

the TAPE RECORDER

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APRIL 1959

Vol. 1 No. 3



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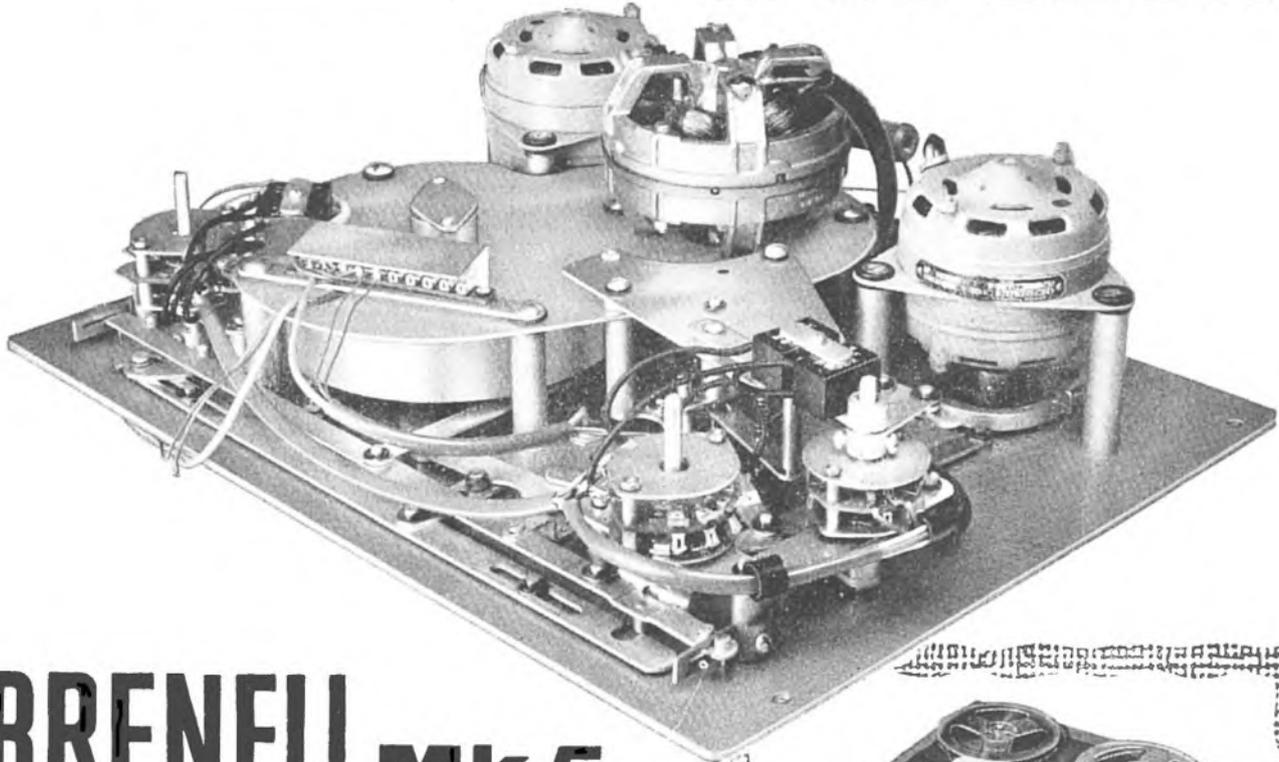
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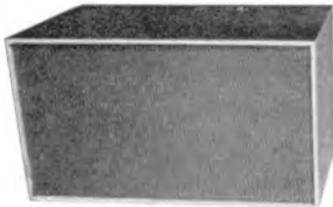


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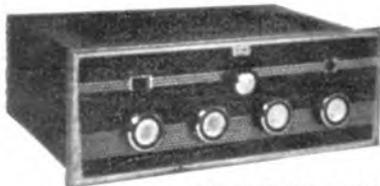
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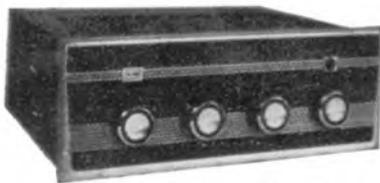
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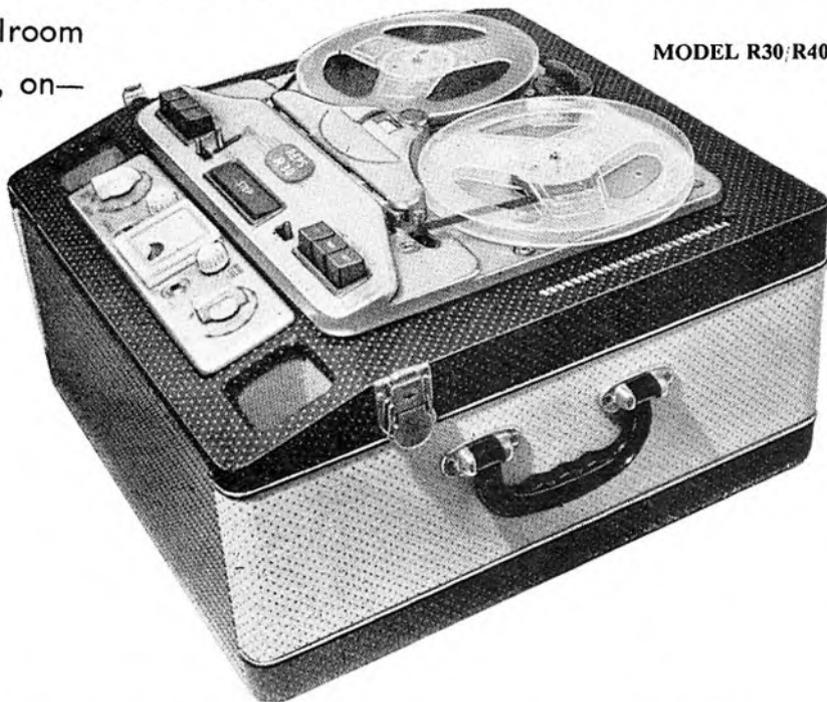
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★
EDITORIAL

AS readers of our two sister journals (*Hi-Fi News* and *Record News*) will already have noticed, in the current "editorial" columns, great emphasis has been intentionally laid upon the need to set "Stereo" in its proper place in the scheme of things; and we therefore devote this column to that self-same subject.

Stereo has been with us on tape for several years now: stereo on disc is still in its twelve-month wonder stage: stereo on radio is still an exciting experiment—and an experiment which will doubtless increase in interest as the months pass, and as the BBC develop the system which promises best results for all. It is therefore a foregone conclusion that stereo will hold public attention, as a separate subject, for some time to come; nevertheless, it is already time for the wise enthusiast to disregard stereo as a lone-wolf miracle, and to regard it in its correct light—as an inevitable and worth-while improvement towards realism in sound reproduction. *Stereo is the other half of the complete sound—the half that has been missing for the past fifty years—and nothing more.*

Stereo came in as a Gimmick. This was inevitable. When sound was added to the cinema, that was introduced in Gimmick form. Everything that could make a noise was filmed. When the pictures on the screen began to change from black-and-white into colour, the Gimmick was featured again, with everything that could make a brilliant rainbow splash! But what has become of these initial "selling points"? All pictures now talk, and the colour film is normal, everyday entertainment. The accent now comes in colour half tones, and in periods of near-silence. And so it will be with stereo.

Stereo, as heard with normal, everyday music, is an almost indefinable thing. It adds something quite terrific, in terms of perspective, depth, and presence; but it takes a very clever pair of ears to analyse the differences—speaker against speaker—that are producing the stereo image. Naturally, when an express train dashes across the room, or when a military band marches out of one speaker, over the hearth-rug, and back into the other speaker, there is a very startling illusion. Only a spoilsport would deny the fun in this and other stereo Gimmicks. But this is not stereo as we expect to live with it and enjoy it; and to expect such amazing effects from every disc, and every tape labelled "stereo" is grossly unfair to stereo itself, as well as to individual appreciation of it.

Owners of tape recorders, who are contemplating the addition of a second channel to their equipment, should think very seriously about these things. In other words, while thinking of the initial excitement of this stereo initiation, they should also concentrate upon the quality that they are going to demand in the future. For, in the long run, the word "stereo" will lose its importance, and the "something extra" that it brings will be accepted as the normal essential. To ask for a "stereo disc" or a "stereo tape" will probably become as silly as asking at the box office for tickets to a "talkie". This magazine will naturally continue to deal with stereo—and very thoroughly too; but it will treat it as it should be treated—as an interesting part of a very interesting whole.

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—COVER PICTURE—

ERIC SIMMS' first article should (again) have appeared this month. To be quite honest, we do not know why it has not. When we discovered and discussed the matter in this office, one suggestion was that the author was still busy on the front cover! The boat is part of the mobility of the BBC's "Recorded Programmes Permanent Library and Recorded Programmes Production Unit". The photo shows Eric Simms, with Engineer Bob Wade, on a waterway near Beaconsfield, Buckinghamshire, in search of bird noises—and also ready for any other useful sounds of a watery nature that may one day come in useful for a programme still to be written. The microphone is mounted at the focal point of a parabolic reflector, which greatly helps the selection of the required sound, and the elimination of the many unwanted sounds that are often so difficult to avoid.

—NEXT MONTH—

AT the time of closing for press with this month's number, we are still dithering over our choice of cover pictures; and our printers, who are urging us to close early (on account of having to print an extra large *Hi-Fi News*, plus a *Hi-Fi Year Book*, before Easter) cannot allow us further time in which to make our choice. So, instead, we remind our readers to look for the familiar Orange and Black cover, and—of special importance—the *Front Cover announcement of the £300 New Music Competition*. The contents of the May number of the magazine should be livelier than ever. Apart from all the regular features—*News Page: Club Notes and News: Tape Reviews: New Products: Equipment Reviews: Readers' Letters: Cartoon: What Do You Know?* etc., etc.: there will be another *Tape Deck Analysed*, "The *Bradmatic*", another instalment of Maurice Brown's new series, "The *Art of Tape Editing*", more "Taking up Tape", another chapter of "What Do These Things Mean To You?", more about *Collecting Sound Effects*—plus other features which still have to reach us. And, having learned the lesson of talking about Birds that are still in Bushes, we leave those announcements for next month's cover. And, once more, please accept our apologies for slip-ups.

