

MAGNETIC FILM &

THE MAGAZINE OF HOME AND
PROFESSIONAL SOUND RECORDING

TAPE RECORDING

**RECORDING TV
PICTURES ON TAPE**

**HOW TO BUILD
A MIKE MIXER**

**MAKE MONEY
WITH YOUR
RECORDER**

**NEW PRODUCT
REPORT: THE
MAGNECORDETTTE**

**RECORDING THE
PIANO**

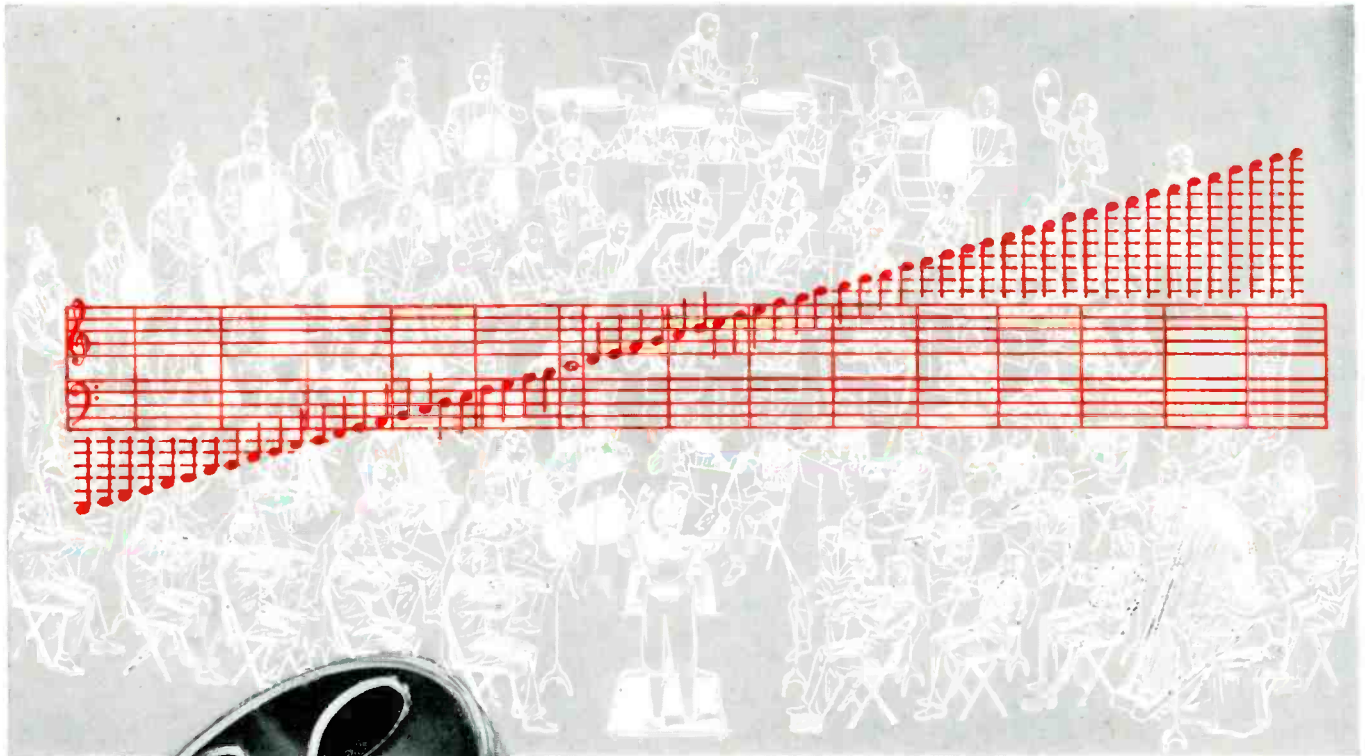
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**PARTY FUN WITH
A RECORDER**

Oscar Levant

FEBRUARY 1954

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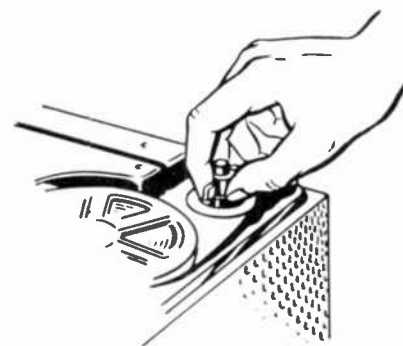
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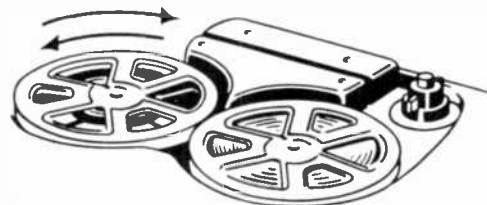
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Vol. 1 No. 1

Frankly I couldn't think of a better place to chat with the very folks who are most alert to new trends in tapes than in this magazine. That's why I arranged with Mark Mooney (when I saw him at the New York Audio Show) to take this space every issue for "Tips on Tapes."

A lot of people at that show said a lot of nice things after hearing a few of our new Swain-A-Fonic Multee-Trak tapes. I just can't repeat 'em, because even after 22 years in the music business, I still *can blush!*



One man described it just as though one man (me) had *eight* hands going all at once! If you'd like to hear a sample of this new musical gimmick, drop me a line, enclose \$9.85, tell me whether you wish 7½ or 3¾ inch per second tape, and I'll send you "Musical Comedy Hits Thru the Years." Full 30 minutes of music. No vocal—except where my gravelly voice breaks in to announce that special Multee-Trak number. If you don't like it, your money back but FAST.

Thanks for reading!
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MAGNETIC FILM &

TAPE RECORDING

VOL. 1 NO. 2

FEBRUARY, 1954

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Cover—Oscar Levant by Adrian Seigel

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THE COVER CELEBRITY

Our cover celebrity this month is Oscar Levant, too well known to need an introduction. He is a composer, pianist, conductor, author, radio and TV star and motion picture actor. He studies piano under Sigismund Stokowski and composition with Arnold Schoenberg. He has appeared as a soloist with the principal symphony orchestras of the nation and conducted some of his own works with three of them. In the popular field he wrote "Lady Play Your Mandolin." He has recorded an album of modern piano music and Gershwin's "Concerto in F" with the New York Philharmonic Society and "Rhapsody in Blue" with the Philadelphia Symphony Orchestra, both for Columbia. He is also the "music expert" on Information Please. He is the author of the book "A Smattering of Ignorance" and a number of magazine articles. Adrian Siegel, who made the picture is a well known photographer of musical celebrities and is also a member of the Philadelphia Orchestra.



Oscar Levant

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NEW TAPES

WE are happy to hear of the announced entry of Webster-Chicago and Pentron into the pre-recorded tape field, and look forward to an early opportunity to review their products in this column. Quality tape recordings offer the *only* practical answer to the problem of true high-fidelity music reproduction in the home, and this entry of two more companies into the field serves to insure the future of the industry.

In the last issue, I promised a more complete review of the *Concertape* offerings. However, I did not get the tapes in time for inclusion in this column. The tapes I did get were, for the most part, exceptional, so I will turn to them forthwith.

A-V TAPE LIBRARIES, INC., 730 Fifth Ave., New York 19

Reel 1015A (part I)
Violin Concerto, opus 35—Tchaikowsky
Austrian Symphony Orchestra
Kurt Woss, Conductor
Michele Auclair, Violinist

This is a big, full, meaty recording of an old "war horse" that doesn't flag once, from beginning to end. (An excellent recording to be used as a demonstration of tape, either by dealers or home enthusiasts.) It is difficult to realize, at times, that this is recorded at 7½ inches per second. The overall tone and dynamic balance, particularly on the solo violin, compares favorably with the best that I have heard recorded.

Although the frequency response is necessarily limited by the tape speed, it doesn't sound that way to my ears. The bass is clean and room-shaking at full volume levels; the highs are distortion-free and in perfect balance. The violin tends to be a little too on-mike during certain cadenza passages, but this might help rather than hinder the recording, as it is admirably suited to the showing-off of high fidelity rigs.

All in all, a satisfying recording and a good place to begin, should you be thinking of investing in pre-recorded tape.

Reel 607
Chorales in A and B minor—Franck
Blessed Are Ye Faithful Souls—Brahms
Robert Owen, Organist

An organ that *sounds* like an organ! I have not collected organ recordings for the simple reason that, to me, they have never sounded like a live organ, and no amount of twiddling with the controls has ever produced this desired fidelity. I imagine that many a hackle will rise with that pronouncement, but nevertheless, it is a simple statement of opinion. This is the first organ recording which I thoroughly enjoyed, and listened to in its entirety.

In the last issue I mentioned the big, full tone of the Christmas carol recordings by Robert Owen, but carols do not require the profound approach and great chords of the Franck Chorales, so the evidence was not

conclusive. Now it is! Played at full room volume, this recording is guaranteed to vibrate the filaments in cold light bulbs. Boost the bass and the phone will ring: the neighbor next door calling to ask if you have heard about the earthquake! And all of this at 7½ inches per second.

Reel 401
Vocal Varieties
Orchestra and chorus directed by
Lewis Williams

Intricate and interesting arrangements of popular and familiar melodies by an excellent chorus and concert orchestra. Although a tenor friend of mine objected to the variation-every-four-bars treatment of these songs, I believe that the general public will take to them. As a member in good standing of this special group, I did.

This is music designed for easy, effortless listening. I can imagine it as accompaniment to dinner, letter writing or just casual lounging around. It is also music that will inspire participation. Who can resist joining-in to the choruses of such favorites as; "The Night Is Young And You're So Beautiful", "Drifting And Dreaming", "Over The Rainbow", and "Back Home Again In Indiana", to name just a few?

It is quite evident from these three samples that A-V is doing a better-than-average job in tape recording. A job that should contribute greatly to the ultimate public acceptance of tape over discs for the optimum reproduction of music. The music is on tape to begin with. Why not permanently?

HACK SWAIN PRODUCTIONS Sarasota, Florida

Program 505
"Slaughter On 10th Avenue"
"None But The Lonely Heart"
"El Relicario"
"World Is Waiting For The Sunrise"
"Showboat" selections
"La Cumparsita"
"Song Of India"
"When Day Is Done"

Recorded in Hack's easy electric-organ style. He has an apparently endless repertoire and never falters from one selection to the next, whether a Spanish tango or a highly stylized number like "Slaughter". Incidentally, I would like to hear Hack's piano-organ combination on this. The recording reviewed featured organ only and, possibly because of past performances, seemed to drag a bit, which is not in keeping with the rest of his work. This applies only to "Slaughter On Tenth Avenue", however, and may not agree with your findings at all. The rest of the recording is excellent and is highly recommended for electronic organ fans.

Program 504
"Serenade" by Drigo
"Poeme" by Fibich
"Dark Eyes"

"Viennese Refrain"
 "Country Garden"
 "Zigeuner"
 "Bluebird Of Happiness"
 "Indian Love Call"
 "Jealousie"

Dreamy music for a dreamy evening. Recommended for young swains with a fireplace, soft lights and a favorite girl. If it's marriage you want, she should say "yes" somewhere in the middle of "Zigeuner". That should give you enough time, before the end of the tape, for the social graces customary at times like these.

Does this make Hack Swain an arbiter of love? No—just an organist who knows how to handle a good tune, particularly these romantic stocks-in-trade. I personally prefer his multiple-track recordings, to the organ alone and hope to be able to review some, come next column time. If he concentrated on these, I predict they would sell like records.

Tape has many uses, aside from the reproduction of music, and we have by our side one of the most novel, and practical uses we could think of: Portable Church Services.

The Evangelical Foundation of Philadelphia, realizing that many communities and groups of people are without churches or ministers, have come up with a tape recorded church service which can be rented on a continuing basis, permitting the organization of regular services. If the community doesn't possess a machine on which to play the tape, the Foundation will rent that too, with an option to buy. A wonderful opportunity for isolated, small communities to attend regular, conducted services. In fact, the tape I have on hand was used at Big Rapids, Michigan, on October 22nd, 1953.

With each tape is sent enough copies of an Order Of Service to equip each member of the congregation. The order for program 26, for example, begins with an organ prelude, "Beneath The Cross Of Jesus". Following this is a Hymn, "O, Happy Day", during which the congregation is instructed to stand. Follows then a prayer, followed by a Scripture reading, in this case Psalm 91.

A choir then sings, "How Sweet The Name Of Jesus". A sermon follows, based on the 91st Psalm and preached by Dr. Walter L. Wilson, president of the Kansas City Bible College. The service closes with another hymn, a benediction, silent meditation and an organ postlude. Truly a complete service recorded on seven inch reels at 3.75 inches per second.

The Foundation also produces 16 millimeter, sound-on, films for the use of groups interested in Bible studies. If you are interested in either of these services, write to The Evangelical Foundation, Inc., 1716 Spruce Street, Philadelphia 3, Pennsylvania. They will be happy to send you their catalogue.

Society of Music Enthusiasts

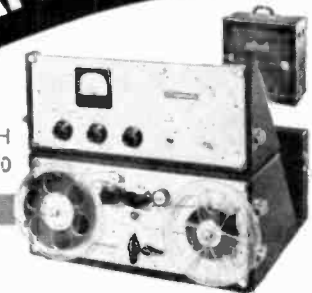
Membership in the Society of Music Enthusiasts is open to all who are interested in fine music. Local chapters have been formed in many cities. For full details write to: Society of Music Enthusiasts, Great Barrington, Mass.



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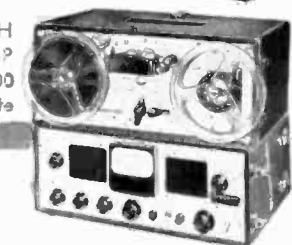
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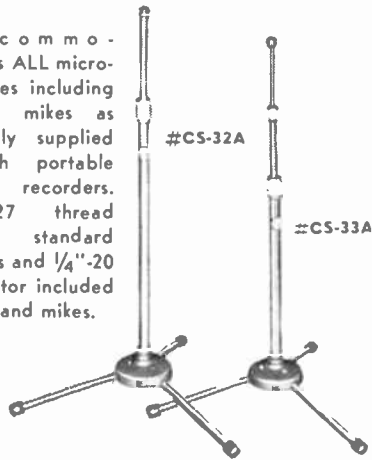
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TAPES TO THE EDITOR

When sending tapes to the editor please use the 3" reel and indicate the speed at which it was recorded and whether it is dual or single track. We will listen to your tape, make notes from it for use in this column and then reply on your tape. Please keep tapes reasonably brief.

If you do not own a recorder a letter will be acceptable. Address tapes or letters to: The Editor, Film and TAPE RECORDING, Severna Park, Md.

To the Editor:

Herewith my check for a year's subscription to your new magazine.

It is just what I've been looking for as I'm planning on using sound next year on my 16-mm. film. Since I know very little about such matters, it should prove very helpful to me. The first number is excellent. If future issues are written for the amateur who is not a technician, and who does not intend to become a professional, then it should be a great success.—*W. M. Aikman, Washington, D. C.*

You'll have a lot of fun adding sound to your films and we'll try to give the kind of information that will make the hobby an open book to you. One way to add sound to your films starts on page 16 of this issue. We hope you like it.



... sent in first tape

To the Editor:

Every time I read through the issue I learn something new. You might be interested to know that I have a tape of your cover girl, Rosemary Clooney, which was made in Hollywood. I am a member of both the Voice-spondence club and Tape Respondents International which I find very good and very helpful. I'd like to see an article on recording from the radio.

I think I can claim the record for the longest distance visitor in tape correspondence. My friend, Fred Bradshaw, of Subic Bay, paid me a visit. He came 12,000 miles, including a drive across the United States.—*Leo J. Matthews, Pompton Lakes, N. J.*

Anyone who has had a visit from a tape pal farther away? Mr. Matthews was the first person to send us a tape instead of a letter. We found it most interesting. Recorded on the tape was part of a message from another tape made in the Philippines which included a Christmas greeting in the native Tagala language.

To the Editor:

We notice in your first publication, in the article entitled "Why Not Join a Tape Club?" that you attribute the origin of tape

clubs to a Chicagoan whose folks were stranded in Berlin during the blockade. We thought you might be interested to know that the Magnetic Recording Club was formed in 1947, practically with the advent of the first tape recorder on the American market. In 1948, the Magnetic Recording Club came out with a monthly publication "Sound Tips" which was very well received by the many new fans of this completely new industry. As a matter of fact, the subscribers to this publication numbered over 2500 in that year.

We should like to take this opportunity to congratulate you on your first edition and to wish you continued success.—*Carmi A. Orleans, Magnetic Recording Industries, N. Y.*

We are indebted to Mr. Orleans for his interesting note on the earliest of tape clubs.

To the Editor:

I have read the first issue and am glad I subscribed to your magazine. I own professional tape recorders and a "Disc Cutter" for both 78 and 33 1/3 microgroove records; also equipment for duplicating tapes.

It is my wish to see an article on "How to Make Money Recording." I am sure that many of your readers would appreciate such an article.—*A. E. Clark, Lexington, Ky.*

It is seldom that a magazine has the opportunity to give its readers such service. Look on page 18. We hope you like it and there will be others along later on different topics.

To the Editor:

After reading the first issue I have placed a year's subscription through Read-More Publications. May I take this opportunity to wish you the best of success.

My equipment consists of a Revere T-10 recorder which I use in conjunction with my Bell and Howell 202 for magnetic recording so I am quite interested in your publication as I am sure it will help me to get better recordings.

I am a member of the Brooklyn Amateur Cine Club and several of the members are also recording enthusiasts so I am sure you will be hearing from some of them.

May I make the suggestion that you include in your publication a classified section for used equipment.—*Bert Seckendorf, Brooklyn, N. Y.*

A number of folks have suggested a classified column so next issue we'll run one if enough of you send in ads for it. We'll set the rate at 5 cents a word for amateur or non-commercial ads and 25 cents a word for ads from commercial houses. It will be a "Shop or Swap" section so if you have anything to sell, buy or exchange with other tape recorder owners send in your ads. Please enclose remittance with the ad.

QUESTIONS & ANSWERS

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

Q—For business and personal phone calls please advise the reference and explanation of the law on recording them to avoid legal difficulties.—H. H., San Francisco.

A—We do know that it is illegal to make any attachments to the telephone without the consent of the phone company and they have special recorders available for those who wish to record calls. Also, when a call is recorded a "beep" signal every fifteen seconds is put on the line so that the person making the call will know that it is being recorded. Use of a recorder without this signal is not permitted. More on this later.

Q—We have one recorder but many recorded reels of tape. Is there on the market a playback machine for tapes? Such a machine would probably be much less expensive and could supplement our school recorder.—M. M. R., Brooklyn, N. Y.

A—Our directory reveals two playback machines, one made by Pentron and the other by Ekotape. As you surmise, they are less expensive than a full recorder and should prove useful in your school.

Q—Here's a question which has been puzzling me ever since I started tape recording from FM radio. How can I eliminate auto ignition noises which are received by my radio, an AM-FM table model without erecting an outside antenna prohibited by the landlord? Many a fine piece of music has been ruined by these noises.—R. F. G. Boston, Mass.

A—In the absence of the specific type and model number of the set in question, we have only two suggestions:

1—that the set, being a table model AM-FM, probably is not a true FM circuit which includes limiting stages, these being completely responsible for the noise reduction in FM reception. The principle involved is that the noise is an amplitude modulation of the received carrier and any such noise is driven beyond the limiter circuit cutoff and thereby can only be received as a minor disturbance well below the level of the signal.

Thus, as in most types of AM-FM sets not equipped with limiting, the demodulation of the ratio detector (usually used in this modified type), or even the discriminator type of demodulation, will recognize and pass through to your speaker the amplitude noise such as you describe.

2—If your set is equipped with limiting, this limiting is only adequate for noise reduction when the signal strength is sufficient for limiter saturation, so that it can function.

If an adequate antenna is not permissible, your only alleviation can be obtained by the use of a dual chassis AM-FM set in which true FM amplification procedures are present

and sufficient signal strength can be obtained.

You might also try one of the indoor FM antennas which are specially cut to get a good signal in the FM bands. We would certainly suggest you try one of these before investing in a new set. Your local radio parts jobber will have one in stock or can get one for you.

Q—I picked up your magazine in a store where I bought my latest recorder and have lain awake half the night reading it. I play the uke, banjo and guitar and like to make multiple track recordings like Les Paul and Mary Ford. I make the recording at 3¾ then play it back at 7½ to get real ragtime but I can't get away from a hum. I have had several recorders but all seem to produce it. I understand that you need good equipment to put more than one track on a tape but how do you monitor it? I'd like to know how to make all the effects. I have a crystal mike—do I need a dynamic?—R. E. N., Columbus, Ohio.

A—A good crystal mike will perform very well but they are not as rugged as a dynamic and must be protected from heat, dampness and mechanical shock, any of which can change their recording characteristics.

As to your hum trouble check as follows:

1—Make a temporary soft iron plate shield to fit between the motor and recording head to reduce any magnetic coupling between them. Ground the shield to the chassis with a short, heavy lead. Next perform the same test between the power transformer and the recording head, checking for improvement. If improvement is noted, make the shield permanent.

