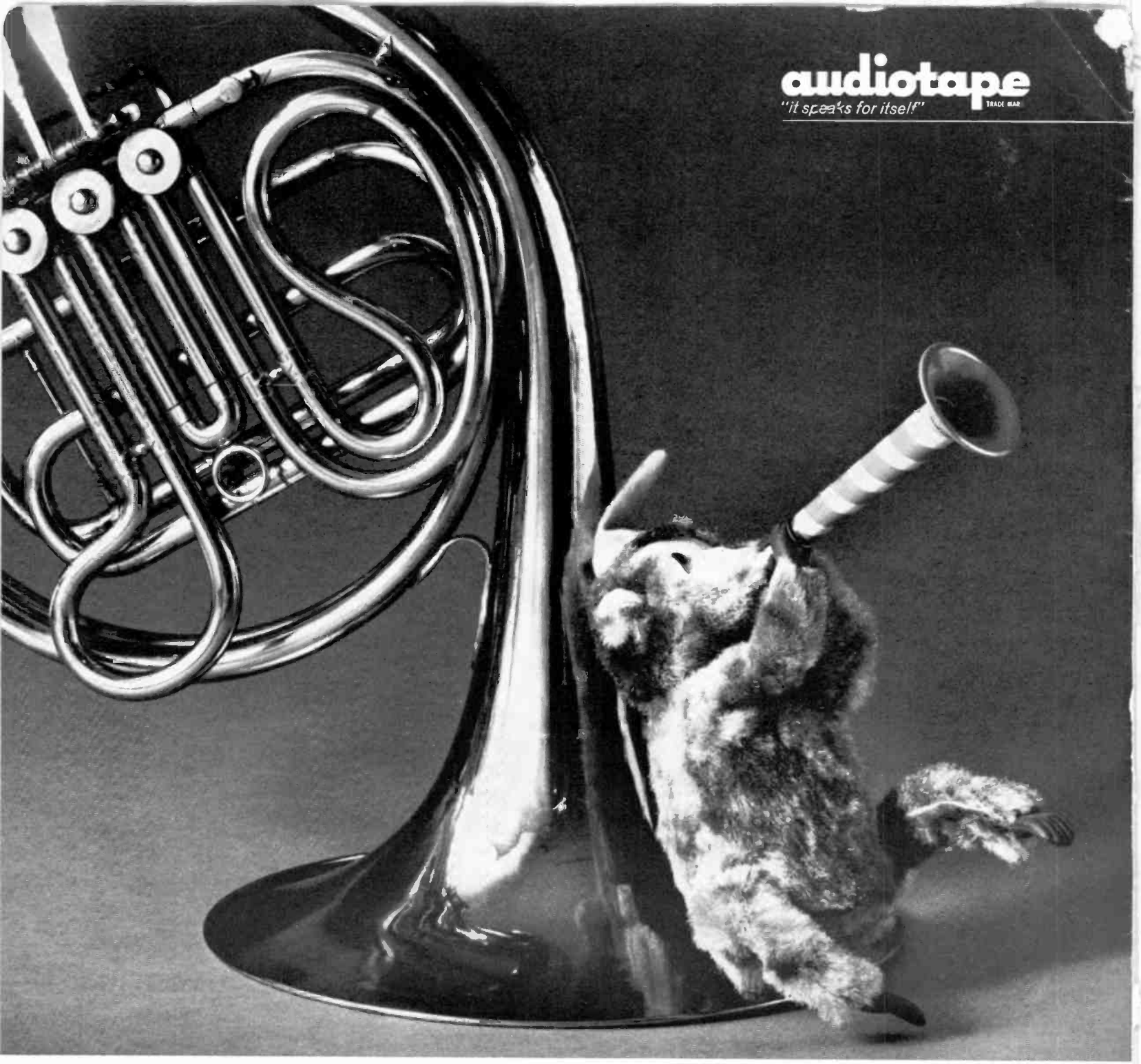

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Buyer's Guide and Condensed Applications Chart—*Norelco*® 'CONTINENTAL' Tape Recorders

This condensed guide, prepared by the High Fidelity Products Division of North American Philips Company, Inc., offers the consumer the factual data he needs to select the tape recorder best suited to his specific requirements.

	Continental '100' Model EL 3585	Continental '200' Model EL 3541	Continental '300' Model EL 3542	Continental '401' Model EL 3534
PRIMARY USERS	The entire family—at work, at play, at home or away.	Serious music lovers with limited budgets.	Schools, churches, teachers of voice and music. Psychiatrists, speech therapists and recreation directors—and collectors of pre-recorded stereo tapes.	Professional musicians, studio recordists, serious music lovers, high fidelity enthusiasts, doctors, dentists, industrial sound installation contractors.
ESPECIALLY SUITABLE FOR	On-the-go, on-the-shoulder recording and playback — anything, anytime, everywhere.	Portable, high fidelity tape-deck applications. Portable public address.	Audio-visual and all specialized teaching applications; music program source for factory, office and home; portable P.A.	Professional-quality stereo recording, live or broadcast; space-saving hi-fi system control center and background music.
SPECIAL FEATURES	Battery-operated, 100% transistorized, feather-light. Records from any source. Tapes interchangeable with all 2-track 1⅞ ips recorders.	Stereo head output direct to external stereo preamp. Records sound-on-sound. Mixing facilities. Compact, lightweight, inexpensive.	3 speeds. Stereo head output for playback through external stereo preamp. Records sound-on-sound. Mixing facilities. Headphone monitoring.	100% transistorized. Completely self-contained for stereo recording and playback at all speeds. Dynamic stereo microphone. Multiplay permits sound-on-sound recording. 4th speed provides up to 32 hours recording time.
RECORDING CAPABILITIES	Monophonic 2-Track	Monophonic 4-Track	Monophonic 4-Track	Stereo and Mono 4-Track
PLAYBACK CAPABILITIES	Monophonic 2-Track	Monophonic and Stereo† 4-Track	Stereo† and Mono 4-Track	Stereo and Mono 4-Track
SPEEDS	1⅞ ips	7½ ips	7½, 3¾, 1⅞ ips	7½, 3¾, 1⅞, 15/16 ips
PLAYING TIME PER REEL	Up to 2 hrs. on a 4" reel	Up to 4 hrs. on a 7" reel	Up to 16 hrs. on a 7" reel	Up to 32 hours on a 7" reel.
WEIGHT	7 lbs.	18 lbs.	30 lbs.	38 lbs.
MANUFACTURER'S SUGGESTED LIST PRICE*	$129.50*	$179.50*	$269.50*	$399.50*

For complete technical data and detailed descriptions of Norelco 'Continental' Tape Recorders, write:

†Tape head output.

NORTH AMERICAN PHILIPS COMPANY, INC., High Fidelity Products Division, **230 Duffy Avenue, Hicksville, L. I., N. Y.**

**The unit prices stated above are for identification only and are not necessarily the regular or usual retail prices and are not to be represented as such.*

TAPE RECORDING

VOL. 10 NO. 4 MARCH, 1963

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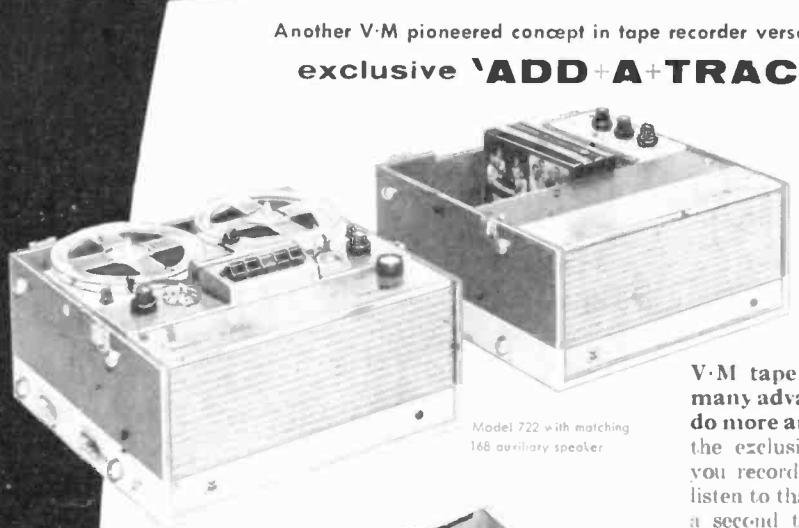


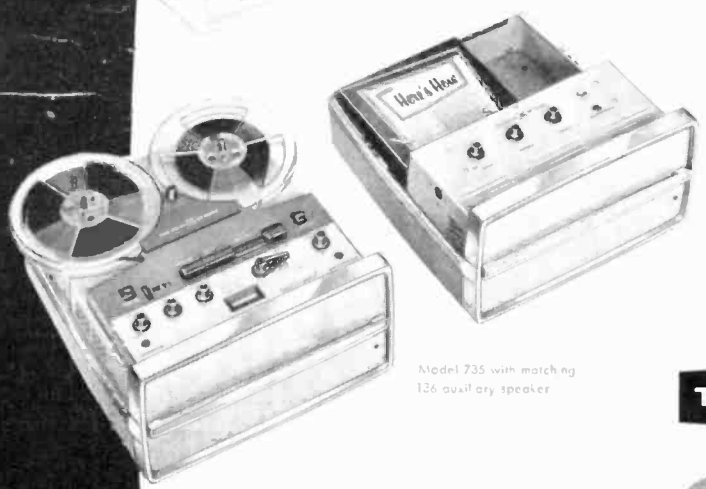
Model 722 with matching 168 auxiliary speaker

V·M tape recorders are the choice of many advanced amateurs because they do more and sound better! For example, the exclusive 'add-a-track'® feature lets you record on one track, then while you listen to that track, add voices or music on a second track of the same tape. When played back, both tracks are heard at the same time. Ideal to learn languages or improve speech or musical abilities, V·M models 722 and 735 offer this unique feature.

Model 722: Stereophonic tape recorder provides two speeds. Companion Model 168 is amplified auxiliary speaker.

Model 735: 'tape-o-matic' recorder with stereophonic playback and three speeds. Auxiliary amplified speaker, Model 136 matches unit exactly.

Model 730: 'tape-o-matic' monaural recorder with three speeds.



Model 735 with matching 136 auxiliary speaker

THE VOICE OF MUSIC®

*Reference: authoritative trade source. Data available on request.

Model 730

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NEW TAPES

★—Fair ★★—Good ★★★—Very Good ★★★★—Excellent

Classical—Robert E. Benson Popular—F. Norman West

CLASSICAL

BRUCH: Violin Concerto No. 1 in G Minor, Op. 26

MOZART: Violin Concerto No. 4 in D, K. 218

Jascha Heifetz, violinist; New Symphony Orchestra of London; Sir Malcolm Sargent, cond.

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

RCA VICTOR FTC 2133

4 track, 7½ ips, 43 mins., $8.95

These performances were recorded around two years ago when Heifetz visited England. RCA has already released a tape of two other performances recorded on the occasion, the "Scottish Fantasy" of Bruch and the Violin Concerto No. 5 by Vieuxtemps (RCA FTC 2111, $8.95), an admirable tape in every way.

Needless to say both performances on this new tape are spectacular technically, with Heifetz in top form, but the romantic Bruch concerto would profit from a richer tone when Heifetz employs here, and the Mozart, despite its finesse, seems rather heartless in this slick performance. Orchestral accompaniments are fine, as is the sound.

BRUCKNER: Symphony No. 5 in B Flat Major

Vienna Philharmonic Orchestra conducted by Hans Knappertsbusch

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

LONDON LCL 80103

4 track, 7½ ips, 61 mins., $7.95

London has now released a tape of Knappertsbusch's interpretation, recorded at least several years ago, of the Symphony No. 5. The cause of Bruckner is not well served here, in spite of the Vienna Philharmonic's long association with music of Bruckner. Tempi are lethargic, and there seems to be no tension, even in the Scherzo. Tape processing is excellent, but the recording itself is quite undistinguished, with a definite lack of bite and absence of big hall sound. In spite of the good intentions, chalk this one up as a dud.

SAINT-SAENS: Symphony No. 3 in C Minor, Op. 78

FAURE: Pelleas and Melisande Suite, Prelude to "Penelope," Masques and Bergamasques

DEBUSSY: Petite Suite

Suisse Romande Orchestra conducted by Ernest Ansermet

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

LONDON LCK 80105

4 track, 7½ ips, 90 mins., $11.95

The main attractions of this tape are the shorter works of Faure and Debussy on the second track. In addition to the familiar lovely suite of incidental music Faure composed for Maeterlinck's play "Pelleas and Melisande," we have the Prelude to his seldom-performed opera "Penelope" and another suite of incidental music entitled "Masques and Bergamasques." Best of all is the charming "Petite Suite" of Debussy. These are not vital masterworks of the repertory, but pleasant miniatures, ingratiating in their unpretentiousness. Ansermet is perfectly at home here, and London's sound is finely-textured.

The Saint-Saens hi-fi showpiece doesn't achieve its maximum effect in this recording. Ansermet's tempi are sluggish and occasionally erratic, and the excellent organ sound only emphasizes the weakness of the orchestra.

BEETHOVEN: Fidelio (complete opera)

Otto Klemperer conducting the Philharmonia Orchestra and Chorus with soloists including Christia Ludwig, Jon Vickers, Gottlob Frick and Walter Berry

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

ANGEL ZC 3625 (two reels)

4 track, 7½ ips, 2 hrs. 9 mins., $21.98

TCHAIKOVSKY: Symphony No. 6 in B Minor, Op. 74 "Pathetique"

Otto Klemperer conducting the Philharmonia Orchestra

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

ANGEL ZS 35787

4 track, 7½ ips, 47 mins., $7.98

STRAUSS: Don Juan, Till Eulenspiegel's Merry Pranks, Dance of the Seven Veils from "Salome"

Otto Klemperer conducting the Philharmonia Orchestra

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

ANGEL ZS 35737

4 track, 7½ ips, 41 mins., $7.98

A WAGNER PROGRAM

Otto Klemperer conducting the Philharmonia Orchestra

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

ANGEL ZS 35947

4 track, 7½ ips, 47 mins., $7.98

It was a welcome surprise to find these new four-track tapes from Angel after such a long period of only limited releases from them. In all cases the tapes are superior to their disc counter parts, with the only drawback being occasional pre-echo in some of the louder passages. Stereo effect is sometimes almost too exaggerated, but few hi-fi enthusiasts will be distrubed by this.

Klemperer's "Fidelio" has been acknowledged as the definitive recording of this opera, and in this superb tape edition it eclipses the recent Westminster tape conducted by Hans Knappertsbusch. The sound is wonderfully natural, with a pleasing balance between the fine singers and orchestra, and this tape should be in the library of every serious collector. The libretto is available via a postcard included with the tapes.

The Wagner collection includes the Entrance of the Gods into Valhalla from "Das Rheingold," the Ride of the Valkyries from "Die Walkure," Forest Murmurs from "Siegfried," Siegfried's Rhine Journey from "Die Gotterdammerung," the seldom-heard Prelude to Act III of "Tannhauser" and the Prelude to "Parsifal." These are noble performances capturing the gandeur of the composer, and technically this is the best tape of the lot.

The Strauss tape is equally admirable from a performance standpoint, although it has more pre-echo than any of the others. As with Klemperer performances, these are broad in scope, somewhat unexciting when compared with the approach to these scores by other conductors, but nevertheless enormously satisfying. Everest's tape of this music with Stokowski conducting (T-43023, $7.95) or Epic's of George Szell conducting "Don Juan" and "Till" together with "Death and Transfiguration" represent the more spectacular approach to the scores.

Klemperer conducting Tchaikovsky is a rarity, but to this, as to all music he conducts, he brings an over-all grasp of the score, avoiding the unabashed sentimentality most conductors feel is appropriate for this music. In spite of an overly-slow Scherzo, and somewhat distorted sound in the last movement, this is as good as any "Pathetique" currently available on tape.

Angel is to be commended for these releases, and we can only hope they will release on tape more of the fine recordings from their catalog.