—SUBSCRIPTION RATES—

The subscription rate to *The Tape Recorder* is 21/- per annum (U.S.A. \$3.00) from The Tape Recorder, 99 Mortimer Street, London, W.1. Subscription + Index, 24/- (U.S.A. \$3.25).

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Perhaps he does have a recorder! Perhaps he's sitting in his attic fuming at it as it spills miles of tape over the cat's saucer, showering him with sparks like Granny with a sparkler on Guy Fawkes night, or breathing fire and smoke over his next week's Pools coupon? Worry not, dear sir! Send it to us! We will buy it and you can set the allowance against a new recorder. Join the lists of our satisfied customers who daily ask for our brochures and terms. So many are now enjoying the full use of their tape recorders at such minor cost they hardly notice it. Write now! IT'S WORTH IT!

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The Art of Tape Editing

(1) Mental Pre-Editing

—By Maurice Brown—

★ Maurice Brown was born in East Anglia, which perhaps explains his love of the sea and ships of all kinds. If we are to believe his own account, he worked ineffectually at Oxford. He joined the BBC in 1933 after a time in journalism, musical criticism, motor racing and sea-going. There he was responsible for the programme side of the Gramophone Department, then Music Adviser to the Drama and Features Department. He is now a Features writer-producer.

During the war he worked on a number of naval and merchant service programmes, and produced a book on Atlantic convoys. He joined the Royal Navy in 1943, was imprisoned in Java, and returned to the BBC at the end of 1945. Since then he has written or produced or both, more than 150 programmes. These include portraits of the Irish writers, W.B. Yeats, James Joyce and G.B. Shaw, and the exploits of a rescue tug in the Atlantic. He has worked in some forty different countries and not, he insists, merely visited them.

In 1957 he won (with Francis Watson) the Italia Documentary Prize with one of his four programmes on Gandhi—The Last Phase.

When the Editor of The Tape Recorder asked me if I would write a series of articles on editing tape, my instant reaction was a mind filled with memories of mile upon mile of tape, page upon page of typescript of the words upon those tapes, of reversing the order of sentences, of a floor covered with cut tape containing "ers" and 'ums' and dithers, of small lengths, carefully preserved, of that most useful of all editing commodities, *a recorded breath*.

But a little contemplation in my bath sorted out my ideas; short of a book, four articles would, I thought, cover enough of the subject to stimulate the tape enthusiasts for whom I am writing. I hope I am right.

I therefore intend to try and deal with these subjects:- firstly and secondly, tape editing in the mind, the pre-planning that I believe necessary when recording sound pictures, effects and the spoken word: thirdly, rough editing; fourthly, personal editing -the straightening out of a speaker's recording without removing his personality and leaving a flattened dead-pan voice that might be anybody's.

Lastly in this general introduction, and before I really get down to it, there is a matter of opportunity and gear. I am B.B.C. producer and writer who has been experimenting with the use of tape ever since we first started using it. But, I am not an engineer I have at my disposal very skilled technicians using highly expensive equipment.

I know that I am writing for you, my readers, who for the most part have one recorder but who, if you gether, can assemble enough equipment to do with my facilities and my opportunities because, and I hope you agree, I always like to try a difficult shot even if, as any persevering reader will discover, I frequently miss.

What do I mean by editing in the mind? Simply this: to get the best results you must know what you want before you start



The author is seen here recording in India for the Ghandi Series of programmes, which he will be touching on next month. In lively acoustics it is important to get a good microphone position as shown.

recording, and carry out your decisions when you are actually on the job. If it is a colour piece you are after—a sound picture of a village, a country fair, a religious fête—you must know what you want, and plan. Nobody wants several thousands of feet of tape to edit when hundreds would suffice. In this first article I am using two recording operations as examples.

Several years ago I produced a programme about a little ebony image of the Virgin Mary which in the spring is carried in procession from its winter home in a village in the Auvergne in Central France to a small chapel on a local mountain top and is brought down again in the autumn.

On both visits we took with us two tape recorders, one permanently fitted into a Land Rover, the other a Midget running off its own self-contained batteries.

The Problems and their Solutions

There were a lot of problems and the solving of them had one real purpose, to give the programme an artistic unity; and that is done by editing, the smooth joining of sequence to sequence, and by editing in the mind before and while you are recording.

The scene had to be set. The first visit was in the spring. The birds sang loudly; the cattle bells tinkled in the high meadows; the streams cascaded down the mountain sides; hooting cars tore up the hill into the village and the cheap-jacks shouted in the weekly street-market. The whole district bustled.

In the autumn the sounds were different and contrast is invaluable. The birds were nearly silent, a distant dog's bark carried in the cold air; the bell-less cows were down beside the village for the cattle fair; there was the patter of rain and the sigh of the wind.

All this had to be recorded; the fundamental sounds on the mobile equipment, the little details on the midget, and all the time as I used the microphone as a movie cameraman uses his lens, I was thinking that fits there, that will later be superimposed on that, I must make a natural approach on that sound or walk away from that noisy child so that I can cut on my own uninterrupted footsteps to the clip-clop of a driven cow coming down the road towards me.

In that last paragraph I have mentioned three techniques which I believe to be important. Firstly, use a microphone as you use your

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eyes; do not merely hold it up and hope for the best, chase the sound. The noise of an axe cutting into a tree is all right as far as it goes but if you move in and record the efforts of the man handling that axe you are getting nearer to a real sound-picture. Then, if it fits your pattern, walk away, so that you at least start the fade you will need during final editing.

That brings me to point two. The fade, up or down, is an editing device it is difficult to avoid, but that made by the turning of a knob is seldom as effective in a closely cut sequence of sounds as one made by one's own movement while recording. Thirdly, I wrote of superimposing one sound upon another, the building up of a sound track by running several tapes at the same time and recording the mixture. Obviously this needs a minimum of three machines and I will write of this part of editing in a later article, but always keep the idea in your editing mind.

Using Background Sounds in a Script

As an example of how I used this technique in the broadcast about which I have been writing, here are my sound track notes on the first two pages of the script in which the written commentary, added after the completion of the sound track, brought the listener into the village in the early morning, out into the immediate countryside, and back by another road, past the school into the street-market. The commentary interjected short paragraphs into continuous sound which I hope illustrated the atmosphere more clearly than any words.

"Quiet bird background—add car climbing—car stops—add church bell—add sawing in carpenter's shop, then rooks and swallows—add church bell. Mix the lot to cow-bells and stream—add belfrey clock striking ten—leave only birds (thinner) and add walk past school with children singing—at bottom of natural fade cut to approach into street-market past fountain—peak on draper selling bedspread."

Planning Beforehand Simplifies the Studio Work

That fairly simple sequence took three minutes to perform; it involved a good many tapes, it took a long time to prepare and several hours to edit, but I do not believe it would have been successful or so comparatively easy to deal with in the studio if it had not been pre-planned before recording.

I have covered a lot of space about one short marriage of sounds, but, I hope, it has displayed some of my principles. There were other problems.

Before our little Black Virgin was taken from her place above the altar in the village church and carried to the mountain there was a short service, then the small local procession took her for some seven kilometres along the Route National, up the mountain side and past the metal crosses making the fourteen Stations of the Cross, and into the small chapel.

Recording a Moving Procession

As you will see, there were three recording difficulties—to get some of the service and the procession leaving the church as well as its movement through the streets; the climb up the mountain side and yet be ready to record the entrance and part of the service in the chapel. All had to be recorded in such a manner as to make the final sound track smooth and atmospheric. The answer was of course to use both the gear in the car and the midget recorder. We slung microphones in the church and chapel so placed as to get the best results from both priests and choir—they all worked in the evenings to help us do this—and left the leads outside ready to be plugged into the equipment in the car, the microphone mixer, and thence to the recorder. With the Curé we arranged which parts of the service in the church, during the procession and in the chapel we would record with *his co-operation*.

It worked like this. We recorded in the car outside the church those parts of the first service we wanted, up to the point where the procession out of the church and onwards was to start. At that moment the car unplugged, I, inside the church switched on the midget and signalled the Curé to start the procession from the altar. The car drove off to a position outside the village—I recorded on the midget until the car could take over the approach. Then we all drove past



The autumn procession with the Black Virgin being carried into the Auvergne village. The recording car is part of the procession and is being driven by the author, as in so large a crowd this was the only way the recording could be made.

the procession, stopped at an already arranged spot, recorded a special piece of ceremonial and on again.

Where the procession left the Route National and started the scramble up the mountain side, I went with it carrying the midget. The car took a passable road up to the chapel and plugged up. I recorded some of the one-minute services at the Stations of the Cross, the increasingly breathless singing, the trudging footsteps, and after a mighty climb staggered into the church with the recorder running. The car had started recording when we first came in sight so that the actual entrance was registered on both our tapes.

I hope you can hear this sequence now in your mind. Church bells; into church; start of service; Curé; choir (all recorded in car); beginning of procession in church and out into street; hymns and prayers—(all on midget)—approach to Resistance Memorial; Benediction; prayers, chants, sounds of many feet; add distant church bells and slowly cross to quiet cow-bells and birds (all on car recorder tapes); 1st Station of the Cross; add louder cow-bells (from car tape); 3rd Station; approach to 14th Station, with chapel bell; Abbé at 14th Station; chant; Benediction; entrance into chapel (all on midget). Cut in car tape of entrance at change of acoustic; hymn (car tape).

Final Tidying up

Some months later when editing in London we naturally found some waste material but all in all there was very little to do except for taking out odd verses here and there for timing purposes, cutting or adding footsteps, superimposing other tapes of bells, etc. The actual joining of the two tapes of the entrance into the Chapel was a matter of exquisite exactitude. The little tinkling bell was the difficulty, ringing as it did over the singing. In the end we took the opening percussion of the clapper on the bell from the midget tape and the ring and the harmonies from the car recording. It worked beautifully. It is such delicate operations that make editing a pleasure.

The sequence ran for sixteen-and-a-half minutes after the live narration had been fitted into the sound track, and the combined result recorded on a new tape. But, that is another story.