2—Check wiring for possible coupling between the 110 volt AC feed lines or unfiltered plate voltage leads to recording head leads or input amplifier ground lead.

For wow or flutter, inspect the capstan and pressure roller for imbedded dirt, irregular surfaces or improperly seated capstan. Clean with carbon tetrachloride as prescribed in the instructions. Check drive tires, of rubber or neoprene, on balance wheel and train, for shiny spots, flats or hard surfaces. Smooth with fine sandpaper or replace. Make sure lubrication instructions have been followed.

One of the foregoing may be the cause of your trouble but if not check the amplifier for residual hum due to poor plate current filtering.

Trick recordings are developed by experimentation and the ingenuity of the operator plus the characteristics of the recorder, so in that you are the boss. From your tape, your music sounds good and we think Hack Swain's article beginning on page 12 will give you some very helpful hints on multiple tracking.

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by S. J. BEGUN

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ORRadio Industries, T-120 Marvyn Road, Opelika, Alabama, manufacturers of Irish Tape, are offering free to tape users the Irish Reel Tab for identifying tapes. It fits snugly beneath the edges of any 7-inch reel, whether the reel is full, half full or empty. Made of sturdy stock, it has loads of room for identification on both sides. The tab is designed to replace the makeshift scraps of paper and China Crayon markings so often used for labelling.

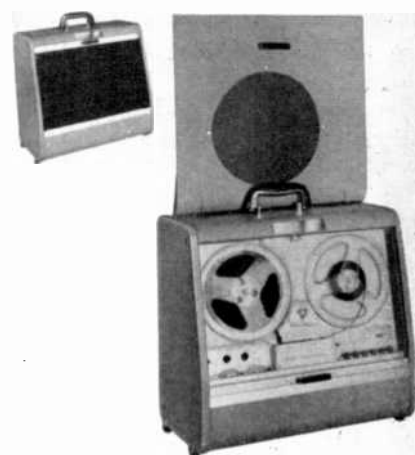
The tab may be obtained free by writing to Nat Welch at the address given above.

CABINET RECORDER



The new Wilcox-Gay Recordio Grand is a Hi-Fi tape recorder housed in a high quality floor type cabinet. Frequency response is substantially flat from 55 to 10,500 cycles. The unit has a 12" speaker and a 4½" tweeter. The output is 6 watts, undistorted. Easy to operate Prestomatic push-button controls, a mechanical footage indicator, normal and overload recording indicators make operation simple. A lock prevents accidental erasure and dual track recording at both 3¾ and 7½ inches per second is available. It will accommodate up to a 7-inch reel. The unit is made in either mahogany or limed oak cabinet and is complete with a 5" reel of tape, empty take-up reel and a controlled reluctance microphone. The company claims it is the most significant development in home recording since the introduction of the Recordio disc recorder 15 years ago. Full details from Wilcox-Gay, Charlotte, Michigan.

TDC RECORDER



The TDC Stereotone Recorder, just introduced by the Three Dimension Company, 4555 W. Addison Street, Chicago 41, a division of Bell and Howell, employs upright design for the first time in the popular priced field. The placement of the reels vertically has permitted the use of a 10-inch speaker. Push button controls operate the three direct drive motors and the electronic brake which makes it impossible to spill, break or strain the tape. The recorder is dual track with both 3¾ and 7½-inch speeds and has a footage indicator. The frequency response is from 50 to 10,000 cycles plus or minus 2 db with an 8-watt output. Made of die cast aluminum, the unit has a separate pre-amplifier circuit and a power amplifier with its own power supply. A recording level indicator is provided. List price is \$229.50.

VICTOR MIXER



The Victor Animatograph Corporation, Davenport, Iowa, has introduced the Mixer Magnesound for use with the Victor projector. The unit permits the recording of music and voice simultaneously. It has individual inputs for microphone and phonograph with separate volume controls. The major components include a magnetic drum incorporating separate record-playback, erase heads and a separate amplifier in a lightweight case. The Magnesound drum is interchangeable with the projector's optical sound drum and is connected to the magnetic amplifier. The complete unit, including amplifier, drum, carrying case and microphone is \$199.45.

BELL THREE SPEED



Bell Sound Systems, Columbus, Ohio, has recently introduced their new Three Speed Re-Cord-O-Fone Model RT-65-B. The speeds which are available in the unit are: $1\frac{7}{8}$ inches per second, giving two hours of recording, $3\frac{3}{4}$ giving one hour and $7\frac{1}{2}$ where the maximum frequency range of from 70 to 8,000 cycles plus or minus 3 db. is developed. All controls are grouped on the front for convenience and the 6" heavy duty speaker automatically disconnects when an external speaker is used. The output is 3.5 watts. The weight is only 33 pounds and it will accommodate up to 7-inch spools. The recording is dual track. A neon light indicator is used for recording level. For full details write to Bell Sound Systems.

NEW CATALOG

Audio-Master Corp., 17 East 45th Street, New York 17, N. Y., has just released a new catalog describing their complete new line of equipment. Write for your free copy—mentioning Tape Recording Magazine.

ELECTRO-VOICE GEORGIAN



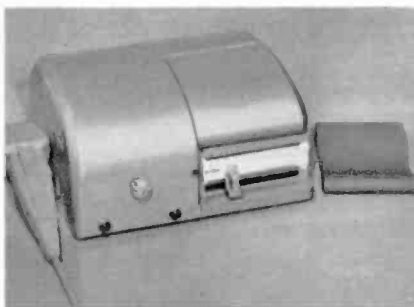
Advanced hi-fidelity engineering has gone into this 4-way corner horn made by Electro-Voice, Buchanan, Michigan. It uses the Klipsch K horn with a 15-inch driver in the bass section. The first crossover is at 300 cps. From 1000 to 3500 cps a special E-V diffraction horn gives smooth treble tones and above that the E-V Super Sonax takes over to beyond the audible range. It has both a "presence" and a brilliance control. It is available in Blonde Korina at \$515 or Mahogany at \$495. Full details from Electro-Voice.

AMPEX 350



Ampex Electric Corporation, 934 Charter Street, Redwood City, California, has announced the Ampex 350, a professional recorder which incorporates features most often desired by recording engineers. The design of the cabinet is a departure from previous designs as the top slopes at a 30-degree angle and the control panel is also slanted, making it easy to operate from either sitting or standing position. All tape motion controls are push button operated allowing for remote control of those functions. The top plate is pivoted for ease of servicing. Speeds are either $3\frac{3}{4}$ and $7\frac{1}{2}$ or $7\frac{1}{2}$ and 15 ips. Frequency response to 15,000 cycles is available at both the $7\frac{1}{2}$ and 15-inch speeds. The $3\frac{3}{4}$ speed is flat from 50 to 7,500 cycles. Full tape speed is had within 1/10 second after start button is pushed. Full details from Ampex.

MAGNETIC DICTATION



Peirce Dictating Systems, 5900 North Northwest Highway, Chicago 31, Illinois, is the manufacturer of the new Magnetic Dictation Machine. Completely electronic, it uses an endless magnetic belt with a 15-minute time limit that can be mailed or filed. The magnetic belt does not wear and all surface noises are eliminated. For correction the belt may be backed up and the new dictation made over the previous error. All operating controls are centered on the hand microphone which also serves as a playback. Standard accessories are available as is a separate transcribing machine that automatically backs up two or three words on each stop.

WEATHERPROOF PORTABLE



The Flyweight Magnemite is a compact 8-lb. weathertight magnetic tape recorder just announced by the Amplifier Corporation of America, 398 Broadway, New York 13, N. Y. It employs a fly-ball governor-controlled electric motor, battery driven and subminiature non-microphonic tubes. It will operate continuously for 25 hours on dry batteries. The amplifier batteries last 100 hours. Available in three models with tape speeds of $15\frac{1}{16}$, $1\frac{7}{8}$ and $3\frac{3}{4}$ inches per second, providing frequency responses of 300-2500, 100-3000 and 50-5000 cps. Priced from \$195 up depending on model. Write to the company for specification sheet.

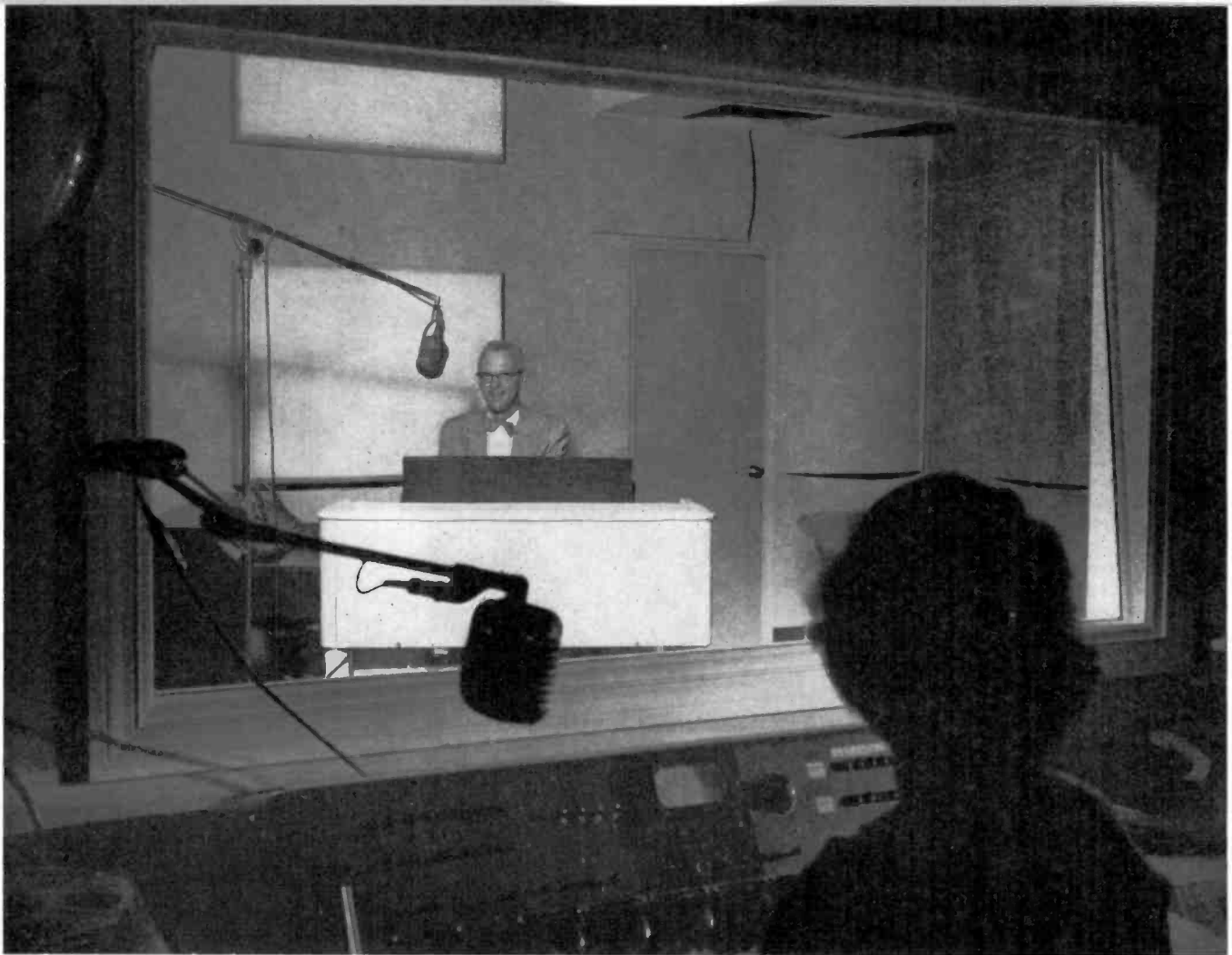
FREE BULLETIN ON SPLICING

"Splicing Techniques for Magnetic Tape" is the title of a new bulletin just issued by Minnesota Mining and Manufacturing Co., 900 Fauquier Street, St. Paul 6, Minnesota, makers of Scotch Recording Tape. The three-page bulletin covers splice weakness, loss of signal and adhesive transfer. It gives detailed instructions for splicing tape for both audio and industrial uses. Write for your free copy asking for "Sound Talk Bulletin No. 26."

EICOR 230



Eicor, Inc., 1501 W. Congress Street, Chicago 7, Ill., is marketing the Eicor 230, a two-speed recorder with a frequency response of 70 to 7500 cps. on double track. It accommodates 7-inch reels which may be left on when cover is closed. The use of plug-in heads makes a switch to a single track a matter of moments. Full details from Eicor. Price \$169.95.



Photos by Lionel Murphy, Jr.

HACK SWAIN:

Master Multiple-Tracker

... the story of Hack and Marie Swain who started in the living room and now have a recording studio.

by C. S. Wooley

IT'S 4 A.M.

A young mother in the Granada section, a peaceful, Moorish-architected suburb of Sarasota, Florida, moves sleepily into her kitchen to warm a bottle for the baby.

Noting a light in the house across the way, the young mother studies her watch, shaking her head in dreary resignation.

"Those Swains!" she exclaims to herself.

In the house across the way, an intent musician with a brush-crew haircut and a broad grin grinds a cigarette out in a heaping ash tray and says, "It's not quite *right* yet, let's try another take."

His "gal Friday," a trim, energetic housewife-radio-engineer, whirs a spool of tape back across the recording head and nods a "ready" sign.

"Those Swains" are Hack and Marie and until just recently this little scene occurred almost nightly, for this en-

terprising couple found it easy to forget all about the clock during the days they were adding to their home-recording equipment and trying new techniques.

The husband-wife combination of Hack at the consoles of organ and piano and Marie at the console of the tape recording equipment has since completed one of the nation's most completely-modern recording studios, but it all began with a Hammond Organ, an upright piano and an Eicor home recording outfit.

At first, the living-room recording studio was confined to one small corner and Hack and Marie taped Hack's unique combination of Hammond organ and electric piano music "just for kicks." But as they added to their equipment and the room became more for recording and less for living, the Swains found a very practical use for their "dabbling" a use which was destined to grow.

Hack had been a radio and recording artist ever since his

"child prodigy" days over WHAM, Rochester, N. Y. With a daily radio show over WSPB in Sarasota and nightly appearances in the resort city's finest supper clubs, Hack found himself with little time for the musical and audio experimentation he loves. Marie, who handled music files and the telephone for his shows, suggested they could plan their time better if, now and then, they could record a show or two and not be tied to such strict schedules. Then, too, several other radio stations had indicated interest in buying Hack's brand of music and relaxed chatter.

The little spool of plastic tape proved to be just the ticket. Not only could Hack put occasional local shows on tape, he could answer requests for open-end quarter-hour segments from other stations.

Soon Hack and Marie found themselves not only taping Hack's shows, but taking on custom recording jobs, creating special effects tapes and commercial background music tapes. Professional equipment replaced the first small units and with each new piece of recording equipment, a piece of furniture lost its place in the living room.

During those early recording days, Hack became associated with another radio veteran and advertising man, Bill Carey. Carey, whose advertising activities were growing, found that he, too, needed additional space. It was only natural that their business association and mutual space problems should result in a new building, housing both Carey Advertising and Carey-Swain Recording.

With room to really "dig in" recording-wise, Hack and Marie began to ignore the clock more than ever. Thousands of feet of tape threaded through the recording head as their work became more and more in demand and they jumped headlong into a new and completely-absorbing interest—multiple track tapes and new sounds in the Les Paul-Mary Ford tradition.

As the husband-wife team progressed, an old friend and business associate, George Poulsen, became more than ever

interested in what Hack and Marie were accomplishing. Himself a Hammond organist and recording enthusiast, Poulsen decided that Swain and Carey should be part of his nationally-prominent firm, G. H. Poulsen & Co.

Happy with the effects Hack and Marie were getting with *good* equipment, Poulsen was eager to determine what could be done with the *very best* equipment. Bill Putnam, President of Universal Recording Company, Chicago, was commissioned to spend as much time as necessary in Sarasota and spare no expense in making the studios the finest available. The result was two large studios. Each has a Hammond Organ and the larger studio also has a Baldwin Piano and 16 mm. film projection facilities. The perfected acoustic design features especially treated non-parallel floating walls and a minutely engineered series of semi-cylindrical wall and ceiling polys and sound pans. Air conditioning for all weather is provided in the offices and studios.

Some of the equipment in the new studios includes Ampex 350 recorders and high speed tape duplicators, RCA control console, Cinema equalizer, high and low pass filters, Presto 6-N cutting lathes and turntable, Rek-O-Kut playback equipment with Pickering diamond pick-ups, six microphone channels with echo chamber input to any one or all channels, Western Electric 639, Telefunken, Altec 21C microphones and Karlson enclosures.

That Hack and Marie Swain have made good use of this superb equipment was demonstrated in October of this year when officials and recording fans alike were thrilled with examples of their multiple-track tapes at the Audio Show in the Hotel New Yorker.

We dropped in on Hack the other day and asked if he had any tips to pass along to those interested in trying multiple track recording with their own machines. Not only did he have some tips but sat down and wrote out a musical score you can try yourself.

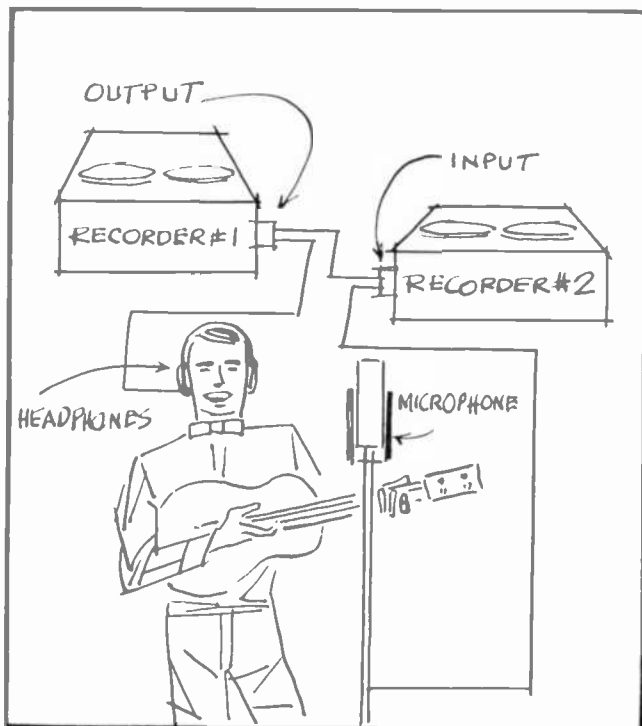
Hack said, "Actually the multiple track process is basically

"Now let's see . . ." Don't let Marie Swain's quizzical expression fool you for there's nothing in the tape editing business that stumps her. The distaff side of the popular Hack and Marie Swain recording team turns some fancy tricks with tape . . . all of them much neater than pictured here. She also is an expert at the audio console to get just the right amount of signal on the tape for a good, full recording. The picture on the facing page shows Hack at the organ and Marie at the studio console.





Hack Swain either writes or carefully edits every arrangement his company does to insure the presence of that special Swain touch. Especially for readers of this magazine he made the arrangement of "America" on the facing page. Below: here's how to hook up your recorders to make your own multiple tracks. Monitoring is done through headphones attached to the output of recorder No. 1 while the mike on recorder No. 2 picks up the next track recording.



quite simple. You do it one part at a time, then put the parts together so they sound as if they had been made on the tape all at one time. Might seem tricky at first, but with a bit of practice anyone can do it. That is, if you get two recorders and a set of earphones.

"Take a simple melody idea you can either sing, or play on a harmonica, piano, violin, clarinet or any of the single note instruments. Then write the simple harmony parts. For example, the score, (page 15), shows how three harmony parts look for 'America.'

"Notice that it starts with what we call three cue beats. as this particular melody is written in $\frac{3}{4}$ time—three beats to the measure. You put these three cue beats on the first track so that when you play that track back to begin your second one, you will know exactly when to begin—you will wait out the three cue beats and then start your second track as you hear the first one coming back at you.

"This simple 3 part arrangement of 'America' will serve as an illustration for your first try at it. It's arranged so that it is playable if you just want to use two parts, that is, the first track and second track. I mention this so that the purist in harmonic structure will understand the reason why the voice leading is not always as it should be. You will find however, that when the three tracks are played back you will have a composite whole that will give you a very interesting effect. The sketch shows the way your two recorders should be hooked up.

"Now for the recordings. Complete your first track, rewind and on machine No. 1 prepare to playback. Now set up machine No. 2 in recording position. It will be a simple matter for you to feed the playback of recorder No. 1 to the recording position of recorder No. 2, at the same time you feed your new signal for track 2 from your microphone. This has been accomplished by others by using a "Y" rig such as is illustrated in the diagram. Now, of course, you realize that if you allow the first track to be played over your loud speaker then it will again be picked up and recorded the second time. To avoid this, listen to track No. 1 coming back on the playback through a set of ear phones. and as you do so, play track No. 2. Try to match it rhythmically as closely as possible. It will take a few tries before it comes out exactly the way you want it to, but it can be done.