BEETHOVEN: Leonore Overtures 1, 2 and 3 and Fidelio Overture

Israel Philharmonic Orchestra conducted by Lorin Maazel

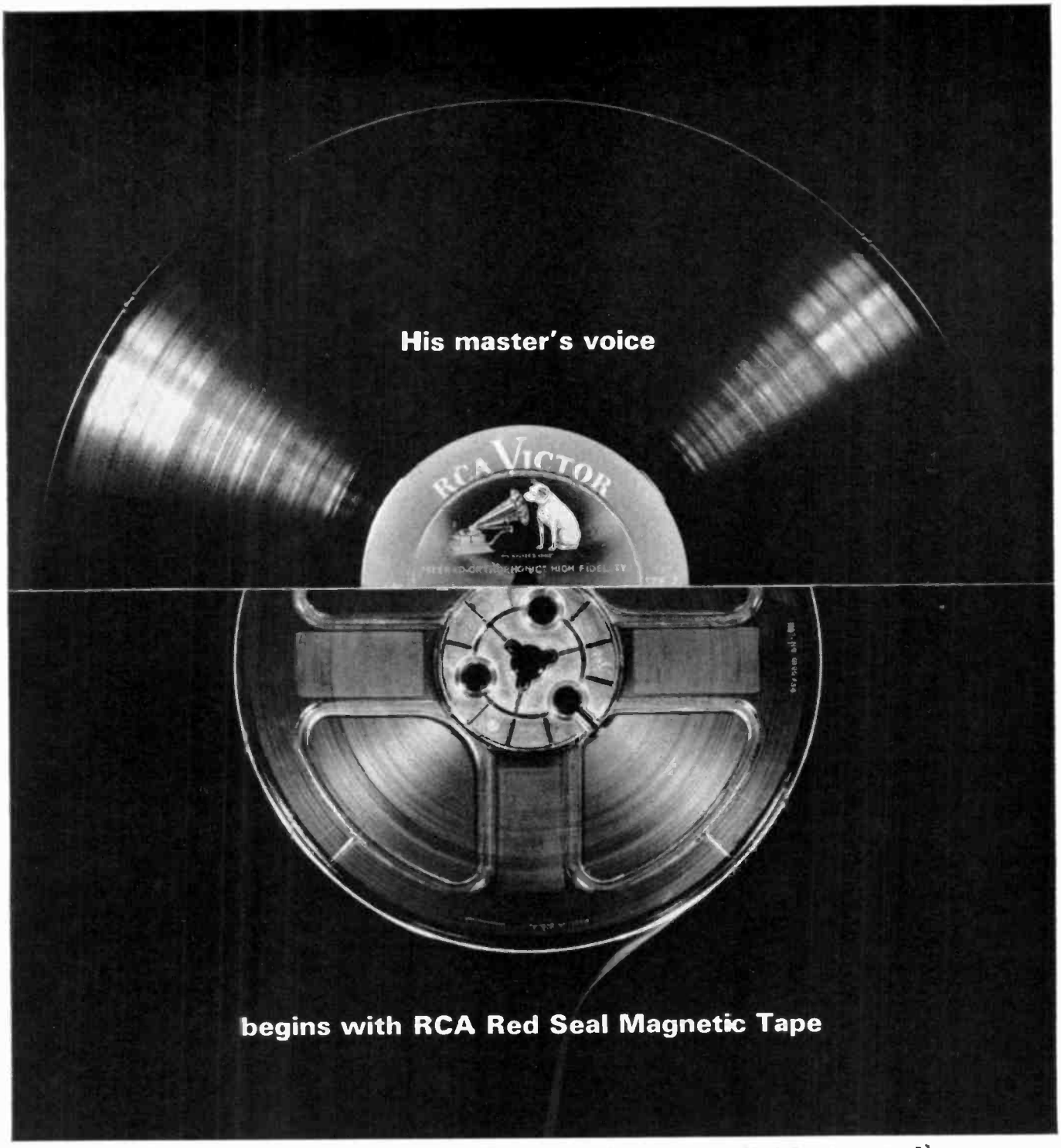
Music	★★★★
Performance	★★★
Fidelity	★★★
Stereo Effect	★★★

LONDON LCL 80114

4 track, 7½ ips, 43 mins., $7.95

This tape contains all four of the overtures Beethoven composed for his only opera "Fidelio." Unquestionably, the third of these is of the most importance musically, but the others are interesting to hear as examples of what the composer felt was inadequate to begin his opera. In performances today, the "Fidelio" overture opens the opera, with the Leonore No. 3 overture played between the two scenes of the second act.

Maazel, at 33, is already recognized as one of the finest young international conductors and he elicits superlative performances from the splendid orchestra. Doubtless as he grows older he will place less em-



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phasis on the virtuoso elements of these scores and more on their musical values.

These performances were recorded in a movie theater in Tel Aviv, evidently a spacious hall judging by the sound on these tapes. The reproduction of the orchestra is full and resonant, with somewhat undefined bass. This tape is decidedly superior to London's earlier tape of Beethoven overtures with Karl Munchinger conducting the Vienna Philharmonic in the Leonore No. 3 and Fidelio overtures heard here, plus the overtures to "Egmont" and "Coriolan."

POPULAR

HIT MOVIE THEMES GO LATIN
Orchestra Del Oro

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

Track A: Exodus, Never On Sunday, Song From Moulin Rouge, Moonglow, Around The World in 80 Days.
Track B: Tara's Theme, Gigi, Ruby, Three Coins In The Fountain, Third Man Theme, High Noon.
BEL CANTO, ST 182
4 track, 7½ ips, 35 mins., $6.95

Nearly every tape label has issued one or more of the hit movie theme albums played by various orchestras in their own style, but now Bel Canto has one that is different.

The world's largest dance orchestra, with more than 90 musicians, directed by Juan Del Oro, gives a Latin beat to a dozen Award Winning songs.

Tasteful arrangements, designed to bring out the quality of big orchestra sound are well recorded, with plenty of natural stereo effect. If you like Latin Rhythm, try this one. —*F. N. West.*

MY SON THE FOLK SINGER
Allan Sherman

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

Side 1: The Ballad of Harry Lewis, Shake Hands with Your Uncle Max, Sir Greenbaum's Madrigal, My Zelda, The Streets of Miami.
Side 2: Sarah Jackman, Jump Down, Spin Around, Seltzer Boy, Oh Boy, Shticks and Stones.
WARNER BROS. WSTC 1475
4 track, 7½ ips, 38 mins., $7.95

Allan Sherman is a TV Comedy writer and producer who amuses his friends with comedy songs of his own writing. On this tape he presents a most hilarious collection of parodies on familiar folk songs spiced with a Jewish flavor and dialect.

The songs are humorous, clean and cleverly written. Sherman is a master with the pun and gag, and uses them in his material to present wit and humor of a high order. He is at his best in the last number, "Shticks and Stones," where he gets in some sharp punches at folk music and personalities.

That he convulsed the audience present at this "live" recording session is ample testimony to his creative comedic talents. Chorus and orchestra, directed by Lou Busch, help out nicely with the fun making. Stereo effect is just right too.—*F. N. West.*

TENNESSEE WALTZ and OTHER COUNTRY FAVORITES
Living Strings

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

Sequence A: Tennessee Waltz, Your Cheatin' Heart, Any Time, A Fool Such As I, Bouquet of Roses.
Sequence B: Have I Told You Lately That I Love You?, I Don't Hurt Anymore, Please Help Me, I'm Falling, Walking The Floor Over You, He'll Have To Go.
RCA CAMDEN CTR 716
4 track, 7½ ips, 31 mins., $4.95

Country music, as played by the Living Strings, is surely a welcome change from the twanging guitar and the pronounced back beat that is generally prevalent in this type of music.

The "Strings" add a fine flavor to this group of country favorites, with some mellow, beautiful high notes, and, although not mentioned, there is plenty of Living Brass too.

Quality of recording is topnotch, with fine fidelity and stereo effect. Real country music with a beat that makes enjoyable listening.—*F. N. West.*

SHOWS

OLIVER!
Original Broadway Cast

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

Sequence A: Food, Glorious Food, Oliver, I Shall Scream, Boy For Sale, Where Is Love, Consider Yourself, You've Got To Pick A Pocket Or Two, It's A Fine Life, Be Back Soon, Oom-Pah-Pah.
Sequence B: My Name, As Long As He Needs Me, Who Will Buy?, Reviewing The Situation, I'd Do Anything, As Long As He Needs Me (Reprise), Reviewing The Situation (Reprise), Finale.
RCA VICTOR FTO 5017
4 track, 7½ ips, 52 mins., $8.95

After a successful tour across the country, the new English musical "Oliver!" has now officially established itself as a box office winner on Broadway, with both critics and public alike.

Based loosely on Charles Dicken's "Oliver Twist," the book, music and lyrics of Lionel Bart have fashioned a gloomy tale into a musical of charm and simplicity. The story deals with misery and hunger of unfortunate boys in a London workshop, and petty crime and thievery of Fagin's pickpocket school.

To create a musical that is light and amusing from such a sordid tale would seem to be well nigh impossible, but apparently it has been done, and exceptionally well, too.

Our report here is concerned not so much with the show itself, as with the music contained on this tape.

There are sixteen songs in all, capably handled in lively and melodic fashion by the all English cast. Clive Revill, as Fagin, growls his way through several numbers, and Georgia Brown, as Nancy Sykes, is a standout with *"As Long As He Needs Me,"* a song that has already reached hit proportions. However, the real stars are the kids, with Bruce Prochnik as Oliver, who leads the crowd in songs that show off their talents admirably.

Recording and fidelity are first rate, with wide spread stereo used effectively.

This is another original cast album that will be appreciated more if the listener has already seen the show.—*F. N. West.*

STOP THE WORLD—I WANT TO GET OFF
Anthony Newley and Original Broadway Cast.

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

Side 1: Overture, A-B-C Song, I Wanna be Rich, Typically English, Lumbered, Glorious Russian, Meilinki Meilchick, Gonna Build A Mountain.
Side 2: Typische Deutsche, Family Fugue, Once In a Lifetime, All American, Mumbo Jumbo, Someone Like You, What Kind Of A Fool Am I?
LONDON LAN 85001
4 track, 7½ ips, 48 mins., $8.95

With so many of our successful Broadway musicals of English origin or background, it is small wonder that producer David Merrick lost no time in importing "Stop The World" to these shores, where it promptly established itself as another smash hit.

In this production an unusual plot, situations, spice, sex, and catchy music have been combined with imagination and talent by Anthony Newley and Leslie Bricusse.

Mr. Newley, also the star of the show, displays an engaging personality and carries his assignments with exceptional ability. He portrays the hero of the story, "Littlechap," a man who is determined to get to the top regardless of any obstacles in his way.

His wife is played by Anna Quayle, whose performance is excellent. As a team the two of them are tops. The music is above average and most enjoyable. One number, *What Kind of Fool Am I?* is already on the best seller list.

Recording has good presence, but stereo effect is somewhat limited. A unique tape that will have particular appeal to theatregoers.—*F. N. West.*

STOP THE WORLD, I WANT TO GET OFF
OLIVER!
Mantovani and his Orchestra

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

LONDON LPM 70058
4 track, 7½ ips, 30 mins., $6.95

Listeners who do not desire to play through two complete show albums of *Stop The World* and *Oliver!,* now have a sampler-sized instrumental version of the music, played by Mantovani and his Orchestra.

This popular maestro generally makes anything he plays sound good, but his interpretations and arrangements of these selections contribute little to tunes that derive their flavor and spirit from the lyrics rather then from the melodies.

Beautifully recorded, with fine stereo effect, the tape might well be worth it's price, except for the fact that the Oliver! side has 18 minutes of music, and Stop the World has 12. This makes the price of unrecorded tape a bit too high.—*F. N. West.*

CAPSULE REVIEWS

CLASSICAL

ANGEL ZS 35505, $7.98, 4 track, 7½ ips, 46 mins., RIMSKY-KORSAKOV: Scheherazade, Op. 35 played by the Royal Philharmonic Orchestra conducted by Sir Thomas Beecham. This is undoubtedly the most elegant recording of this music, with virtuoso performances by the orchestra. Sound is better than the corresponding disc, with wide-spread, rich reproduction. Competition is great, notably Reiner's recording with the Chicago Symphony on RCA (FTC 2017, $8.95).

CAMDEN CRS 489, $4.95, 4 track, 7½ ips, 54 mins., TCHAIKOVSKY: Symphony No. 5 in E Minor, Op. 64 and March Slave, Op. 31 played by the Oslo Philharmonic Orchestra conducted by Odd Gruner-Hegge. These are rountine performances, only moderately well recorded, but the low price may attract some collectors. Everest's twin-pack coupling of this symphony with Dvorak's New World Symphony offers greater quality at a proportionate cost not considerably higher (Everest 43-007, $11.95).

CAPITOL ZP 8371, $7.98, 4 track, 7½ ips, CHOPIN BY STARLIGHT: Most of these arrangements were made by Carmen Dragon who here conducts the Hollywood Bowl Symphony Orchestra. Selections include the familiar Polonaise in A Flat, Nocturne in E Flat, Fantasie-Impromptu and seven others. I found the orchestrations overly saccharin and considerably less effective than the piano originals. The reproduction is adequate, but sounds as if artificial reverberation was used.

POPULAR

ABC PARAMOUNT ATC 827, ADVENTURES IN PARADISE. Apaka, Smeck and the Islanders, 4 track, 7½ ips, 33 mins., $7.95. This is a splendid presentation of Hawaiian music featuring the voice of the late Alfred Apaka. It is worth the price of the tape just to hear him sing. The Islanders give a good account of themselves in the instrumentals, as does the renowned Roy Smeck, master of stringed instruments. Most of the selections are calm, restful and dreamy, although the Tahitians bring you back to reality, when they present authentic atmosphere. The tape might have been better with out them.

WARNER BROS., WSTC 1480, GYPSY. Original Sound Track, 4 track, 7½ ips, 45: 50 mins., $7.95. Transplanted from the Broadway stage to Hollywood film, this gaudy, brassy musical, based on the life of Gypsy Rose Lee, has a completely new cast of actors. There are some good solid tunes in the well orchestrated score, but it is in voice performances that Gypsy is lacking. Rosalind Russell's dubbed voice is no match for the boisterous Ethel Merman, and the other principal singers are equally unconvincing. The music is probably more enjoyable when the visual performance is available. Quality of sound and limited use of stereo offer no comparison with Columbia's original cast album.

CROSSTALK

from the Editors

"MUSIC HATH CHARMS to soothe the savage breast" according to an old quotation but from an item which we came across recently it also apparently has an effect on vegetables.

* *

ACCORDING TO THE NEWS, if you want to make corn grow faster the thing to do is play a flute in a cornfield. This fact was revealed in a report made to the International Botanical Congress in Montreal.

* *

THE FLUTE MUSIC was played to a test group of plants for half hour a day for thirty days. A control group was left in silence. The plants which "listened" to the music grew 25 to 50% faster than the others.

* *

IF THIS BECAME GENERAL it sure would be "cornfusing" in the countryside as the farmers spurred their plants on to greater effort via the musical route. We don't know if the musical treatment works on plants without "ears." And the suggestion has been made that perhaps the government will have to subsidize orchestras for not playing in the fields, like they now pay farmers for not growing grain and other things.

* *

MAYBE THIS MUSIC being played to plants could be made to work on the wife's African violets or pet petunias. Naturally the tape recorder could do the job if equipped with an endless loop. A similar plant out of earshot of the experimental plant should be set up as a control. In fact, the whole business should be out of your own earshot or you'll go nuts from hearing the same thing played over and over again.

* *

THE ITEM DID NOT STATE whether the music used was classical, rock and roll or standards. Possibly one kind might produce a more marked effect than another. One also starts to wonder what would happen if a transducer were placed underground so that the seed and then the roots would be exposed to direct vibrations through the soil rather than the air.

* *

IT IS A WELL KNOWN fact that background music in manufacturing establishments ups the production rates of workers and similar music in stores holds people longer and thus tends to up sales. Cows are also more contented and give more milk if music is played in the barn. So there may be more to this business of music and plants than meets the eye.

* *

WITH SPRING ABOUT to be sprung in most parts of the country now is the time to begin thinking about making an experiment like this if you choose. It might be interesting to find out what kind of music produces the best results. We do not know if anything has been done along this line or not.

* *

WHICH RECORDER SHOULD I buy? This is a question which we get frequently in letters—and it is one which we cannot answer. . . . It is much like telling someone which girl he should marry for they all have different features and what would suit one man would be poison to another.

* *

OUR BEST SUGGESTION is tobuy the best recorder you can afford and which has the most features which you will need. Before dashing to the recorder dealer's shop, sit down and write out the uses which you wil have for the machine. Then list the features which will be required to accommodate those uses.

* *

ONCE YOU HAVE DONE this, you will be surprised how your choice has been narrowed down to a relatively few machines. From there on it becomes a question of price, service and the integrity of the manufacturer.

TAPE CLUB NEWS

Earn Money Taping W.T.P.'s

Members of World Tape Pals and World Tapes for Education are invited to submit reports telling about life in their country to "Patterns," a public service radio feature heard on U. S. radio stations.

Reports should be confined to 1½ minutes, and should begin with the sentence: "This is (name) from (city and country) speaking for Patterns."

Producers of Patterns are interested in general material for subjects such as a great moment in the nation's history, a legend, a custom, how people dress, description of town, scenic spot, or major industry, humorous news item from the daily paper, cultural life, etc. Each report should be limited to only one subject, and care in production should be primary. Background music or interviews with another person should not be used. It is suggested that you submit four reports on one 3-inch reel, recorded at 3¾ ips, for consideration.

Each reporter will receive $2.00 for each accepted report. Tapes should be sent to WTP Michael Daves, 11911 High Meadow Drive, Dallas 34, Texas.

Answering A Tape

Last issue we ran some pointers on sending your first tape as suggested by the American Tape Exchange Club. Now A.T.E. sends along its suggestions for answering a tape.

While listening, take a few notes about things you care to comment on when you answer. Note especially all of the questions. No need to make these notes lengthy—just a word or two to remind you will suffice. Be sure to give full answers, but don't over-pad the tape.

Some persons have the idea they must fill a tape. This is untrue; if you have finished, say so and tell your listener goodbye. Explain that the remainder of the reel is blank. Or, you may wish to fill in with music. Be sure you know the type of music your listener likes.

Always answer your first tape from a new contact promptly. As a matter of fact, you should not issue or accept an invitation unless you are reasonably sure you can proceed through the first exchange cycle on a definite schedule. If, for any reason, your time is to be limited, explain this to your tapespondent on the first tape. No time limit is required in answering a tape if the two individuals fully agree and understand these things in advance.

U.M.V.F. "Service de Tutelage"

Once again, we make reference to a service offered by The Union Mondiale des Voix Francaises Club. In using this service, a club member is able to converse with a French-speaking tutor in France, Belgium, or some other French-speaking area who will help you in learning the French language. You will learn direct from Europe many things about their life. The French-speaking correspondent is not really so much a tutor as a friend, in this case, one who can adapt to the student's possibilities and, more important, provide personal encouragement.

The U.M.V.F.'s object in offering this service is not so much to teach French as to offer an opportunity to improve and add to, with real life experiences, a basis of French grammar or conversation.

This service is free except for an initial fee of $1.25, and the only cost from then on is for postage each way on the tapes. It is felt that in return for his effort the student should pay the tutor for return postage, and for this the club has organized a system where the student buys tickets at 3 for $1.00. A ticket or "bon" is sent with each tape which the tutor can then send to the Paris office for a refund.

Anyone interested in learning French is invited to contact Emile Garin, club secretary.

New Club For Shut-Ins

Charles W. Ingersoll, 1420 Avenue "C" of Cloquet, Minn., has organized a tape club for shut-ins only known as "The Friendly Tape Network." There are no membership dues at present. The Network is operated on the round robin basis. Anyone interested may receive information by sending a self-addressed stamped envelope to Mr. Ingersoll at the above address.