1964
TOMORROW'S
 1963
Tape Recorder
 1962
is here
 1961
TODAY!
 1960
 1959



During the ten years that have elapsed since we first blazed the trail for Tape Recording an important new Industry has been created. To us it is a matter of pride that so many features of that first Ferrograph have since become standard practice and embodied in the designs of other manufacturers.

To-day we again look to the future and initiate a policy to ensure that—no matter how Tape Recording develops or for what purpose it is used—every Series 4 Ferrograph can be readily adapted at any future time for a variety of applications. To achieve this, space has been provided under the Head Cover to permit Head changes and additions for monitoring, stereo recording, stereo playback, dual track stereo to the new American standard or for lower track use. Such Heads are designed to be plugged in and rocking facilities are provided for azimuth correction.

This Ferrograph development, for example, permits any Series 4A to be instantly converted into a Series 4S merely by plugging in the additional stereo Head costing seven guineas.

In the new Series 4 are several important design improvements such as the resilient mounting of the Capstan Motor, the re-fashioning of the Function Switch Knob, the fitting of a gear-driven Turns Counter accurate to a turn and the use of a one-piece hinged Head Cover. The Brief Stop (or pause control), hitherto an extra, is now a standard fitting on all Ferrographs.

Finally, to conform to our policy of rationalisation, the Ferrograph will be supplied only in one standard colour finish—a handsome two-tone grey. It is available in two forms, either as a transportable or as a chassis unit (without loudspeaker) for installation into your own cabinet, in the following models:—

Series 4A

With standard monaural Recording/
 Playback facilities

Model 4A/N 3½/7½ i.p.s. 81 gns.
 *Model 4AN/CON 3½/7½ i.p.s. 81 gns.
 Model 4A/H 7½/15 i.p.s. 86 gns.
 *Model 4AH/CON 7½/15 i.p.s. 86 gns.

* Suffix CON denotes chassis form
 for building into own cabinet.

Series 4S

With optional stereo sound playback
 facilities in addition (when used with
 Stere-Ad Unit.)

Model 4S/N 3½/7½ i.p.s. 88 gns.
 *Model 4SN/CON 3½/7½ i.p.s. 88 gns.
 Model 4S/H 7½/15 i.p.s. 93 gns.
 *Model 4SH/CON 7½/15 i.p.s. 93 gns.
 Stere-Ad Unit (when required) 30 gns.

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our readers write

BY way of a brief reminder to our regular readers, and also to put new readers in the picture, this monthly feature also offers three prizes for the first three letters printed—which are, in that order and in the Editor's opinion, the three to merit 1st, 2nd and 3rd awards of a spool tape. The prizes are 7-inch, 5-inch and 3-inch spools respectively. Letters not intended for publication should be clearly marked, beneath the signature NOT FOR PUBLICATION.

. . . about a bright idea

From:—Richard A. Margoschis, 14 Victoria Road, Atherstone, Warks.

Dear Sir:—I think you will agree that when copying tapes it is more advantageous to have visible warning of the arrival at the replay head of certain passages of the recorded material, the operation of the controls of the machine making the new recording is then simplified. Suitable marks can, of course, be made in several ways, but I thought your readers might be interested in a method I have been using recently.

Photographic dealers sell small self-adhesive labels known as "Arrow tabs" which are used for titling colour transparencies. These labels are obtainable in several different colours and are just the right width to apply to $\frac{1}{4}$ inch tape. Being about $1\frac{1}{2}$ inches long they are easily seen coming off the spool at $7\frac{1}{2}$ inches per second. Different colours can be used to indicate different settings of the controls and what I consider quite important, they can easily be removed from the tape after use.

Many thanks for an excellent monthly which is obviously going to have plenty of "meat" between its covers. Yours sincerely

. . . about elephants in the garden

From:—R. Bryan Smith, 141 Finsborough Road, London, S.W.10.

Dear Sir:—May I congratulate you on your excellent magazine. It is just what enthusiasts such as myself have been waiting for. I wonder how many of your readers share my hobby of collecting high fidelity sound effects which excite them. To those who do, may I say that the most exciting noise I have ever come across is that of the elephant. Indeed nothing taxes my hi-fi apparatus more than the sound of a rogue elephant rampaging through the drawing room. I sometimes wonder whether people walking past the house are alarmed by the noise of elephants crashing the undergrowth behind our laurel hedge.

However, I am having difficulty in indulging to the full in this hobby of mine due to the regrettable shortage of elephants in this country, and that constitutes my purpose in writing to you. Can any of your readers please tell me where I can obtain further recordings of elephants? I should be extremely grateful if any readers who might possess a recording of an elephant would agree to exchange a copy of it for some of my own recordings.

Africa is such a long way away. Yours sincerely

. . . about everyday sounds

From:—S. Lewis, 46 Newcombe Road, Luton, Beds.

Dear Sir:—I find *The Tape Recorder* very welcome and highly interesting. "Build a Library of Sound" must have given plenty of ideas to those who have so far recorded music and human speech. May I suggest that comparisons between *laughs*, played back at various speeds, would be a very interesting study—to anyone with the patience and time to "collect" them.

I have no t/r, but have long had the habit of "mentally recording" sounds of all kinds. Sometimes I've written down a short musical phrase which I've heard quite distinctly in a girl's laugh. It is surprising how often a laugh contains a phrase expressible in musical notation. At one time it seemed to me that the scraping of chairs on floors (and oil-starved iron gates) almost always produced "hard" intervals—fourths, fifths, and perhaps octaves.

When, so to speak, one's ears are in that sort of "mood", it is possible to detect a succession of musical notes, sometimes perfectly in tune, in a spoken sentence. Once, when I realised I had absent-mindedly considered the note of a cash register bell to be a "dominant" (fifth note of a diatonic scale), I asked myself "Why dominant? Dominant of what key?". There was only one answer to this; something, somehow, must have "set the key" in my mind beforehand.

I had not been even mentally humming any tune or even thinking about music, so it was not that. Then it dawned on me. Just before the bell rang I had been listening to a woman talking. The modulations of her voice contained recognisable notes, which suggested a key—of which the note of the cash register bell was the dominant?

Perhaps many fascinating "adventures in sound" await the keen-eyed tape recorder owner with leanings towards subjects a bit off the beaten (sound) track. Yours truly

. . . about being a Home Reader

From:—Terence C. Nurse, 108 Bordesley Green, Birmingham, 9.

Dear Sir:—Whilst purchasing some tape this week I was introduced to your new magazine. Noticing that the issue offered to me was No. 2 I asked the dealer if he had the first issue as well; but he said he had sold out all his copies in the first three hours and he couldn't get me one now! Reading your editorial I see that he was not the only one who sold out all his copies. Reading the whole of the magazine I see why! I have scouted all round the Birmingham Tape and Magazine dealers to find, I hoped, a spare copy hidden somewhere, but no luck.

Whilst re-reading No. 2 for the third time I noticed a sentence. I noticed ten words. I noticed fifty letters. I noticed a glint of hope NOT FORGETTING THE NEEDS OF HOME READERS IF SUPPLIES PERMIT. I am hoping, with ten fingers neatly crossed, that supplies do permit me to be a home reader. I give you my word I do all my reading in the home. I will be extremely grateful if you would send me a copy. And—if you don't—there'll be but one thing left to do. I shall visit your offices in black of night, make a forced entry, and remove the copy that the office boy tucked away under his desk to read himself. Please save me a trip to London.

Yours faithfully, truly, affectionately (but only if I get a copy) Lovingly.

. . . about Mr. Turner's "Neck"!

From:—A. Jordan, 8 Regent Street, Melton Mowbray, Leics.

Dear Sir:—Mr. Turner of London is certainly "sticking his neck out" with the remarks he makes about the capabilities of his wife regarding the operation of his tape recorder. He could, however have kept these thoughts to himself if he obtained a time switch for operating his radio and tape recorder. For the past three years I have been enjoying radio programmes that I would have otherwise missed through being out (or going to bed early!). The one I use is designed for use in conjunction with an electric cooker. It has two dials. One setting is for the length of time that the meal requires cooking, and the other is set to the gap of time between actually switching the time switch on and the time the meal is to commence cooking. It is easy to see from this that all that needs to be done is to set the length of the programme, and then the time before it is due to start. The radio and recorder must be pre-set of course for the correct recording level, and the machine must be set in the record position. This means that the capstan drive is left on, but before I started this idea I enquired of the manufacturers if this would do any harm. They said "no", except that the rubber capstan drive might need replacing a little earlier than usual. I have just done this after three years!

Congratulations on your magazine. I am looking forward greatly to future issues. Yours faithfully

From:—Florence L. Day. (Address withheld by request).

Dear Sir:—I wonder where Mr. Turner, N.W.10, gets his idea that a tape recorder is for men only. I have, to my surprise, found that his idea is general among men. My recorder is my hobby, although I am 60 years old. I can record extremely good reproduction of concerts broadcast by the B.B.C. and I also have a good working knowledge of its "innards".

My one grouse against manufacturers is, why not more attention to the "Magic Eye" to get it stabilised. By that I mean if a small dial could be fixed whereby one would know exactly if the recording was the correct modulation. It is on the hit-and-run principle now,

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ponse. Tape/Input switch providing instant comparison between input signal and signal recorded on tape. Treble and bass tone cut controls. Two input and two output sockets. Peak level record meter. Complete with two 10 ft. speaker leads, two screened plugs, splicing tape, demonstration stereo tape and tape reel. Price 149 gns.

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Dimensions: 31" long x 14½" wide x 11½" high: Weight 70 lbs. Frequency Response: ±2 dB. 50—10,000 c/s: ±3 dB. 45—12,000 c/s. Overall Response: Strictly to C.C.I.R. recommended specifications. Signal to Noise Ratio: Better than—45 dB. (unweighted, including hum). Output from Playback Preamplifier: 200mV. R.M.S. Inputs to Record Amplifier (High Impedance): Microphone 1mV.: Radio or

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sessions every 20 minutes

you are either lucky or tune the " Magic Eye " too low and get the " tape " noise, or too high and the recording is coarse and rough.

Yours sincerely

... about tape tactics for the blind

From:—James F. C. Adams, Home Teacher of the Blind, 54 Richmond Road, Gillingham, Kent.