"You now have two parts recorded on machine No. 2, that is, the first track and the second track. Remove this, place it on machine No. 1, rewind of course, and prepare to playback these two parts. Your cue beats on the second recording are your cue to begin your third track. Proceed as before by playing back on this one roll of tape tracks one and two. feed it into recorder No. 2 in record position and proceed as before. You will hear the cue beat come off then you will hear two parts in your earphone. Now put your third part on it.

"Of course, it can be expanded to four, five, six or seven or as many parts as you choose to play. At the conclusion of your final track you could even put on a rhythm background using the same method as outlined.

"It will take a little bit of doing to get an exact balance and a pleasing effect, but believe me, you can have a lot of fun with it.

"When you have a completed tape, then you can eliminate your cue beats by cutting them from the tape and splicing your leader up to the beginning of the composition.

"Another suggestion. If you decide to attempt to record something in $\frac{4}{4}$ time, then of course you would place 4 cue beats at the beginning of your first track giving you the

AMERICA

CUE BEATS

The musical score is organized into four systems, each containing three staves. The first system is labeled '1ST TRACK', '2ND TRACK', and '3RD TRACK'. Above the first staff, the word 'AMERICA' is written and underlined. Below it, 'CUE BEATS' is written with three arrows pointing to the first three measures of the first staff, which are numbered 1, 2, and 3. The music is written in treble clef with a 3/4 time signature. The notes are simple rhythmic patterns, including quarter and eighth notes, and rests. The score continues for three more systems, each with three staves, showing a progression of rhythmic patterns.

Here's a special arrangement for a three track tape. The cue beats get you started at the right time. The score shown may be played on any single note instrument and rhythm beats added later.

counts one, two, three, four, and you start on the next beat when you play your second track.

"I would be very much interested in how you make out with this experiment, and I will be very happy to receive your comments. If you have any questions send them to me in care of "Film and Tape Recording" Magazine and they will be relayed to me for reply. Have fun—go to it! You'll be a multi-tracker, too!"

Hack's flying fingers have turned out 260 15-minute open-end Hack Swain Shows in catalog, a library of stylized, imaginative music tracks for high fidelity fans, industrial

sound systems, 30-minute programs of organ music, tracks for funeral homes and parks and incidental music tracks of virtually every nature. At the studio a complete script, music, dramatic, announcing and engineer staff is geared to produce commercial radio and TV spots, open-end radio and TV shows, sound effects, eight-hour music tracks for commercial background use and commercial sound movies.

For Hack and Marie, it's all a far cry from that first little set-up in the corner of their living room. But if you ask Hack and Marie Swain how so much can be accomplished in such a short time, they'll tell you, "Just follow the tape."



ADD SOUND TO YOUR MOVIES

. . . any film old or new can be shown with
sound using your tape recorder.

by *Ed Mankus*

Revere Camera Co.

With the new Revere Synchro-Tape, either 8- or 16-mm silent projectors which are equipped with a rheostat speed control can be used with any tape recorder having a speed of $3\frac{3}{4}$ inches per second. The perfection of the synchronization is amazing and the quality of the sound is excellent. The whole family can get into the act with lots of fun for everyone—and also make a valuable record for the future.

The Synchro-Tape differs from ordinary sound recording tape in that the entire length is striped with evenly spaced vertical lines. These lines are scientifically calculated and provide a means of governing the projector speed at exactly eighteen frames per second, the stroboscopic effect affording the control.

In practical use, the projector is placed in front of the tape recorder and a small clamp-on reflector, supplied with every roll of Synchro-Tape, is attached to the projection lens. This reflector is for the purpose of deflecting a portion of the intermittent light to the lines appearing on the back of the tape. As motion-picture film is projected, a rotating shutter cuts off all illumination momentarily between each

scene. We have, in effect, a steady pulsation of light and dark impulses. Remember the "flickers?"

As the tape travels in the recorder, the synchro-lines correspond to the light and dark flickers of light produced by the projector shutter. By adjusting the speed of the projector, these pulsations can be synchronized to produce the illusion that the lines apparently freeze and stand still. As long as this illusion exists, perfect synchronization of sound and picture is assured.

To make a recording, set up the screen full height and place the projector on a table no higher than 36 inches and the tape recorder directly in front of the machine. Allow only one-inch clearance between the projector take-up reel and the recorder front. The projector lens must be about six inches above tape level. It may be necessary to prop certain projectors to this height.

Switch on the motor light and tilt the projector until the screen is filled with light; insert a film, and focus sharply. With the projector light still on, attach the small reflector and bend it downward until a bright reflection is picked up

and cast down to the area between the sound head and the reel of the recorder. This is the "strobe vicinity" and a strip of white adhesive tape, supplied with the Synchro-Tape, is applied in this area to establish a starting mark. If the reflector has been adjusted properly, the picture appearing on the screen will not be shaded in any way.

Allowing for sufficient leader, press another tab of white tape on the Synchro-Tape at least two feet from the start. Neatly trim off the excess with scissors. Thread the tape in the recorder and line up both tabs in the strobe area.

The microphone is then plugged in and the volume adjusted to proper level. Start the projector and, when the first title or scene appears, instantly turn on the recorder. It is helpful to have another person attend to the strobing if you plan to do the narration. This also allows you to stand away from the projector so the noise of the machine will not be picked up.

If the lines drift to the left, slow the projector, if to the right, speed it up. A few trial runs will help and the rheostat should be tabbed as shown to mark the correct spot. The commentary is made as the scenes appear on the screen, and background music from a phonograph or radio may be added at the same time.

To play back the finished results, the projector and recorder are lined up as for recording. When the first frame of the title or first scene appears on the screen the tape is started from the tab points. The results can be seen and heard without further editing.

Still another method allows you to dub-in sounds and comments without watching the screen.

Synchronize the projector and recorder as described and instead of commenting identify each scene on the tape by tapping the mike with a pencil. At the same time verbally identify it. These clicks and comments are for temporary editing and will automatically be erased when the final narration is added.

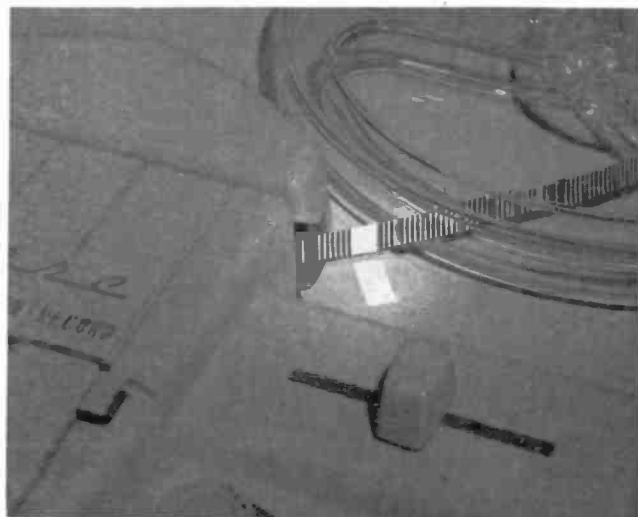
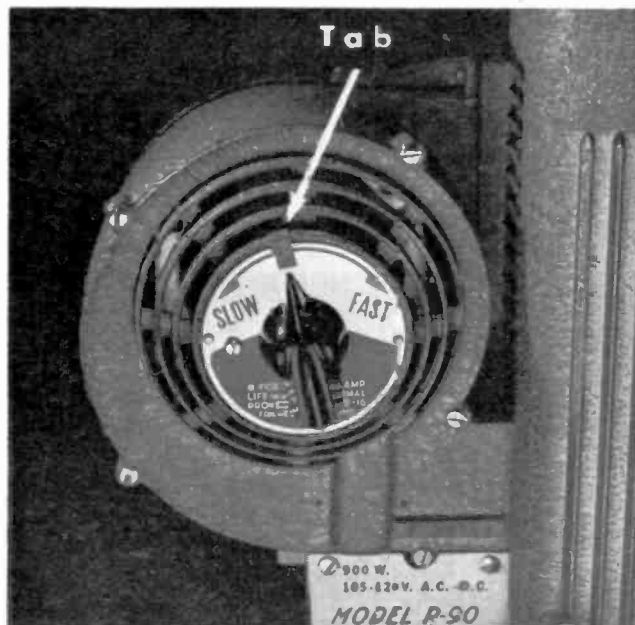
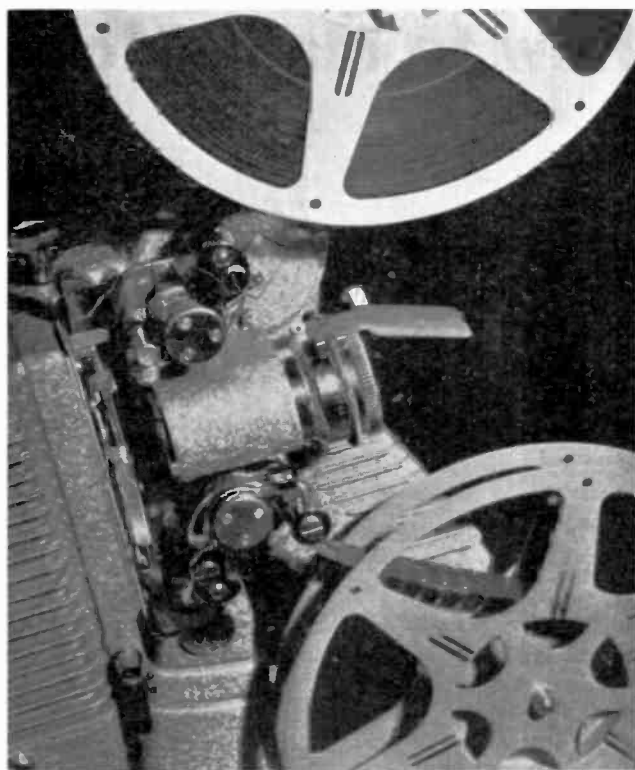
Rewind film and tape. Run the tape through and as each click is heard, stop the recorder and tab the tape opposite the starting line as marked on the recorder. Pencil notes may be made on the face of the tape if desired. To add the commentary, just record from tab to tab.

With this method you can plug in a record player and add music or fanfares, noises, and sound effects. If an error is made, corrections can be made by re-recording just between the areas zoned by the tabs.

When all sounds have been recorded between the tab marks, resynchronize the projector and recorder and run a playback showing. Do not remove the tabs, as they are very helpful in checking the accuracy of playbacks. Note their timely appearance in the strobe area with each scene change.

If these suggestions are followed, there should be a successful result with every performance. The roll of tape should be filed with its corresponding roll of film for future showings.

The picture on the facing page shows how the projector and recorder are set up. Light from the projector is caught by the small deflecting mirror shown in the top picture on this page and directed downward to the "strobe" area on the recorder. The black lines on the back of the Synchro-Tape will appear to stand still when the projector and tape recorder are in synchronization. Once this point is found a small tab placed on the back of the speed control of the projector will mark the point for future reference. The tape is usable with any tape recorder having a $3\frac{3}{4}$ -ips speed.



How to Make Money With Your Recorder

by

Mildred Stagg

New York Editor

A sound album of a wedding is just as important as a picture album. Here's how to make one.

SEVERAL leading recording specialists in New York declare that equipment owned by the average amateur is satisfactory for recording weddings. In fact they've noticed that their wedding business has dropped sharply within the past year. This may hint that the recording of weddings has become largely an amateur project. To the professional this branch of recording has never been a major source of profit because it's comparatively time consuming and the ceiling price is rather limited. For an amateur, however, the time he expends on recording a wedding he would probably spend on his hobby anyway while the pay is high enough to buy a few more rolls of tape or a new mike.

Take a tip from the professional if you want to give your recordings that professional touch. Guion Rogers of the

Merel Recording Company and Bernard Zimney and Joseph Garafolo of the Delta Recording Company are both engineers with a lot of experience in recording weddings and have a high regard for high fidelity in recording. Yet both of them use equipment for this purpose that is popular among amateurs. They do not recommend the use of the lowest speed, $3\frac{3}{4}$ (3.75) inches per second for the average wedding. This long playing tape speed is popular in amateur circles because it provides an hour of recording on each side of the tape. A professional considers $7\frac{1}{2}$ i.p.s. a minimum speed even for a wedding that's performed without music.

Until the recent improvement in lightweight, amateur equipment the professional used the high fidelity speed of 15 i.p.s. This high fidelity recording involved carrying bulky



Photo by Toni Venti

More than one microphone is necessary to record a wedding in a large church. Mikes may be hidden in plants at the altar or in other inconspicuous locations that will assure a good pickup of the voices. A recording of the ceremony is as important as a photo album.

heavy equipment and made the recording of weddings almost a professional monopoly. Since 7.5 i.p.s. is satisfactory for almost any wedding (unless a Toscanini is a participant,) and most tape recorders have this speed it follows that practically any tape recording enthusiast can record a wedding successfully on his equipment.

At 7.5 i.p.s. you get half an hour on one side of the tape or an hour on both. The average wedding takes between 30 and 45 minutes so one roll of tape will cover it easily. You needn't abide by the professional preference for tape speed if the wedding has no musical accompaniment. For voices, alone, the speed of $3\frac{3}{4}$ is satisfactory in most cases. This gives you an hour to a side and provides even fuller coverage.

Complete coverage of course means different things to different people. The standards among amateurs vary as widely as their experience and talent. If you want to approximate a professional job you must be prepared to give your tape the time, work and polish that distinguish a professionally prepared wedding recording. The monetary rewards are high enough to mean something to the average amateur although the professional admits that a wedding is more apt to give him a headache than a profit.

You have to allow at least 4 to 5 hours from the time you set out with your tape recorder until you return. Part of the time is consumed by arriving at the church or reception hall, where the ceremony is to be held, well in advance of the wedding party.

Suppose the wedding is set for high noon, 12 M. The bride has made arrangements in advance with the clergyman who is marrying her so that the engineer can set up his microphones. At the church or hall the engineer sets up one microphone as close to the altar as possible. He may hang it from the canopy over the pulpit or conceal it among the flowers at the altar. This mike picks up the voices of the minister and the bridal pair. Another mike is placed in the choir stall if a choir has been engaged or on a wall fixture or handrail near the soloist if there's a singer.

A third mike takes care of the organ music. Long cables run from the mikes to the recorder so the engineer can place his equipment off to one side. He should be able to see what's going on without being conspicuous. Extension cables of 30, 40 and 50 feet are the usual lengths. A Max Mix handles the job of blending music and voices and cutting from mike to mike. The engineer keeps an eye on the wedding party, the meter or volume indicator or Magic Eye. Usually he wears a headphone set.

At the average wedding the recording begins with the chiming of church bells or the organ music that's played while the guests are being seated. When the choir or soloist is ready to begin the engineer turns on the mike nearest the performer. "I've recorded 'Oh Promise Me' only once out of ten weddings," Guion Rogers said when he was asked if every bride insisted on the same old song.

After the preliminary music he cuts back to the organ for the wedding march. If the organ music continues in the background during the service he tunes it down when he cuts in the mike at the altar. During the ceremony he blends music and voices so not a word is lost. Then when the wedding service is over and he records the triumphant "Recessional" of Mendelsohn. That takes care of covering the average wedding. When the bridal party has left the church the engineer packs up his equipment and returns to the studio where he must work some more before he can deliver what most people order from a professional recording company—an acetate record of the wedding.



Joseph Foldes

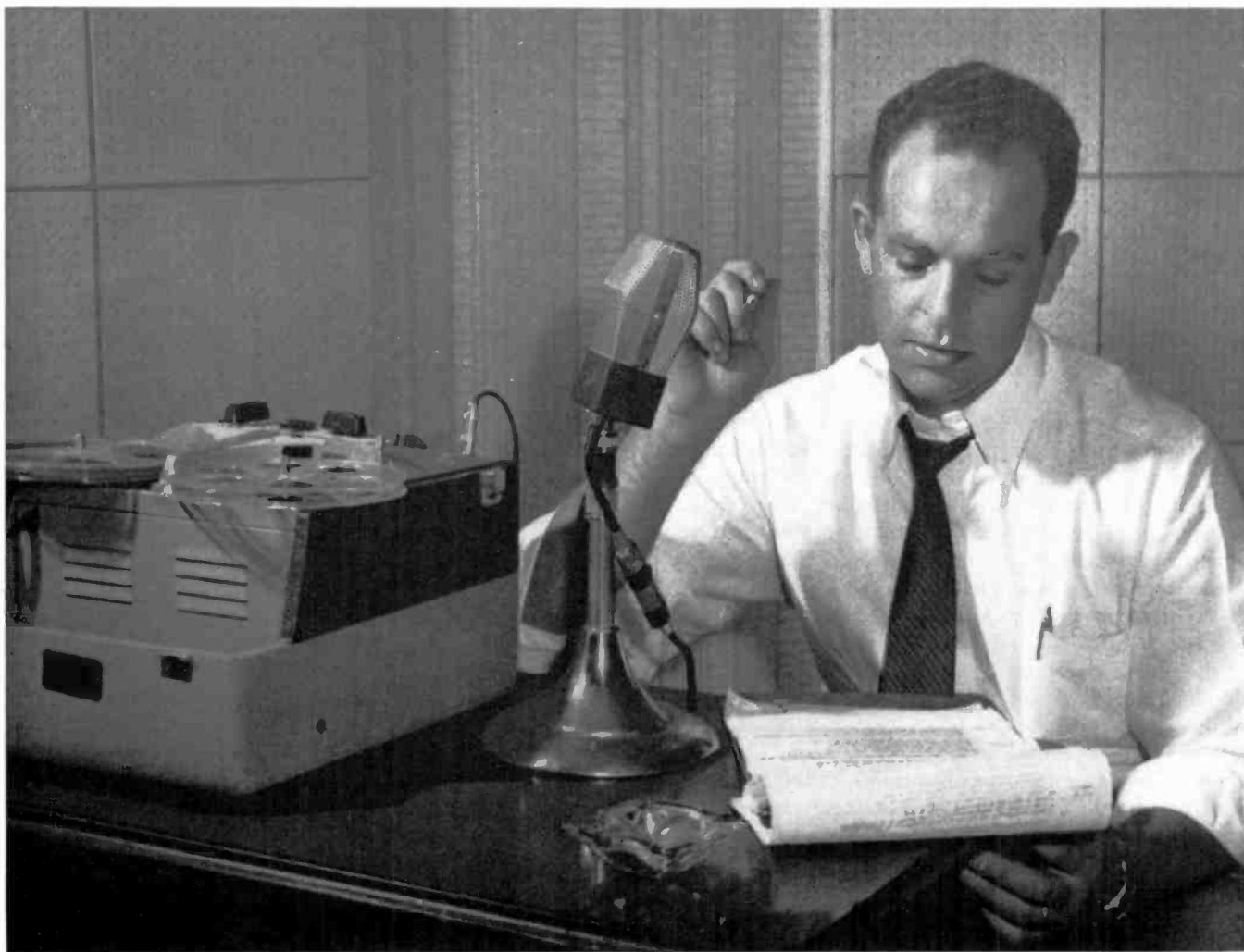
The equipment should be set up and tested prior to the ceremony. Low impedance cables are used so that the recorder may be placed in a convenient spot. Here Bernard Zimmey enters the church.

This is the spot where professional polish starts to function. A professional seldom delivers a tape recording of the proceedings. At the least he presents an edited long playing $33\frac{1}{3}$ RPM Microgroove record that can be played on the average record player. But if the wedding is an elaborate affair and the parents of the bride want a really handsome sound souvenir the professional is prepared to fill the order.

In dollars and cents the wedding recording can run as high as \$125.00. This sum provides the bride with a beautifully decorated wedding album. Inside she finds records with white satin labels hand lettered with her name and the name of the groom. When she puts the first record on the turntable she hears a fine baritone voice narrating a description of her wedding with the same dignity accorded the coronation of Queen Elizabeth.

A stock narration can be submitted for the bride's approval. The correct names of the wedding party may then be substituted for the —s. Accurate descriptions of the costumes of the bridal party are usually supplied in advance by the bride. This narration is dubbed in at the studio rather than read on the spot because the engineer is busy enough with his recording without attempting to read a script in a smooth unhurried voice.

You might put a sample stock narration on tape to show a prospective bride how it will sound. Here's a narration that can be adapted to any wedding, simple or elaborate. The narrator's voice is heard reading the wedding invitation against a background of appropriate organ music. The invitation always includes the names of the bridal pair and their parents and this makes an effective introduction to the recording. During the preliminary music, before the ceremony begins, the voice describes the church and floral dec-



Joseph Foldes

Commentary to complete the recording is added later from a prepared script. The tape is then edited, music added to fill in the time if necessary and then the tape is transferred to discs and made into an album. A good voice should be used to do the commentary.

orations. He announces the name of the choir or soloist and the selection before the singing starts.