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.

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

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

AMERICAN TAPE EXCHANGE
Clarence J. Rutledge, Director
1422 No. 45th Street
East St. Louis, Illinois

CARTRIDGE CORRESPONDENCE CLUB
George C. Ekmalian, Sect.-Treas.
45 Haumont Terr.
Springfield, Mass.

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
Rosemauri Brickens, Secretary
R.R. 4, Box 384
Indianapolis 27, Indiana

INTERNATIONAL VOICES OF YOUTH
P. O. Box 3041-T
San Mateo, California

MAGNETO-VOX CLUB
J. M. Roussel, Secretary
7915 Des Erables
Montreal 35, 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
c/o Romance Languages—Rm. 1617
Cathedral of Learning
University of Pittsburgh
Pittsburgh 13, Pa.

UNIVERSAL TAPE NETWORK
Larry Duhamel, President
R. F. D. #1, Main St.
East Douglas, Mass.

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

OVERSEAS

AUSTRALIAN TAPE RECORDISTS ASSOC.
Grahame Lowe, Hon. Sec./Treas.
P. O. Box 67, Eastwood,
New South Wales,
Australia

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

INTERNATIONAL TAPE FELLOWSHIP
Fred Rimmer, Overseas Rep.
21 Mount Pleasant
Sutton-in-Ashfield
Nottinghamshire, England

STEREO TAPE CLUB
P. J. Kruger, Secretary
3 Clan Building
181 Main Road
Diep River
Capetown, South Africa

THE NEW ZEALAND TAPE RECORDING CLUB
Kenneth M. Texford
P. O. Box 7060
Auckland, W. 1, New Zealand

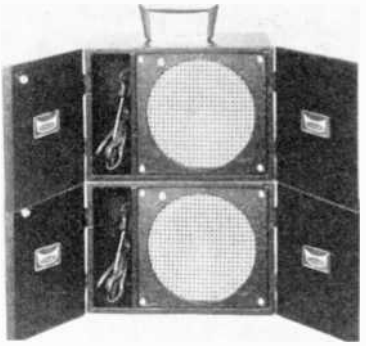
WORLD WIDE TAPE TALK
Charles L. Towers, Secretary
35 The Gardens, Harrow
Middlesex, England

NEW PRODUCTS

KNIGHT TAPE DECK

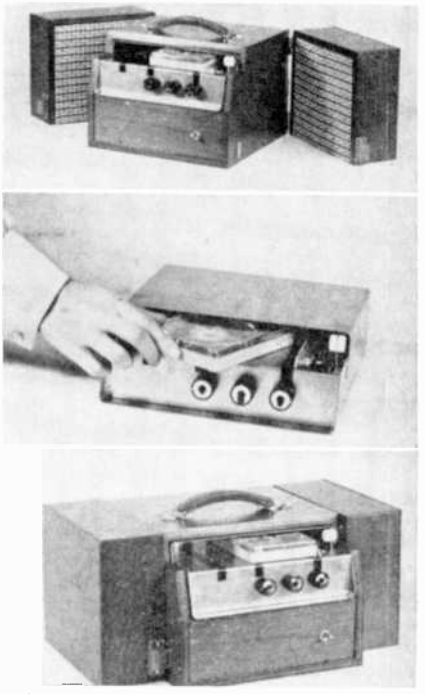
The Knight KN-4400 professional-quality stereo tape deck has been introduced by Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill. This 2-speed tape deck provides complete 4-track stereo and monophonic tape facilities. It has laminated 4 track record/play head and a double-gap erase head, a built-in stereo record/play preamplifier which includes dual VU meters, and a built-in multiplex sub-carrier filter. The tape deck has a single sliding lever that selects rewind, stop, record/play, or fast forward. It can change from 7½ to 3¾ ips at the touch of a button. The deck is perfect for custom installations and can be mounted vertically or horizontally in a 12½ inch square cutout. The cost is $179.95, and an optional carrying case is available at $24.95. For more details, write to Allied Radio Corp.

CITROEN SPEAKER SET



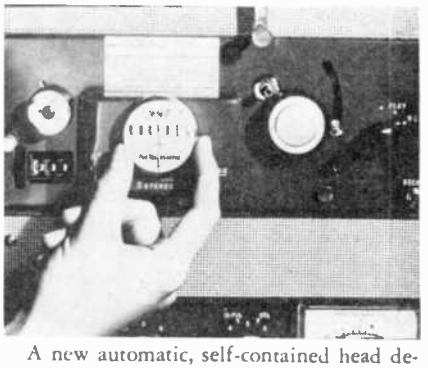
Citroen Electronics Corporation, 729 North Highland Avenue, Los Angeles 38, California, has designed a wide range stereo speaker set, Model S-40, for use with their tape recorders and other stereophonic equipment. The speakers weigh just six pounds, are 12" wide and 19" high, and they have a frequency range of 50 to 15,000 cps. They have bass ports protected by heavy metal grilles, an infinite baffle in the sound chamber and the doors of the speakers act as sound baffles. The speaker case is of grained vinyl and includes handy storage compartments for tape recorder accessories. The S-40 retails for $59.50. Literature on this set is available from Citroen.

"WAYFARER" CARTRIDGE UNIT



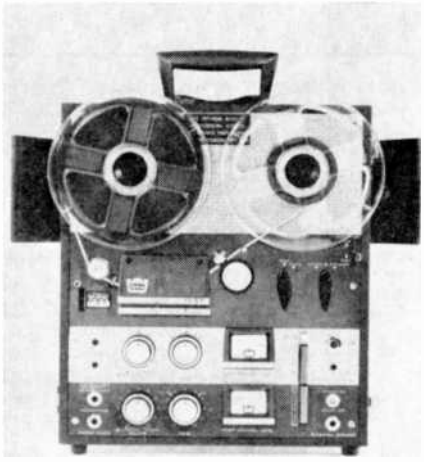
Electronics Recorders, Inc., 7418 Beverly Blvd., Los Angeles, Calif. has introduced a new, versatile stereo tape unit which is designed for continuous play cartridge tapes. This "Wayfarer" stereo playback unit plays in the home on 110 volts, in an automobile, boat or aircraft on 6 or 12 volts, and as a portable on its own batteries. The pre-recorded stereo tapes are encased in plastic containers and are self-winding. The unit is self-contained, including two detachable speakers, converter and batteries. A cartridge is simply slid into the unit, a lever pulled and the tape is playing. The tapes are 4 track. Electronic Recorders has also compiled a library of cartridge stereo tapes available. The unit is priced under $250. Additional information may be obtained by contacting the manufacturer.

ROBERTS ADDS DEMAGNETIZER



A new automatic, self-contained head demagnetizer has been added to the Roberts Models 997 and 1057 recorders to end "residual magnetism," a problem that can affect all recorders. Through continued use, the tape heads may become magnetized, a a condition which can increase the noise level and distort recorded signals. This Roberts demagnetizer is simple to use and takes just a minute of time, once a week, to insure that heads are demagnetized. All Roberts Models 997 and 1057 now being shipped include the demagnetizer.

ROBERTS NEW MODEL



Roberts Electronics, Inc., 5978 Bowcroft Avenue, Los Angeles 16, California, is marketing their new Model 1057 stereophonic tape recorder. It incorporates such advanced features as 4-track stereo and monaural play, sound-on-sound multiple recording in stereo, sound-with-sound, and sound-over-sound microphone and radio-phono mixing. Other features include dual extended range stereo speakers, dual, self-contained stereo power amplifiers, two large easy-to-read VU meters, separate record buttons for each channel with record safety lock, pre-amp outputs, 4 stereo outputs, three-position speaker switch, automatic shut-off, professional edit lever, professional index counter and automatic tape lifters. Tape speeds are 3¾ and 7½ ips, and a 15 ips accessory kit is available at no extra cost. The 1057 is designed to operate in either a vertical or horizontal position for custom installation. Cost is $339.95. Contact Roberts for more information.

NEW SHURE MIKE

Shure Brothers, 222 Hartrey Avenue, Evanston, Illinois, has announced a new omni-directional microphone, called the Model 575 Versadyne because of its versatile dynamic cartridge. It features a smooth response from 40-15,000 cps; it has a rugged Armo-Dur body with satin anodized cap and stainless steel grill; and it is adaptable to hand-held, stand-mounted or lavalier use. The Versadyne is available in two models: Model 575S features high impedance and high output, and Model 575SB is a low impedance model. Both feature a slide-to-talk locking switch, frequency response 40-15,000 cps, and the output level of 575S is —58 db and of 575SB is —62 db. The price of 575S is $24.00 and 575SB is $21.00. Any further information desired is obtainable from Shure.

PRESSURE PAD REPLACEMENTS

Robins Industries Corp., 15-58 127th Street, Flushing 56, N. Y. has available packages of replacement pressure pads for tape recorders. These handy pads are partially cut in individual sizes and there are some felt pieces left whole for cutting to desired size. Pressure pads are easily replaceable on most machines and should be changed when worn or caked with residue. These packages of pressure pads sell for $1.00. When ordering, specify Part No. PP-1.

CITROEN BOOKLET

Citroen Electronics Corp. has prepared a 24 page booklet on portable tape recorders and their uses as well as technical data on their portable units and accessory equipment. Priced at 50¢, this is one of the most comprehensive booklets on tape recorders ever assembled, and it is available now from the company's headquarters at 729 N. Highland Avenue, Los Angeles 38, California.

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.

Tape Recording magazine assumes no responsibility for any inquiries between people listed in this column which are not answered.

Ray Bradford, 1134 7th St., Apt. 9, Santa Monica, Calif.; Recorder: Lafayette RK-100, 2 track, 3¾ & 7½ ips; Interests: Corresponding with intellectual interesting people, piano students or professionals, modern jazz, classical music, free thought, satire, humor, electronics, philosophy, psychology; Adult (30), single. All welcome, all answered.

John Llanes, 1152 Briarcliff Dr., Rantoul, Ill.; Recorder: Akai M-5, semi-professional model, 4 track stereo, single individual tracks mono, playback older 2 track stereo tapes also, 3¾, 7½, 15 ips; Interests: Tape-movies shows, Latin-American music preferable in stereo (exchange of tapes). I speak, read and write Spanish fluently also. Would like information on other recorders like mine; Adult (31).

Elver Bolay, Jr., 1496 W. Main, Decatur, Illinois; Recorders: Ampexes, 7½ & 3¾ ips, records 4 track, 2 or 4 track playback; Interests: Photography, both 8 mm and 35 mm, radio control, model airplanes and boats, stereo-records, tapes, and radio, sound effects, tape techniques, popular music, mostly instrumental. Wants to tapespond in stereo, also to female of similar age in mono or stereo; Adult (27), single.

David Casson, The Spotlight Sound Studio, 15 Cameron Drive, Northampton, Northants, England; Recorders: Grundig TK20, Philips Transistor Portable, (British) Sound Riviera, speeds of 1⅞ and 3¾ ips; Interests: tape, 8 mm cine and the professional cinema (projection), and also science fiction; Adult (20).

John A. Campbell, 491, Beacon Street, Boston 15, Mass.; Recorder: Norelco 300, 1⅞, 3¾ and 7½ ips, 4 tracks; Interests: Recordings of BBC comedy series "The Goon Show" wanted, and I am prepared to exchange goon shows from my own collection. Likewise, I am interested in 20th century classical music recorded from broadcasts, and which is not commercially available; Adult.

Ed Phillips, 1504 Sheridan Avenue, New York 57, N. Y.; Recorder: Robuk RK3 (British), 1⅞ 3¾ and 7½ ips, 2 track mono; Interests: Psychology, literature, new views on established subjects. Am learning French and would appreciate criticism and aid. Would welcome tips on unusual recorder applications and "home-brew" accessories, i.e. audio shut-off, Vox, male, female, any country invited; Adult (22).

Preston Burge, Jr., 2741 Posey Dr., Irving, Texas; Recorders: Ampex 601-2, 7½ ips, 2 track rec., 2 and 4 track play, Viking 85, 3¾ & 7½ ips, 2 and 4 track play; Interests: Song writing (C&W—R&B), and sound systems. Would like to hear from anyone of like interests; Adult (30).

Bob Schwartz, 1860 Greenbriar Place, Cincinnati 37, Ohio; Recorders: Pentron and V-M, 7½ or 3¾ ips, dual; Interests: I'm a law student and graduate of Ohio State University. I would like to tape with others around my age interested in social or psychological sciences—hypnotism, literature, ham-6, radio announcing, gadgets, practical jokes, creative invention; Adult (22), single.

Elaine Goodman, 76 Riverside Drive, New York, N. Y.; Recorder: Revere, monaural, 3¾ & 7½ ips; Interests: Folk Music, Flamenco and classical, guitar, opera, classical; Adult (28).

Gregg Turner, 32 Upper Bartlett Rd., Quaker Hill, Connecticut; Recorder: Ampex 960, 2 or 4 track, 7½ or 3¾ ips; Interests: Pipe organ, Mormon Tabernacle Choir tapes, classical music, railroad sounds, railfans please write; Teenager (16).

Bert Van Loon, 893 Lancaster St., Albany 3, N. Y.; Recorder: Norelco "400", 4 track, full stereo, 1⅞, 3¾ & 7½ ips; Interest: High quality old-time fiddling. If suitable, will purchase or exchange tapes; Adult (single).

Lee Reininger, 318 Midland Ave., Pompton Lakes, New Jersey; Recorder: Westinghouse, monaural, 3¾ & 7½ ips, dual track; Interests: Conversation, foreign customs, tropical fish. Would like to exchange tapes with anyone, anywhere, any subject; Adult (36).

Floyd Mitchell, Bridgeton, Indiana; Recorder: Webcor, 2T-4T, 1⅞, 3¾ & 7½ ips; Interests: Talk travel, color slides, picture post cards; retired.

Ted Taeth, 21465 Detroit Road, Cleveland 16, Ohio; Recorder: Wollensak, 3¾ & 7½ ips, 2 and 4 tracks; Interests: Compiling notes on the history and life of female impersonators up through modern times. Can you help? Recordings of night club comedians, male and female impersonations. Controversial discussions or books. Psychic phenomena. Adult humor. Hypnosis. Send tape, will answer promptly; Adult (38), married, self-employed.

Jack Lampton, 1049 Jackson Pike, Columbus 23, Ohio; Recorders: Webcor 2207, 2 and 4 track, 1⅞, 3¾ and 7½ ips; Revere T-500, 1⅞ ips, half track; Interests: Circus, Minstrel, Showboat, Calliope tapes, old and modern bands, am musician; Adult (58), married.

Charles Q. Berkey, Jr., P. O. Box 3461, Hayward, California; Recorder: Roberts 1057, 3¾ & 7½ ips, 2 & 4 track stereo, 1, 2, 4 track mono; Interests: Commercial photography, sound effects, pre-recorded music. I am starting to learn Spanish. Would like to talk to any of Jehovah Witnesses, any country; Adult (27), married.

Sid Finley, Jr., P. O. Box 1709, Asheville, N. C.; Recorders: Telefunken-85, dual track, 3¾ & 7½ ips; Korting-1585, 4 track, 3¾ & 7½ ips, stereo/mono, record/playback; Norelco-100, dual track, 1⅞ ips only; Interests: Women, recorders, C.B. radio, motorcycles of all kinds, music of all kinds except opera, sport cars, women; Adult (single).

Roger Feingold, 2055 Cruger Avenue, Bronx 62, N. Y.; Recorders: V-M 722 and 714, 3¾ & 7½ ips, 1, 2 and 4 tracks, stereo record/playback; Interests: Hypnotism, music—all kinds, people from other countries, science-fiction, all forms of E.S.P., mental telepathy and other phenomena of this kind, just talking in general about anything, debating, photography, occult, anything I left out? I will answer all tapes from boy or girl, man or woman, any age, from this country or any other. I speak a little Spanish; Teenager (17).

Mory Victoria Monroe, 116 Drake Avenue, South San Francisco, Calif.; Recorder: Sony 300, 7½ or 3¾ ips, 2 or 4 track; Interest: Would like to tapespond with anyone interested in poetry and/or camping; Adult.

"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.

Gentlemen:

It is hard to put a value on something as important as sound.

If I was to walk outside of my house and yell, only those around me could hear.

My tape recorder has brought the voice of many new friends into my home and the sound of my voice has reached others all over the world, bringing new ideas and understanding on all subjects.

So my recorder is like a friend who brings a voice of a friend in for a visit and what could be more valuable?—*William Korzelius, Bergenfield, N. J.*

Gentlemen:

My tape recorder has enabled me to acquire a personally valuable collection of recorded historical events and music not readily available to the public. It has given me many enjoyable and profitable years of use.

The most priceless tape recording I've ever made is that of my father speaking over the telephone to my three children, my wife and myself. He passed away last March and I will always have this recording to listen to and treasure.

My recorder has prompted my interests in all aspects of tape recording and my interests lead me to help form The Society of Tape Hobbyists of which I am Chairman of the Public Relations Committee.

My tape recorder will always be an important item in my household.—*Thomas A. Roker, Jr., Woodside, N. Y.*

Gentlemen:

For several years we had an old tape deck wired into a radio phonograph, but aside from transferring a few 78 rpm records to tape, we did little with it.

Then we bought a modern tape recorder (SONY 101) and decided to see just what it could do for us. It proved so useful that we added a Tandberg model 4 to our equipment, and now use both machines constantly. Here are some of the ways:

1. For taping music from FM radio (and listening to it whenever we wish). We subscribe to station program guides and plan our taping in advance.

2. For taping player piano music wherever we can find it. (We're slightly nuts on this subject).

3. For taping talks, discussions, plays, and readings from Pacifica Radio. We're fortunate in having a Pacifica station in New York (WBAI) and urge all New Yorkers to subscribe. Same goes for people in Los Angeles and San Francisco, also served by Pacifica. Many of these tapes we send to our God-daughter, in college, who listens to them and plays them for the girls on her floor. Thus, these girls get the benefit of Pacifica's fine programming, even though they're 200 miles away from New York.