*Dear Sir:—*In answer to Mr. G. E. Payne's letter in the March edition of *The Tape Recorder*, asking for advice to blind persons on tape splicing, he may find the method adopted by myself helpful. Use a really good jointing block such as a BIB or E.M.I., so that the tape is securely held in position by the grip at each end. Overlap the ends of the tape so that one passes either side of the 45 degrees slot in the centre of the jointing block. Place the tip of the little finger on the free end of the top piece of tape and, using a really sharp single edged razor blade, draw it across the tape through the 45 degree slot. The end under the little finger will come away, leaving two perfectly butted ends. Press a piece of jointing tape firmly along the recording tape; the edges of the jointing block will ensure this being straight. Should the jointing tape overlap the sides of the recording tape, the razor blade may be carefully drawn along the slots running the full length of the jointing block, trimming the edges perfectly level with those of the recording tape. On lifting the tape from the jointing block, the odd end from the underneath piece of tape will automatically fall away, leaving a faultless join. The length of the piece of jointing tape should not be confined to that used by fully sighted persons, until some degree of skill is attained. With regard to jointing compound, this is best avoided by blind persons, for whilst a good join may be made, it is only too easy to remove some of the tape base beyond the area of the join itself, so that the quality of the playback signal is badly affected on that portion of the tape, necessitating further cutting and rejoining.

From a fellow in the same boat as Mr. Payne

From:—M. L. Chambers, Organiser, Tape Programmes for the Blind, 139 Goldthorne Avenue, Birmingham, 26.

*Dear Sir:—*Since your mention of Tape Programmes for the Blind in the March issue of *The Tape Recorder*, I am delighted to inform you that I have been inundated with letters from *The Tape Recorder* readers—all asking how they can help!

This truly wonderful response proves that our fellow tape enthusiasts are not only interested in amusing themselves with their recorders, but are only too willing to share with others the fruits of their labours.

I am hard-pressed to answer all the wonderful people who have written to me, so will you please convey through the pages of your magazine, my sincere appreciation and the fact that I will eventually write to everyone who has offered his or her services.

Finally, congratulations once again on a very fine magazine—its success is assured.

Yours sincerely

... about converters for portability

From:—R. A. Mullis, 18a Border Road, Sydenham, S.E.26.

*Dear Sir:—*Since you seem genuinely interested in helping tape recordists over the stile, may I ask your help on two things which have been worrying me for some time.

I want to buy a 12 v. converter, and am undecided between a vibrator or (ex-service) rotary type. I have two recorders, a Truvox (which I believe consumes 80/100 watts), and an (Australian) Tecnicorda which I estimate consumes 100/125 watts. Would I be able to get a converter which would satisfactorily feed both, not at the same time, of course. My second problem is my Australian recorder. I think in many ways it betters many British machines (e.g. it has a cine adaptor), but through inexperience I ruined a valve which was unobtainable here. Although I have wiring charts and technical data I have spent a good deal of money trying to get it repaired in S.E. London, but it still won't perform. Perhaps through your columns I could find someone who CAN get it going for me. I meet so many people who TELL me what should be done, yet, there seems to be a dearth of those who can actually DO it, successfully.

In conclusion I would like to say " Thank you " for your March Editorial and I would like to ask correspondents like my near neighbour Mr. R. Fairweather, not to deny the " new boys " the benefit of articles he has read in *Hi-Fi News*. There must be many who like

readers letters—(continued)

myself never read *Hi-Fi News*. To omit articles of great tape recording interest from *The Tape Recorder* because they were previously printed in *Hi-Fi News* seems to be to be a bit illogical, even if a little boring for Mr. Fairweather.

Yours faithfully

... about taping old 78s

From:—Donald Dods, 10 Dean Park Street, Edinburgh, 4.

*Dear Sir:—*I would like to add my congratulations to the many you have received; your editorial is what the large majority want, but is seldom obtainable. I write with the marvellous music of " *I know that my Redeemer liveth* " echoing through my head, the particular recording being from the network three programme " **Sound** ". This old record is virtually unobtainable, and if I found a copy it would have background scratch which would ruin the pleasure of the listener. This can be filtered out with more expensive equipment as used by large concerns, but not possessed by the average enthusiast.

As the 78 r.p.m. is now being disbanded, many of these fine pieces will no doubt fall by the wayside, and the recording companies will say that the demand for these does not justify the expense of production. One cannot wonder that people stopped buying when progress in the field of recording eliminated the background noise. I thought it would be of interest to many, to find out if any readers who heard this programme wished they had a recording (just as it was broadcast) of " *I know that my Redeemer liveth* ".

Do any of the readers share this viewpoint?

Yours truly

... about time switches

From:—W. R. Webb, 121 Scotland Green Road, Enfield, Middlesex.

*Dear Sir:—*In reply to Mr. N. P. Turner's letter in the current issue about the B.B.C. programme " **Sound** ". I feel the solution to this problem of missing any programme is to buy from one of the surplus stores a clockwork time switch. Most switches have an eight-day movement and need to be fixed in a suitable housing. The switch I use has an alternative switch in order to " set up " the radio and tape recorder before leaving the machine. I have included the circuit and, of course, need not stress the importance of realising the switch will be " live " and therefore all contacts should be totally enclosed against accidental contact.

Yours faithfully

From:—F. V. Wells, 72 Greenfield Avenue, Carpenders Park, Watford, Herts.

*Dear Sir:—*Every few days one hears of fresh uses for Tape Recorders, therefore, a pooling of ideas through your up-and-coming magazine would be a boon to Tape Recorder owners. Here is an idea which may be of use to both users and manufacturers.

Users. Supply the Radio and Recorder mains via a Venner Time Switch (or wall type pre-set cooker switch). Simply set the switch to starting time and duration time. This will enable you to record favourite programmes although you are absent.

Manufacturers. Why not build a Time Switch with an additional supply plug into a Tape Recorder, or as an add-on unit?

Yours faithfully

... about what is wanted

From:—R. Penfold, 48 Holbrook Lane, Coventry.

*Dear Sirs:—*I feel that any wide-awake tape recorder manufacturer who introduces a battery-operated portable machine on to the British market which complies roughly with the following specification will obtain very large sales in a reasonably quick time. (a) Weight not to exceed 10-12 lb. (b) Half-Track recording. (c) One speed only (1½ i/s or 3½ i/s, as required). (d) No erasing facilities. (e) No power rewind facility. (f) 5 in. reels. (g) Standard jack socket and any crystal or moving coil mike of high impedance permissible, but no mike supplied with machine. (h) No internal loudspeaker, but monitoring facilities available through headphones. (i) Power pack available as accessory for use on mains where available. (j) Transistorised and using 6 V.2 batteries lasting, say, 20 hours. It should be possible to market such a machine for £35, and such is the demand for portable recorders for outdoor work that the first machine on the market should be quickly followed by others once the sales potential is realised.

Would any of your other readers like to comment on this and perhaps provide their own specifications for such a machine?

Yours truly

By B. R. Read

BUILD A LIBRARY OF SOUND EFFECTS

No. 2. CARS, ANCIENT AND MODERN

BEING a car enthusiast, especially where older cars are concerned, I find recordings of these possibly the most interesting of all to make. That being so I am hoping to find a famous make 1937 1½ litre saloon for myself very soon or its 1947 equivalent. Modern cars, though, have plenty to offer in the way of sounds to record, although presenting very difficult problems to solve and overcome. Manufacturers of modern cars have spent a tremendous amount of time and money in making their cars as smooth and silent as possible, and from a recordist's point of view, they have been far too successful. By scientific use of insulating and dampening mediums, they have pushed down whatever sounds remain, right into the lower frequency ranges, thereby giving "actuality" recordists their biggest headache. An actual straight recording in a modern car is practically meaningless and so very uninteresting that it is really not worth while, so what we have to do is to somehow get outside our insulated box, and this is how I go about it. First of all, though, I must assume that you have either a battery driven portable recorder or have found the ways and means of driving your mains machine from a battery, probably a car battery.

Problem One of a Hundred

There are three sounds that "point" a motor car. *Gear changing, exhaust noise and the horn.* As the car chosen for recording will most probably be a saloon, the idea is to so position the microphone to pick up the gear changes and, when these are made, then to record the exhaust note to make the constant running of the car interesting. Two of the best ways of doing this are as follows, although both spell **Danger!** so I must warn you to examine them carefully and take adequate precautions if you decide to try them. *Do watch your step, and decide against them if you have the slightest doubt.*

Method 1

In many if not most cars, there is a back axle inspection cover located under the back seat. Unbolting and removing this gives



Please do not try this. It is a specialist's job, and very dangerous. Only steplejacks climb steeples.

access to the filler plug of the differential. By holding the microphone slightly through the aperture, facing it backwards and slightly downwards, the gears and exhaust are usually nicely balanced and good recordings obtainable. By carefully positioning the microphone, a windshield will probably not be necessary. The great danger lies, of course, in the fact that the microphone and its cable will be in very close proximity to the rapidly revolving propeller shaft and quite unexpectedly violently moving back axle, this back axle "working" occurring even on a seemingly smooth road. By using this method of recording, minor body squeaks and rattles are of no import as they are not picked up, but loose bumper bolts, spring shackles and transmission clonks will be picked up and exaggerated. Adding patches of gravel surface, and some changing up and down of the gears, as if for cornering, will give variety to the constant running sound and add interest as also will some occasional nifty double declutching.

Work out a Code of Signals

When recording in this manner, care should be taken not to distract the driver in any way during the run; and to this end, a simple signal code should be adopted to give him his instructions when to start and stop. One tap on the shoulder to start and two taps on the shoulder to stop are all that are required, it being understood that these signals are for him to start or stop when he is satisfied it is safe to do so. And the recordist must keep his eyes glued to the hand holding the microphone and make sure it doesn't descend too far into the inspection aperture. Levels can be approximately taken before moving off by starting and revving the engine and this will also be the time to find out if static and splash from the ignition is going to be a nuisance.

This ignition bother is seemingly quite unpredictable. I have had two identical cars out, both fully suppressed. Number one proved impossible to record, no matter what was done to suppress it and number two gave no trouble at all, even with suppressors removed! Moving the recorder from one side of the car to another sometimes helps, as does shortening or lengthening the microphone cable. Earthing the recorder to the car chassis or dangling an earth wire on to the road can be tried, but if these fail on Recording Method No. 1, then you might consider trying Method No. 2.