As the wedding party is scheduled to appear the voice may say, "The Reverend Dr. — has taken his place at the altar and the groom, Jack — has entered from the right with his best man, Henry —. They're wearing black club coats with striped trousers and ascots with white carnations in their lapels." As the organ plays Lohengrin he announces "The guests have risen and the bridesmaids are coming down the aisle. Mary — and Joan — in pink organdy with sweetpeas and lilies of the valley. Now the maid of honor, Molly — is moving slowly down the aisle in green silk shantung with yellow snapdragon. And" his voice rises just a little "here come's the bride on her father's arm! She's lovely in her white satin gown with a tulle veil and pearl diadem. Margery is holding her mother's prayer-book with a marker of white orchids. Her nephew, Peter —, is the train bearer. He's wearing a white satin shirt with black velvet breeches. Now the bride has reached the altar. The groom steps forward to meet her as her father takes his position to one side." Pause. "The next voice you hear will be that of the Reverend Dr. —."

The narration stops during the ceremony. He picks up the description when the ceremony ends with the groom kissing the bride, and the rest is music.

On some de luxe jobs the engineer is expected to conduct

tape interviews with the important guests during the wedding reception. If guest interviews are required the engineer is told beforehand and he is usually introduced to the person who is to be interviewed by the father of the bride or another relative or close friend. Most tape recordings of weddings end with the strains of "Recessional" dying away on the organ.

The simplest professional job costs about \$35.00 in the city, \$25.00 in a smaller community. This consists merely of a record of the wedding from the time the music begins until it ends. The record that's presented to the client has a simple label or a blank. All pro records, regardless of price, are recorded to the customer's order on long playing 33-1/3 RPMs microgroove regular 78 RPM records. The average ceremony takes 45 minutes or less and a professional recording company usually fills the blank time with a recording of organ music.

The recording of a wedding tape on discs is often handled by a professional studio such as Delta or Merel even if the tape was made by an amateur. There's a tape recording enthusiast in Winston, N. C. who sends wedding tapes to Guion Rogers regularly. He uses a Revere recorder at 3.75 and gets adequate results.

This client pays \$4.00 for one side of a Microgroove or \$5.00 for both in 10 inch size. For a 12 inch record he pays \$5.00 for one side or \$6.00 for both. Naturally he adds a

Right: sound effects or music are added to the tape with the aid of a sound truck. The previously prepared script is followed closely. Center: after the tape has been completed the discs are cut on high quality cutters to assure a perfect result. Below: The sound album is discussed with the customer. By combining your recording talents with those of a capable photographer the team can make for the bride a picture and sound presentation that she'll cherish.



Photos by Joseph Foldes

profit when he makes a price for the wedding. But even at the lowest rate, \$25.00, there's profit. The tape costs about \$3.50 but it's reusable.

In contrast to an adequate recording job Rogers tells of one wedding he recorded where the groom was a composer-musician. He was a composition major at the Juilliard School and he had written a theme at school. It was decided to use part of the theme for the wedding procession instead of the familiar Lohengrin. The engineer was enjoying the fine music until he realized that the bride had made her entrance and moved halfway down the aisle before the guests got to their feet. Neither the minister nor guests had realized that she was there without the music that proclaims "Here comes the bride!"

Rogers uses the Sound Mirror recorder for weddings while Zimney prefers a Pentron. Both take along a Max Mix with three mikes for the average wedding assignment. While Zimney agreed that more amateurs than professionals are covering weddings nowadays he's been doing some in conjunction with specialists in home movies. At first the movie maker brought a wedding movie to Delta Recording Studios after it was developed. He projected the film and Zimney dubbed in appropriate music on tape. A closer tie-in, however, is possible. A tape recording can be made of the actual wedding plus a movie. By joining forces the motion picture company can increase business for the recording company and vice versa.

Another suggestion for securing wedding business is to make an arrangement with a local photographer who takes candid wedding photographs. He can recommend you to his bridal clients and you can either pay him a commission on sales or recommend him in turn. The more complete the coverage you can suggest to a bride, the more grateful she'll be to you someday. It's a once-in-a-lifetime event and to hear her voice and that of her husband as they repeat the marriage vows is one souvenir that will never fade nor go out of style.



TV PICTURES ON TAPE

RCA unveils method of putting both color or black and white image and the sound on magnetic tape. Sarnoff looks forward to home taping of favorite TV shows.

A METHOD of tape recording both the picture and sound of black-and-white and color TV, which might be the forerunner of an "age of electronic photography" was unveiled by RCA recently. The first public demonstration took place at the David Sarnoff Research Center in Princeton, N. J., and was attended by leading figures in the industry and the press.

RCA's method of video recording is similar in basic respects to the recording of speech and music in home tape recorders and looking ahead into the future, Board Chairman Sarnoff sees the time when it will be possible for the recording of favorite TV shows to be done in the home, to be played back at any time through the TV receiver.

As in the ordinary recorder, electrical signals are impressed on the tape as it passes over the recording heads. As the tape passes the gap in the magnet, the polarity of the magnetic oxide particles is changed to conform to the signal and in playback the process is reversed, the magnetic fluctuations in the tape generating a current that is amplified to reproduce the original signal.

Although the basic principle is the same, the engineering problems are vast, as compared to regular audio recording. The usual audio signal ranges from 20 to 20,000 cycles per second while the video signal may go as high as 4,000,000 cycles. And color television signals, as now formulated,

must carry at least twice as much pictorial information as black-and-white in addition to the sound signals.

It was necessary to develop special recording and reproducing heads to carry the tremendous range. As one of the factors which determines the frequency range that may be recorded is the speed of the tape past the heads, RCA uses a tape speed of 30 feet per second, which is within manageable limits. Advanced equipment now under construction is expected to allow the use of a lower tape speed and with time still further reductions appear likely.

The tape reels on the present equipment are 17 inches in diameter and will record 4 minutes of TV program. Present research goal is a reel 19 inches in diameter which is expected to carry a 15-minute program.

The transport mechanism also presented some design problems for even a small variation in the speed of the tape (called wow or flutter on audio tape recorders) can create noticeable effects in the picture. Precision apparatus had to be devised which accurately controls the speed of the tape. The laboratory video tape equipment does this many times more accurately than is necessary in magnetic tape recorders for sound. Even greater precision in regulating speed and pressures seems possible in research now under way.

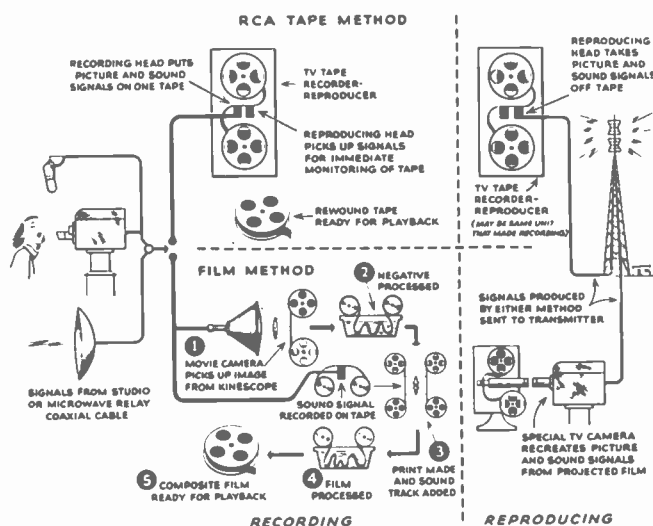
In the RCA system, five parallel channels are recorded on a single magnetic tape one-half inch in width. There is one recorded channel for the primary color signals (red, green and blue), for the synchronizing signal and for the sound signal. In black-and-white recording the tape need only have two channels, one for the picture and synchronizing signal and the other for the sound. For black-and-white the present 1/4-inch tape is sufficient.

In the demonstration, the five signals were obtained from the output of color TV receiver. In reproducing the picture, the tape supplied the three primary color signals direct to the three electron guns of an RCA tri-color kinescope, the signals needed to synchronize the scanning and the signal which carried the sound.

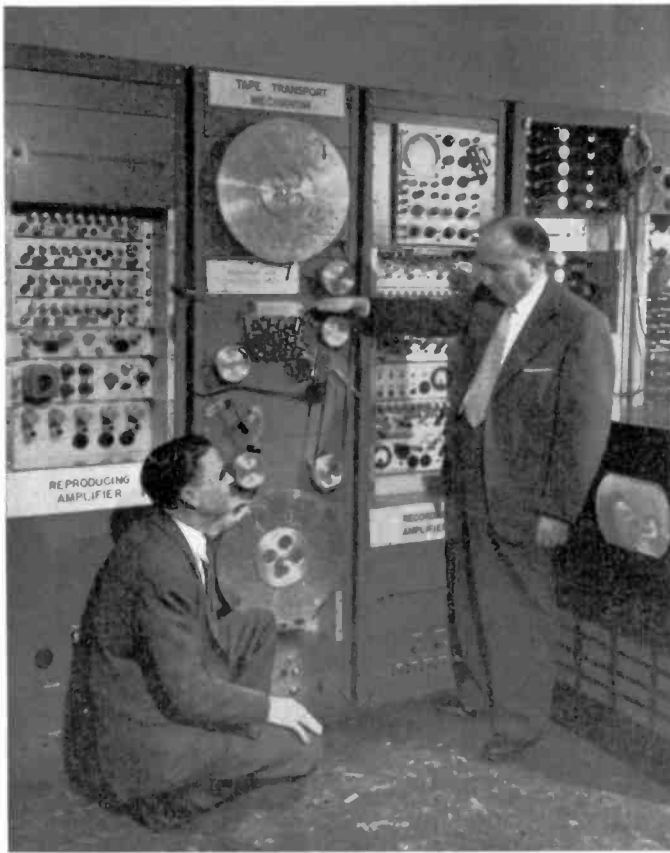
To rebroadcast a color TV program from a tape recording the three color signals are combined with the synchronizing signal to form a composite signal to send to the transmitter.

In summarizing the present status of research and engineering problems as they relate to video tape recording, Dr. Engstrom said, "While some technical problems still must be surmounted before video tape equipment can be made available commercially, RCA considers that the toughest of them have been conquered and that further development is certain to solve the remainder."

In the demonstration, a color TV program was beamed



The diagram shows the steps in recording and reproducing a TV program by the RCA video tape method as compared to a typical film method as used today. The use of video tape will permit instant playback and will be cheaper than photo film methods.



This is the laboratory equipment on which the first public demonstration of both black-and-white and color television was made by RCA at the Sarnoff Research Center in Princeton, N. J. W. D. Houghton, left, and Dr. Harry F. Olson, Director of RCA's Acoustical Research Lab head the research team perfecting the system.



Joseph Zenel, research engineer, holds an experimental recording head unit, the heart of the video tape recorder. These heads have been specially designed to respond to the high frequencies used in TV which run out to 4,000,000 cycles per second as compared to the maximum audio range of about 20,000 cycles per second.

from the National Broadcasting studios in Radio City to the research center 45 miles away.

This program was seen as it arrived. At the same time the picture and sound was recorded on tape. During part of the transmission both the live program from the microwave relay and the immediate playback of the magnetic tape recording were shown.

As soon as the tape reel was rewound, it was played back on two RCA color TV receivers. The program consisted of two dramatic presentations.

In the first part of the demonstration, previously recorded tapes were run through the equipment and showed both black-and-white and color that had been beamed out of New York on an earlier date.

The same apparatus handled both the recording and playback of the tape for both the color and black-and-white tests.

General Sarnoff, two years ago asked the scientists and research men at the RCA laboratories to give him three presents to mark his 50th anniversary in radio in 1965. One was a video tape recorder, another was an inexpensive electronic air-conditioner without moving parts, and the third was a true amplifier of light. The video recorder is their answer to his first request and work is progressing on the other two items.

He envisioned great possibilities for the future of the new medium, saying, "It has great possibilities for television broadcasting and, later, for national defense, for the motion picture and theater industry, for industry in gen-

eral, for education and for home entertainment.

"While this electronic video tape equipment is still in the developmental stage, the basic principles and principal elements of our system have been tested and confirmed. We are confident that it is only a matter of time, perhaps two years, before the finishing touches will bring the system to commercial reality."

He continued, "The all-electronic chain of portable television camera, video tape recorder and standard television receiver, would make a convenient and versatile system for making amateur as well as professional motion pictures. It will speed the preparation of newsreels and will be a useful tool for news reporters. The tape would not have to be sent away for processing with its attendant delays and extra costs. In the home, the tape equipment could be used for home movies or connected to the television set to make a personal recording of a favorite television program."

Most of the guests that witnessed the demonstration agreed that not only was it a milestone in technical progress but the pictures themselves were of good quality.

Bing Crosby Enterprises showed its version of black-and-white recording in 1951. Their system is being developed in conjunction with Ampex.

In addition to Crosby and RCA, other firms also are working on the problem including: General Electric, Minnesota Mining and Manufacturing, Armour Research Foundation, Audio-Video Products Corp., Brush Development Co., Shoup Engineering and General Precision Laboratories.



Party Fun With Your Recorder

by Jeanne Lowe

. . . here's how you can add new and novel twists
to your next party by using your recorder.

TAPE recorders and parties seem to go together like ham and eggs, and you've probably already discovered the fun you can have by recording friends' voices and singing, or even putting on recorded radio shows complete with home-made sound effects and background music.

Now something new has been added for party fun—games on tape. The versatile recorder can create an amaz-

ing variety of original new games to entertain your friends, as well as make the old favorites even better. In fact, the possibilities of tape recorder games seem to be limited only by the ingenuity and interests of the host and his guests.

Chances are that once you've played some of these, you'll start improvising more of your own, and the problem of how to entertain the gang next Saturday, or many Saturdays to

come, won't rear its ugly head for a long, long time.

Almost everyone enjoys guessing games, so tape quizzes head up the list. A particularly nice feature of these quizzes on tape is that you'll get as much fun out of preparing them as your guests will from playing them. Further, the recordings can, of course, be saved to entertain a different group of friends at another party.

Musical themes is a particularly popular category of tape quizzes. It can be built around either classical or popular music, depending on what you and your friends like.

To put together a classical music quiz, select various symphonic and operatic records and tape brief excerpts from them on one tape in advance of the party. Select portions that are typical or familiar, but not such dead giveaways as, for example, the opening notes of Beethoven's Fifth Symphony. Also make sure you record enough of the excerpt so that it can be identified.

Take down about eight or ten different selections, allowing 30 seconds blank tape between each one. As you record, write down an exact description of the selection, so that you'll have the right answers, in order, the night of the party.

There are two different methods for recording off radio, television or the phonograph. One is to hold the microphone in front of the loud speaker. While this may seem like the simpler technique, you're apt to record any background noises in the room at the same time you are trying to tape the music. The preferable system, and really just as easy, is to use the radio-phonograph extension cord which comes with most recorders and connect it with a jack to the radio or phonograph. This way you'll get a recording directly from the music source without external noise. But you will still be able to hear the music over the speaker so that you can record exactly what you want.

To "record" the blank in between each selection, simply turn the volume all the way down and let the tape run at the regular speed for the desired 30 seconds. Then push the stop button, and prepare to record the next selection. (Don't

forget to turn the volume up again, though, when you're ready to record again!) On the night of the party you will have the complete music quiz ready to be played.

Guessing games are best played in couples or teams. This avoids showing up any individual who may not know the answers, and working together usually provides more laughs.

Give everyone pads and pencils and let the tape play. The blank after each selection will provide time to guess the tune, and you can allow a few minutes at the end of the recording for the people in each group to arrive at the correct answer after comparing their guesses. Leaders of each group read off the final guesses, trying to make identification as complete as possible. Points are given for the name of the composer, the title of the work and, if it's a symphony, the particular movement, or, if any opera, the overture, prelude, act or aria name. You would do well to decide on points to be given for each piece in advance.

When all the guesses have been announced, chances are the participants will want to hear the tape again, in case they missed some of the numbers.

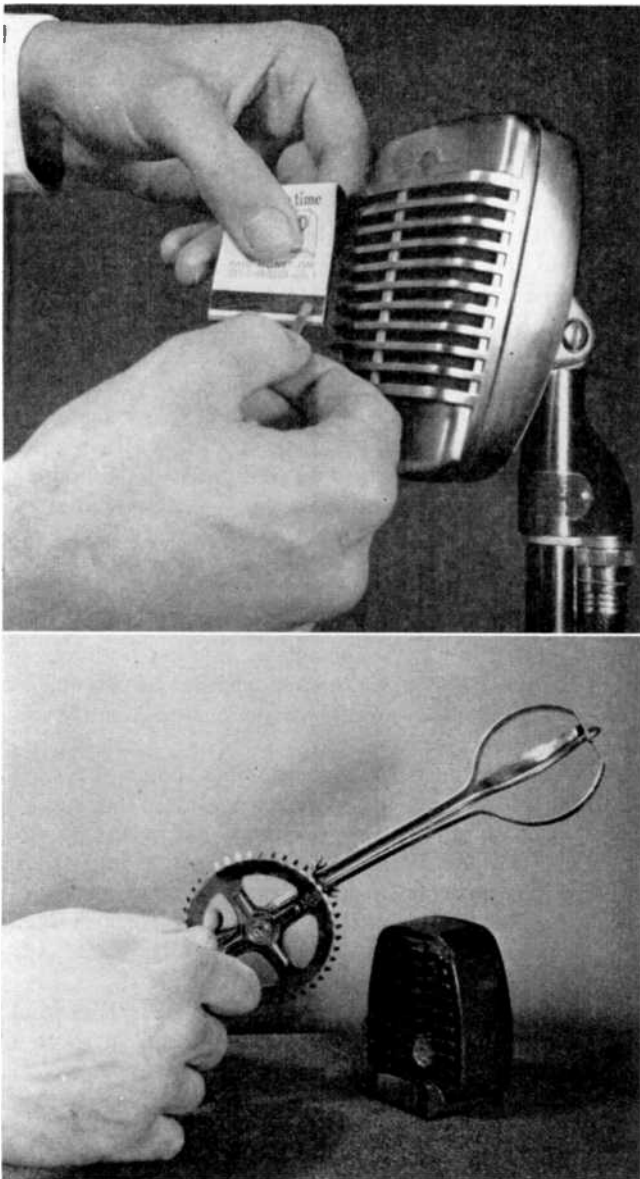
The same game can be played with popular records, taping a portion of the introductory verse, not the chorus, or the chorus without the words, to see whether contestants can name the tune. You can also program it to identify well-known vocalists and bands.

Off-the-air recording provides another source of material and new categories for taped guessing games. The voices of famous people, comedians, announcers and news commentators are taped off radio and TV in advance, as in the music quizzes. The tape can be edited, if desired, to preserve the best excerpts of each voice, or to remove portions where the person's name is given. You can also tape off the musical signatures of popular radio and television shows, to see who can guess the show it's from. Dragnet's theme would perhaps be a little too obvious, but this should give you an idea of the type of material to be used.

To program these off-the-air quizzes, watch the newspaper listing of radio and TV shows so that you can make your

Facing page: home made soap operas are fun to record. Sound effects can be added with anything that's handy. Parts are assigned by drawing slips from a hat and from that point on it's catch-as-catch-can. Right: children's games, such as Musical Chairs or Going to Jerusalem are played with a recorder furnishing the music. Sections of blank tape between the musical selections afford the stops and starts. This can provide the party hostess with time to put out the refreshments as the game may proceed unattended.





"What's That Sound" is a quiz game that will keep the guests guessing, whether they be children or adults. The trick is to make recordings of small sounds close to the microphone with the volume turned up. The striking of a match or the whirring of an egg beater when amplified are quite mysterious sounds. Be sure to tape some common sounds so that your guests will be able to make correct guesses quickly—it's more encouraging.

choices in advance and be set to record when the desired show comes on.

"What's that sound?" is a quiz which particularly appeals to children, but it's challenging enough to stump many adults. For this game, prepare a tape recording of various familiar household sounds and see whether the contestants can identify the object or action making the noise.

Here are some suggestions for sounds to be recorded:

1. Dialing a telephone number
2. An egg whipper whipping cream
3. Striking a wooden match
4. Uncorking a bottle
5. A pack of cards dropped on a table
6. An egg frying
7. The buzz of the TV set warming up

8. Blowing up and bursting a paper bag
9. A ping-pong ball bounced on the bare floor
10. Turning the pages of a newspaper
11. A baby's rattle
12. A running shower

If you are entertaining a group of people who don't know each other very well, "Mystery Voice" is a good get-acquainted guessing game. Either in advance of the party, or at the beginning of the evening, ask one of the guests to record his voice in disguise, giving a few clues as to who he is. If done at the party, make the recording in another room, without letting the others realize that you are doing it.

When everyone has gathered, play the recording for them and announce that you will give a prize at the end of the evening to whoever can identify the mystery person. As the group are not familiar with each other's voices or background, they won't be able to guess at first, but you can be sure they will all talk with each other and inquire about where they come from, what they do, et cetera, in hopes of trying to identify the voice.

Towards the end of the party, ask every one to write down the name of the mystery voice's owner, along with their own name and hand it in. The mystery person, will of course, have to pretend to make a guess, but all he will do is write his own name twice, and unfortunately will not be eligible for the prize.

When all guesses are in, play the recording back again, read off everyone's answer and then announce who made the correct identification. It's best to be prepared with a few prizes in case more than one person wins.