4. For improving my own daughter's Latin vocabulary, through sleep learning, and helping her build worthwhile personality traits, using tape vendor, pillow speaker, etc. (This works rather better than one would expect).

5. For corresponding with my clients. In preparing financial estimates it's necessary to mail a worksheet, partially filled in, on which the client must enter certain figures. Instructions for this sort of thing are much better taped than written (and clients who've never used tape are fascinated).

6. My daughter enjoys reading aloud and play-acting with the tape recorder. Her reading ability and diction are already improving, because she's her own critic.

So you see, our tape recorders are pretty valuable family members. At times, I wonder how we managed to get along without them. —*Halbert Speer, Brooklyn, N. Y.*

Gentlemen:

In trying to learn a foreign language in the United States, we are greatly handicapped by not being able to hear a great deal of the language spoken by native speakers. I have been studying Spanish for some time but my ability *to speak* has always lagged far behind my ability to read and write well.

With the advent of the television and radio courses and the capability to preserve and repeat the sounds with the tape recorder, I have at last begun to make progress in speaking. With my two machines, it is possible to edit and to collect as much as two hours (one side, ½-mil tape) of Spanish for my wife to listen to. She is also interested in learning Spanish but does not care for the electro-mechanical aspects of tape recording. I also make short tapes for my portable tape recorder which I may listen to at odd moments.—*William C. McHenry, Bethesda, Maryland.*

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

Noise Pickup?

To the Editor:

I have been using a small, battery operated tape recorder to obtain recording outside the home, usually recording at the 3¾ speed.

Later I transfer the recording to another machine using a connecting cable. In re-recording this way does one pick up noise from the second machine?—*R.J.H., Oakland, Cal.*

Since you are making the recording by means of a connecting cable, without the use of a microphone, there should be no increase in noise level since there is no pickup of extraneous noise.

The only possible source of noise is hum induced into the connecting cable through the influence of electrical fields—which is a very remote possibility—or hum due to a difference in potential between the two machines. Since only one of them is connected to the power line, this can likewise be ruled out as a possibility.

Filing System

To the Editor:

I have just completed reading your recent article on indexing in your February, 1963 issue. I was originally a proponent of indexing by use of leader, box and reel, but I soon found that binding myself to use the same reel each time could become a nuisance.

If I am dubbing a particularly long recording such as an original cast album, I usually include only that recording on a reel, cutting off the unused tape; but if I am recording a shorter selection, I will often do so in such a manner that has become known as a "twin-pak," with a different selection on each side of the reel. Accordingly, I will at times play only one selection of a "twin-pack," and it is convenient to let the tape remain on the take-up reel rather than rewinding it. This, of course, would create difficulty in using the reel itself in my indexing system. I therefore use a modified three-way system.

First, I keep a card or loose-leaf file. This can be as simple or ornate as one wishes. I personally index only by composer and name of composition for classical music, or name of artist and name of album for popular or jazz music. This refers me to any particular box or tape by number.

Second, I use white leader tape for tracks 1 and 3 of any particular reel and red (or other color) for tracks 4 and 2, and on this leader I write simply the box number. An added advantage of the two colors is, of course, to identify immediately which tracks are ready for immediate playback.

Third, on the box I place all pertinent information secured from a record label, or recording information if not a dubbing, and on the edge of the box I place the box number which as stated before, is keyed to the leader and the file.

I have found this system is compatable with home recording information, recording from records or the air, and the inclusion of pre-recorded tape into my collection. I hope my system might be of help to some of your other gratified readers.—*William J. LeWinter, Pittsburgh, Pa.*

Trouble!

To the Editor:

We have some two inch computer tape which has been cut to standard quarter-inch width but we are having unusual difficulties with it and wonder if you have any advice to offer. I was duplicating with this tape on a Stereo Wollensak recorder and noticed that about half way through a five inch reel there was no sound. I re-recorded and noticed that part way through the recording the tape seemed to be mechanically pulled inward, as if by a magnetic force between the erase head and the recording head. When I stopped the recorder and started again, the tape seemed to move properly and only later was pulled out of line again.

Another difficulty just discovered is that three-quarters the way through a five inch reel there is very bad slippage and terriffic wow. Other tapes played on the recorder do not slip. I hope you have enough facts to make some kind of suggestion.—*G. B., Phoenix, Arizona.*

The answer probably lies in the fact that computer tapes are made for computers, as we have mentioned before. These tapes many times have different characteristics than audio tape and may not be suitable for use on regular recorders.

The tapes may be heavily lubricated and thus cause the slippage and wow that you mention. Perhaps cleaning the tape before it is used might help. The cleaning might be done similar to cleaning movie film.

We would suggest you check the pressure pads and their pressure against the heads on your machine. It is difficult to determine why the tape loops between the heads since the pull is from the capstan and roller which are to the right of the recording head. What you seem to have is backlash and this may be a function of the slippage and wow you have encountered, although this, in itself does not seem logical. We would suggest that you check on the brake on the payoff reel to make sure it is putting a slight drag on the tape. This drag, plus proper pressure from the pressure pads should hold the tape properly.

The slitting of the tape must be done with precision or it may hang up in heads and guides and cause trouble. You might check this also. The tolerances on commercial audio tapes are extremely close, and the greatest care is taken in the slitting operation. Tapes improperly cut will skew on the recorder and ride up or down, causing binds.

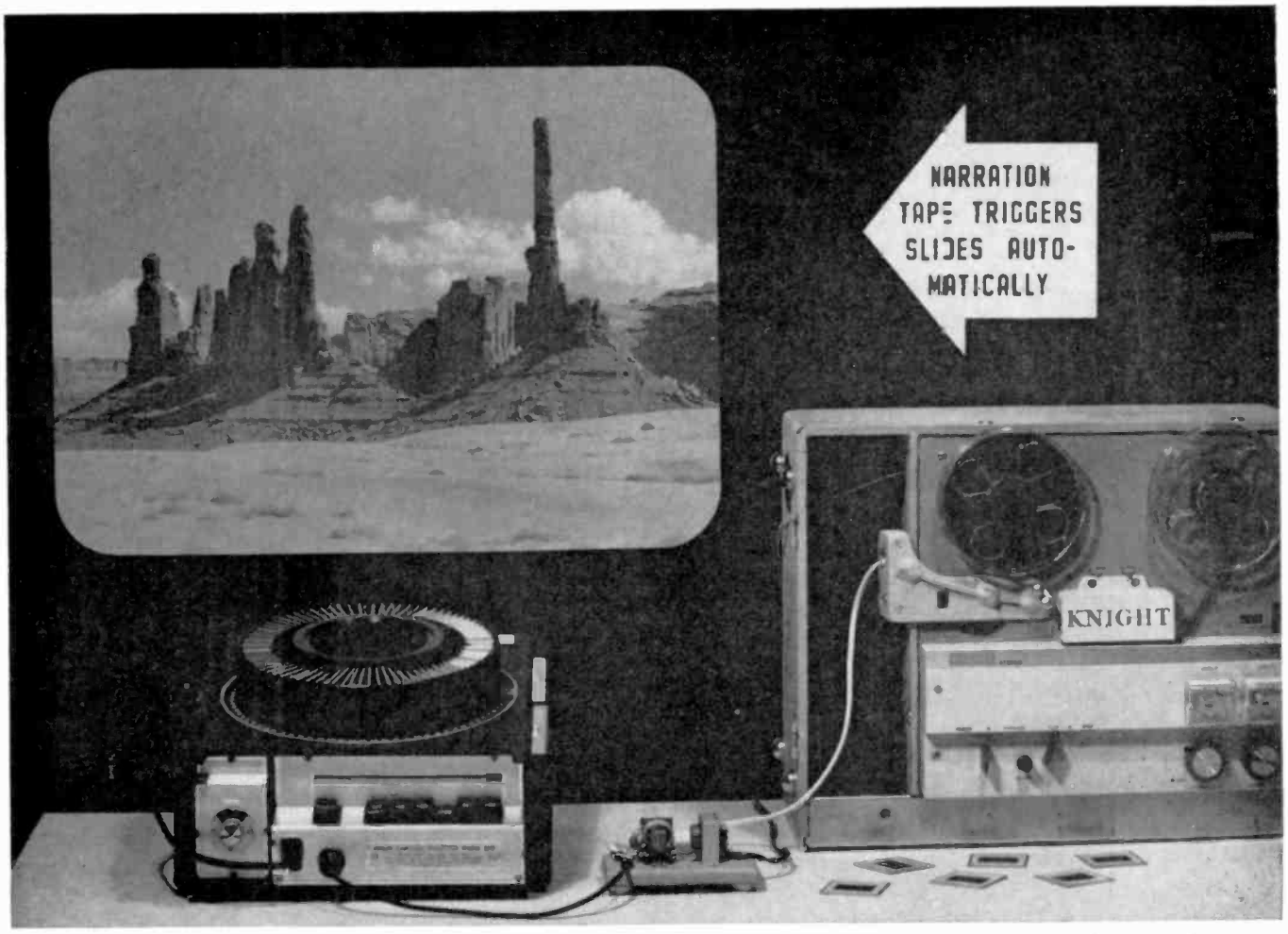


Fig. 1—"LOOK MA, NO HANDS!" Just set it up and turn it on. With this arrangement, with your tape recorder coupled to your automatic slide projector, you can sit back and relax with the rest of your audience as the entire show is presented completely automatically.

TAPE CONTROL YOUR SLIDES FOR $6.00

by Tommy Thomas

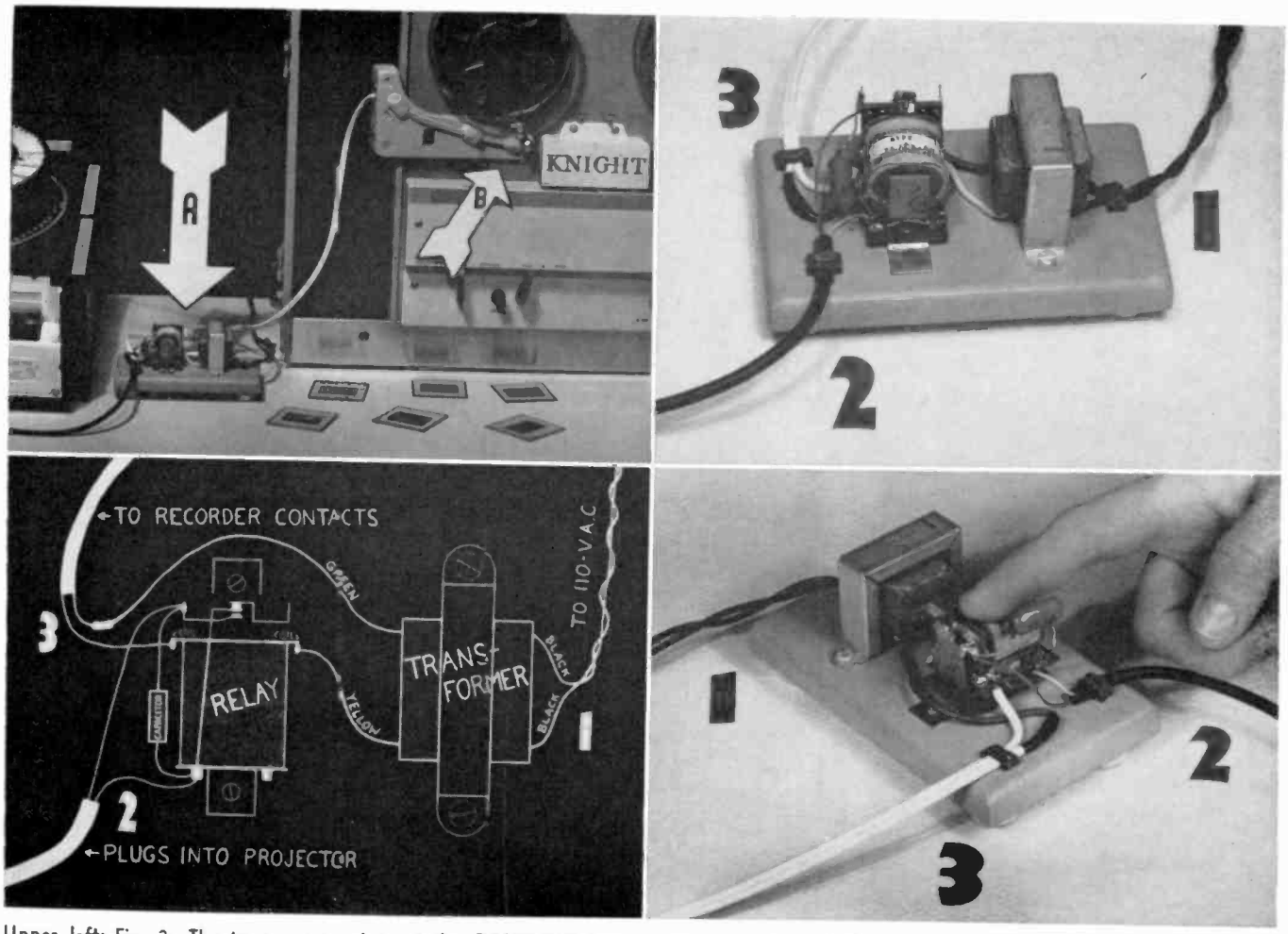
- - - here's a simple synchronizing system to control an automatic slide projector

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

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

For instance, imagine if you will a front room scene where you're all set up as shown above. Your friends are gathered so you turn off the room lights and turn on the recorder . . . then you sit back, relax and watch the fun. One after the other the different slides come on the screen, automatically, each accompanied by from ten to forty seconds of appropriate narration or sound effects. First it's *you* describing the scenic beauties of a vacation slide. Then it's *your wife,* perhaps, telling about how you wandered off on a little side road during this same trip, and discovered this lovely field of flowers. By golly, here's a cute shot of your dog and he's actually barking. And there's Sister Sue all dressed up for Easter and happily exclaiming about all the pretty colored eggs she found in the back yard.

Let me tell you, the effect is tremendous! I'm not at all running down home *movies,* now, but if you're a color slide fan as I am, then this is for you. And if you can beg or borrow a battery-portable recorder the next time you go on vacation, then there's no limit to the exciting things you can do. The sounds of happy people at the



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

beach, monkeys at the zoo, the hissing and thumping of an old-time steam locomotive, kids playing, etc. If you think they're something on tape alone, you just ought to hear these sounds coupled to color pictures thrown on a home screen.

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

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

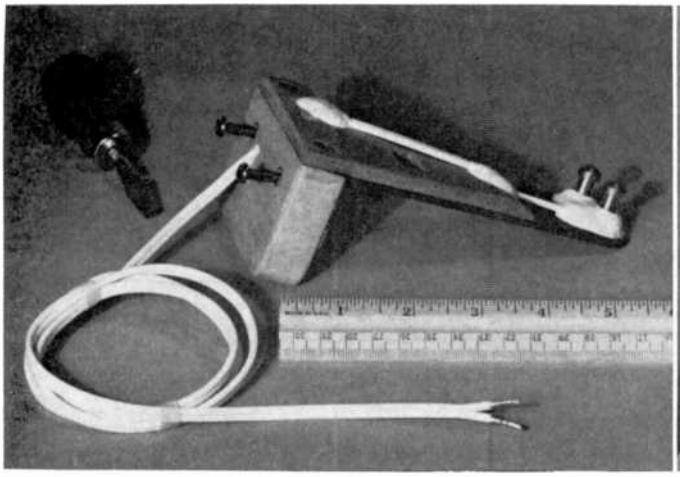
Mount your relay and transformer on a small board

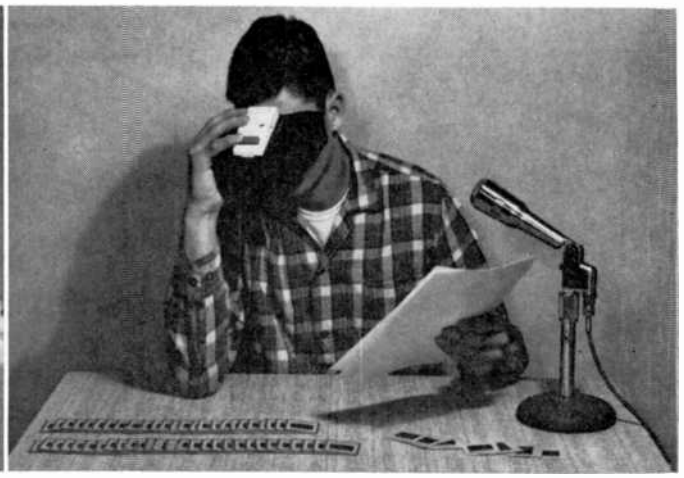
Upper left: Fig. 6—The "Sensor Unit" consists chiefly of two metal TAPE GUIDE POSTS firmly epoxy-fastened to a wooden "jig" that holds them in proper place on the tape deck of my recorder. When a strip of metal foil, which is on the rear of the recording tape, comes by, it "joins" the posts, making the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

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

The CAPACITOR shown in the circuit is optional. It's a .01 Mfd., 600 V.D.C. Sprague capacitor, and for 18¢ it's worth installing ("shunting") across the relay contacts even on the chance that your particular projector setup doesn't require it(?). At worst it's a few pennies lost, and maybe it's cut down on the arcing across the relay points, thus extending the life of the relay. Any radio store can supply you with this capacitor, or you can get one from Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill., for 18¢ plus postage on 2 oz. It's their Stock No. 28L725, Sprague Type 6PS-S10 Capacitor. And while we're mentioning Allied, they also carry the special Scotch "Sensing Tape" you'll need. This is a thin, flexible, strong conductive aluminum foil tape with pressure-sensitive adhesive on one side that sticks tight and stays clean. It's Allied's Stock No. 80R577, Scotch Type 51-7/32 S Aluminized Sensing Tape, in a dispenser package of 150 inches for $1.85 plus 3 oz. postage. Or try your local hi-fi shop; they should stock it by now.