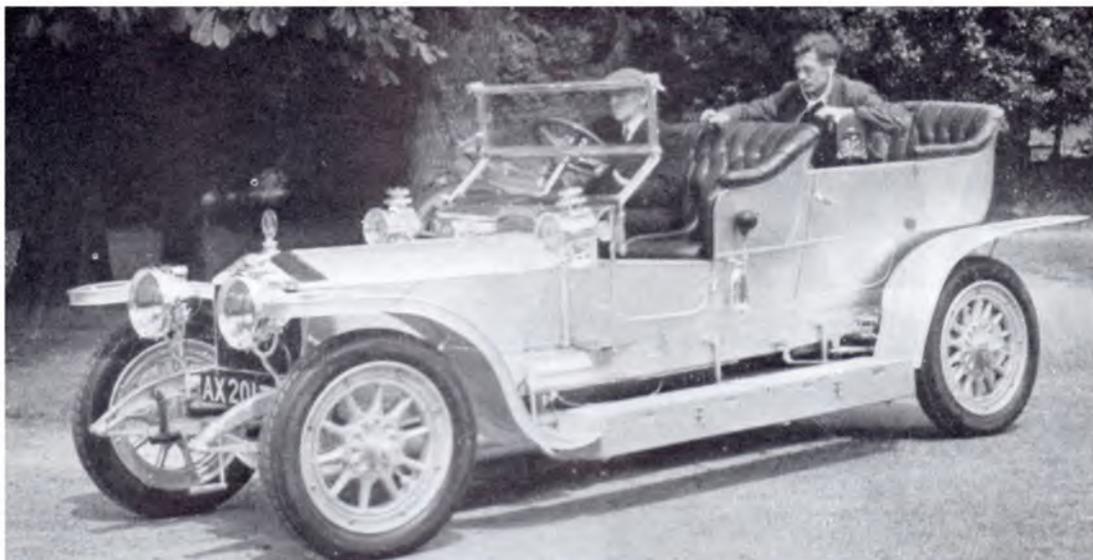
Carbon Monoxide

The second method of recording cars can be dicey, so do consider the pros and cons carefully before embarking on it. The idea is still to get a recording giving a good impression of a car starting, gear changing, running and stopping and involves putting yourself in the luggage boot with the recording gear, the boot lid, in the case of downward closing lids, closed all but four or five inches. In most modern cars, the boot is quite large enough to curl up inside, and a few cushions or an old eiderdown will make it tolerably comfortable and can help to cushion the gear.

By lying facing the rear, with the boot lid propped slightly open on one knee, the microphone can be held, facing to the rear, just by the opening, above the exhaust pipe position. Assuming you wedge yourself cosily in, the great danger with this procedure lies in the exhaust fumes being sucked into the boot when the car is in motion, especially on the over-run, and they are nauseating at the very least. It is essential, therefore, that firstly, a positive signalling system with the driver must be devised and secondly, only short runs of two or three hundred yards or so should be attempted initially until you have found out what is involved.

Car exhaust fumes are most unpleasant and disagreeable, but if ever I am lucky enough to find a car using CASTROL R, I will sniff it all day!! An important point here for the driver to decide is whether

● *This magnificent veteran, a Rolls Royce of 1907 vintage, can teach every "modern" a lot of lessons when it comes to quality and finish—and not a few would smell its dust! The author is in the back with mike and ear-phones.*



or not the quite considerable load in the boot upsets the handling qualities of the car too much. It is bound to affect the steering and braking to quite a degree, although this effect can be reduced by a passenger or ballast in the front passenger seat.

The Real Old Cars

And now, with all due respects to the modern car, some notes on recording the cars of yesterday, and long may they be with us. Most vintage and post vintage cars I have recorded have been open cars and have had magneto ignition and, with a suppressor fitted on each plug, I have been lucky enough never to have had bother with interference. With machine and operator installed on the back seat and the microphone held facing down and backwards over the back under the bulge of the folded hood, out of the wind, the burble of the exhaust comes over beautifully. The gearbox is almost bound to be somewhat obvious and I have found this microphone position to be the kindest to it. There are still many Coventry Rileys about and one I found, a 1929-30 Monaco Saloon proved particularly good. Those old coachbuilt fabric bodies are very rattle free, and, by removing the back of the back seat, emptying the boot of tools and cans and strapping the boot lid partly open, the recording was simple and effective.

The tunes that were played on the crash type gearbox coupled with the exhaust crackle made a really nice recording with character. It is, of course, quite possible to record from the front passenger seat position, subject to ignition interference being overcome. The gears and gear changing come through fine if the microphone is held facing downwards towards the gearbox, but you'll lose the exhaust note and once you have reached top gear, the sound becomes most disappointing.

Modern Sports Cars

Similar methods to those used for old cars are also successfully employed when recording modern open sports cars, but as most of these are two seaters, leaning over the back becomes difficult. I had a T.R.3 out where the luggage boot method was used, but with this car and others of similar type, really first class results are obtainable with the recording operator sitting in the passenger seat, the microphone being held facing towards the rear of the car, low down immediately behind the passenger door which is fixed open on a safety strap about three or four inches. This can only be done, of course, with a rearward opening door. The door makes a fine wind break, and on such short wheel base cars, the exhaust is near enough to be heard together with the gearbox. And what a fine mournful note it is too!

Motorcycles

To make a recording of a motorcycle, it must of course, be fitted with a sidecar. The biggest obstacle to overcome will be space for the recorder and power supply, but once these problems are solved recording is usually straightforward. The microphone should be

held, again facing rearwards and downwards, by the offside open window out of the slipstream. Modern motorcycles make plenty of good noise without much encouragement, although I still hanker after a chance to record a Sunbeam Model 95 or an old E.S. 2 Norton.

The Open Road

The conditions for recording cars starting, stopping and approaching and passing from a static position beside the road are the same whether vintage or modern, but here the old trouble of extraneous sounds comes to the fore. Whereas, when recording in a car in motion they are not very troublesome, outside they are a real problem. I usually look round for a nice straight piece of little used "B" class road right out in the country somewhere, as far away as possible from houses. If the road is in open country with a slight incline, so much the better. The best weather conditions, I have found, are when it is cold, very still and frosty and usually the best hours are between 9 p.m. and 2 a.m. Try to position yourself and equipment about eight feet back from the road and do your recordings in sequence, starting with a start up and tick over, switch off. Then start up, drive away and then on to approaches and passes at various speeds, then approaching, stopping and switching off. The reason I like an incline is that then, when the car is passing the recording point, instead of cruising along effortlessly and nearly noiselessly, the engine is "working" and there is a better impression of movement.

Don't interfere with the Driver!

When doing these recordings, the driver of the car must be briefed beforehand as to what is wanted and signals to him should be avoided so as not to distract his attention from his job of driving. Points can be checked with him after each stop and switch off and fresh instructions given. To save tape, after each run by, the driver can signal with his headlamps just as he is about to make a run up to or past the recording point. For all these recordings, I advocate holding the microphone in the hand. It lessens the risk of damage to the microphone and by wrist action alone, the microphone can be turned to favour or follow a sound. A firm positive grip is needed, and any movement of the fingers whilst recording must be avoided. And whilst on the subject of movement do keep quite still, especially feet, during recording. It is very irritating to have slight crunching of gravel, etc., during an otherwise flawless recording.

I will conclude this month's article with a note on horns. Remember, it is an offence to sound a horn when the car is stationary! I do not wish to be blamed for any trouble later on! Also car horns may not be sounded at all after a certain time at night, I believe it is about 11 p.m. But for just one go, you might get the driver to blow up when approaching and passing, holding it until well past. That is an exciting noise!

*The next article in this series will cover Aeroplanes and atmosphere recordings.

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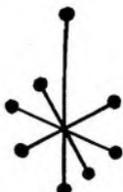
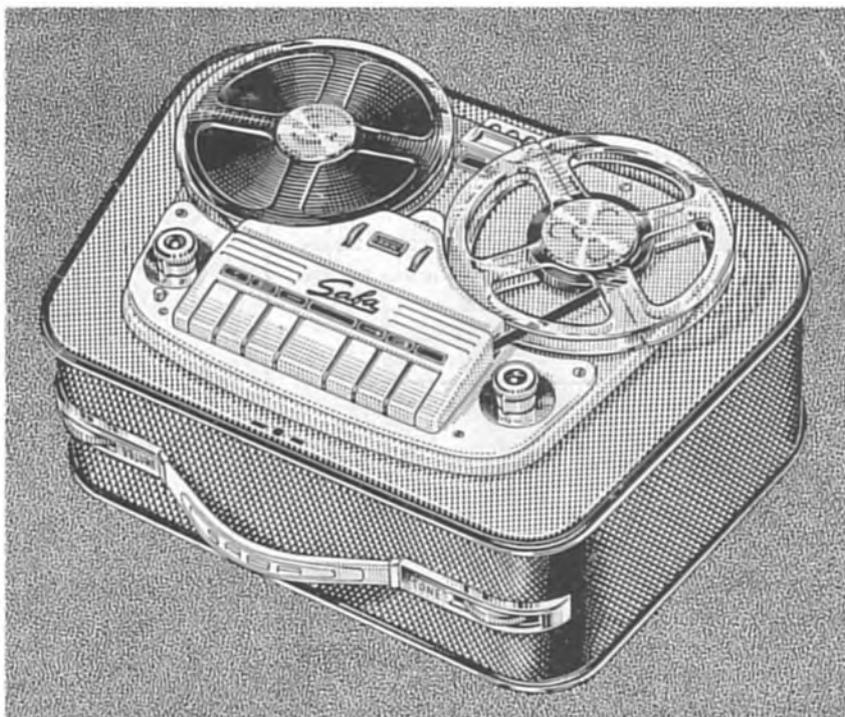
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TAKING UP TAPE

★ In the previous two issues we have discussed the choosing of a tape recorder, and the special language of tape recording firstly as applied to microphone recording. This instalment deals with the methods of taping from radio and disc.