For a group who know each other well, there's a different, or you might say, reverse, twist to this game. During the course of the evening, ask everyone to make a brief recording in his normal voice. Then, to play the game, run the tape through the machine backwards, and see whether they can identify their friends' voices.

In giving the answers, it's more fun to just let everyone call out their guesses, and for one person to write them down, as each voice is played. When you play the tape through straight, he can read off the guesses, starting at the bottom of the list, which will be the beginning voice on the tape.

Many common parlor games can be given an extra fillip by playing them with the tape recorder. One oldie that's good with a large group is "Gossip." This is the game where everyone sits in a circle and the leader whispers a message, which he has written down, to his neighbor. The neighbor whispers it to the person next to her and so on around the circle. The last person repeats what he has heard to the group. No doubt his version will be a far cry from the original message, which is then read back by the leader.

When you play "Gossip" with a tape recorder, you can follow the way a story gets changed in the process of retelling. As each person whispers the message to the next, he should record it on tape at the same time, holding the mike very close as he whispers. (Be sure to turn the volume way up so that you can record the whisper.)

The last person announces what he has heard out loud, and then, instead of the leader reading his original message, play the tape back from the beginning. The group will have some good-natured fun kidding the "worst" gossipers.

You'll find the recorder a wonderful assistant in playing most kinds of group activity games involving music. For instance, if you want to play Musical Chairs or Going to Jerusalem but don't have a piano, you can tape the tune to

be used in the game from a disc and use this recording for the party. To make the tape for this game, use the same procedure as outlined under quizzes. Vary the lengths of the music recorded and allow about 15 to 30 seconds of blank tape between each musical selection. All you need do is to turn on the recorder and the game begins. The starts and stops will be automatic and none of the participants will be able to tell, or even guess when he should dive for a seat. This avoids any cry of favoritism, as sometimes happens when the person playing a piano, or lifting the tone arm on a phonograph, might be accused of doing so when some one player is in a good position.

The same effect, although not so automatic, can be achieved by using a full tape of music and stopping and starting it by pressing the stop and play keys on the recorder.

When preparing for games like Freeze or Touch and Go, you can record the music on tape and superimpose directions for the game on it. The night of the party all you have to do is turn on the recorder and let it play. This means that the poor person who usually has to give directions or sit at the piano playing while others have a good time can get into the game, too. (Or if you're preparing to serve refreshment, this will give you a chance to go into the kitchen and look after them.)

Speaking of refreshments, here's a stunt to play when your guests go into the dining room for the midnight snack. Pretend to turn on the radio in the living room. But instead of this, put on a tape you have made of a radio show which generally goes on at that time and one on which you have recorded or edited in comments about the guests who are there. Thinking they are listening to a regular broadcast, they'll be startled to hear announcements about themselves.

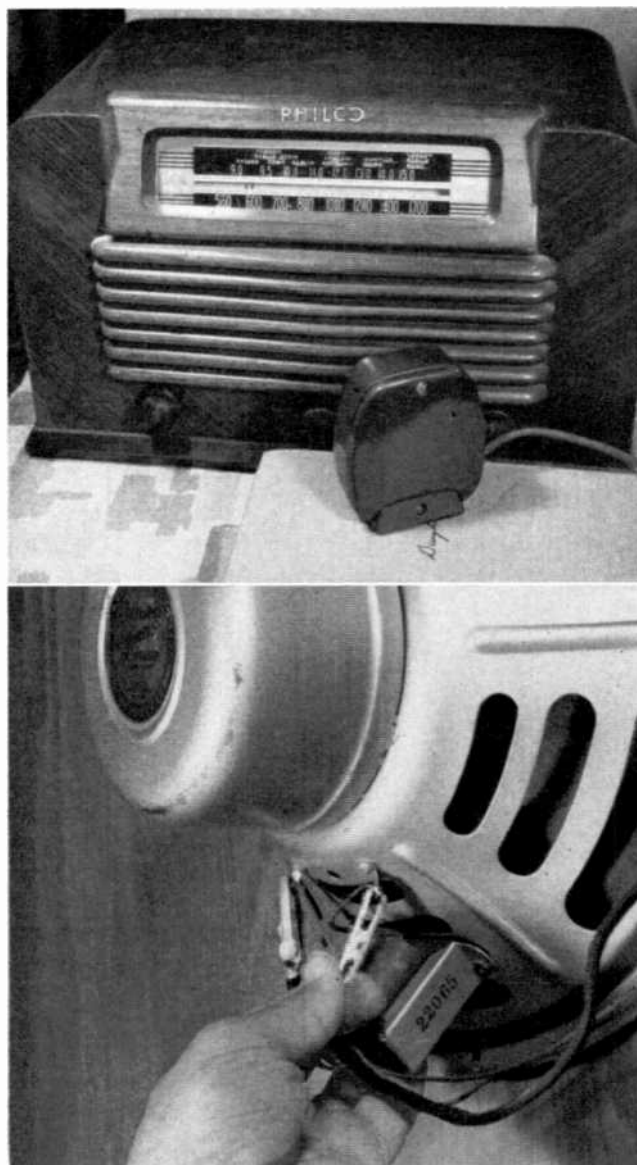
If your guests have a bent for story telling, they'll enjoy "Tape a Story." This is a verbal version of that game everyone played as a child in which one person draws a head, folds the paper and passes it to the next person who draws the shoulders, and so on around the room down to the feet.

In "Tape a Story," the group decides on the subject or theme of a story which they will tell. Any subject, from a romance to a who-dun-it, lends itself to this game. The opening episode of the story is arrived at by group discussion and then the first narrator goes out of the room to record it, so no one else can hear. He stops his "chapter" in the middle of a sentence, giving the next narrator only that much of a clue as to what he said. Each person tapes an additional portion of the story in this fashion, out of the others' earshot, and the last person to record makes up a conclusion.

The recorder is brought back into the room the playback the completed story. The patchwork plot and cockeyed situations resulting from the succession of unrelated episodes is sure to be fantastic and hilarious, and the story tellers will get the additional kick out of hearing their voices on the recorder.

"Radio Acting" is a kind of dramatic version of "Tape a Story," with a certain sporting element added to the game. There's no script to follow; in fact, the play is written by each of the actors in the process of speaking the lines he makes up. Anything can happen!

One way of deciding on the cast of the play is to have each person secretly write on a slip of paper the description of one character, put all the slips of paper in a hat or bowl, and let each person draw his or her part. Of course this means that some women will get men's parts and vice versa, but that adds to the fun. It might also mean that one man ends up with two wives, but let him wriggle out of that in the play.



There are two ways of recording off-the-air for your quizzes. The mike may be placed in front of the loudspeaker and while this will produce a satisfactory recording you may also record background noises. A better way is to make a direct connection using the cord supplied with your recorder, to the voice coil terminals on the speaker itself. You then can hear the sound through the speaker but no background sounds will be recorded on the tape.

One of the slips of paper will be for the announcer.

Everyone states what part they have drawn and without further consultation about the plot, the recorder is turned on to tape the show.

The announcer gives a description to the imagined radio audience of what happened in yesterday's installment and where today's show finds the characters. He thus puts several of the characters on stage, and they then take over the action, improvising the dialogue and plot as they go along.

Anyone is free to speak at any time, in fact grabbing for the microphone might make this game a little rough. The ground rules also allow for the characters to dispose of each other. For example, John can put Mary out of the play by



Scavenger hunting for sounds with a portable tape recorder is a new game that you can spring on your guests. It's much more fun than scavenger hunting for objects. The portable recorder shown here is a self contained unit that operates from batteries for the electronic functioning and a spring wound motor to provide the tape transport. It is the Magnemite Model 610-SD which is made by the Amplifier Corporation of America. Left: so the proprietor thinks you're crazy when you want to record the ring of the cash register—that adds to the fun. Right: collecting the ring of a fire bell at the engine house.

saying that he has shot her because he was jealous of her carryings-on with the milkman. However, by this action he might also be eliminated, too, as another actor can have him jailed for the attempted murder.

The announcer acts as time-keeper, and keeps the show to its fifteen-minute limit. Half-way through he can interrupt with "a short announcement from our sponsor." At the end, he concludes the show with the usual "Will Mary recover from her gun wound? Will John be sentenced to death?" and so forth.

Naturally, the recording of the show is played back to the actors so they can hear what happened.

The format of this game also lends itself very well to writing poetry. One person recites a line, the next person makes up one to rhyme to it, and so on around the group, with the even people having to rhyme their lines. After you've been around the circle one way, make the odd persons rhyme their lines for the next stanza.

To make this game into a contest, put a time limit on how long each person is allowed to make up a new line, and insist that it make some kind of sense. If a rhyming consecutive line cannot be recited in the time limit, that person is eliminated, and the next person must try. Recording is essential to this contest, as it goes too fast for writing.

"Background Music" is a game that's fun to play with

imaginative people of any age. It's a switch on the usual process of scoring the music for a motion picture after the film has been cut and edited. In this game, you write the script to go with the music, which has been "written" in advance.

Before the party, record a ten to fifteen minute tape with excerpts from various types of music—everything from grand opera to jazz. Program it to form a sort of narrative sequence, introducing "leitmotifs" at various points. The music in *Peter and the Wolf* or a Wagner opera will give you a good idea of how to go about this.

For instance, you could start off with "Night and Day," then a little chamber music, followed by some Dixieland jazz. Then some organ music and back to "Night and Day," and so forth. Conclude it with the actual ending of some piece of music.

The night of the party play the tape through for your guests, explaining that they are to write a movie script to go with the background music just played. Then give them pads and pencils and play the tape through once again while they write their stories. Allow several minutes after the recording is played for them to finish the scripts and then collect all the papers, to be read to the group, in case individual authors are too shy to read their own stories. Each script should be given a title.



Left: if you have a converter in your car which will convert the car battery output to 140 volts you can take your regular home recorder along with you on the hunt. Just so long as the officer doesn't take you in to explain why you are out hunting a blast from a policeman's whistle, you'll have fun. This officer was most obliging. Right: another item on the scavenger hunt list was a parrakeet that talked. With the growing popularity of the cute little birds, finding an owner who had a talker was not too difficult but getting the bird to perform was something else again. Time limit for the hunt was two hours.

If your friends prefer the great outdoors to parlor games, why not give a tape recorder scavenger hunt? What do you hunt with the recorder? In case you haven't guessed it already—sounds, of course.

For the scavenger sound hunt, you should have two portable tape recorders—they can be rented from a dealer if none of you own them yet, or use a converter so you can play your regular recorder in your car. Divide the group into two teams, giving them both recorders and a list of sounds to be taped, and set a two hour time limit for when they must be back, with or without all the sounds.

In making up the list of sounds, be sure to avoid any that could be simulated by the group. Also beware of anyone who might have access to a sound effects library. Your selection of sounds will depend to a large extent on where you live and how accessible certain locations are, as well as the season of the year.

For example, if you live in a rural area, getting the ringing of a cow's bell would probably be too simple, while if the party is given during the winter months, it would be pretty tough to tape a cricket's chirp.

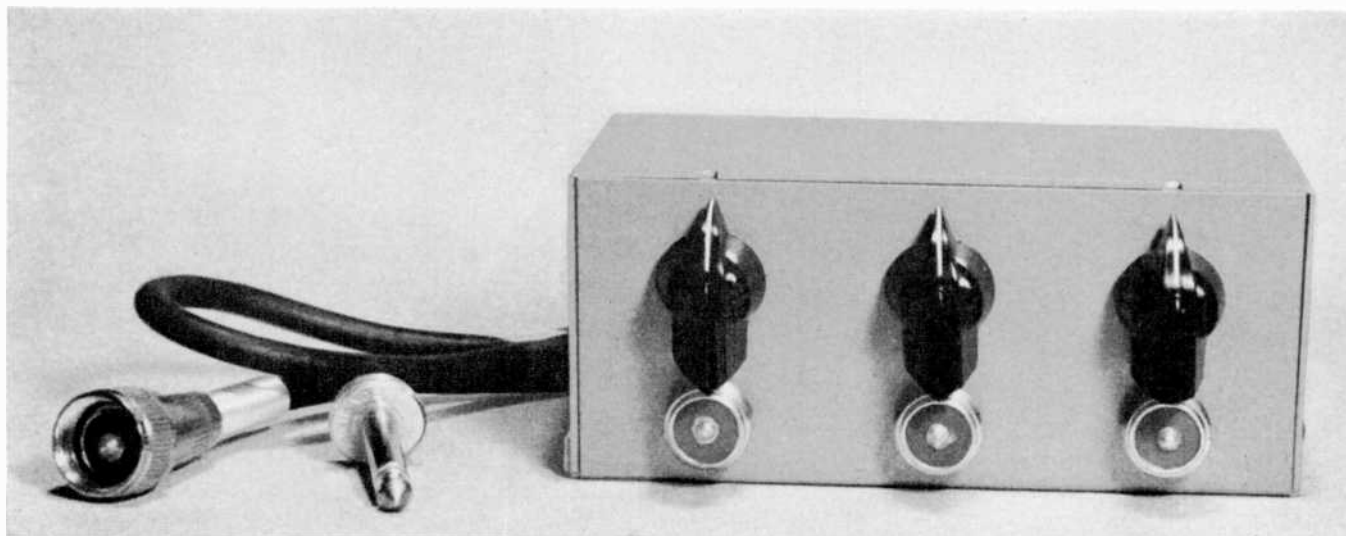
Here is a list of sounds you might find helpful in suggesting ideas for your tape recorder scavenger hunt:

1. Train whistle
2. Cat's meow

3. Fire engine or ambulance clanging
4. A bird call
5. A dog's bark
6. Cash box ringing up change
7. A talking parrot or parakeet
8. Someone who speaks Chinese
9. A horse's neigh
10. An airplane takeoff
11. Church bells or clock
12. Coin box registering deposit of a quarter
13. Ship's whistle or horn
14. Policeman's whistle

The sounds should be scored according to the difficulty of obtaining them. For instance, it shouldn't be hard to find a cat or dog, or to record a cash register ringing up change, but locating a talking parrot or a fire engine passing by is tougher. (Anyone who sends in a false alarm is disqualified.)

There's no rule of thumb for setting the exact number of sounds to be found in the two hour limit, as so much depends on where you live and the sounds you choose. However, by giving a variety of easy and difficult items, you can probably allow for between eight and twelve. Give points according to the difficulty of obtaining them. When everyone has returned, play the sounds brought in by both teams to see who wins.



BUILD THIS MIKE MIXER

... A simple, inexpensive 3 channel mixer

by
George M. Thompson

SOONER or later, if you try to do any serious tape recording, you're going to need a microphone mixer. A mixer is just what the name implies: it is used to mix the sound coming from two or more mikes into the one channel that goes into the recorder. For instance, you might use one mike to pick up the voice of a singer and another to record the piano accompaniment. Feeding both mikes into the mixer you could then adjust the relative loudness of both singer and piano to get the best result.

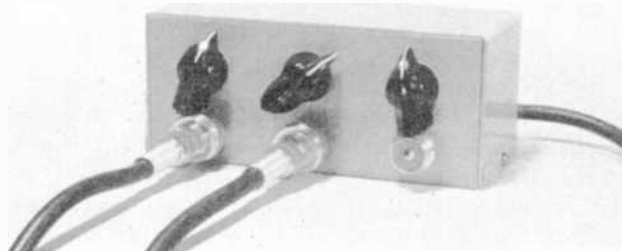
The mixer shown here is the simplest type anyone can build. It can be used to mix three high impedance crystal or dynamic microphones to any tape recorder or amplifier having a high impedance input. Because of its simplicity, it does have limitations. It should not be used with different types of high impedance microphones. I would suggest that

three dynamic or three crystal microphones having the same sensitivity (or Db rating) be used. This will eliminate any interaction between the microphones when the mixer controls are varied.

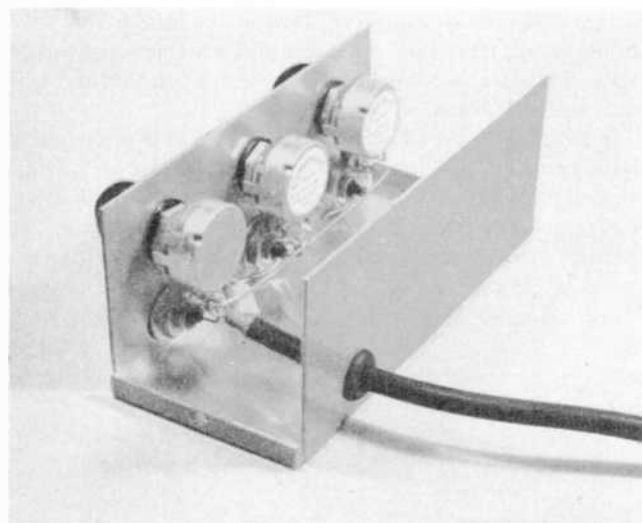
I do not recommend attempting to mix phono and mike with this unit as the amount of power put out by the crystal of the phono pickup is so great that distortion will result. An electronic type mixer should be used for this.

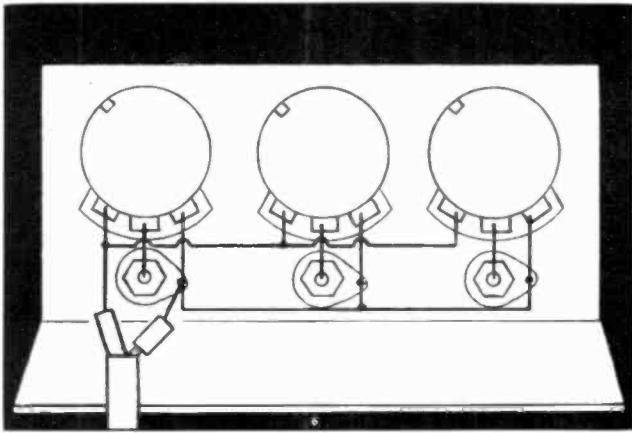
Construction

The complete three channel mixer is housed in a gray hammetone Minibox, size $2\frac{1}{4} \times 2\frac{1}{4} \times 5$ ". The circuit is quite simple. It uses three 500,000 ohm potentiometers connected in parallel across the output connector which feeds into the tape recorder or amplifier. The center ter-



Top: the completed mixer which handles three microphone channels and measures only $2\frac{1}{4} \times 2\frac{1}{4} \times 5$ inches. It may be built and wired in one evening. Above: the mixer with two channels in use. Right: the interior construction. All leads should be kept as short as possible and the tiny 390K $\frac{1}{2}$ watt resistors can be placed inside the Amphenol 75-PC-I-M connectors for better shielding. All connections should be carefully soldered using rosin core solder.





Above: the wiring of the mixer is simple. Upper right: the Max-Mix, a 3-channel mixer of good quality. Upper center: the Pentron MM-4 Audio Mix. It features six inputs, two phono and four microphone. Contains two tubes. Lower center: the Masco EMM-6 Microphone Mixer and Pre-Amplifier also has six inputs, four microphone and two phono. It has a cathode follower output allowing 400 foot separation from the amplifier; three tubes. Lower: the Mini-Mix made by Switchcraft which uses two hearing aid volume controls and plugs directly into the recorder. Provides for two mikes.

terminal of each potentiometer is connected to a 390K ohm $\frac{1}{2}$ watt resistor.

The other end of each resistor is connected to the center terminal of the 75-PC-1-M chassis-type microphone connector. To keep the leads as short as possible, the resistors may be put inside the connector, affording greater shielding.

The chassis side, or ground terminal of each 75-PC-1-M connector is wired to the ground side of each potentiometer and also to the shielded side of the microphone cable. The opposite sides of the potentiometers are wired together and connected to the inner conductor of the microphone cable which leads to the recorder. The pictorial diagram shows how to make the hook-up.

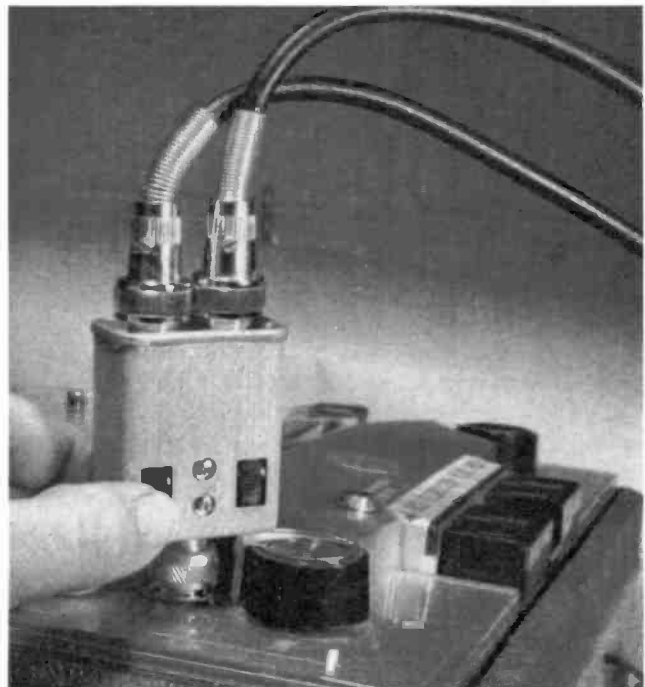
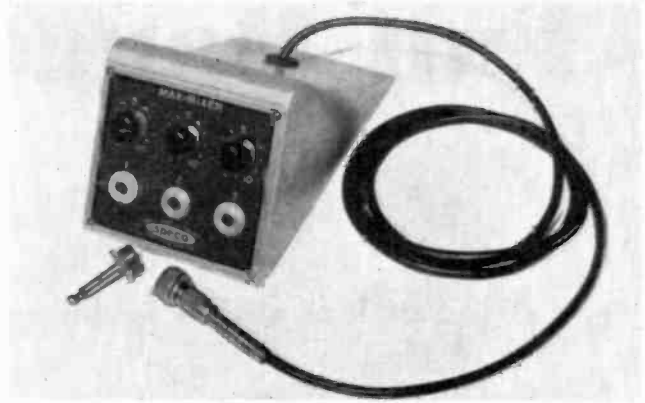
The end of the single conductor shielded microphone cable which runs to the recorder or amplifier is connected to an Amphenol 75-MC-1-F or a regular phone plug, depending upon the type of connection on your recorder. This microphone mixer can easily be assembled and wired in one evening.