Now let's get on to the "Sensor Control" unit (Figs. 6 through 10, Figs. 1 & 2, Arrow "B"). Exactly how you make this particular assembly will depend on the type recorder you have. And also, on whether or not you want this to be a permanent addition to your tape deck. A permanent installation would be much neater because then you could eliminate about 90% of the unsightly bulk necessary when you make the "add on" type unit shown here. Also, you could use a much lighter *wire* (ending in a small plug, perhaps, that would plug into the wire coming from the Relay/Transformer unit whenever you wanted to have projection control). I need my recorders for many different uses so I *had* to make a removable assembly . . . and I used heavier-than-otherwise-necessary





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

Above right: Fig. 11—Now forget all about the mechanics for a while and prepare the NARRATION TAPE. Put all of your 35mm slides in proper sequence, have handy whatever notes you might consider necessary, use a small hand slide viewer to eliminate projector noise . . . and make the tape. Leave anywhere from three to ten seconds between "talks."

Right: Fig. 12—Finally, with the narration tape finished and edited to your satisfaction, you're ready to add the little strips of SENSING TAPE FOIL between your individual slide "talks." The Scotch 3M foil-tape dispenser comes complete with a molded plastic guide that may be used for centering the foil strips, but it's easier without it.

wiring so it would stand up under constant use. By limiting myself to 5-inch tape reels I had plenty of room on the tape deck, and since 1-mil recording tape at 3¾ ips gives me an ample 45 minutes of narration, this works out fine.

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

Notice, in Fig. 7—"A," that I filed the Nortronics posts down a bit to better expose the underneath brass for soldering. Also, I drilled tiny holes for the wires. Then I located the guide posts (Fig. 8) so that *when the reel of tape was almost empty* the two posts still exerted pressure AGAINST THE REAR SURFACE OF THE PASSING TAPE. There's plenty of pressure when the reel is full of tape, but be sure it's still there at least a little bit when the reel is almost empty or the final passing foil strips may not make proper electrical contact. NOTE! Fig. 8 shows the two posts being epoxied into place about an eighth of an inch apart (Arrow "A"). When the epoxy adhesive was partially hardened, I taped down the two tape reels (Arrow "B") to exert just enough pressure on the recording tape so as to keep the guide posts perfectly aligned until the epoxy hardened completely. Then I finished the job as shown in the photos, using generous quantities of heavy-consistency epoxy to properly secure my wiring, and ending with a neat paint job.

IMPORTANT! The electricity that goes from the secondary of the transformer (Fig. 4, green wire) is not harmful. Bridge the two metal guide posts with your finger and nothing will happen. But if you're test-operating your projector and would like to advance a slide, bridge the two posts WITH A COIN OR A KEY and one slide will advance each time you make contact.

I haven't space to go into the making of a narration tape but I would like to mention that it would be a good idea to make a short PRACTICE TAPE first. Your own particular setup will have a number of *variables* that should be carefully determined. The length of the aluminum foil strips, for instance, depends on just how you make your particular sensor unit and what speed the tape is running. The contact strips should be generously long enough so they will always trigger your projector, but keep in mind that the longer they are, the harder this ultra-thin foil is to put on accurately. Another thing to determine is the number of seconds of silence you should leave between the separate talks for the individual slides. Be sure your projector not only has time to change to the next slide, but also that all slide-changing *noises* have time to subside each time before more narration begins again. Done smoothly and carefully, you can put together a highly polished narration/slide show you'll be proud to show to any audience.

Courtesy CBS Radio

Choosing and Using a Microphone

by Jeffery Grant

. . . Your recorder can't record it if your mike doesn't pick it up. Here are the reasons for using a better microphone, the vital first link in the recording chain.

TOPPING the list of things the owner of a good tape recorder covets most is a first-rate mircophone. Always a delicate question, there is a noticeable lack of general, objective information concerning microphones. While the amount of material that has been published has reached encyclopedia proportions, it is difficult for the tape recorder owner to gather practical information on how to evaluate and select a microphone. Traditionally, the theory of microphone construction and design has been obscured in a cloud of such extreme technicality that only few electrical engineers and advanced physicists have been able to stride with confidence through the labyrinth of applied theory.

One of the simplest and most obvious methods of selecting a microphone is by the criteria of price. Normally, a higher price is no absolute guarantee of quality, whether you are buying a car, walking shoes or a new suit. However, without exception, the better the microphone the higher its cost. The first and second steps down from the very best save the buyer the major portion of the expense. There is also a gain in adaptability and versatility, while losing somewhat in potential response.

Even the least expensive home-type tape recorder with a limited frequency response, not exceeding 7,500 cycles, will gain decidedly by the use of a good microphone. Obviously, a recorder cannot perform in excess of its limiting factor, whether it be its magnetic heads or loudspeaker. But by bolstering one weak element, the entire recording system will benefit. Generally speaking, the two weakest links of any home-type tape recorder are the speaker and microphone that is furnished as original equipment.

Once equipped with a new and expensive microphone, the tape recording enthusiast literally drools in anticipation and excitement. He may speculate on such delights as picking up the sound of corn growing in a Midwest farm field or, almost, a mosquito sharpening his proboscis 30 feet away in any direction. Considering the lack of basic information, his assumption that a more expensive microphone is also more sensitive is a common error. At this point it would probably be unwise to suggest to the recording enthusiast that his expensive microphone would not pick up sound at a distance as well as a cheap microphone. Recovering from his amazement, he might logically ask, "Why? Didn't you just say that the more expensive the microphone the better its quality?"

When purchasing a more expensive microphone, the buyer is paying for just two things: flatter, more uniform frequency response characteristics. Secondly, an expensive microphone assures a substantially broader band of response over the spectrum of audio frequencies. And naturally they are made of finer materials with superb workmanship.

Sensitivity is totally unrelated in judging the criteria of a good microphone. As the manufacturer improves the flatness of the microphone's frequency response, the output or electrical signal from it is being proportionately decreased. Consequently, this means that a cheap microphone will, generally, yield a much stronger signal than more expensive microphones.

The first and primary task for any professional microphone is to have good frequency response. Consequently, the professional recording engineer is willing to use micro-

phones with low sensitivity. As a result, he has at his disposal carefully designed recorders with very high amplification and very low noise to restore the microphone's weak output to a usable level.

Naturally, there are many characteristics that are desirable in a microphone. Everyone would like a microphone with a maximum signal output, saving a number of tubes in the recorder amplifier, and thus reducing the possibility of noise pick up. It would be desirable, too, for a microphone to be rugged, impervious to shock, insensitive to temperature and humidity. In addition, the smaller and less conspicuous its size the better, making it easier to locate without hiding the performer.

All of these qualities are desirable. In addition to this limited list could be added many more features. But in an imperfect world, it is rarely possible to get something for nothing. The recording engineer would gladly trade all these advantages: high sensitivity, durability, inconspicuous size for the most important feature of all, flatness of frequency response. Fortunately he doesn't have to trade for modern microphones combine most of them. The entire tape recording system can never reproduce sound better than the microphone does. The microphone is the starting point for the entire chain of magnetic recording.

Every tape recorder owner wants, naturally, an even broader frequency response band with lower lows and higher highs. But in the clamor for higher and higher frequency response, high fidelity fans have overlooked the most basic fundamental of all—uniformity.

More important than the width of a microphone's frequency range is the uniformity of response within its range. Often in the cheaper microphone there are many resonant peaks. This non-uniform response over the pass band is caused by an electrical signal far stronger at some frequencies than at others for a given sound intensity.

Electrical resonance results from the combination of a coil and condenser. At certain frequencies, when in combination, they will be resonant, either passing more current at certain frequencies or rejecting current at certain frequencies. At times resonance performs a useful work load. When tuning a radio to different stations, one is adjusting the resonance condition of the radio to the frequency the station is broadcasting. But in magnetic recording systems, the microphone must be sensitive to sounds and create an electrical signal *in proportion* to the sound *irrespective* of the frequency. If a microphone is resonant at 200 cycles it will produce a much stronger signal at 200 cycles than it will, say, at 1,000. This causes humps or peaks in the response curve, resulting in a very unnatural type of sound. If the resonance is at the low frequencies, the result will be a booming sound. If the resonance is at high frequencies, the sibilants will be objectionable. A hollow, telephone-like sound quality will be caused if the resonance is in the middle frequencies. In all cases, resonance in a microphone is to be avoided. If the condition does exist, it should be as far to either end of the audio spectrum as possible, eliminating interference within the band, the region the recordist is interested in.

There is a growing feeling among recording engineers that if a compromise must be made, it would be better to have a microphone somewhat limited in response, not going out as far on either the high or low end. The good microphone has a uniform, flat response within the existing band. Regardless of the frequency, its output is the same.

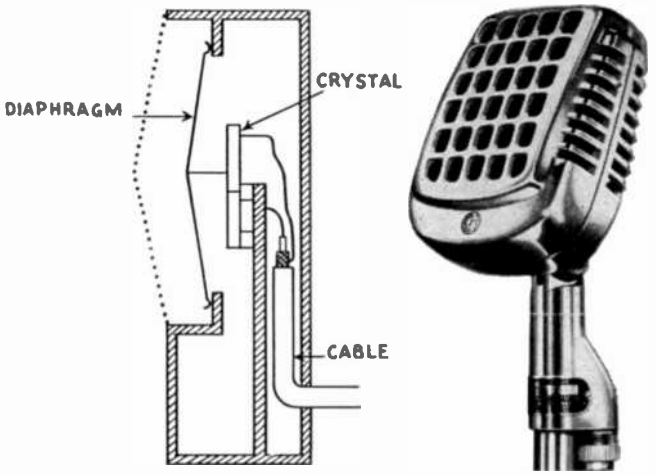


Figure 1. At the left is a cross section of a crystal mike. It will be seen that the apex of the diaphragm is coupled to the crystal. The crystal is attached to the microphone case. The motion of the diaphragm deforms the crystal, producing an alternating voltage. Right: a crystal mike, the Shure 737A Monoplex. Its output is sufficient to drive any recorder and it is high impedance to match recorder inputs.

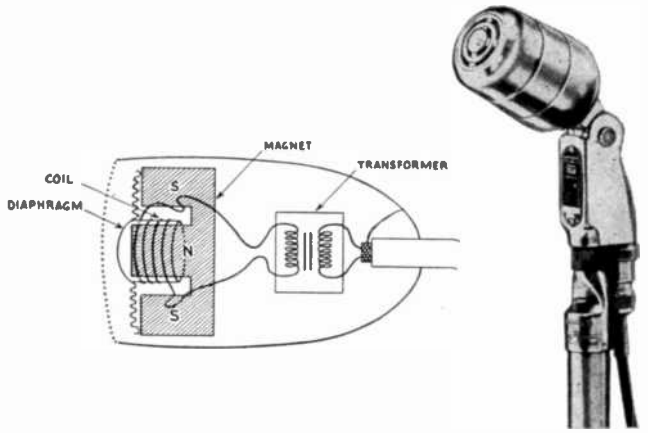


Figure 2. Cross section of a dynamic mike. The output results from the motion of a conductor in a magnetic field. The coil is suspended within the magnet and is attached to the diaphragm. As the diaphragm moves it moves the coil and causes a current to be generated. Right: the Electro-Voice 630 Dynamic Microphone. Its output is about the same as a crystal mike and enough to drive a recorder.

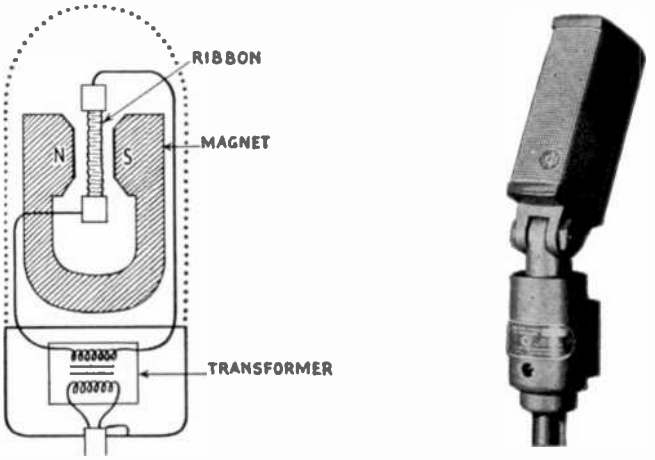


Figure 3. The velocity or ribbon microphone. It uses a metallic foil ribbon suspended in a magnetic field with both sides of the ribbon accessible to the air. The ribbon is vibrated by the difference in sound pressure on the two sides, causing a current to flow. Right: Shure 333 Ribbon Microphone. This is an expensive studio-type microphone with low sensitivity but excellent frequency response. It can be used with recorders that have high gain and low noise level.

To determine band uniformity, the curve of output, generally expressed in volts converted to decibles, is compared to frequency. Thus, for a given frequency, a microphone will have a given output in db. The better the microphone, for a constant amplitude sound source, the more constant its output over the audio band. Therefore, if the characteristic frequency response curve of the ideal microphone were plotted, it would be a straight line. On the other hand, a cheap microphone might reproduce 200 cycles very well and give a relative output of 50 db, but at 500 cycles it might give a relative output of only 30 db, while at 1,000 cycles the output could be 40 db. Consequently, the response curve of the cheap microphone, when plotted, would be full of peaks and valleys, the peaks indicating resonant conditions.

To hold the price of home recorders at a realistic level, machine manufacturers furnish adequate, durable micro phones. The microphones are more than satisfactory for many voice applications. But as the tape recorder owner graduates to more expensive equipment, he will require a microphone with new features and characteristics.

The inexpensive microphone furnished as original equipment has a strong output. In this way, weight and bulk of many portable home recorders are minimized, eliminating the need of having to use increased amplification and more complex low noise amplifier circuits. Consequently, the possibility exists an occasional tape recorder will not have a sufficiently strong amplifier to satisfactority boost the low output of an expensive microphone when a substitution is made. Microphone output should be greater than 55 db below one volt per microbar for home-type tape recorder use. Some of the older recorders require even more output, unless, of course, a high gain mixer or preamplifier is employed.

It is simple to quickly ascertain whether or not the output of a microphone is too low for the recorder's amplifier system. The output of all microphones is specified in number of decibels from a known reference for a given sound level. By glancing at the specifications of the output of different microphones it is possible to tell the relative output.

Before making a final purchase, the prospective buyer would do well to make a tape recording with the microphone he is considering. When making the recording on a home-type recorder, one need simply adjust the volume control so that the volume indicator shows the recording is fully modulated. It is preferable, however, to use a volume indicator. If the microphone is insensitive, it will not be possible, even by turning the volume control all the way up, to record the tape with suffcient intensity.

Most home-type tape recorders have ample reserve gain. Lacking the sensitivity of the cheap microphone, it is necessary to advance the volume control and use more amplification when recording with expensive microphones. If there is noise, hum, and hiss in the amplifier of the tape recorder, a substantially worse signal-to-noise ratio will result despite the fact a better frequency response is being obtained. Thus, the recording enthusiast runs the risk of picking up noise in the tape recorder amplifier when using expensive, improved microphones.

From the humblest home tape recorder to the console model professional machine, an expensive microphone will produce improved recording results providing the signal-to-noise ratio does not appreciably suffer. The advantage of a good microphone is that all recordings will be more natural. The typical characteristic of cheap microphones is a "tinny" sound quality. A voice pleasing to the ear with a pleasant, smooth bass with sharp, well defined highs will sound hollow, shrill and "spitty." In musical recording, a cheap microphone will not reproduce the low frequencies such as the critical, all-important, low notes of a piano and organ. With the lower frequencies gone, coupled together with resonant peaks, cheaper microphones cause music to sound unnatural, harsh and irritating. When music is distorted out of its true character, the screechy sound quality has the effect of rubbing sandpaper on the nerve endings of listeners.

In recording there are five main types of microphones: crystal, variable reluctance, dymamic, ribbon (sometimes referred to as velocity), and condenser. Each of these microphones serves a distinct and separate purpose, having both inherent advantages and disadvantages. The type of microphone should be selected with a specific recording problem in mind.

It is interesting to note that the carbon microphone, not included in this discussion, is the most widely used microphone in the world. Today every telephone uses a carbon microphone, and during the thirties it was used extensively in broadcast stations. The carbon microphone has poor frequency response and is undependable for critical recording since its frequency characteristics change from day to day, depending upon the position of the carbon granules. It is no longer used in any serious professional recording work.

The average tape recorder is equipped with either a crystal or variable reluctance microphone. The crystal microphone is more common, although the variable reluctance microphone is growing in poularity with many recorder manufacturers including it as original equipment. Low in cost and varying in quality, the inexpensive crystal microphone included with most home recorders has a frequency range of about 100 to 8,000 cps (range of the human voice).

A crystal microphone may be best described as a microphone which depends upon the generation of a voltage by the deformation of a crystal having piezoelectric properties. A piezoelectric crystal generates a voltage when it is deformed, changing acousrical energy into electrical energy. The several common piezoelectric materials which are used in the crystal microphone are rochelle salt, barium titanate, and ammonium dihydrogen phosphate. Barium titanate is being used increasingly in crystal microphones because of its better frequency response, although its output is lower.

Shown in Figure 1 is a cross-sectional view of a crystal microphone. It will be seen the apex of the diaphragm is coupled to the crystal. The crystal is attached to the case of the microphone. The motion of the diaphragm due to an impinging sound wave deforms the crystal, producing an alternating voltage which corresponds to the pressure undulations in the sound wave.

Among the more serious disadvantages of the crystal microphone is that it is particularly susceptible to high temperatures and variations in humidity. The crystal microphone, using rochelle salt, can be permanently damaged by being exposed to heat as high as 122 degrees F. Particular care must be taken to avoid leaving a recorder, together with its crystal microphone, in a closed car during a hot summer day. A crystal microphone should never be exposed to direct rays of the sun.

The electrical properties of a crystal microphone are affected by variations of both temperature and humidity. If the temperature and humidity change, the frequency response and output of the crystal microphone also change.