LAST month we began a survey of the terminology of tape recording. The method we have adopted is to describe the various functions of a tape recorder, deliberately introducing and defining as many as possible of the technical and practical terms as we go along. We studied first the links in the recording chain, working back from the tape with its iron oxide coating, through the ring-shaped electromagnet which is the recording head, and the record amplifier.

Recording Without a Microphone

Recording from other sources than the microphone will not usually require such a large degree of amplification and most recorders therefore possess an auxiliary input socket labelled *Radio, Line, High Level Input*, etc. The simplest method for recording radio programmes is via the External Loudspeaker sockets, found on nearly all sets. Of course you can dangle the microphone in front of the radio, but I don't recommend this for serious recording as you will pick up all sorts of extraneous noises, not to mention that the quality is almost bound to suffer in transit through loudspeaker and microphone!

When recording from the *Ext. L/S* sockets, use a length of ordinary twin wire or flex. Screened cable is *not* necessary. When you have plugged in, proceed as follows:—

(1.) Adjust volume control of radio to a comfortable listening level. (2.) Find the correct setting of the recorder gain control, either by making a few trial recordings, or by watching the pre-monitor meter, if you possess one. (3.) Set the tape to the point at which you want to begin the recording—making a note of the reading of your position indicator or digit counter etc. If your machine has no indication of the tape position, you can tuck a small piece of paper under the first turn of tape on the take-up spool, or mark the place with a chinagraph pencil or small piece of jointing tape. (4.) When the item you wish to record comes along, start recording. You

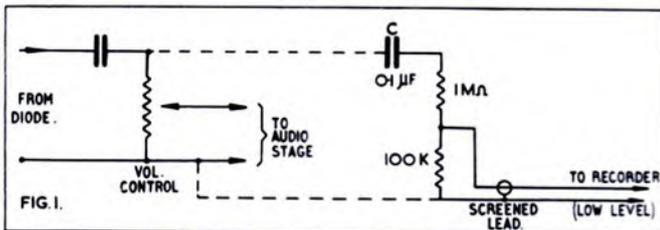
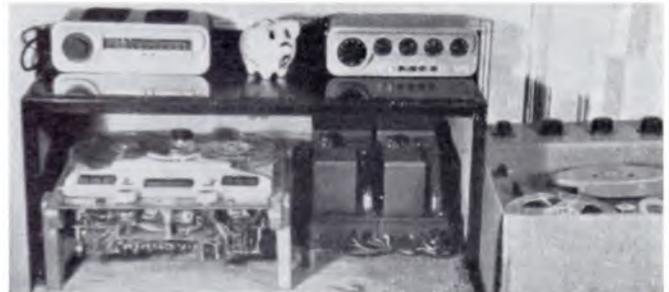


Fig. 1. Recording from the diode connection of the volume control, so as to by-pass the output stage. A 1 MΩ volume control might be substituted for the two resistors.

must anticipate by a few seconds, of course, to allow time for the tape to attain its correct speed before the programme begins. Some recorders have a "pause" control which removes the drive from the tape, while the capstan continues to turn, and with a bit of practice you can hold this device and get a quicker cue on the tape. The pause control is useful too for cutting out announcements or other unwanted material during the broadcast, when stopping and restarting might just miss the cue. (5.) At the end of the required item, fade out the recorder gain control and switch off. This makes a neater ending than switching off abruptly, and should avoid putting a loud click on the tape.

Taping your Gramophone Records

Recording via the External Loudspeaker sockets of your radio will cope also with the "dubbing", i.e. copying, of gramophone records, if your record player is normally fed into the radio—perhaps



The enthusiast whose equipment is shown here is able to record from radio or disc. Stereo record/playback is also possible using the stereo tape machine on the right, and the record player (not shown).

into special "Pickup" terminals. Or you may possess a record player with built-in amplifier, and "Ext. L/S" sockets of its own, for connecting to your recorder. In either case, you should follow the steps outlined above, including a preliminary level test to ensure that the volume settings are right.

Readers who possess a proper hi-fi control unit, with independent control of bass and treble, plus a choice of record equalisation characteristics and filters, will naturally carry out a trial recording. By careful setting of the controls, it is possible to record each disc so that it is reproduced from the tape to best advantage without further equalisation. Even if you possess only an elementary tone control—which functions by progressively suppressing the high frequencies—it is worthwhile experimenting a bit prior to recording.

What is the Best Recording Speed?

Another decision that has to be taken, is the best recording speed to use for taping radio or disc. From the economy point of view, the slowest speed is obviously the best choice. But, at least until recently, the quality of recording at 3 3/4 i/s was not really good enough for music. The greater demands of music reproduction in terms of wide frequency range, and speed constancy on sustained notes, meant that 7 1/2 i/s or even 15 i/s was necessary.

Tape recorder design has now advanced so that the 3 3/4 i/s speed is capable of as good quality as 7 1/2 i/s previously, and you may indeed find that this speed is satisfactory for your discs.

Some time ago I was faced with the well known domestic situation of being firm about the family's hoarding of old 78 r.p.m. gramophone records. On looking at the response curves of my recorder for 3 3/4 i/s—as reviewed in a back number of *Hi-Fi News*—I saw that although its response fell off drastically at high frequencies, it would probably be just right for the job. Accordingly, we spent an extremely enjoyable weekend taping 78 discs. We found that on all but a few of the records a filter setting of 10 Kc/s was advantageous, but that little or no additional top cut was necessary.

The family vote was that the recordings *sounded better* from the tape, and with an hour's music on each track—Heddle Nash, Glasgow Orpheus Choir, Jan van der Gucht, on the vocal tracks; Furtwängler, Cortot, Benny Goodman, on the instrumental tracks—we had a neatly labelled 7 in. tape box instead of a dozen and a half heavy brittle records.

By-passing the Audio Amplifier

Where the best quality of recording is important, it is advisable to derive the signal from as early a point in the radio circuit as possible. Using the External L/S sockets as described above is beautifully simple, *(continued overleaf)*

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TAKING UP TAPE—(continued)

out has the disadvantage that the programme has passed through the output valves of the receiver only to be dropped down again, and 'mismatched' at the input to the recorder. This can be avoided by picking up the signal at the earliest possible stage, namely across the volume control itself. This is usually at the output of the detector valve—"the Diode"—and an arrangement such as that shown in fig. 1 will usually give very good results. Fortunately, radiograms, and the 'pickup' sockets of radios, usually inject the gramophone feed just prior to the volume control, so this connection copes with disc and radio recordings simultaneously.

It is doubly useful that the volume setting on the radio loudspeaker can then be set independently of the recording level or turned down altogether during recording.

The Copyright Situation

It would be very wrong to describe procedures for recording radio programmes and gramophone records without giving a word of warning on the question of copyright. The Acts, which are designed to protect authors and artists, are the Copyright Act 1956 and the Dramatic and Musical Performers' Protection Act 1925.

We shall not attempt to summarise these here, but would strongly advise everyone who records at home to study them carefully. Both may be obtained from H.M. Stationery Office. Strictly speaking it is an infringement of copyright to record any copyright material without the owner's consent. And even though it is permissible to record B.B.C. and I.T.A. programmes for private use, this does not include any copyright material in the programmes. Thus you may be breaking the law without knowing it. Most important of course is that you should not engage in public performances or playbacks of copied material.

The Playback Chain

As the tape passes over the playback head, the magnetic recorded signal is "scanned" by the head. The nature of the recorded signal, as we said last month, is a succession of magnetised states. The alternating current of the original signal produced—at the time of recording—an alternating magnetic force, fore and aft across the recording head gap, the polarity or "sense" of which changed as the direction of the current alternated. It is the instantaneous value of this magnetising force which is recorded on the tape, and to which the playback head is sensitive.

An unrecorded tape induces no signal in the playback head coils, except that the random distribution of the magnetic particles gives rise to background noise or hiss.

Considering a tape speed of $7\frac{1}{2}$ i/s, and a signal at 750 vibrations or cycles per second, we should have 100 cycles recorded on each inch of tape. This means that each cycle—i.e. each complete current swing positive and negative—occupies $1/100$ th inch. By similar reasoning, it follows that 1 cycle will take up 0.1 and 0.001 in. at frequencies of 75 and 7,500 c/s respectively. The name for the distance occupied by 1 cycle is the wavelength.

In other words, therefore, the recorded wavelength at a tape speed of $7\frac{1}{2}$ i/s falls from 0.1 in. at 75 c/s to 0.001 in. (one "thou") at 7,500 c/s. The wavelength corresponding to a frequency of 75,000 c/s—which is the order of frequency used for the erase and bias voltages—is 0.0001 in. This is too small for the gap and the playback head to scan, even if we could hear sounds above 20,000 c/s, which we cannot.

Indeed, we must expect some loss of sensitivity even at 7,500 c/s with the standard head gap of 0.0007 in. The position is a little better at the faster tape speed of 15 i/s, where all the recorded wavelengths are doubled, and a little worse at $3\frac{1}{2}$ i/s. This is the biggest factor explaining the need for pre-emphasis of high frequencies in recording, and why is it that more top lift is necessary at the lower recording speeds.

Next month we shall deal with tape recorder output connections, and the transport mechanism.

SUBSCRIPTION RATES

The subscription rate to *The Tape Recorder* is 21/- per annum (U.S.A. \$3.00) from The Tape Recorder, 99 Mortimer Street, London, W.1. Subscription + Index, 24/- (U.S.A. \$3.25).

WHAT DO THESE THINGS MEAN TO YOU?

(3) HUM and NOISE

MOST people, who refer to a manufacturer's specification before buying a tape recorder, seem to concentrate on the magic item "Frequency Response." This was the subject of the first article in this series, and there is no point in returning to it, except for the purpose of emphasizing that Frequency Response can well be the least important item in the spec. It does, of course, depend very largely upon the main use to which the instrument is to be put; but taken by and large, it is still well down the list. For instance, a good *wow and flutter* figure (dealt with last month) is infinitely more important than a fantastic frequency response, for all normal uses.

Let us have a quick look at the essentials of a useful and reliable tape recorder. Good mechanics, with particular emphasis on brakes: good quality recording and reproduction of everyday sounds and everyday music; simplicity of operation; maximum facilities, up to the limit of not interfering with the last item.