Space the connectors and potentiometers carefully so clearance is provided between the knob and the ring on the 75-MC-1-F. An inch and a quarter between centers should be enough. The unit has deliberately been kept small so that it may be packed easily and be kept near the recorder when in use.

Parts List

- 1—2¼ x 2¼ x 5" gray hammertone Minibox
- 3—Amphenol 75-PC-1-M, or equivalent Microphone Connectors (chassis type)
- 3—500K Volume Controls with audio taper (Centralab or equivalent)
- 3—1¼" Bar Knobs
- 3 ft. Single Conductor Shielded Microphone Cable
- 1—Microphone Line Plug (to fit your recorder or amplifier)
- 2 ft. #16 B & S Tinned Hookup Wire
- 3—390K ohm $\frac{1}{2}$ watt Resistors

If you are not too handy with a soldering iron and prefer to purchase a mixer you have a number of good ones from which to choose. Some of these are shown in the column at right and can be supplied by any radio parts house.



Full Range Recording

Harold D. Weiler

Part II of a series by the author of "High-Fidelity Simplified."

Judging the Quality of a Recorder

THE first part of this article closed with the statement that "A great deal of literature on tape recording is available, however, most of it is highly technical." We then promised to present in a simple manner a general picture of high-fidelity tape recording for the average layman.

The prospective purchaser of a tape recorder upon visiting his dealer is usually confronted with a wide variety of brands and models. To make matters still more complicated, the dealers clerk invariably supplies him with manufacturers literature describing in detail the features and specifications of the various brands. Unfortunately, this literature contains technical terms and specifications which have no meaning to the prospective customer.

For example; a manufacturer will state that his recorder has a frequency response of from 30 to 13,000 C.P.S. with a maximum deviation of plus or minus 2 Db. He continues by saying that the distortion is less than 2% and the wow and flutter is 0.3% or lower at $7\frac{1}{2}$ " per second.

These specifications to the technically initiated indicate that this particular recorder is an excellent one, but to the layman who does not understand the technical phraseology it provides absolutely no information as to the quality of the instrument in terms of results to be expected. It is the intention of the writer to explain the most important of these technical specifications in a simple manner and show how they can be used by the layman to indicate the results which he can expect from a particular instrument.

Part one of this article stated "There are a number of factors which influence the home recording and reproduction of music and speech. The most commonly known of these is the tonal range of the equipment. The tonal or frequency range, as it is correctly called, reflects the ability of the equipment to record and reproduce with equal fidelity all of the tones and overtones in the musical scale from highest treble to lowest bass."

In order to understand the meaning of the term tonal or frequency range, we must acquire an elementary knowledge of the sounds we wish to record and reproduce. Sound is created when the atmosphere is set into motion by any means. Any vibrating body can create or produce sound by imparting a portion of its energy to the atmosphere surrounding it.

The vibrating body may be the string in a violin or a piano, the skin on a drum, the reed in a saxophone or a tuning fork. A tuning fork which has been struck will vibrate and, consequently, produce sound. By watching a

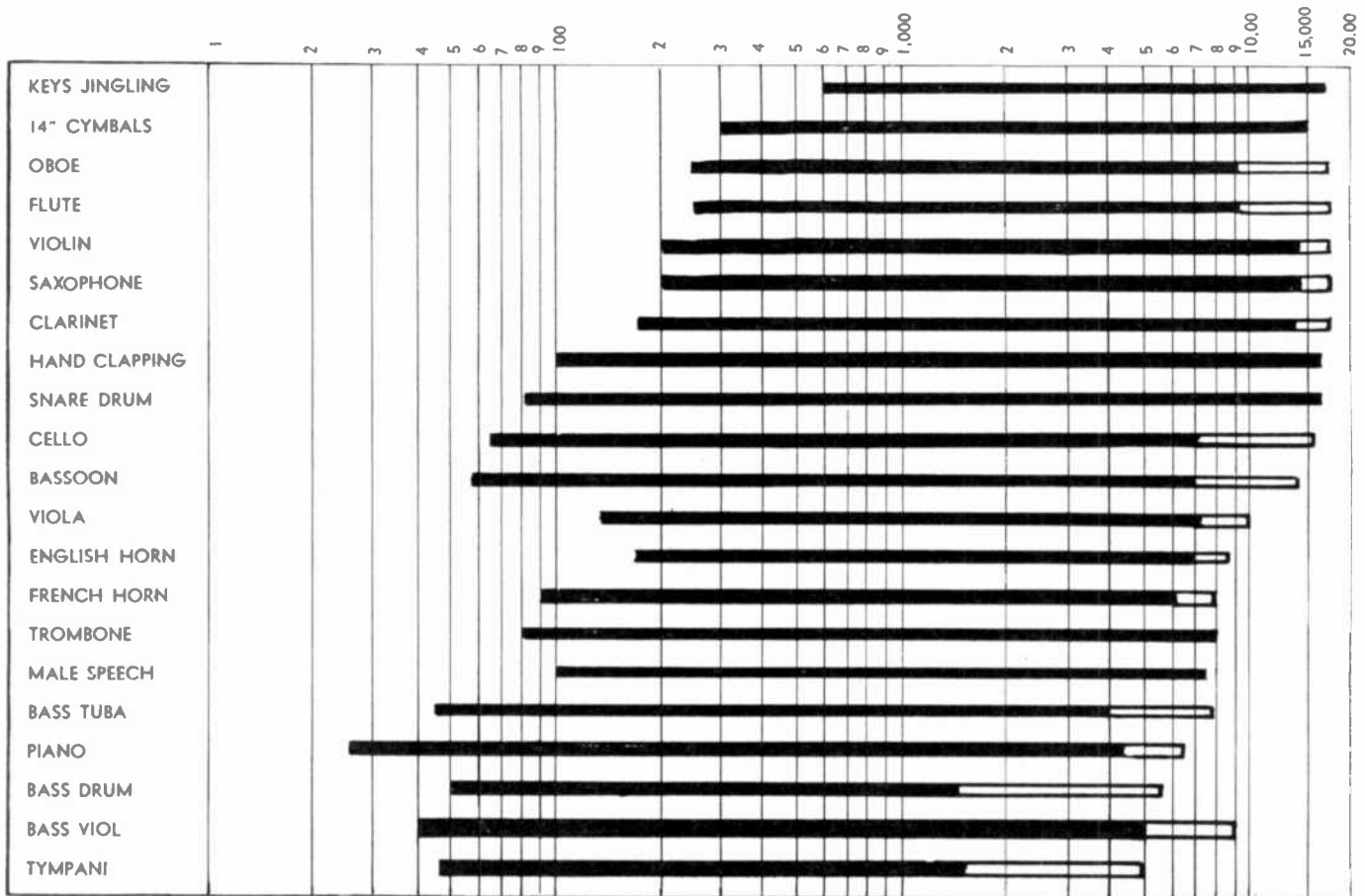
tuning fork which has been struck we can see the edges of the prongs appear blurred because of their rapid to and fro motion. Holding a finger lightly against the prongs will enable you to feel the vibration. Look inside a piano at the strings, strike a key, you can see the strings vibrate, touch the string lightly and you will feel the vibration. Should you stop this vibration with your finger it will cause the sound to cease.

These vibrations (the sound) travel in waves. The simplest method of explaining the manner in which the sound travels is to compare it to a water wave. Everyone has seen a body of water when a stone is dropped into it. From the point where the stone enters the water, a series of ripples move outward in all directions. Sound waves act in the same manner.

Returning to the original vibrations which create sound we find that the number of vibrations or, to and fro motions that the tuning fork or piano string makes in one second, determines the pitch of the sound. Pitch may be specified in two ways. To the musician pitch is that characteristic of a musical tone which enables him to place it in its proper position in the musical scale. The sound engineer, on the other hand, uses a term which describes this characteristic in a physical manner. The number of vibrations per second or the frequency with which the sound producing object vibrates is used to describe it. When the piano string, for example, makes 440 complete vibrations per second, it is said to have a frequency of 440 cycles per second, (abbreviated C.P.S.).

Using the piano as an example, we find that each string makes a different number of vibrations per second consequently each note has a different frequency or sound. The difference in frequency of each piano note is due to the fact that the strings vary in length, tension and thickness. How this affects the pitch or frequency can be easily demonstrated by attaching a rubber band to some object, then stretching it a bit and plucking it. A tone will be heard. Stretching it still further and plucking it again will result in another tone higher in pitch or frequency. By stretching the rubber band we have reduced its thickness and increased its length and tension.

The average human ear is capable of hearing sounds between 16 and 20,000 C.P.S. This is known as the frequency range or the frequency response of the human ear. Most sounds with which we are familiar have a specific frequency range. We can obtain the frequency range of a sound or a



The chart shows the fundamental and overtone range of a number of musical instruments and the male voice. The figures across the top represent cycles per second. The solid lines show the fundamental tones and the open lines the overtones, which give the instruments their "voice."

sound producing device such as a musical instrument by determining the lowest and highest number of vibrations it produces per second. These two figures when stated together provide the frequency range or as in the case of a device which responds to sound (a tape recorder) the frequency response. Figure 1 shows us the frequency ranges of familiar sounds and musical instruments. From this illustration we can see that the fundamental frequency range of a piano (as shown by the solid portion of the line) is from 27½ C.P.S. to 4186 C.P.S.

Thus far, in order to simplify our explanations, we have confined our discussions to fundamental tones, actually musical sounds are more complex. Musical instruments and the human voice produce both the fundamental tones mentioned previously and also overtones or harmonics of the fundamental tones.

One of the most important qualities which give a tone its musical value is timbre. It is timbre which gives a musical instrument or voice its individual color and enables us to recognize it. This quality, is to a large extent dependent upon the overtones generated by the instrument or voice, consequently when we wish to record or reproduce it in such a manner that the recording or reproduction is an acoustic facsimile of the original, the frequency range must be sufficiently wide to include these overtones or harmonics. The chart shows the fundamental tones of the various instruments as a solid line. The range, including the overtones is shown by the open line at the high frequency end.

We can now partially understand the first specification usually given in manufacturers literature. "Frequency Re-

sponse." Let us assume we require a recorder which will be used only to record human voice in applications such as the narration to accompany films or slides, or to be used for interviews, etc. From the chart we can see that the human voice (male) will produce frequencies from 100 to 7,500 C.P.S. For an application of this nature we need not record frequencies wider than this range. To record programs from conventional A.M. stations it is necessary to obtain a recorder which covers slightly wider range from 50 to 7,500 C.P.S. since this is the frequency range they broadcast. This range, however, is not the entire tonal range of a symphony orchestra, for example, to record such a group would require a frequency range of from 26.5 to 15,000 C.P.S. This last figure would only be required for a direct recording at the concert hall which would be quite rare for the average home user. The average person, at best, would record this type of program from a live F.M. broadcast which covers a range of from 30 to 15,000 C.P.S. When a broadcast of this nature is carried by telephone lines, the frequency response is further reduced at the high end.

Insofar as the first specification "Frequency Response" is concerned, let us take a typical good quality recorder which we will use as our example, and which will record the entire range of sounds available to the average home user, since the frequency response of this particular instrument is from 30 to 13,000 C.P.S. with a maximum deviation of plus or minus 2Db. This last phrase, "with a maximum deviation of plus or minus 2 Db." is extremely important as the frequency response figures alone are almost meaningless unless any variation of *loudness* or *volume* within this range are also specified.

These qualifying figures refer to linear distortion which is created when the recording or reproducing equipment favors one set of tones above another. As explained previously, it is as though the listener was sitting next to a particular group of instruments and heard them almost to the exclusion of all other instruments in the orchestra. This type of reproduction in a piano solo, for example, might result in Middle A being recorded or reproduced at twice or three times the volume of Low A. This is obviously unnatural and therefore a distorted reproduction of the original music.

We have illustrated our previous discussions on frequency response with a straight line drawn from one frequency to another. This actually implied that all frequencies between the two extremes were being recorded or reproduced at exactly the same intensity or volume level. This is the most desirable response, no one portion or frequency within the range is emphasized over another, however, it is a theoretically ideal response and not an actuality, except in high priced professional equipment. For various technical reasons there is always some variation within the frequency range of an instrument, but the smaller this variation, the more desirable is the recorder from the standpoint of performance.

Few human ears can detect a volume or loudness difference or change of less than 2 Db. Those who can are usually highly trained, such as those of a record critic, music critic, or a musician. Frequency response standards for the type of recorder under discussion have been set up by the National Association of Radio and Television Broadcasters. These standards read: A response of plus or minus 1 Db. between 100 and 7,500 C.P.S. Beyond this range the standard may exceed this deviation at the rate of 3 Db. per octave. Thus, in our required range of 30 to 13,000 C.P.S. the allowable variation can, according to these standards, be plus or minus 3 Db. From the specification sheet we find this variation or deviation to be within the standard set, as the manufacturer claims a frequency response of 30 to 13,000 C.P.S. with a maximum deviation of plus or minus 2 Db. However there is still another qualifying remark, at $7\frac{1}{2}$ " per second.

Until recently the frequency response of a tape recorder was largely determined by the speed at which the tape moved past the recording and playback heads. Roughly speaking, the frequency response was 1,000 times the tape speed in inches per second. In this manner a tape speed of 15 I.P.S. was required to obtain an upper range of 15,000 C.P.S. and a tape speed of $7\frac{1}{2}$ " I.P.S. permitted an upper range of up to 8,000 C.P.S. However, recent technological improvements now allow a response of up to almost 15,000 C.P.S. with a tape speed of $7\frac{1}{2}$ " per second. This improvement is of tremendous importance from the economic standpoint.

as it permits wide range recording while doubling the playing time of a reel of tape, thus, cutting the cost in half. For example, the older tape recorders using a 2,400' $10\frac{1}{2}$ " reel would operate for 60 minutes using dual track operation, at 15 I.P.S. The latest models provide essentially the same response at a tape speed of $7\frac{1}{2}$ " per second and will operate for double the time, providing 120 minutes of operation.

We previously mentioned that tonal range or frequency response was only one of the factors which resulted in the very obvious difference between conventional recording and reproduction and high-fidelity recording and reproduction and that the second factor was distortion. We stated that distortion was simply the generation, modification or elimination of tones within the recording or reproducing equipment to a point where the result was no longer an acoustic facsimile of the original program.

Another paragraph discussed the elimination of harmonics or overtones which were present in the original music but eliminated through faulty recording or reproduction. The one form of distortion we will discuss in this article results from the addition of harmonics and overtones which were not present in the original performance and is called harmonic distortion. These added harmonics created within the recording and reproducing system modify the reproduction to such an extent that it is no longer a duplicate of the original performance. The harmonic distortion standard set by N.A.R.T.B. is 3% at minimum recording level. The specification sheet of our example shows their figure to be less than 2%, which is well within the standard.

The next and last important specification we will examine is the one which reads Wow and Flutter; 0.3% or lower at $7\frac{1}{2}$ " per second. The terms wow and flutter are used to describe the variations in reproduced or recorded frequency caused by minute speed variations of the tape as it moves past the heads, and are indicative of the quality of the tape transport mechanism. Wow refers to variations at a relatively slow rate of speed. The term flutter is used to describe the same phenomenon at a higher rate of speed, for example, 10 times per second. A simple method of testing the speed constancy is to obtain a recording of a violin solo with long sustained notes. Since the human ear is extremely sensitive to changes in pitch during a sustained note, any variation will be quickly noticed. Wow and flutter not exceeding 3% will not be noticeable in a test of this nature. We can see from the specification sheet of the recorder, which we have used for our example, that it again falls within this figure and therefore is satisfactory.

The specifications we have discussed are the most important in choosing a recorder and are the basic reasons for the difference in the prices of the various units available today, laying aside, of course, cabinetry and other features which make the recorder more versatile. *To be continued*

EUGENE ORMANDY AND HAROLD WEILER ADDRESS PHILA. AUDIO SHOW

Eugene Ormandy, conductor of the famous Philadelphia Orchestra, and Harold D. Weiler, Hi-Fi expert, were both guest speakers at the recent Philadelphia Audio Show.

Ormandy congratulated the audiophiles on the improvements in equipment, citing some of the experiences of earlier years in contrast. He also said that the only real high fidelity is that heard in the concert hall. He continued, "There is one characteristic of a concert which no mechanical device can capture: that is the recreation with each per-

formance of the beauty the composer expressed in his music—a process that takes place from moment to moment and varies from one performance to another . . . So my advice to you is this: enjoy your recorded music and enjoy your equipment but may I suggest you come to hear your Philadelphia Orchestra so you can keep your ears sharpened for the highest fidelity—a live concert."

Mr. Weiler's talk was based on the phono pickup and its place in reproduction.



Ormandy Addressing Audio Show Crowd



RECORDING THE PIANO

by
L. L. Farkas

writer and producer formerly with the Columbia Broadcasting System

. . . here's professional advice on getting a good, clean, noise-free recording of the piano.

ONE of the most difficult musical instruments to pick up on a microphone and to record is the piano; and yet, with a moderate amount of care, a tape recording of piano music can be made which will compare favorably with any professional job.

The key to success in piano recording—or that of other instruments for that matter, lies in knowing the characteristics of the instrument. How does it work? How does the sound come out?

Basically the piano consists of a large frame, somewhat like a harp, upon which steel strings are stretched. Felt-covered wooden hammers, actuated by keys on a keyboard, strike the strings and make them vibrate. In turn the vibrations are communicated to a sounding board whose function

is to transmit the sound waves to the surrounding air. Two pedals are used to control the quality of the sound: the loud pedal removes the normal dampers from all the strings, thus permitting them to vibrate long after they have been struck; the soft pedal cuts down the volume of the sound either by interposing a strip of cloth or felt between the strings and the hammers, or by shortening the length of the hammer strokes.

Since there are several types of pianos, the sound for each of these will originate from a slightly different location, and naturally, this will influence the position from which the microphone will produce the best possible pick-up for recording. For our purpose however we will consider only the three most common types: the spinet, the upright, and the

grand piano.

In the spinet, the strings and sounding board are mounted in a vertical position with the sounding board toward the rear of the instrument. With this arrangement the sound waves will emanate more directly from the back of the spinet than from the front or sides. Consequently, in order to best pick-up the spinet, the instrument should be moved away from the wall where it is generally set and its back portion faced toward the open part of the room. In cases where there is insufficient space to do this, the spinet should be placed so that its back forms approximately a right angle with the wall. This will not only permit the microphone to be set easily at any required distance, but also will prevent any possible distortion that might be caused by reflection of the sound waves from the wall.

There is one school of thought which claims that, with the spinet or piano against the wall, the sounding board transmits its vibrations to the wall itself which in turn acts as a giant sounding board. In addition, the air inside the piano is also made to vibrate by the action of the sounding board and it then transmits the sound to the front part of the instrument. Therefore it is maintained that it is best to leave the spinet in its normal place and simply pick up the sound by facing the microphone toward the front part of the instrument and the wall.

It is true that some of the sound will be transmitted to the wall close to the sounding board, but unless this wall is especially constructed, the sound retransmitted will be weak and may also be greatly distorted. The sound which comes from the front part of the piano will generally be undistorted, but for microphone pick-ups particular care must be taken to keep out the noises introduced by the mechanical action of the keys and pedals. Such noises, normally unnoticed by persons in the room, become very objectionable in a recording where they intrude upon the musical rendition. This is one of the points that makes placement of the microphone very important.