Although fairly rugged in construction, the crystal microphone is susceptible to shock damage such as dropping on the floor. It can, however, be freely transported, handled by many people, subjected to the usual vibrations of being carried about in a car. Although all crystal microphones will deteriorate over a period of time, generally their useful recording life will be ended through some other cause such as traumatic shock or exposure to excessive heat.

One advantage of the crystal microphone is that it has a high sensitivity. Thus, for a given sound level, the crystal microphone gives a strong electrical signal, requiring less gain in the amplifier. The inexpensive crystal microphones furnished with home recorders are sufficiently sensitive to pick up a weak sound some distance away and still supply a strong signal to the recorder. Of all the types of microphones listed in the radio parts house catalogs, the crystal microphone is likely to have the strongest output.

The variable reluctance microphone is being issued as original equipment with an increasing number of new tape recorders, especially in the $180 through $300 range. The variable reluctance microphone is a moving armature type microphone. In a magnetic field, the armature moves in a coil wire, creating a current in the coil as it moves. The armature is attached by a coupling through a diaphragm that is operated by sound waves. This microphone has many advantages over a crystal since it is not affected by temperature or humidity. It can also withstand considerable shock. The reluctance, as contrasted to crystal microphones, has better low frequency response. As a general rule, variable reluctance microphones furnished with home tape recorders are superior in sound reproduction characteristics to crystal microphones supplied with comparable quality recorders. It is interesting to note that any type microphone, whether crystal, reluctance, dynamic, ribbon, condenser, can be built to be excellent in quality, but each has its limitations and advantages.

In a dynamic microphone, the output results from the motion of a conductor in a magnetic field. The conductor, a coil, is attached to a diaphragm, suspended in the magnetic field. When sound waves hit the diaphragm, it vibrates back and forth, moving the coil in the magnetic field, generating an alternating voltage across the coil. The voltage generated is proportional to the number of magnetic flux lines which are cut per second.

In the cross-sectional views, Figure 2—construction of the dynamic microphone is clearly illustrated. The dynamic microphone is rugged, unaffected by variations in temperature or humidity, and generally is of high quality.

The response of the ribbon or velocity microphone is unlike that of the crystal, variable reluctance and dynamic microphones which correspond to pressure variations in a sound wave. The response of a ribbon microphone corresponds to the particle velocity in a sound wave. Shown in Figure 3 the velocity microphone consists of a metallic foil ribbon suspended in a magnetic field with both sides of the ribbon freely accessible to the surrounding air. The ribbon is vibrated by the difference in sound pressure on the two sides, causing an electrical current. Since the motion of the ribbon is proportional to the particle velocity in the sound wave, the motion of the ribbon produces a voltage which corresponds to the particle velocity in the sound wave.

While crystal microphones will vary in price from only a few dollars to $40, all ribbon microphones are fairly expensive, ranging from $40 to princely sums of $300 and more. The ribbon microphone is used extensively in professional recording work under controlled conditions. While it is not affected by either temperature or humidity, the ribbon microphone is extremely susceptible to damage by shock and wind. Even breathing directly into the ribbon microphone can, in certain circumstances, permanently damage its performance by stretching the ribbon.

In response to numerous requests for more information on the subject of lower cost microphones as supplied with tape recorders, the relative merits of the three most popular types are summarized as follows:

CRYSTAL

Best frequency response (widest range and flatest), highest output. Sensitive to shock, damage through rough handling, temperature and humidity changes.

VARIABLE RELUCTANCE

Only fair frequency response since not as wide as crystal at the low and high end. However, this microphone has a certain amount of resonance at low frequencies which gives the illusion of more "bass" on most home recorders. While this may not be called "better" low frequency response as stated in the previous article, the reluctance microphone's lower high frequency response and resonance in the bass region, gives a mellow, "booming" sound, pleasing to many people. Its output compares favorably to the crystal microphone. However, the microphone is susceptible to stray magnetic hum fields from nearby power equipment. Extremely rugged, it is virtually free from shock damage and insensitive to temperature and humidity changes.

CERAMIC

Although not mentioned previously, this is a type microphone now appearing as original equipment on several home recorders. Frequency response good (but not as good as crystal—being limited more on the high end and generally having a slight rising characteristic in mid-frequencies). The output is considerably lower than both crystal and reluctance type microphones (6 to 10 db lower). It is rugged and insensitive to humidity and temperature changes.

A still further classification of microphones falls into two broad categories: high impedance and low impedance.

All home-type tape recorders use high impedance microphones. Professional recording equipment uses low impedance microphones. In addition, there are microphones available that have a switch, enabling them to operate at either high or low impedance output. The advantage of high impedance microphones is that the cost of one transformer is saved. The disadvantage is that it is not possible to safely run more than 10 to 20 feet of microphone cable without adversely affecting the high frequency response. The microphone line connecting directly to the amplifier input is the most sensitive part of the whole recording system. If the cable is near AC power cords there is a good chance it will pick up induced hum. Low impedance microphones can use a balanced line, canceling out hum. High impedance lines are unbalanced, with one side grounded. The greater the length of cable used with a high impedance microphone the greater will be the high frequency attenuation.

Crystal microphones are always of the high impedance type. Having a high electrical impedance, the microphone cable is therefore coupled directly to the grid of the first vacuum tube in the amplifier.

Dynamic microphones can be made to have almost any impedance output. The most common electrical impedances are 50, 250, 500, and High Z (around 100,000 ohms). With low impedance microphones (50-500 ohms), a transformer is used to couple the output of the microphone to the grid of the input tube.

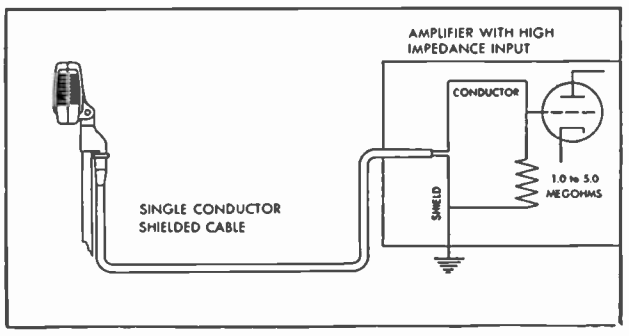
The electrical impedance of ribbon microphones is very low, being about one-fourth ohm. Therefore, a transformer is located in the microphone case to step up the electrical impedance to a value suitable for transmission over a line to the vacuum-tube amplifier (50, 250, 500 or High Z).

These microphones must be used with an amplifier which has an input impedance that will match the output of the microphone. A 50 ohm microphone should be connected to an amplifier having 50 ohm input. If a high impedance microphone is connected to a low impedance input amplifier, distortion will result.

The classification of microphones may again be subdivided into directional characteristics. Microphones are available in undirectional, bidirectional, or nondirectional types. In many instances it is possible to obtain any desired "pick-up" pattern by the simple expedient of turning an adjustment screw to the desired position.

The pick-up pattern of a unidirectional microphone is approximately heart-shaped or cardioid. It will vary from this pattern, to a limited extent, in different makes of microphones. The unidirectional pattern, however, is of sufficient width at a normal microphone distance to allow three or possibly four people to use it simultaneously. The unidirectional microphone is perhaps the most useful, covering nearly 90% of regular daily recording needs. This is a particularly useful microphone in excluding audience participation and background noise, reproducing only the voice of the performer. Another typical application for the unidirectional microphone is in location interviews, excluding all extraneous street noise. Unidirectional microphones also eliminate the possibility of feedback. Manifesting itself by a squeal from the loudspeakers, feedback occurs when an electrical sound circle is formed. By orienting the microphone, it is possible to pick up only the voice of the performer with no possibility of the sound from the loud-speaker feeding back into the microphone.

The nondirectional microphone will pick up sound from all directions. It is desirable in a panel discussion, when it is necessary to record a number of voices or sounds surrounding the microphone. Greater care must be exercised when using a nondirectional pattern because of the danger of feedback.

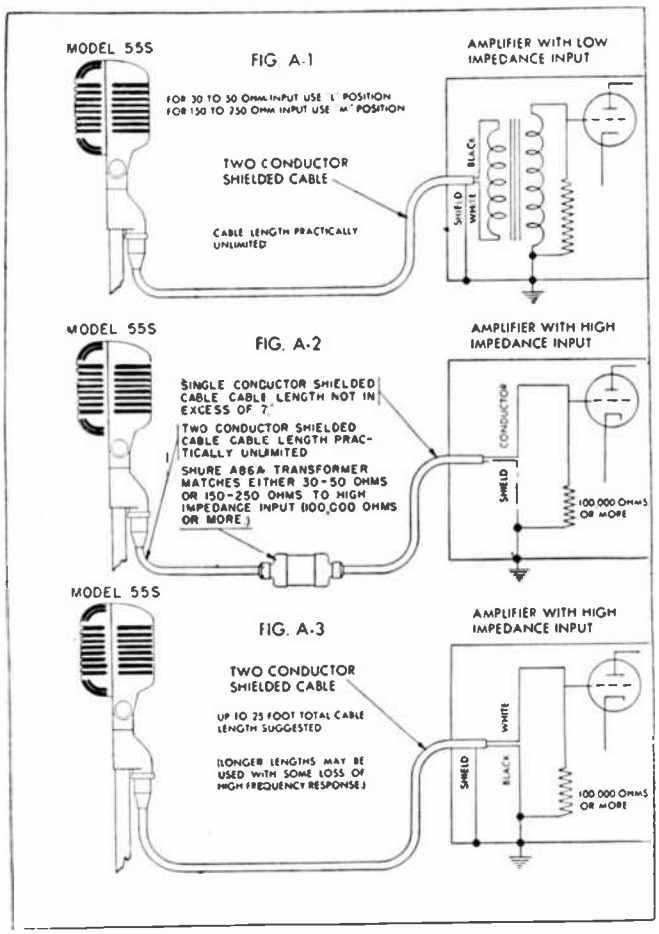


This illustration shows how a high-impedance microphone is connected to a home type tape recorder. Because the mike is high impedance it is coupled directly to the grid of the first vacuum tube in the amplifier which is also a high impedance load.

The bidirectional microphone will pick up sound in two directions. Application of the microphone is particularly useful in recording voices of two people across a table, as well as a multidude of similar uses. The bidirectional pick-up pattern was first introduced with the ribbon microphone.

The tape recording enthusiast with between $30 and $100 to invest in a microphone has a wide variety of alternatives. Wanting a really good microphone with superior recording characteristics, his choice would logically center on two types: dynamic or ribbon. If durability was a prime factor, and further providing that the recording enthusiast was willing to sacrifice some uniformity of frequency response, he could profitably buy a dynamic microphone. However, not anticipating rough usage, he might then consider the ribbon microphone. It is interesting to note that the ribbon microphone is the most widely used in professional recording work, although the dynamic microphone is going fast in popularity. Dynamic microphones have been vastly improved in quality during the past few years, some models making possible exceptionally good recording results.

The repair of microphones should not be undertaken, except for limited maintenance work. To cite an example, the microphone cord may break off within the microphone



If the recorder has a low impedance input, as many professional recorders have, then it is connected as shown in the top illustration, using a transformer inside the recorder to match the grid. In the second drawing, a low impedance mike has been connected to a home type recorder with a high impedance input through the use of a matching transformer in the mike cord. The lower drawing shows how the connections must be made when long mike cables are used. The cable shield is grounded to the recorder chassis and the two wires carrying the mike current are fed to the grid.

shell. Repairs of a more extensive nature should generally not be undertaken. Return, instead, the microphone to the manufacturer. All manufacturers void their guarantee if the microphone has been tampered with.

If in doubt as to whether a microphone is bad, the simplest and most obvious method of determining is by substitution. By substituting a known good microphone for a questionable one and recording either voice or music, it is generally possible to quickly ascertain whether or not the microphone is defective. A more accurate method, of course, is to use an audio oscillator. Generally, however, when a microphone is damaged there is no midway point between a good and bad operating condition. Either it will not respond at all, or will be so distorted or low in volume it will be unusable.

Regardless of the quality of the microphone or the magnetic recorder, difficulties result generally from improper use of equipment. As in photographic work, it is possible to outmatch the most expensive professional equipment with a box camera, providing the equipment is being improperly used. Microphone placement is certainly all-important in magnetic recording.

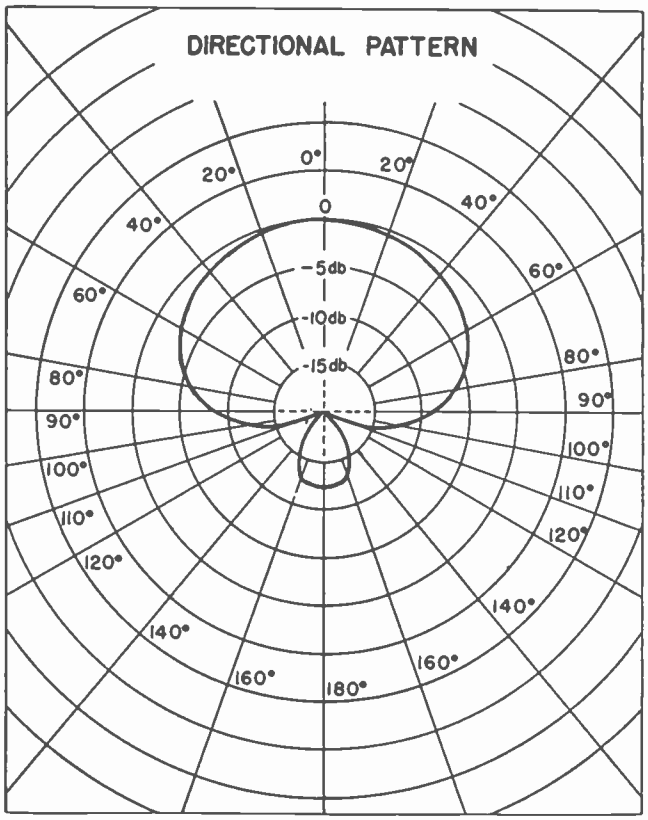
The modern recording studio with its impressive, sleekly-styled equipment has an aura of romance. Photographs of the recording engineer seated in his control room have the same effect on the public's imagination as the traditional portrait of a white-coated research worker surrounded by test tubes and bunsen burners. On the surface, however, the recording engineer's job would appear to be simplicity itself. First, he selects the needed equipment and, second, he rides gain during the recording session.

Recording becomes a true creative art through microphone placement. When an artist paints in oil a picture of a lion, he need not be concerned with photographic realism. He is striving to create an over-all effect. To impress us with the ferocity of the lion, he may, for example, accentuate the beast's gaping mouth and sharp teeth, its powerful shoulders, poised ready to spring.

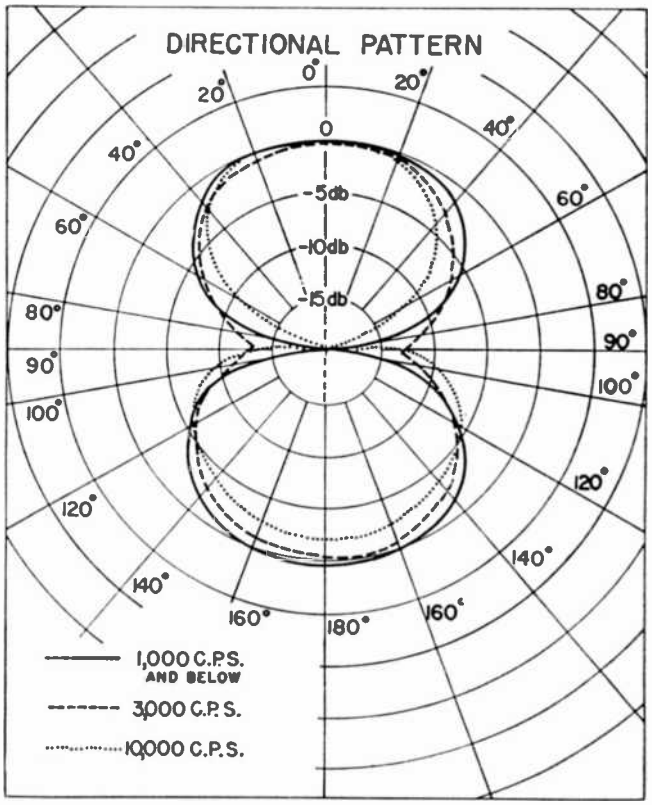
As the artist uses a paint brush, the recording engineer may use his microphone to create whatever artistic effect the situation demands. The recorder is essentially a passive instrument recording whatever the microphone feeds it. To achieve truly effective microphone placement may require years of patient practice and experimentation. Space does not permit more than a brief summary of some of the basic guide posts for the audiophile to follow in microphone placement.

Frequently people have a tendency to record too far away from the microphone which results in an excessive amount of room reverberation or reflected sound, making the recording difficult to understand. Also, the uninitiated recording enthusiast will frequently attempt to record in too "live" a room which, because of its size and acoustics, also results in too much reverberation. However the acoustics of an empty room change when filled with an audience.

If a recording is made in a room that contains an excessive amount of reverberation, captured on the magnetic tape will be both the original recording combined with the room reverberation. Compounding the reverberation of the room in which the recording was made during playback, the extra reverberation of the playback process is added to it. Under these conditions the reverberation of the original recording is frequently more than doubled.



This directional pattern chart shows how a uni-directional mike picks up sound. The radial lines indicate the angle from dead center in front of the mike and the circles the amount or db. The heart-shaped, or cardioid, pattern shows that the mike picks up best from straight ahead and will pick up sound effectively up to 90° on either side. Past that point the sound pickup falls off. Only a very slight pickup is made from the rear. A mike like this is useful in cutting down background noise.



This shows the pickup pattern of a bi-directional mike, the Shure Brothers Gradient 300. Note the high front and rear response and the "dead" areas on the sides. A mike having this pattern would be excellent for recording groups as both sides may be worked.

Original recordings should be made in a "dead" room in quiet surroundings, with background noise held to the lowest possible level. Reflections off hard surfaces such as the ceiling, walls and floor should be avoided. If a voice recording must be made in a room with reverberant conditions, one way to cure the difficulty is to talk as close as 12 inches to the microphone. Thus a person's voice is substantially stronger than the surrounding noise. There is danger in working too close to the microphone, however, in picking up sibilants, tongue clicks and breathing, in addition to an accentuation of the bass. Working too far away from the microphone, the voice will be weak contrasted to the total noise in a reverberant room.