The mechanics will be dealt with in a later chapter; so will the facilities. Under the item "good quality recording and reproduction" must be listed the following sub-headings. **Wow and Flutter: Hum and Noise and Distortion: Frequency Response.** If the first two of these factors are bad—or if only one of them (either one) is bad—the quality can never be good. But if the frequency response is not so expansive as one might like it to be, the quality can still be excellent to all normal ears, judging by all normal standards. Putting it even more simply, it is infinitely more pleasant to listen to a piece of music, cleanly recorded, but lacking a bit in top and bass, than it is to listen to the same piece of music with everything—from organ pedal to bat-squeak thrown in—plus a noisy background, plus wavery notes and throaty voices.

The Two Freedoms

Therefore, with that fact well in mind, it should be apparent that the important thing to concentrate upon is *best possible quality over the most useful range*. And so we come to "clean backgrounds"; and the essentials are freedom from hum, and freedom from noise, and minimum distortion. First things first, what is hum?

Hum, in terms that everyone will know and understand, is the noise created by the A.C. electricity supply, if that A.C. voltage is not properly suppressed. It can be heard, in greater or lesser degree, from the loudspeakers of nearly every radio set in the low price range, and from far too many in the higher price bracket. It is not noticed nearly as much as it should be, for the simple reason that (a) we are conditioned to it, and (b) we do not listen to it consciously when it is present in the reproduced music from radio and discs. But, turn up the wick when there is no music. And, enough said!

There is a danger of hum trouble in any piece of electronic equipment which is mains operated. This is obvious, for the mains themselves carry it to the instrument. Once there, hum can be present in the circuits where it has no rightful place, as a result of one of two (or both) causes. (a) It can be that the manufacturer has not paid enough attention to the business of suppressing it, and (b) it can creep in, by radiation, or careless connection and wiring, from other apparatus or accessories. Not all hum is the now familiar 50 c/s mains hum; occasionally it is a multiplication of that figure, and sometimes it is the sum of—or difference between—mains hum and some other frequency. However, for the purpose of this essay, let us assume that "hum" means *mains hum*. It makes life easier!

Hum—Tape's Worst Enemy

Hum is undoubtedly the biggest bugbear of the tape recorder maker and/or user—it is far more troublesome with tape electronics than it is when associated with disc and radio. The reason for this is that the tape signal—the magnetically recorded trace on the tape, as reproduced—is of a very low voltage (perhaps one thousandth part of

one volt, average), whereas the hum voltage, ex mains, can easily become present at even greater level than the signal.

In theory there is no excuse at all for any hum to be present in the electronics of a tape recorder when it leaves the factory; but people want to spend as little money as possible, and suppressing hum costs money. Between these two opposing factors there is a happy medium; and provided that the manufacturer is conscientious in delivering good value for money, the hum level of a good quality domestic tape recorder should not be noticeable.

Hum can be allowed to creep in (by the manufacturer) through insufficient attention to positioning of components, or through bad smoothing circuitry, with cheaper-than-should-be bits and pieces. The motors radiate fairly strong electro-magnetic fields: so can the mains transformer, etc. And if these radiators are badly placed, with reference to the tape heads, the latter will act as "radio receivers", and pick it up. Hum can be introduced by the user through improper "earthing" of equipment, through imperfectly screened leads (microphone, etc.), or even through wires to other equipment being allowed to lie too near to the deck. Hum can appear in an "old-faithful" as a result of ageing components (electrolytic condensers, or valves with sagging electrodes, etc.). But, however it comes, it is a curse.

... and Noise Comes a good Second

Noise, as distinct from hum, can be a mixture of many things; and most predominant is the "mush" that sometimes sweeps from the speaker like a water tap turned on, or a gust of wind. Noise can include clicks, pops, splutterings, hissings, buzzings and even a rhythmic rumble (from motors). Noise can be present without hum, and vice-versa; but usually the two are to be found together in unworthy equipment. Noise is generated in the instrument itself, and is *not* mains-borne. Its causes are as numerous as its forms—anything from a "dry" soldered joint to an imperfectly seated valve, or a badly fitting plug, can cause one, two or a combination of noises.

In makers' specifications, references to the two are often found together. Sometimes they go hand-in-hand, referred to in the item "*Signal-to-noise Ratio*". Again, look for "*Hum and Noise better than . . .*". After the latter will occur a figure, and the expression dB. Let us say the spec. reads "Hum and Noise better than 50 dB", and see what this tells us. A decibel is too awkward a term to describe here; so consider it as a unit of comparison. The human ear is said to be incapable of detecting a *change in noise level* if it is less than 3 dB. If two items are recorded on the same tape at the same time—the main item at loudness level "X", and the secondary item at a loudness level of 50 dB more quiet (i.e. -50 dB)—then item 2 will be quite inaudible against the noise of item 1. Now think in terms of item 1 as the music, and item 2 as the hum and noise. If the spec. says *better than 50 dB*, it means that the loudness level of the H & N is even softer than 50 dB below the music.

In actual practice (provided that the machine lives up to its spec.), a figure of 50 dB is very good for a tape recorder. At 40 dB the results will be very acceptable.

There is another way of looking at this matter, however. Even if the hum and noise level (item 1) is so far below the level of the recorded music that the ear cannot hear it, *any appreciable hum must be cutting up all the recorded frequencies that make up the music*. Hum must *not* be audible, even when there is no music! So try this simple test when you go to listen to the tape recorder of your initial choice. Remove the recorded tape. Start the recorder, on *replay*, and turn up the volume. Turn it right up. Then turn it back to the level at which the hum and noise seem reasonably acceptable. Then, leaving the setting at that point, replace the recorded tape, and play it. In the long run, your ears must be the judge of what you buy and use. However nice a good-looking set of specification figures may appear, you have got to live with the actual performance.



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When recording from a large area source such as a choir, orchestra, or family group, it is possible to pick-up the whole group with a single uni-directional microphone. This will, however, result in a badly balanced recording. One section of the group perhaps being too predominant in the record. To correct for this two or three microphones should be used, each microphone being fed to a separate input on the mixer unit. The output is then monitored and the controls on the front adjusted until each section is heard at the required level.

Another case which is normally impossible to record satisfactorily is the vocalist singing to a piano, or in fact any instrument or group of instruments. The problem here is that if a single microphone is used the piano will drown the singer if the microphone is any distance from the voice source. Furthermore if the microphone is closer to the piano than to the singer the sources must reach the microphone at different times resulting in a disjointed performance. This problem is solved by using two of the three available channels on the mixer, the third channel being ignored. One microphone is placed as near as possible to the vocalist and the other is placed near the piano. Then, by monitoring the output, the unit may be adjusted until just the right ratio is obtained.

In conferences, where contributions from many people are to be recorded, three omni-directional microphones should be used positioned so as to cover the entire area. The mixer may then be adjusted so that wherever a person speaks the signal fed to the recorder will be constant. A similar method should be employed for recording a play.

Thus, whenever more than one microphone is used, or when a microphone is to be used in conjunction with a radio tuner or record player, the TSL UNIVERSAL MIXER UNIT is a necessity, especially when a spoken commentary is required to be superimposed between musical or other items.

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IF you own a tape recorder—if you are interested in the possibilities of making music, or musical or rhythmic patterns, from strange or everyday sounds—then here is a brand new hobby for you, and also an opportunity for winning a valuable prize which may help you to secure still more enjoyment in this fascinating field.

The rules of this competition will be simple to follow and clearly defined. They will be so framed that the contestant with one tape recorder, plus ingenuity, will have (in that particular class) an equal chance against a group entry, with possible access to a battery of machines and equipment (in another class). The required product will be something well within the capabilities of anyone who possesses the aptitude, the enthusiasm and "the flair". It will require an outlay that can be measured in shillings.

We are giving no further clues at this stage; but if you are going to be interested, our tip is: get to know your recorder thoroughly—find out, in terms of length and time, how much tape passes the heads at different speeds—become familiar with recording levels—practice cutting and joining—practice dubbing, re-recording—in short, get to know the possibilities of your recorder, and regard it as an instrument of many possibilities, and not merely as a handsome box of tricks for home entertainment.

The New Music

Music, as we know it, is produced by musical instruments, such as trumpets, violins and drums. It is blown, plucked, scraped or banged. It has been that way for countless centuries. True, in more recent times there has been an invasion by many quite "unconventional instruments" into what we call "conventional music"—as for instance washing boards, saws and even sandpaper; but if we lump together all classes of music—Classical, Jazz and Pops—and think of the lot as "conventional music", regardless of what new media are introduced for producing it, we are able to make a clearer distinction between it and something quite new—no more than ten years old, to be accurate; and this, for want of a better name, has been called (in France, where it originated) *Musique Concrète*, and (in America and England and elsewhere) *Electro-Phonic Music*, *Radiophonic Music*, *Artificial Music*, *Synthetic Music*, and so on.

As was to be expected, when *Musique Concrète* was first discussed, and even when it was first heard, it was derided by the multitudes. But today there are already tens of thousands of people who listen to it, and like it, without fully appreciating what it is that they are hearing; and this, surely, is one of the strongest points in its favour. It is our firm belief that this new form of music has a truly enormous future. How, where, and in what setting, we would be presumptuous to suggest. Certainly not on the concert platforms of the musical centres in the predictable future!

Regardless of its main future, commercial or otherwise, the New Music is a ready-made and completely fascinating new hobby with, literally, almost limitless possibilities, for young or old alike. It is because of this that we have decided to open the Competition, as described briefly in the opening paragraphs of this page. As with any hobby, the pleasure to be derived from it must depend primarily upon one's liking for it; after that, success with it must depend upon individual aptitude and ingenuity. So far as equipment is concerned,

anyone with any tape recorder can take it up immediately. Finally, in terms of cost, the outlay can be limited to a few spools of tape per annum, depending only upon the desire to use much or little.

To make any "music", conventional or otherwise, one must have access to a source of sounds. To make this New Music, the basic sounds are already in existence—all around us, everywhere. They are to be found in the realms of nature—in the plop of raindrops, the buzzing of a bluebottle, the rustling of leaves, or the voices of animals; they are with us in mechanisation—the squeal of car brakes, the rhythmic clatter of train wheels, the bite of a circular saw; they exist with such everyday things as church bells, recorded music (played backwards or forwards at different speeds), snatches of conversation, tinkling glasses, spinning coins or penny whistles (now probably 8½d. including P.T.).