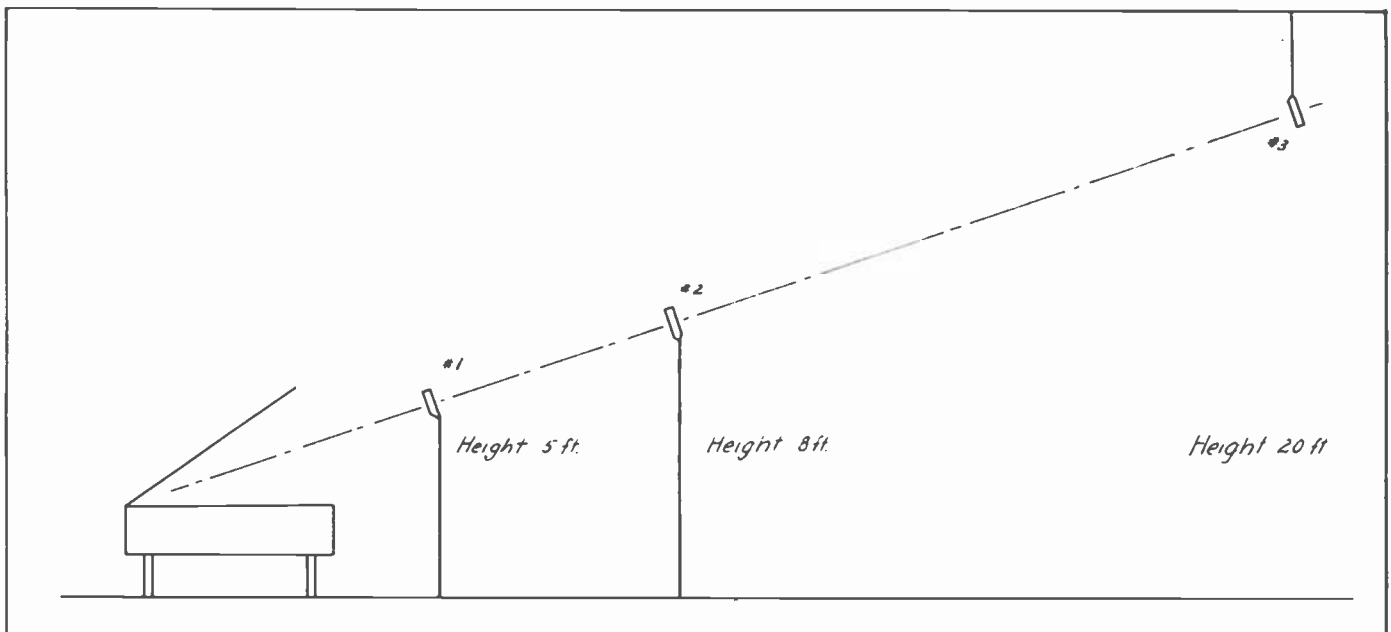
There are two main positions from which the microphone can pick up the sound from the spinet to best advan-

tage. The first and probably most generally used is with the microphone on a stand about four feet high and located from four to five feet from the back of the instrument. The head of the microphone should be tilted so that it faces toward the center of the sounding board. If the head cannot be tilted at an angle it can be placed in a horizontal or vertical position facing the instrument. From this location the microphone pick-up will produce a recording in which the musical tones will be full and equal while any noise from either keys or pedals will be reduced to a minimum.

The second position may be termed a close pick-up in that the microphone is set within two to three feet from the rear of the spinet and at a height which places the head of the microphone at approximately the center of the sounding board. For this type of set-up a desk microphone, placed on a stool or chair, may be used. The advantage of this position is that the treble or bass notes can be accentuated to suit personal taste simply by turning the microphone slightly toward the high or low strings. The exact distance from the spinet at which the microphone should be set will depend upon the resonance or amount of sound produced by the sounding board in relation to the noise generated by either the key or pedal mechanism. The best way to check this is by making a test run on tape. If definite key or pedal noises are heard, particularly during pianissimo passages, then the microphone should be moved back to a position where the noise picked up is no longer objectionable. At the same time the microphone can be adjusted to obtain the desired balance between treble and bass notes. With a little care this type of pick-up can produce a clean and very intimate recording which is often preferred to the results obtained with the more distant position.

The procedure for making the upright piano pick-up is very similar to that used for the spinet. There are a few differences, of course, for the upright piano, while using the same vertical sounding board arrangement, is much larger than the spinet and, in some cases, the top portion of the upright can be raised to permit the sound to emerge.

For the best kind of pick-up, it is also preferred that



Suggested microphone placement for an intimate, semi-distant, and distant pickup of a grand piano. The type of surroundings and the kind of microphone will determine the best position. Test runs on tape should be made to determine this. The picture on page 35 shows the intimate pickup. The close pickup is made at about 3 feet distance, the semi-distant pickup at about 10 feet; distant pickup from 20 to 30 feet away.

the upright be moved away from the wall, as with the spinet. The microphone may also be set at the four foot distance, but here it produces the intimate recording. For a more rounded overall effect the microphone should be moved back from ten to thirty feet and its height adjusted from eight to twenty feet, with the head of the microphone always tilted so that it faces the center of the piano. If the top part of the upright can be raised, an intimate pick-up can again be obtained by setting the microphone on the treble side of the piano, close to the front, and, from a height of approximately six feet, pointing the face of the microphone toward the center of the sounding board. If this cannot be done leave the face in a vertical position. With such a set-up the upright need not be moved from its position close to the wall and still can be picked up to advantage.

The third type of piano which we want to consider—the grand piano—probably can produce the most professional recording, but it also requires the most care in its set-up and, for that reason, will be treated in more detail. Except for the baby grand type, it is larger than the upright; it has a horizontal case, with the sounding board on the lower part and a hinged top that can be adjusted to various openings.

The hinged top is used as a means, beside the pedals, of controlling the volume and quality of the sound produced by the piano. When the top is closed the tones have a tendency to be muffled, for the sound can come out only through the bottom portion of the sounding board, which faces the floor. With the lid on the low stick, the sound can now emerge through the open portion. However, in order to get the full value of the tones, the top should be placed on the high stick. In this way the sound waves originated by the sounding board are all heard, particularly the bass notes which come out clearly defined. In addition the intensity of the sound is increased in the direction of the open part by the reflecting action of the top which projects the sound forward. Where a non-directional effect is desired, the piano top can be removed entirely. Then the sound will travel upward from the sounding board and be distributed equally throughout the room.

The position of the hinged top will depend upon the type of pick-up desired—distant or intimate—and on the acoustics of the room. One quick check is to raise the top on the high stick; then ask someone to play a selection. By standing a short distance in front of the piano, you can easily tell whether the tones are clear or muffled. Clear and clean-cut tones indicate good acoustical qualities, permitting the use of a distant type of set-up; hollow, reverberating tones indicate that the room is too live and, if some of the echo cannot be cut down by hanging draperies from some of the walls, the only way in which the piano can possibly be recorded, is by a soft, intimate pick-up.

Actually the best way of picking up the notes of any piano is by the use of the distant perspective. The microphone is placed from fifteen to twenty feet away, and is raised to a height of about ten feet, with the head facing downward toward the open part of the piano. If the mike cannot be tilted downward, use it with the face in a vertical position. The tones heard in a test recording should be clear and full. If they sound hollow, the pick-up for that particular room is too distant and the microphone should be brought closer. This will increase the definition of the notes and at the same time, since less gain will be needed



The best results from an upright or spinet can be had by moving the piano to a position at right angles to the wall or by placing it so the back faces the center of the room. If neither of these positions can be secured, open the top and place the microphone at the treble end of the keyboard. If possible, tilt the head downward toward the center of the strings. Mike should not touch the piano.

on the recorder, the distortion caused by the excess roominess or echo of the room will be reduced and possibly eliminated.

The microphone should be moved in or out until the recorded tones have the desired quality. One point to keep in mind is that as the microphone is moved, its height and angle should be changed so that the head of the unit is always in the plane that bisects the angle formed by the piano sounding board and the top. In this way the microphone will always be in the most direct path of the sound. The head of the microphone should also be twisted slightly toward the treble side of the middle C key, for by thus favoring the treble, the high pitched notes that are usually low in volume will be picked up more easily, while the bass notes which are generally heavy and tend to distort on a too-direct pick-up will be left slightly off the center of the microphone beam and will be attenuated.

When recording a piano solo from a very large room or hall that has excellent acoustical characteristics the top of the piano may be removed entirely. In this case the pick-up is quite distant, but excellent results can be obtained. The microphone is placed in a hanging position from twenty to thirty feet away and it is raised to a height of approximately twenty feet. Again the exact position of the microphone should be checked on the recorder. Too distant a pick-up will be indicated by lack of definition and distortion of the piano tones plus a very noticeable booming of the bass notes. Moving the microphone in should eliminate the booming and improve the definition.

When an intimate pick-up is preferred, the top can still be left on the high stick, but the microphone must be moved to a position six to seven feet away from the open end of the piano. As with the other types of close set-ups the microphone should be turned so that it favors the strings in the upper register, thus preventing the bass notes from booming through in the recording.

Occasionally we encounter a room so live that it seems

almost impossible to pick up piano tones without distortion. To solve this problem a very close pick-up must be made. With the top on the low stick, the microphone is placed about two feet from the inward curve of the piano, with the head of the microphone at the height of the opening. Under these conditions the treble notes must be particularly favored or the bass notes echoing within the case will hit the microphone too strongly and cause it to distort; however, with the sound waves being picked up thus close to their source, it is possible to play the piano very softly and in this way avoid picking up any of the reverberations that may be present in the room.

Closely related to the pick-up problem posed by a live room is that condition in which a certain object, like a chandelier or a piece of metal or glassware, resonates with a particular note on the piano. This sympathetic vibration, as it is called, can be stopped by moving or turning the piano so that it faces in a different direction, by playing more softly or, if these steps prove unsuccessful, by finding the offending item and either removing it or damping out its vibrations by wrapping it with a heavy cloth.

Another factor which will affect the pick-up and consequently the recording is the response of the microphone. The fidelity with which it picks up the various frequencies of the piano notes, the width of the beam adequately covered by the microphone, and the level at which the piano tones are transmitted electrically to the recorder: all these will necessitate some slight adjustment of the microphone position. For instance, the crystal microphone, which favors the high frequencies, will have to be turned more toward the bass strings of the piano than a dynamic microphone which favors more of the bass notes. A ribbon microphone, picking up sound from two opposite sides over beams of only approximately forty-five degrees, will have to be set farther back from the piano for a well-rounded pick-up than a dynamic microphone with its beamwidth of about one hundred degrees; also, when the respective sound level is taken into consideration, the ribbon microphone with its greater sensitivity can be placed farther away from the source of music than the dynamic microphone. Now it is not absolutely necessary to know these microphone characteristics to make tape recordings. By careful test-runs any microphone can eventually be placed correctly. Nevertheless, knowing just what your particular microphone can do and its limitations will not only permit you to make a set-up quickly and easily, but it will also help in solving any unusual pick-up problems which may be encountered.

Now thus far the types of pick-ups considered have been piano solos; however there are many occasions, especially with home recording, when both voice and piano must be picked up. If you use more than one microphone with a mixer you have no problem. The piano can be picked up by any of the methods described while the voice is directed over another microphone, either set to one side of the piano on a five to six foot stand when the singer does not play the piano, or placed so that its face is from six inches to a foot away from the mouth of the person singing and playing the piano.

Without the use of a mixer one microphone must pick up both the piano and the voice. One way in which this can be done successfully is by placing the microphone on a short stand or hanging it so that its head is at the eye level and slightly to the right of the person sitting at the

piano. The head should also be tilted toward a point slightly above the keys and near the center of the instrument. The person playing then sings upward and across the face of the microphone, exercising only the necessary caution whenever using sheet music not to rustle the pages in turning them over.

Another method is to place the microphone directly in front of and about four to six inches from the person's mouth, thus highlighting the voice while letting the piano tones come in as they may. Of course in these kinds of pick-ups the piano tones will not be as good as in solo set-ups, but since the piano is generally not emphasized, acceptable recordings can thus be obtained.

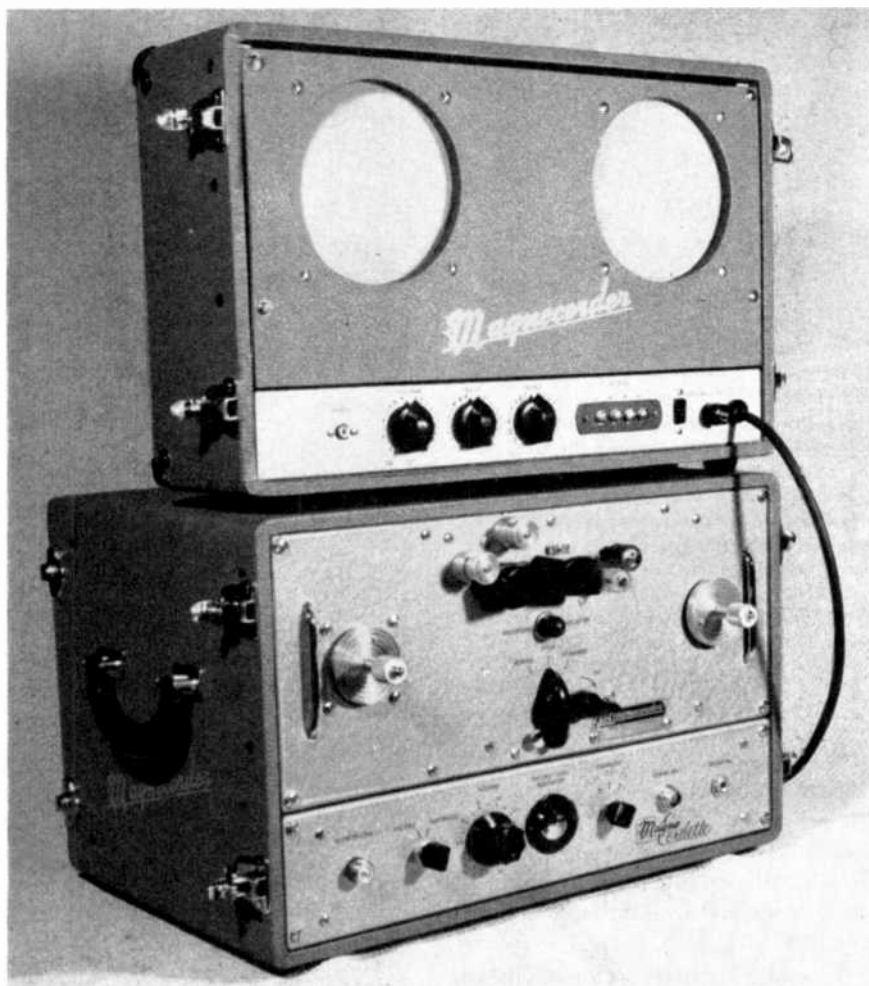
One point should be mentioned: both the voice and the piano should have the same perspective. For example, when the vocalist is close to the microphone, the piano pick-up should not be distant; nor should the singer stand far from the microphone while the piano is close in, for an intimate pick-up. Again the best way to check this is by listening to a test recording. There both the singing and the piano should appear to come from the same distance, regardless of whether or not this is physically so.

Also affecting the results in all types of piano recordings is the operation of the recorder. Generally the gain of the recorder is adjusted so that the indicator eye just closes on peaks of sound or, if a volume indicator is used, the pointer reaches the zero mark on the scale. But the piano being a percussion instrument—that is to say: the tones being produced by percussion or striking—the sharp bursts of sound thus transmitted through the microphone to the recorder will cause its amplifier to distort. To prevent this it is essential always to run the recorder gain at a lower level for all piano pick-ups. The sound level should be adjusted so that the indicator eye does not quite close or, with the volume indicator, so that the pointer does not exceed a minus 2 on the sound peaks.

The playback gain of the recorder must also be adjusted correctly otherwise what sounds like a perfect pick-up when the piano tones are test-run through the recorder, with the loudspeaker at a low level, often will prove to be boomy and distorted when played back later at a higher level for entertainment. The remedy is to make sure that the loudspeaker level used for test-recording of the piano set-up is the same as that which will be used during the normal playback of the recorder.

The various factors discussed which in one way or another will affect piano recordings may at this time make you feel that the process is very difficult. Actually the main points to keep in mind are: where is the most direct path of the sound emanating from the piano? What kind of a pick-up is desired: intimate or distant? How good is the quality of the piano tones heard over the playback loudspeaker of the recorder? Determining the location of the sound path and the type of pick-up desired will dictate the approximate position of the microphone. Final adjustments can then be made by closely checking the quality and perspective of the playback sound. It may take a little time and practice to become proficient in this technique but when it is once mastered, it will insure piano recordings with clear realistic tones that will compare well with professional recordings made with high-priced recorders. The results are well worth the efforts!

NEW PRODUCT REPORT



THE PORTABLE MAGNECORDETTE ... a professional recorder in portable form—with 10 watt power amplifier

TESTING the Portable MagneCordette with the precision power amplifier PT6-K was a pleasant experience, one that would give any Hi-Fi fan a thrill.

This is truly a professional-type recorder made portable and, except for a few minor details, it is identical in design and construction to the console or rack-mounted studio model.

The recording unit combines the standard recording unit with the Cordette "custom" amplifier which acts as a recording amplifier and also as a pre-amplifier in playback with the new power amplifier speaker combination. The two match to give an essentially flat response.

Frequency response tests revealed that it more than lives up to the manufacturer's claim of below 50 cycles to 15,000 cycles per second at 15 inches per second, plus or minus 3 Db and 50 to 8,000 cycles at 7½-inch speed.

The response at the 7½ speed easily surpasses "A" standard broadcast requirements and at 15 IPS is in excess of "AA" program requirements.

In addition to the bench tests we also gave the recorder a complete field workout. It was used to record a school Christmas musical program and a similar church program. It was used to record off the air and in regular recording procedure.

It was subjected to outside tempera-

S T A **F** I K S T E D

Product: Portable MagneCordette Model PT-6 with Cordette Custom pre-amplifier and Precision Power Amplifier PT6-K.

Price: \$549.00 (does not include microphone).

Manufacturer: MagneCord, Inc., 225 West Ohio Street, Chicago 10, Ill.

tures of 10° F. during transportation to the recording locations and was carried in the car over back country roads not especially noted for smoothness. While treated with the respect due a fine piece of equipment, it was definitely not babied in any respect.

We are glad to be able to report that it stood up excellently on all counts. No difficulty was experienced in its operation and, despite its very professional appearance, it is as easy to operate as any other recorder.

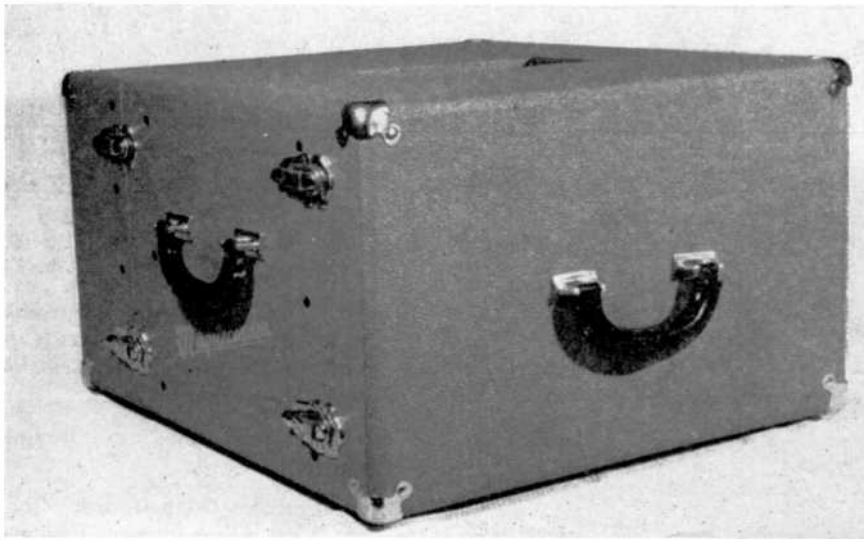
It takes but a few seconds more to thread the tape than the "drop in the slot" type of machine but after a few tries you can really whip the tape in place.

Due to the clever design of the case, the setup time of the complete unit, both for recording and playback, is very short. Once placed on a table, the front cover is removed, the power amplifier placed on top of the recorder as shown in the picture, the cord connecting the output of the recorder to the input of the speaker plugged in, the line and mike cords connected and the tape reels placed on and you're in business.