Reverberation when it is properly controlled is, however, an important recording tool. The ratio between reflected sound and direct sound has a vital effect on liveliness and blend of the recording. Timbre is dependent on the number and relative intensity of the overtones recorded. Balance assures the correct relative loudness among all sound sources.

We hear with both ears, a positive advantage over using but one ear in liveliness and brilliance of tone. Listening with both ears enables us to locate sound and automatically relegate extraneous background noise to its proper perspective. But hearing with only one ear accentuates noises out of all proportion, losing the perspective of location and depth. Monaural reproduction is similar to hearing with one ear. Special effort in microphone placement is required to simulate the closest monaural approximation to binaural listening effect with timbre, liveliness blend and balance.

Normally, it is desirable to make a number of preliminary tests in order to get the "feel" of the microphone. As someone speaks into the microphone, the recorder's volume level should be carefully controlled. Next an assistant should walk back and forth before the microphone, step toward it and away from it. Carefully note the "pick-up" pattern of the microphone, particularly noting its sensitivity, the "live" and "dead" areas, its tendency to accentuate unwanted reverberations. It may be necessary to move the microphone from side to side until a point of proper "balance" is achieved. A test recording should then be made.

The technically inexperienced recording enthusiast would do well to make his recordings with one microphone, even for large orchestral or vocal groups. Superlative results are often obtained using only one microphone. Excluding binaural work, even the professional recording engineer follows the principle of using as few microphones as possible.

BUILD YOUR OWN MIKE STAND

by C. P. Hofmann

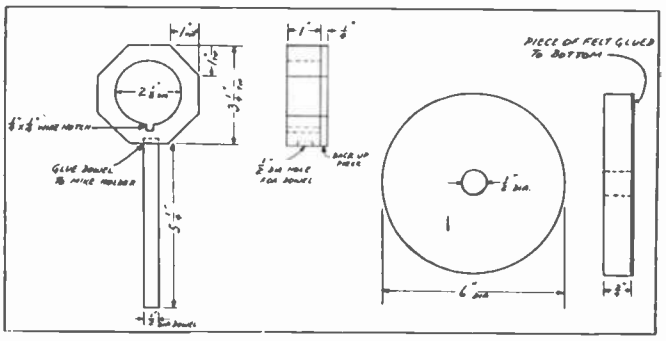
The small, round microphone that came with my recorder was inconvenient to use because it could not be adapted to a standard mike stand. Consequently, I made a wood stand which serves the purpose very well. The construction of the stand is very simple, consisting of three parts: the holder, the stem and the base. If you care to make one like it, follow this procedure:

THE STEM. Saw a piece of ½" diameter dowel stock to 5½" length.

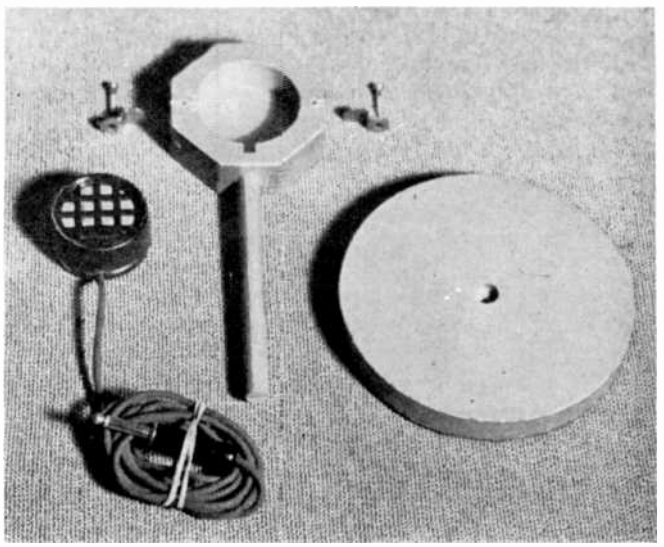
THE HOLDER. Take a piece of wood 1" thick and saw out a square with 3¼" sides. Cut a 2 1/8" diameter hole in the center. (I cut the hole by drilling a series of ¼" diameter holes all around the circumference just inside of the 2 1/8" diameter layout line. Then, I chiseled and filed the hole clean.) Next, chisel a ¼" x ¼" wire notch. After the hole and notch have been cut all the way through, nail a solid ¼" back-up piece in place. Then saw 1" x 1" diagonal cuts on all four corners.

THE BASE. Saw a piece of ¾" or 1" wood to 6" diameter and bore a ½" diameter hole in the center. Glue a piece of felt or rubber on the bottom. (I used felt from an old hat.)

ASSEMBLY. When assembling the stem, glue it to the holder, but do *not* glue it to the base. Make the stem fit neatly into the base, so that it can be removed easily for use as a hand mike. Use any type of retainers which will keep the mike in the holder. (I used two mirror hangers which were purchased in the 10-cent store.) Finally, paint the entire mike stand with aluminum, gray or black. Sandpaper smooth before painting. A two-tone effect may be had by painting the base a different color than the stand and holder.



The mike stand takes very little material and is easily made. The drawing above shows the suggested dimensions for the parts, and the photo at right shows the stand before assembly. The small ceramic mike, furnished with some brands of recorders, is held in place by the metal lugs. It may easily be removed, if necessary, from the holder. This same design may be adapted to hold other types of small microphones.



A common inhabitant of woods and ravines is the Carolina Wren, which has a loud clear song consisting of several similar phrases. A single bird may sing as many as twenty-two different songs.

Capturing the

of

The singing season is

hand - - now is the

prepare your recording

BIRDS are without doubt the world's most versatile singers, and if you are interested in unusual melodies you should try recording bird songs. You can record many birds right at home, either from a window of your house or in your yard, particularly if your yard contains a few trees and shrubbery. You'll find recording bird songs a fascinating hobby.

Recording bird songs is a wonderful way to get acquainted with both the birds and their songs, and you'll find that birds have interesting singing habits. Listening to song recordings is an easy way to learn bird songs, and although you can buy phonograph records of the songs of many birds it's a lot more fun to make your own tapes.

Most bird songs can be recorded satisfactorily with the average home recorder. The frequencies generally lie between about 1,000 and 8,000 cycles per second, with relatively few over 8,000. You can get good recordings of most songs with a tape speed of 7½ inches per second; with the higher-pitched songs a tape speed of 15 inches per second will give you a better recording. I use the faster tape speed because it gives greater fidelity with the higher frequencies, and it enables me to play the songs back at a reduced tape speed when I want to study the details of a song.

The biggest problem in recording bird songs is to get the microphone within range of the bird. If the bird is singing in your yard, you may be able to get a good recording merely by setting the microphone on the window sill. You'll do better if the pick-up can be limited to the direction of the bird, and still better if you use a parabolic reflector to increase the strength of the sound at the microphone. If your recorder operates only on AC current, a long power cable, or a low impedence microphone on a long cable, will enable you to get the microphone closer to the bird.

One reason for some sort of directional pick-up is the problem of extraneous noise. If you've never done any outdoor recording you may be surprised at the amount of noise you sometimes encounter. The sounds of traffic, airplanes, and trains, even though they may seem to be a long distance away, will often spoil a recording. If you want to record just one bird, you may have trouble with other birds singing nearby. Man-made noises sometimes make it impossible to get good recordings no matter how directional your pick-up is, and the only think you can do is wait until the noises have stopped or moved out of range, or do your recording somewhere else. The singing of other birds is usually not so bad, as they can furnish a natural background for the singer you're recording.

A simple way to screen out some of the extraneous noise is to use a cone or cylinder of cardboard around the microphone. A better way, which not only provides directionality but adds to your pick-up, is to use a parabolic reflector.

I have made many good recordings in my yard—or in other people's yards—using a recorder powered by AC current; I usually use a long power cable to get the microphone closer to the bird. However, I've made better recordings, and of more kinds of birds, using a battery-powered portable recorder. I now use a Magnemite Portable Model with a microphone mounted in a parabolic reflector. If I'm recording under conditions where it is desirable to be able to move about easily and quickly, or if I'm working alone, I use a 24-inch reflector (see facing page); one person can easily carry all this equipment. If mobility is not so important, that is, if the bird I want to record is apt to remain in one place for a while—and I have some assistance in carrying the equipment—I use a 40-inch reflector mounted on a tripod (see photo, p. 31); this has more than twice the pick-up of the smaller reflector.

Most recording of bird songs must be done in the spring and early summer, during the bird's mating and nesting seasons. In the northern part of the country the first singing starts about the middle or latter part of February, and continues until about mid-summer. Call notes can be recorded almost any time of the year. During the heat of the summer most birds are quiet and sing little.

Melodies Birds almost at time to equipment.

by

Donald J. Borror

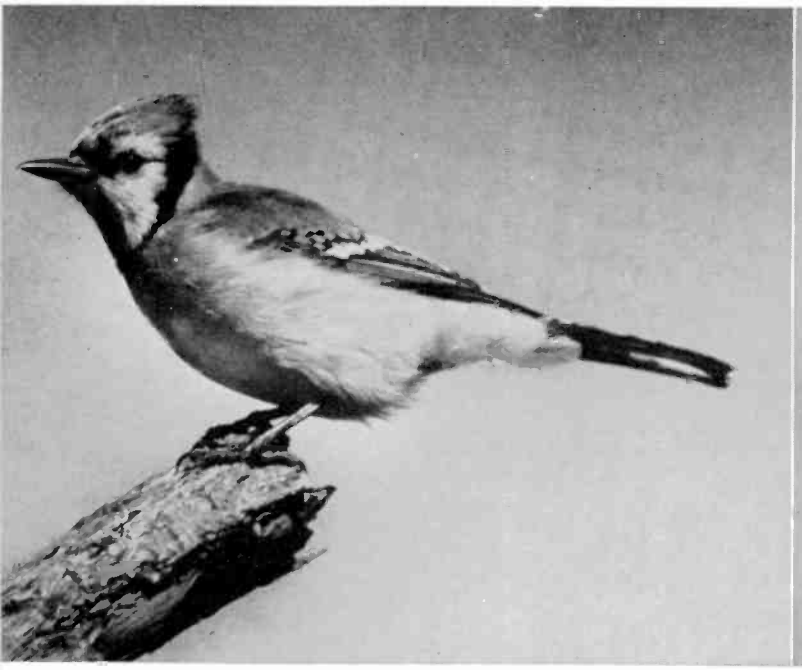
The author records a bird song with a Magnemite portable, and microphone mounted in a 24 inch parabolic reflector. This equipment can be carried most anywhere.

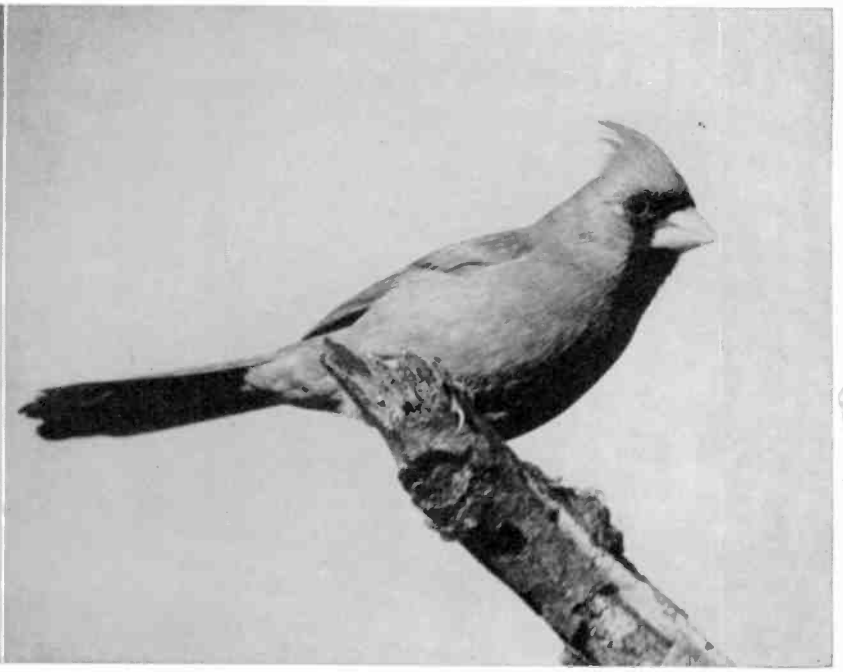
The best place to record bird songs is on the nesting grounds, where the birds do most of their singing. If there are birds nesting in your yard, you can record them right there. Nearly all the singing is done by the males. Song seems to be the male's means of advertising itself, proclaiming its nesting territory, and attracting a mate. Once the territory has been selected, the male sings from a few selected perches in its territory. A little observation will soon reveal the location of these singing perches, and knowing where a bird is apt to sing is a big help in getting a recording. The best time to record birds is early in the day; this is the time when there is the most bird song, and the least extraneous noise.

During March, April, and May many birds are migrating north, and pass through your area on their way to their nesting grounds farther north. Many of them sing during migration, and recording their songs is usually a matter of being ready for them when they pass through. Some will go through your yard; others are more apt to be found in woodlands, parks, thickets, and swamps—places providing different habitat conditions from those in your yard.

If you hear a bird song you don't recognize, my advice is to record it first and look it up afterward. If you fail to find or identify the bird, at least you have the recording; you may later learn what the bird is, or you may find someone who can identify the recording. A pair of binoculars is very helpful in identifying birds, and if you're interested in a good bird guide, Roger Tory Peterson's "Field Guide to the Birds" (Houghton Mifflin Co., $3.75) is one of the best. "A Guide to Bird Songs," by Aretas A. Saunders (Doubleday and Co., $3.00) is the best guide to bird songs.

When I make a recording in the field I use the microphone to put my field notes on the tape. Later the recording is edited, that is, the parts I want to keep are cut out, assembled, and labeled. A recording is labeled (on the leader tape) with the name of the bird, the date, and a serial number, and additional data on the recording are put into written field notes under this serial number. The tapes are filed by species; I use 3-inch, 5-inch, and 7-inch reels, depending on how much tape I have on any particular species. This editing, incidentally, is often quite a job, and may take longer than it took to get the recording in the first place. I think I have done well if I have a minute of edited tape for

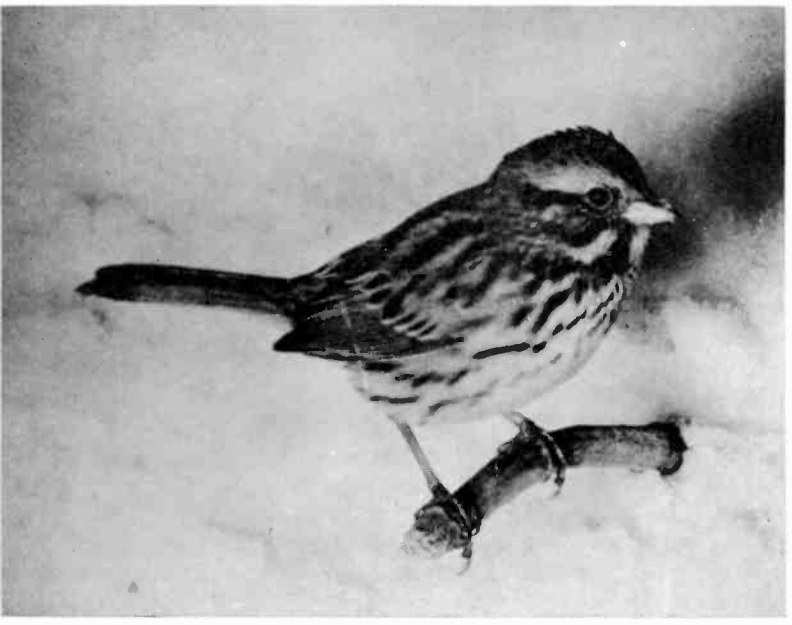




Left: The Blue Jay is looked upon by some people as a rather noisy bird, but it has the remarkable ability of uttering several notes at once. Right: Nearly everyone is familiar with the Cardinal, a common bird throughout eastern United States. Its song is a series of loud, clear, whistled notes.

every hour I have spent getting it.

My associates and I have been recording bird songs for several years, and now have recordings of 196 species—plus recordings of a good many other animals. Our tapes fill a couple of fair-sized book cases in the Department of Zoology and Entomology at Ohio State University. In the process of making these recordings, and in studying the recordings themselves, we have learned some interesting things about bird songs, and we have been surprised at the vocalizing some birds can do.



One of our most versatile and persistent singers is the Song Sparrow. No two individuals sing quite the same, and individual birds can be recognized by their songs.

There is a great deal of variation in the songs of different birds—in their length, the frequency with which they are sung, and in their complexity. Some songs are quite short, only a second or two in length, while others are long-continued and of an indefinite length. Most of our common birds sing at fairly regular intervals, the interval varying from about five to thirty seconds in different species. Once this interval is determined, you can often predict within a second or two when the next song will be sung. For example, wood thrush songs are usually four or five seconds apart, Carolina wren songs about six seconds apart, cardinal songs nine or ten seconds apart, song sparrow songs ten or twelve seconds apart, field sparrow songs about fifteen seconds apart, and ovenbird and yellowthroat songs about twenty seconds apart.

Some amazing complexities can be found in bird songs. Many birds are capable of some rather remarkable vocal gymnastics, and their songs are not as simple as the bird books lead us to believe.

Bird notes are often not pure musical tones, but contain many frequencies, and their pitch is difficult or impossible to determine accurately by ear. Many songs contain more notes than the ear detects; some birds can utter a hundred or more distinct notes a second. What sounds to the ear like a buzzy note is actually either a very rapid series of short notes, from forty or fifty to a hundred or more a second, or it is a note that fluctuates up and down in pitch equally rapidly. There are notes in some wood thrush songs that fluctuate in pitch two hundred times a second, and some of the buzzes of this bird consist of notes uttered at the rate of a hundred and twenty a second. What sounds like a trill in a bird song is usually a rapid series of notes or phrases, up to forty or fifty a second (if uttered more rapidly they would sound like a buzz); notes fluctuating in pitch from ten to forty or fifty times a second also sound like a trill.

Many birds can utter more than one note at a time. In one song sparrow song I recorded in Maine there is a moment

when eight notes are uttered simultaneously. In some wood thrush and blue jay songs there are moments when four notes, pitched like the notes of a major chord, are uttered simultaneously. Some wood thrush songs contain a series of relatively steady notes, and at the same time a rapid series of lower-pitched, abruptly down-slurred notes. Some bird notes may be slurred over an octave or more in less than a hundredth of a second.

These features of bird songs, as well as many others, have been determined by means of electronic sound-analyzing equipment, but many of these things can be detected simply by playing the recording at a reduced speed (one-half to one-eighth normal speed). Playing bird songs at a reduced tape speed often produces more very unusual effects.

Once you begin recording bird songs you'll soon find that they show a lot of variation; the same bird may sing different songs, or the songs of different individuals of the same species may be different. If you can make a number of recordings of a single individual, for example, a bird nesting in your yard, you'll be able to determine just how many different songs it sings. The cardinal, a bird that commonly nests around houses, has a fair-sized repertoire; I have recorded as many as four different songs from the same individual, but I suspect it sings more than that. I have recorded 13 different songs from a single song sparrow, a bird that often nests in yards containing shrubbery. I have recorded 18 different songs from a single wood thrush and 22 from a single Carolina wren—birds you may have in your yard if there is a woods or ravine nearby. Once you learn the songs of some of these birds, at least the song sparrow, Carolina wren, and wood thrush, you can recognize individual birds, and you can tell if the bird in your yard one season is the same bird that was there the season before.

After you get a collection of bird song recordings, you'll have a lot of fun listening to them, and you'll soon learn to recognize the different species. And you'll find that all the bird students in your vicinity will be interested in listening to your recordings.

The author (right), and Dr. Carl R. Reese, a colleague, capture a bird's melody with a Magnemite portable, and microphone mounted in a 40 inch parabolic reflector. The parabolic is aimed by sighting through a small hole near the center.

Watch Those Long Cords!

Care must be taken whenever a long cord, either a power supply cord or a microphone cord is attached to a tape recorder.

In the case of the power cord., unless the wires are heavy enough to prevent a voltage drop at the machine, the recorder will not have sufficient power to operate properly. This can result in off-speed recordings, low levels and distortion.

The extension of microphone cords similarly requires special considerations. The usual mike supplied with a recorder should not be used more than 25 feet from the machine even if regular mike cable is used. The result will be a falling off of the high frequencies and the possible pickup of hum, especially in the vicinity of electrical appliances, fluorescent lights, etc.

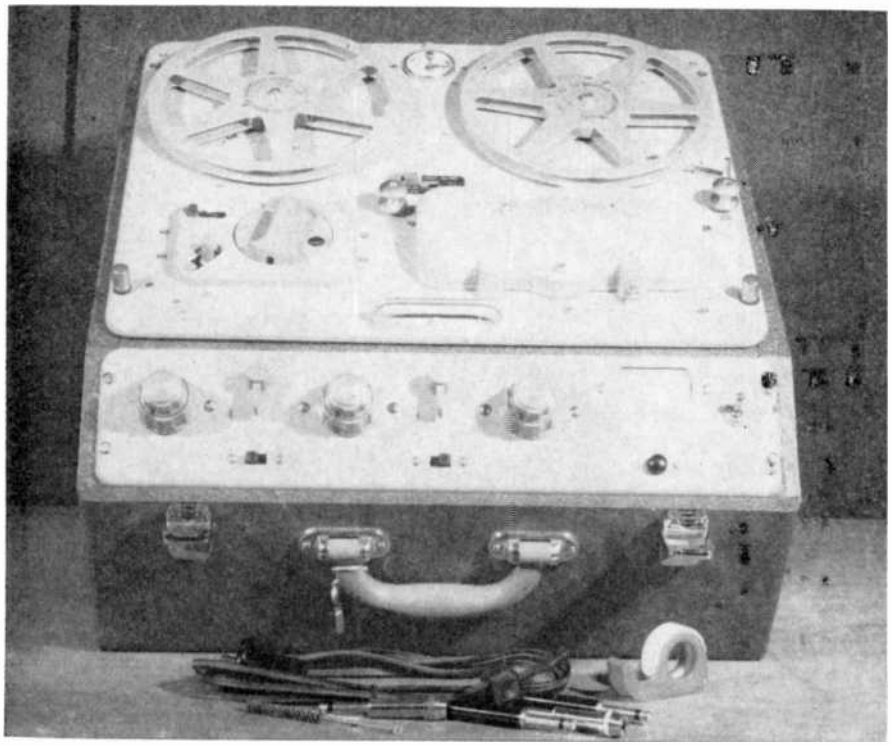
To run a long line to a microphone requires that a low impedance mike be used with a microphone transformer at the recorder to raise the signal to high impedance again to match the recorder input.

If a high impedance microphone is to be used, then two microphone transformers must be used, back to back, to change the high impedance of the mike to low impedance for going through the line and then back to high impedance gain at the tape recorder position.

The microphone transformers are relatively inexpensive and may be obtained at any good radio parts house.

Any extensions of microphone lines must be made with shielded microphone cable, ordinary wire will not do. The cable is available in two forms, one with a single conductor in the center inside the shield and the other with two conductors in the center and a shield. The former is the most common with the shield being connected to the ground or chassis side of the mike and the center used as the hot wire.

NEW PRODUCT REPORT



STAFOKSTED

Product: Ferrograph Model 424A Recorder

Distributor: Ercona Corp., 16 W. 46th Street, New York 36, N. Y.

Price: $595

FERROGRAPH RECORDER

. . . . A British import with 2-channel stereo record and 4-channel playback capability.

THE Ferrograph, of British design and manufacture and is more of a "do-it-yourself" recorder than most other machines. It is not for the "drop-it-in-the-slot" school of recordists, being more on the level of semi-professional machines.

It is sturdily built, even heavily built, as is attested by its weight of 48 pounds—and this does not include power amplifiers and speakers which must be connected externally. The unit itself has two recording amplifiers and two playback preamps.

The components used in the recorder include three motors, one each for rewind, forward and the capstan drive and heavy duty transformers. Nothing has been skimped in the way of parts, which accounts for the weight.

The unit will record mono on either the upper or lower track, stereo on both tracks, will playback 4 track stereo tapes and has internal facilities for mixing and echo effects, and also provides for recording one track while playing the other.

It also has an erase link on the back panel which, when removed, disables the current going to the erase head. This may be used as a safety feature, preventing anyone from accidentally erasing tapes or it may be used, together with an external potentiometer hooked into the circuit, to produce fades or superimpositions on the tape without the clicks that occur when the tape is started and stopped to insert material.

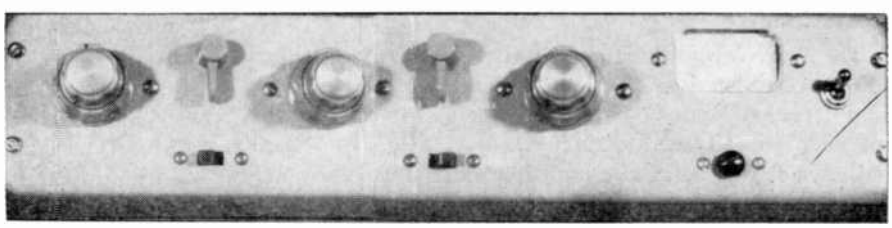
All controls are mounted on the front panel for the electronics and on top of the deck for tape motion control. The equalization control and the tape speed control are manually interlocked and the recorder will not function unless both controls match.

The equalization control has positions for 3¾, 7½ and 7½X, the latter being for playing tapes of European manufacture which are equalized to the CCRI standard rather than the American. The 7½ equalization is standard,

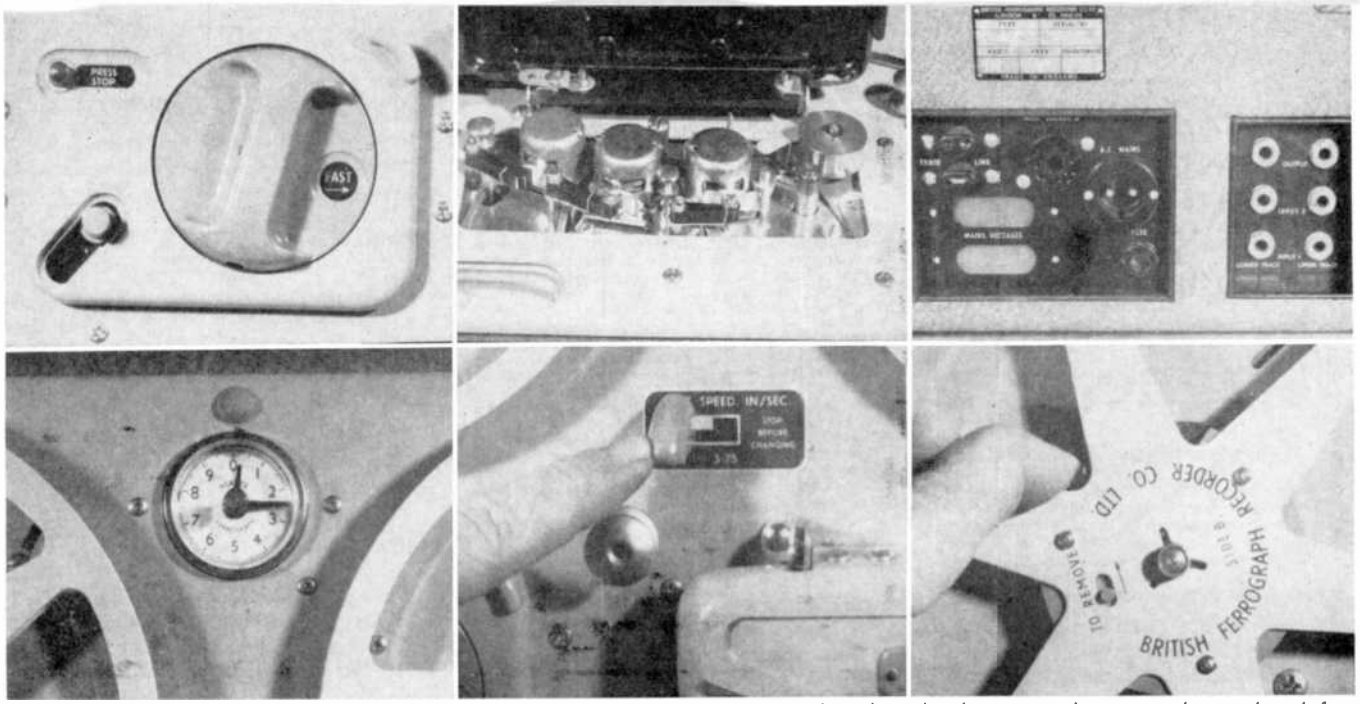
Rewind is fast and positive with a 1200-foot reel being rewound in less than a minute.

To insert the tape in the recorder the tape motion control must be set to fast wind which lifts the pressure pads from the heads. The tape path is not straight line but goes over a tape guide as it comes from the feed reel, past the heads, between the capstan and roller, over another tape guide and then bears on the automatic stop which operates if the tape comes to an end or breaks.

Two buttons are provided for start and stop and there is also another button on the head cover for instant stop. This lifts the pressure roller from the capstan and avoids any clicks which might be present if the recorder is taken in and out of record.



Controls, left to right: dual record gain, input 2, equalization lever, output switch, dual record gain, input 1, record selection lever (upper track, lower track, stereo) meter selection switch, dual playback gain, meter with zero set, and on/off switch.



Upper left: tape motion controls are grouped on top of deck. Upper center: unit has three heads, two track erase and record and four track playback. A rubber covered capstan and brass roller are used to move tape. Upper right: inputs and outputs are grouped on rear including a link for disabling the erase. If this is removed then machine is "safetied" for playback only in inexperienced hands. Lower left: the "turns counter" is a clock type. Lower center: speed control should only be operated when record is off. Lower right: reels lock on shafts and have tape holding device built into hub.

We were impressed with the instruction manual which is a case bound book of 60 pages. Since the recorder is highly adjustable and since versatility in an instrument always means a multiplicity of controls, *reading the instruction book is a must.* Even though you may know recorders, operating this one without familiarization will only add up to frustration. Once mastered, however, operation is easy.

The instruction book, in addition to operating instructions also contains a complete list of parts and their numbers, pictorial illustrations with parts named and numbered and schematic diagrams. The book also contains full directions for bias adjustment, checking of frequency, and electronic parts, a complete rundown on the mechanical aspects, etc. Since these recorders are shipped all over the world where repair depots may be completely lacking, the instruction book must be complete and factual. It is.

The reels supplied with the recorder have a device in the hub to hold the tape. By pressing on the red section a slot opens between the gray and green segments for insertion of the tape. The reels also lock on the spindles.

The speed change from 3¾ to 7½ or vice versa may only be made while the recorder is not running.

As mention, the recorder is ruggedly built, highly adjustable and versatile. It is housed in an attractive gray covered case. For servicing, the deck is hinged at the back and may be lifted without removing it from the case.

SHOP OR SWAP

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

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

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

Remittance in full must accompany copy. No exceptions permitted. Ads will be inserted in next available issue. Please print or type your copy to avoid error. Address ad to: Shop or Swap, Tape Recording Magazine, Severna Park, Md.

PROFESSIONAL TAPE RECORDER — Tapesonic Model 70-C, like new, still in original factory carton. 3 motors w/hysteresis capstan drive, 10½" reel capacity, 4" meter, push-button solenoid operated, DC filaments, built-in playback amplifier and speaker. Cost $425.00. Sell for best offer. Lesner, 7615 Suffield, Morton Grove, Illinois.

CALLING ALL TAPE PALS. Your hobbies listed in our world wide collectors magazine free. Clubs and Societies also listed free. World Wide Collectors Magazine, Jimmy James, 54, Keslake Road, London, N.W. 6.

WHILE THEY LAST! Reeves and Presto 16" double faced recording discs. Absolute first quality. Packaged of 20, $15.00. Jackets included. John Bush, 45 Hartland Rd., Rochester 17, N. Y.

I RESELL the stereo tape bargains and deletions available in N. Y., 2Tk, 4Tk. Charles Sokol, 1241-59 Street, Brooklyn 19, New York.

USED TAPE RECORDERS and audio components. We accept trade-ins on new equipment. Boynton Studio, 295 Main St., TR, Tuckahoe, N. Y., Tel. 914 SP 9-5278.

USED MYLAR TAPES—150 reels on hand. 1,800 foot, $1.10 each. For order of 40 or more—99¢ each. Postage prepaid in U. S. B. Freeman, 800 W. 87th St., Kansas City 14, Mo.

TAPE—1800 ACETATE, $1.69 postpaid. Shamrock label. Ampex manufacture. Roger Bartlett, Box 342, Columbia, Missouri.

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FOR SALE: NEW Magnemite Transflyweight 312 BCTDV complete outfit. Write for details. Charles C. Vandervort, Lacyville, Pennsylvania.

"CHRISTAIN TAPE LIBRARY"—Gospel singing, organ music, good gospel sermons. Undenominational. Also write about rental of slide show to Samuel Fry, Box 500, Selinsgrove, Pa.

LEARN HYPNOTISM, SELF-HYPNOSIS from recorded tapes! Other amazing Tapes, Books, Records. Complete Sleep-Learning information! Free Catalog! Philanthropic Library, Drawer TR400, Ruidoso, New Mexico.

HI-FI RECORDS MADE from your tape. Finest professional quality. All speeds-sizes. Prompt service. For prices write MBS Recording Studios, 228 S. Wabash, Chicago.

WRITE for our low quotation on components, recorders. Hi-Fidelity Supply, 2817-C JC Third, N. Y. C. 55.

ONE WOLLENSAK T 1500 tape recorder for sale, in good condition, $85.00. One Wollensak T 1515 tape recorder for sale in good condition, $115.00. Michael Lee, c/o Tape Recording Magazine, Post Office Box 716, Severna Park, Maryland.

TRUE SCIENCE, TRUE HISTORY, Bible confirmed recordings, donate $1. 2521 N. W. 23 St., Miami.

RENT STEREO TAPES—Over 2,500 different—all major labels—free catalog. Stereo-Parti, 811-F Centinela Ave., Inglewood 3, Calif.

WANTED FOREIGN TAPESPONDENTS interested in cultural exchange of musical artists your country for United States artists. Two track, 3¾ ips 3" tapes, age 44 married. Ken Ostrinsky Box 66, Manchester, Conn.

5 AMPEX RECORDERS for sale, very good condition 601-2 (7½ stereo); 601 (Full track, 7½); 601 (Half-track, 3¾); PR-10 (7½-3¾ Stereo); 910 (7½-3¾ Stereo with two amplifier-speakers). Glen Broughman, Box 27, Opelika, Alabama.

SWING ERA BANDS taped Air Checks. Collectors items, Box 322, Glen Head, New York.

SELL: EICO RP-100, stereo rec-play tape deck. Electronically and mechanically perfect. Best offer over $180. L. Drasin, 9302 Kings Highway, Brooklyn 12, N. Y.

HI-FI LP RECORDS. Prices from $1.98 to $2.50. Write for free list. Jensen amplifier/speaker $25. G. E. preamplifier $10. Fisher X-202 Stereo Master Control amplifier $175. Ronald Baringer, 449 E. 7th St., Red Wing, Minn.

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HOW TO GET THE MOST OUT OF TAPE RECORDING

by Lee Sheridan

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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 sort stories, in many magazines both here and abroad.

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HOW TO MAKE GOOD TAPE RECORDINGS

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

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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 of Stereophonic Recording, Putting Together A Recording Show, and a Glossary of Tape Recording Terms.

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by Charles G. Westcott and Richard F. Dubbe

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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 originator 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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