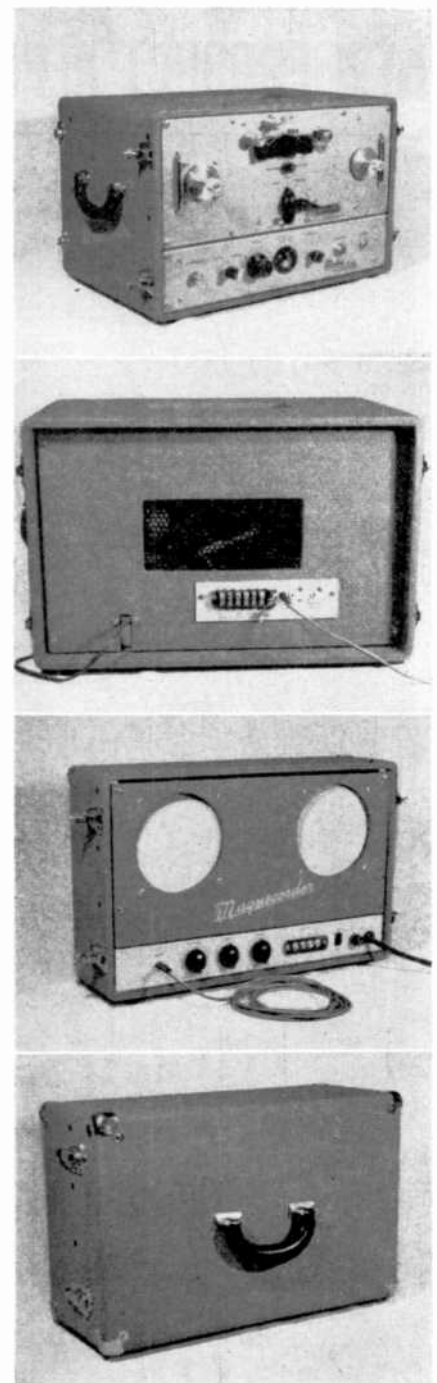
The line cord of the recorder may be plugged into the receptacle provided on the face of the amplifier.

It would be difficult to surpass the Portable MagneCordette for cleverness of design. The case when closed presents an attractive appearance. The removal of the lid reveals the recorder mechanism and the amplifier fits on the back of the recorder.

As the amplifier may be used by itself for music or public address work, it is not necessary to take the recorder along if only the amplifier will be needed. The top fits on the amplifier as



Above: the MagneCordette in its case, closed. Note the three compartment construction. The section nearest the camera is the lid, the center section the recorder and the back the precision amplifier. Upper right: The front of the recorder section showing the controls. Upper center: the back of the recorder showing the connection strip and also the inputs for phono, radio, etc. The unit is shipped in two cartons and the recorder is mounted in its case by the customer. The mounting job is simple requiring only two plug in connections and the attachment of two wires to a terminal strip. Lower center: the 10 watt precision power amplifier. Bass and treble controls are very effective and the unit has enough power to fill a large hall. It may be used with the recorder or by itself as a PA system. Used with the recorder, to which it is matched, the response is essentially flat. Lower: The lid clamps on the amplifier when it alone is to be carried.



well and makes a neat package.

Conversely, if recording only is to be done, there is no need to take the amplifier, and the recording unit alone may be taken along. Monitoring or playback is provided through the monitoring jack on the front panel of the Cordette amplifier. Any type of good quality high impedance headphones may be used.

In addition to the monitoring jack, the recording amplifier also has an equalizer switch for the various recording speeds, a gain control, an electronic eye recording level indicator, the record-playback switch, a microphone input and a jewel indicator for on-off.

Mechanically the Magnecordette needs no detailing other than to state that it is designed to meet professional specifications and is precision-built for continuous service.

The instruction manual is complete giving full operating instructions and a comprehensive set of thorough maintenance practices with the view of minimizing service expenses.

Few gadgets found in the popular priced recorders are found here as quality reproduction is the keynote. The single exception is the use of the electronic eye modulation indicator instead of a VU meter, usually found on the studio models.

The model which we tested was a full track unit with speeds of $7\frac{1}{2}$ and 15 inches per second. Should the $3\frac{3}{4}$ speed also be desired it may be had with the addition of a two speed motor. Half track heads are also available for the machine.

Tape speed changes are accomplished by changing the capstan and pressure roller. The smaller capstan and large roller provide the $7\frac{1}{2}$ -inch speed and the larger capstan and smaller roller the 15-inch speed. As mentioned previously, if the recorder is equipped with the optional two-speed motor, the $3\frac{3}{4}$ -inch speed will be available in addition.

Changing the rollers involves only the removal of two knurled thumbscrews, removal and replacement of the capstan and roller of the proper size and the reinsertion and tightening of the thumbscrews. No tools are necessary, and the change may be effected in less than a minute.

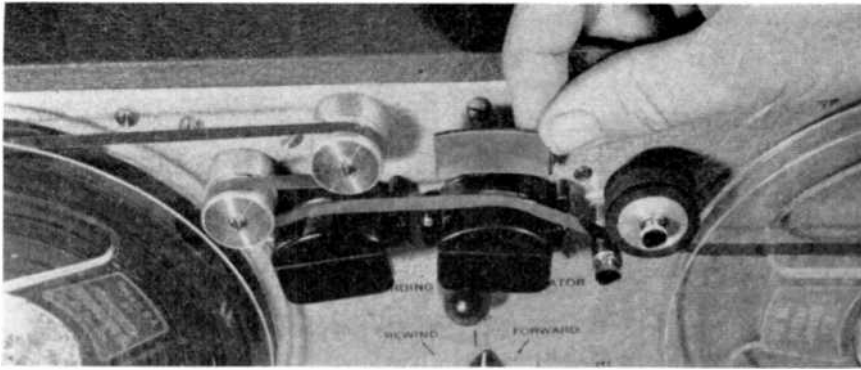
The capstan which drives the tape fits snugly on a tapered shaft which must be kept clean.

The tape threading is almost a straight line affair, the only deviation being the running of the tape over the two idlers which line it up to pass over the erase and record-playback heads.

The erase head is provided with a high frequency erase current which as-

ures complete erasure of the tape before it reaches the recording head. To eliminate any possibility of hum, the recording head is equipped with a cover which eliminates outside electric fields at the point where the tape is recorded.

All controls are equally accessible and easily operated. The "forward-rewind" switch is located in the center of the recorder and a safety button must be depressed before it can be switched to forward position. A high-speed forward is also built in and is operated by a separate lever. This should only be used when the "forward-rewind" lever is in stop position. The fast forward is a help



The tape feed is simple and threading is quick because all parts are accessible. The erase head is of the high frequency type assuring a clean erasure. The lid on the recording and playback head shields the tape from stray magnetic fields and prevents hum.

when editing is being done or when a selection must be located on the reel.

The high-speed rewind is just what it says—requiring about 40 seconds to rewind a full 1200-foot, 7-inch roll of tape. When rewinding, the tape is lifted from the heads and allowed to ride over the head cover free of the heads. This reduces wear on the heads.

As the rewinding progresses the speed of the loaded reel increases until it is turning very fast yet the switch may be thrown to stop position without any danger of tape spillage. We found that by shutting off the rewind while there is about 1/8-inch of tape yet to be rewound, the momentum will carry through and the tape reel slow down just as the end is reached.

Of particular interest is the speaker-amplifier combination which fits on the back of the recording unit. We found it to have an exceptional range of response fully controlled by separate potentiometers from full treble or bass to nearly cutoff.

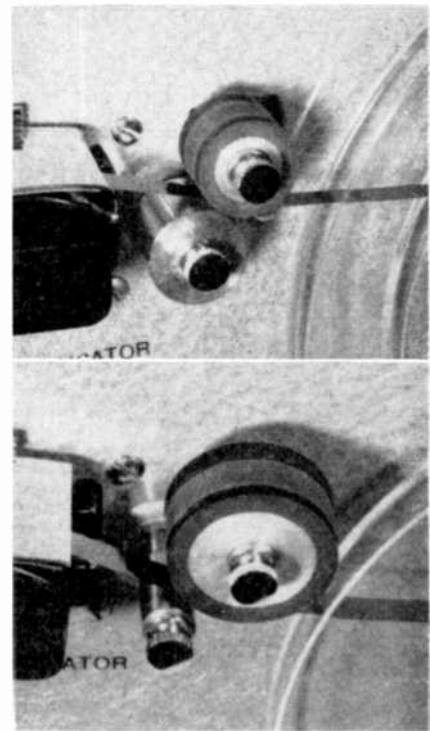
The maximum power output is 10

watts with a frequency response of 30 to 15,000 cycles plus or minus 2 Db. The unit contains twin acoustically-matched loudspeakers. The case itself acts as a loud speaker baffle. All controls and connections are on the front of the unit, as well as a 110-volt power outlet into which the recorder line cord may be plugged when they are used together.

In our tests of the recorder, we played back to an audience the singing of a children's choir which we had just recorded. The church was a good sized one and the volume supplied by the amplifier was more than adequate.

In addition, by accentuating the bass a bit by means of the tone controls, we were able to hold down the background noise which usually accompanies an on-the-spot recording.

According to the company, this unit has been designed with church, school, advertising and sales use in mind but we feel that anyone who is seriously interested in good tape recording should look it over.



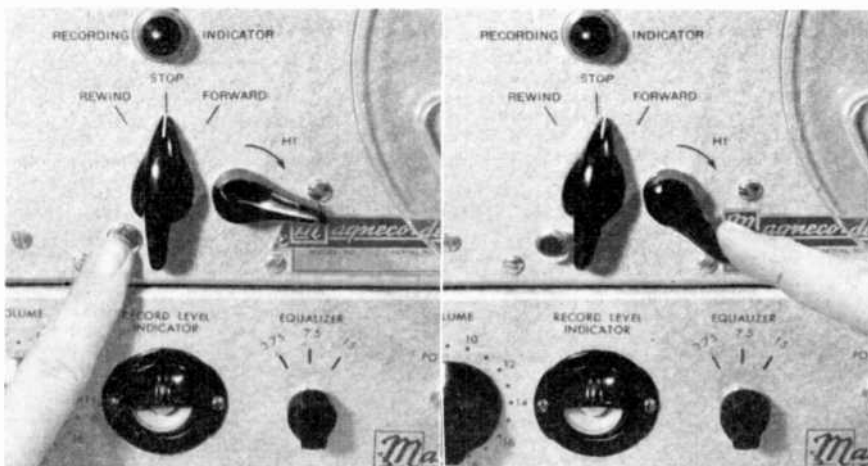
Top: the larger capstan and smaller pressure roller give 15 IPS. Below: for a tape speed of 7 1/2 inches per second the small capstan and large pressure roller are used. If equipped with a 2 speed motor a speed of 3 3/4 IPS may be had in addition. Changing of rollers and capstans is done without the use of tools and takes less than a minute.

Having tried it in both church and school, we can vouch for its effectiveness in those places.

Until we hit on a way of handling it we did have a bit of bother packing up the cords. The line cord for the recorder and amplifier and the output-input cord to connect the two are stowed away in the space between the back of the recorder and the front of the amplifier.

If you try to pack them in while the unit is in operating position, they have a habit of falling between the edges of the two pieces and you can't snap the clamps shut. We finally hit upon the idea of putting the amplifier section down in carrying position, coiling the cords up on its face and then lowering the recorder in position—which is what we should have done in the first place. This made the task easy but we still feel that if clips or cleats for the cords could be provided without defacing the attractiveness of the units it would make life easier.

We feel that this is a mighty fine machine and represents full value for the price asked. It is precision built, excellently engineered and performs well. It equals or exceeds the claims made for it by the manufacturer and we have no hesitation in recommending it.



Left: to move the tape forward the safety button must be depressed before the lever can be thrown into forward position. Right: the Hi-Speed forward should only be operated with the direction lever in stop position. The more it is depressed, the higher the speed.

Tape Club News

MEMBERSHIP IN TAPE CLUBS GROWING

TAKE A TAPE TRIP



Fred Goetz
Tape Respondents International

Fred Goetz, prexy of Tape Respondents International suggests that you be a world traveler—via tape. "There are no worries about luggage, passports, schedules, customs and the like when you travel via tape—you won't get air sick or sea sick and you can't beat the travel rates either," says Mr. Goetz, who has been operating the club since its inception. "For as little as 12 cents per trip you can visit quite a few interesting countries." Included on the T-R-I list are correspondents in Angola, Argentina, Australia, Austria, Brazil, Canada, Chile, England, Germany, India, Israel, Italy, Japan, Lebanon, New Zealand, Northern Rhodesia, Philippines, Puerto Rico, South Africa and Switzerland.

The list of hobbies and topics of conversation with friends here and abroad has zoomed past the 125 mark and, counting the subdivisions, totals more than 200 topics. Almost everything is included from babies to zoology. The list is kept flexible and new topics are added as the membership grows.

So, if you'll take Mr. Goetz's advice you'll turn on the recorder and take a trip overseas at small expense and with no bother. After having sent more than a thousand tapes, Mr. Goetz can vouch for the pleasure and profit it gives.

NEW CLUB FORMING IN NEW YORK AREA

Alfred L. Sferra, D.D.S. of 125 Hamilton Street, Bound Brook, New Jersey would like to hear from people living in the New York area who are interested in starting a new tape correspondence club to be called "Global Recording Friends." He is also interested in having the names of those here and abroad who might be interested in joining the new organization.

As with the other clubs, the new club will be devoted to the exchange of tapes and also plans are underway for holding live meetings at some point in New York City for members in that area.

Anyone who is interested should write to Dr. Sferra at the above address.

CHURCH GROUPS EXCHANGE TAPES

From Tape Topics, the publication of World Tape Pals we learned of a tape exchange between young people's groups here in England.

From St. Albans, West Virginia to St. Albans, Vermont, is a long way and the distance to St. Albans, England is even longer. But Roland W. Ruff, World Tape Pals member, is using his tape recorder to cover the distance. The young people of St. Albans, West Virginia, Presbyterian Church, under his leadership, are exchanging evening worship services of songs, prayer and talks with the young people of the First Congregational Church, St. Albans, Vermont and St. Albans, England.

Mr. Ruff says he hopes eventually they may contact many different parts of the world. Mr. Ruff is also interested in Boy Scout work and has been a Scouter for many years.

Harry Matthews is the secretary and founder of World Tape Pals and also prints and edits their bulletin from which the above quotation was secured.

RECORDER OWNERS FIND FUN AND FELLOWSHIP OVER THE WORLD

With the continuing increase in the number of people who own recorders, the membership in the various recorder clubs is likewise increasing.

Corresponding by means of recordings has a special attraction and is much more intimate and satisfying than correspondence by letter. To hear the actual voice of your tape friend is quite an experience and you can say so much more on a small 3" tape than you can in a letter that friendships are formed much faster.

There are people interested in tape correspondence all over the world and all the clubs have rosters of foreign members, as well as lists of members scattered throughout the United States, Canada and Mexico. Some folks join all the clubs and thus have the maximum choice of correspondents.

Dues in the clubs are nominal and are used to defray the club's expenses in sending out literature, maintaining the lists, etc. All are non-profit organizations and, at present, all the work is voluntary.

Tape correspondence with people in other lands provides an exciting hobby by and both the correspondents can gain much in knowledge about the other fellow's country and ways of life.

As such international friendships grow, so will the understanding between nations.

To join one or all of the clubs simply send a letter or postcard to the addresses listed and you will receive full details. Members are grouped or "keyed" by their interests so you will be able to choose someone as a tape correspondent whose interests are similar to your own.

Memberships also include the receipt of the club bulletins, lists, etc. and additional rosters as they are issued.

In addition to voicerecording with folks all over the world Melva Owen one of the Associates who operates the Voicerecording Club also has a hobby within a hobby—collecting foreign recipes

VOICERECORDING ASSOCIATE COLLECTS FOREIGN RECIPES VIA TAPE

The Owen's table has seen some mighty strange dishes pass across it and Mrs. Owen's recipe book grows fatter with each tape.

One of the latest acquisitions is a recipe for Babootie, a South African dish sent in by the mother of Max Nicholls, a club member living in Pietermaritzburg, South Africa.

All the ingredients are obtainable at your local grocery store and if you want to try it here's how to put it together:

1 lb. of Minced meat (ground beef), 1 large onion, 1 tbl. curry powder, 1 tbl. sugar, ½ cup vinegar, handful of raisins, 1 slice brown bread, ½ pint of milk, 2 eggs, salt to taste, butter or fat to brown the onions.

Brown the onions with butter or fat. Mix curry, sugar, vinegar, and raisins and stir into onions. Soak bread in milk, squeeze out and mix with meat. Add all the rest of the ingredients except milk and one egg. Put into casserole or loaf pan. Beat remaining egg with milk and pour over all. Bake one hour in a medium oven.

Mrs. Owens reports that they tried it as soon as it had been jotted down from the tape and found it to be as good as the Nicholls had said it was.

In the past 3½ years the Owens estimate that they have sent out over 1,500 recordings to about 30 families all over the world.

After many years of working together on the Voicerecording Club, the secretary and his associates were able to meet in person recently when the Owens drove to Chicago on a vacation trip. Along the way they also visited a number of tape correspondents in various cities. John Schirmer, the



Mr. and Mrs. Charles Owen
with John Schirmer

founder of the club lives in Chicago and the Owens in Noel, Virginia, a town which does a land rush in Christmas mailings.

Bob Forman of Monmouth, Illinois and Rolf Strom of Oslo, Norway became fast friends through the Voicerecording Club. After the exchange of a number of tapes across the sea, Strom expressed a desire to emigrate to the United States and Forman sponsored his entry into this country. Strom is now employed at the University of Minnesota.

ROSTER OF CLUBS

A letter or postcard addressed to the club of your choice will bring you full details regarding membership, dues, etc. A self addressed stamped envelope will be appreciated by the secretaries.

TAPE RESPONDENTS INTERNATIONAL

Fred Goetz, Secretary
P. O. Box 1404T, San Francisco, Cal.

THE VOICERECORDING CLUB

John M. Schirmer, Secretary
1614 N. Mango Ave., Chicago 39, Ill.

WORLD TAPE PALS

Harry Matthews, Secretary
P. O. Box 9211, Dallas, Texas

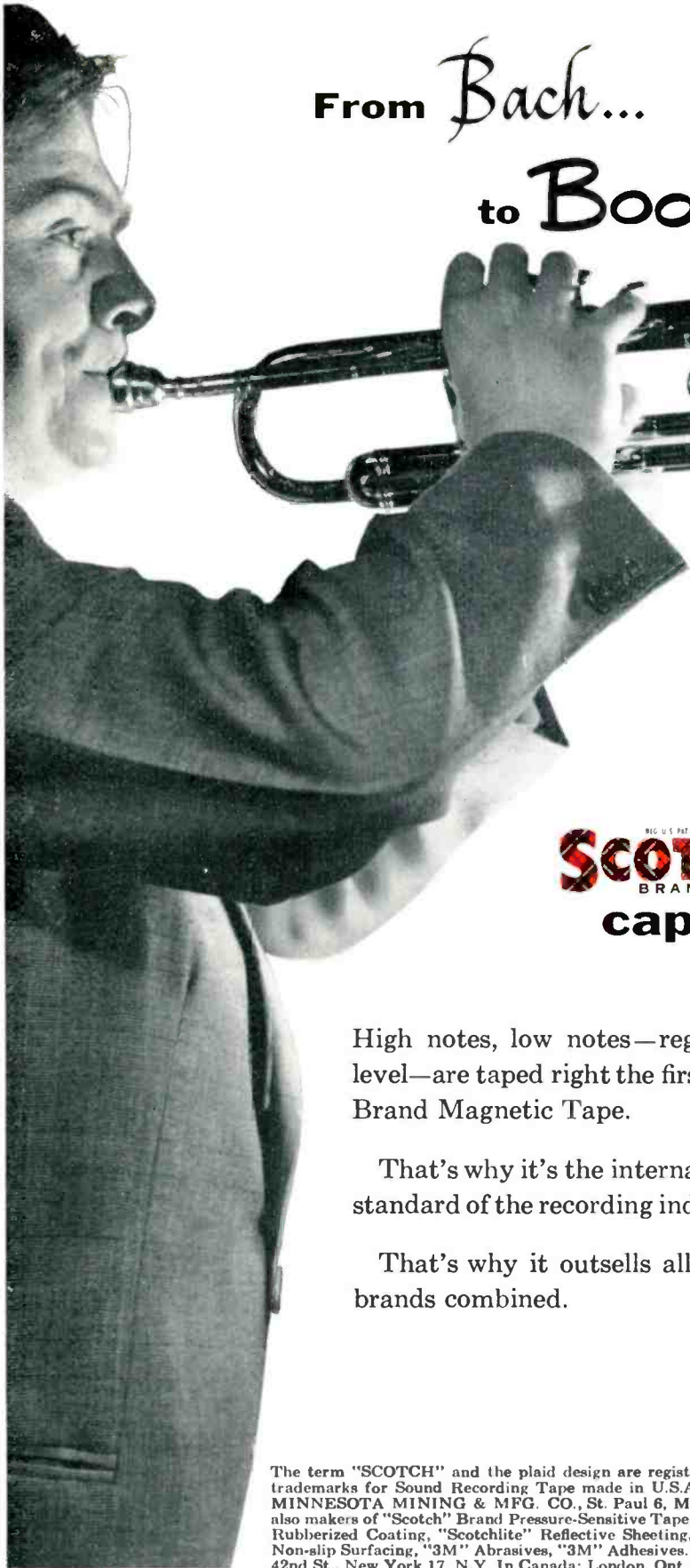
MEMBERS OF THE TAPE CLUBS CAN SUBSCRIBE TO THIS MAGAZINE THROUGH THEIR CLUB.

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Cock your ear for this little type whisper:
it *can* mean a lot to you. . . . This maga-
zine, Tape Recording, is published to show
you and thousands of other fellows just like
you how to get more and better use from a
tape recording machine right in your own
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Tape Recording, Severna Park, Maryland.



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to *Boogie...*



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