Readers who want to hear a bit more about this New Music—and to learn how some of it is created—are recommended to listen to the BBC programme "Sound", which is broadcast every Monday evening on Network Three at 6.45 p.m. In this magazine, too, we shall shortly be publishing some useful articles on the subject, written by some of the most experienced enthusiasts.

Given the skill, there is truly no limit to the extent to which this New Music could be developed. It could even be cast, with all its unconventional sounds, into the conventional form of a symphony or a concerto. In its simplest forms, produced with the use of a single tape recorder, it can take shape as short lengths of pleasing rhythms and tunes. And because of this very big gulf—between the simplest and the most complex—we have decided to frame the competition so as to make it equally fair to all. And, at the time of judging, only originality and good work will count.

Open to all . . . Details next month.

In our next number (dated May) full details of the outline of the competition will be given; and in our June number we intend to follow up this announcement with final rules, details of entry and closing date, and precise briefing for entrants.

Unlike any other tape competitions so far organised, this New Music competition will be open to everyone in any part of the world, and entrants may be individual tape enthusiasts, beginners or experts, of any age, or groups of people, such as schools or clubs. There will be no entry fee.

We do, however, add one timely warning. Readers are most strongly urged to place firm orders for this magazine with their suppliers. Widely as it is distributed, "The Tape Recorder" is still too young to have found its way into all its possible outlets, and each week we receive hundreds of letters from people who have "just missed the last copy in the shop". To the best of our ability we have made provision for these "extra copies", but it is impossible for us to forecast each next-month's demand. Already, after two months' experience, we have found it necessary to print ten thousand copies more than we planned for, per month. So, to avoid personal disappointment, place a firm order . . . or, if you prefer to receive your copies direct, enter your subscription with this editorial office (The Tape Recorder, Subscriptions Dept., 99 Mortimer Street, London, W.1.). The annual subscription rate is 21s., or 24s. with annual index.

YOUR LOCAL CLUB? (3)

The Rugby Amateur Tape Recording Society

MIKE BROWN, the Secretary, formed the Rugby Amateur Tape Recording Society in May 1958. Their first open meeting was held in June of that year, and since then meetings have been held every month at the local C.D. Headquarters, the Gatehouse, North Street, Rugby, by kind permission of the Civil Defence Officer. Before long members wanted more frequent meetings and these are now held every three weeks, usually on a Thursday night at 7.30 p.m.

Back in December Mr. John Campden started the local Hospital Recording Service at St. Cross Hospital, Rugby. By this means they



Photograph taken during the recent feature "On the Spot" shows left to right: Mr. J. O. Bannister (Chairman), Mr. Hedley Fishlock, Mr. Ray Fishlock, Mr. S. S. Fishlock (President), Mrs. Adamson (daughter), Mrs. S. S. Fishlock, Major R. Burns, Commandant Salvation Army, Rugby.

link up patients with relatives or friends on tape anywhere in the world—free of charge. They use W.T.B., B.T.R.S. and Voicepondents Directories to assist in the contact, in the appropriate town or country. They correspond with Norwich and Leicester Clubs on tape, and visit the local clubs from time to time.

For club nights each member in turn is invited to prepare an item of up to half an hour of material of his own choice suitable for club audience. They are setting up a fund for their own premises whereby they can build their own studio and store and purchase equipment for the general use of members. Future plans include, possibly, an educational series of talks followed up by visits to places of mutual interest, they hope to join an ATV (Birmingham) Sunday afternoon show in April (as audience). Members will be asked to make up tapes on their holidays, and this will form the basis of a series of programmes.

The last Club Night was March 12th when the main item was the recording of short talks given to members by representatives of the Fire, Police and Ambulance services. Members then "threw" questions at the panel. Representatives of all the local clubs were invited to make their own recordings for the Rugby Tape Library.

Those interested write to Mr. M. Brown, 219 Clifton Road, Rugby.

CLUB ROUNDOABOUT—

- **British Tape Recording Society.** B.T.R.S. wish it to be noted that they have no connection whatsoever with the Midlands Counties Tape Society which is now known as: The Tape Recording Society (of Great Britain). "All about Tape on Tape" and "How's your Hearing?" have been received from America and placed in their Tape Library, instruction books are available also; and there is no dubbing fee for the loan of either but return postage must be paid on members' and Clubs' own tapes.
- **Federation of British Tape Recording Clubs.** The Secretary, Mr. Roy Penfold, has received a request from a married woman in Germany, aged 28 years, with a daughter of 4 months, to exchange tapes with an English woman with children in this country to enable her to improve her knowledge of the English language. If any readers would like to exchange tapes with her, please contact Mr. R. Penfold, 48 Holbrook Lane, Coventry, direct, and he will be pleased to pass on her name and address.
- **Birmingham.** The Birmingham Tape Club is soon to be under way, anyone interested please contact Mr. Dennis Osborne, 75 Millmead Road, California, Birmingham, 32.
- **Coventry.** The meeting held on the 5th February proved to be the most crowded since the Club came into existence. The Competition

TAPE CLUBS

Notes and News

for the 5-in. tape came to a thrilling climax, but was yet again a tie. So the 5-in. tape was split and Mr. Freer and Mr. Marston each received a 3-in. tape. Mr. R. Penfold gave a demonstration of his Boosey & Hawkes portable battery recorder. Tapes played included one Roy Reynolds had received from the U.S.A. demonstrating present day recording techniques with the one used way back in the 1920s. Two new members joined the Club. At the meeting on the 18th February a film show was given, by Mr. Wheatley.

● **Kettering.** There were fourteen members at the meeting held on the 11th February. The main event of the evening was the playing of the American production tape "About Tape, on Tape". Tickets were distributed to all members for the forthcoming demonstration by M.S.S. in the Basket Lounge of the George Hotel on Wednesday, March 18th.

At their meeting on February 25th they enrolled their first lady member bringing the membership up to seventeen. Plans were announced for a possible club recording later in the year telling the story of the Kettering Fire Brigade.

Details of future meetings can be obtained from the Secretary: Mr. A. M. Webb, 93 Regent Street, Kettering, Northants.

● **Leicester.** Leicester Tape Club held their inaugural meeting on January 30th and twenty people were present. Greetings tapes were received from Rugby, Bristol and the Chairman of F.B.T.R. The last meeting was held on February 20th. Particulars from: Secretary, Peter J. Starie, 56 Minehead Street, Leicester.

● **The London Tape-Recording Club** enjoyed a tape "Quiz" provided by their Secretary at their February meeting. They are interested to hear if any of their members have any period music of the Seventeenth Century to be used as background music for their Spring Fair to be held on the 18th of April, 1959.

● **Tape Programmes for the Blind.** In November 1957 Maurice L. Chambers of 139 Goldthorne Avenue, Sheldon, Birmingham, 26, decided, having purchased his first tape recorder, to make a number of recordings of interest and to place these at the disposal of any blind person anywhere who owned or who had access to a tape recorder. The title "Tape Programmes for the Blind" was decided as the most appropriate. This has proved a great success, and any Tape Recordists who are sincerely interested in this form of tape exchange and who would like to contact any of these people, are invited to get in touch with Mr. Maurice Chambers at the address stated and he will be only too pleased to assist in the expansion of this scheme. Teenagers are particularly welcome.

● **Tape Respondents International.** T.R.I. have just appointed Mr. Robert Ellis, Schoolhouse, Whitesome, By Duns, Berwickshire, to be their British Representative. Mr. Ellis took over his new duties on 1st February.

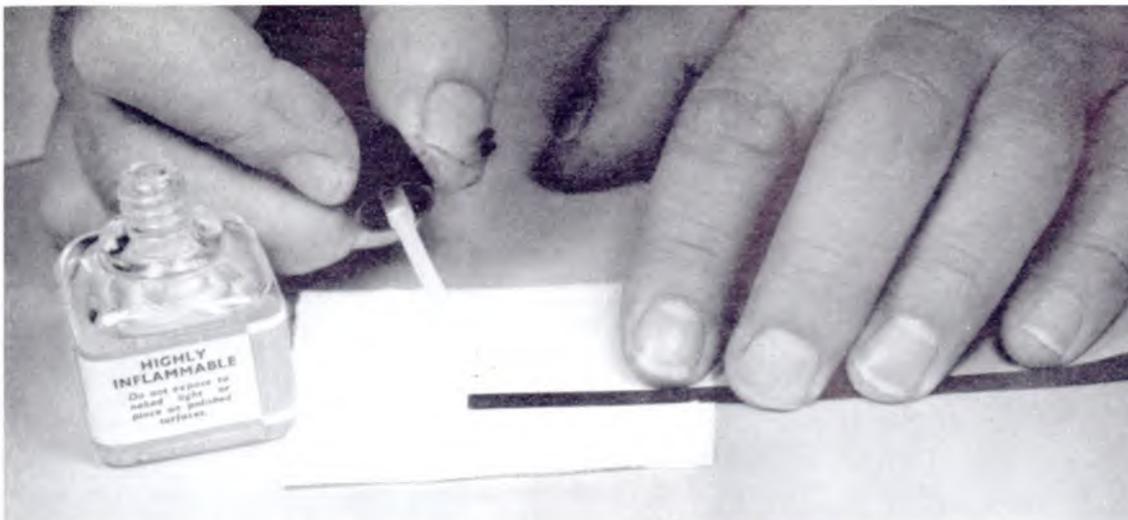
● **Ulster Amateur Tape Recording Society.** On Thursday the 12th February the Club had a most interesting evening. Mr. P. Thompson, Studio Manager of the BBC, gave a talk on the Technique of Recording. They have produced a new magazine called "The Evergreen", this is produced for old Peoples' Homes in Belfast. Secretary: W. J. Scott, 41 Haypark Avenue, Belfast.

● **World Tape Pals.** Final arrangements have now been made for the WTP Jamboree. This is to be held in Schliersee near Munich, Bavaria, from June 20th to July 5th. The Jamboree is open to anyone interested in promoting world peace by means of the free interchange of ideas and views on magnetic tape. For information contact Mr. Dennis Cooper, 14 Guilford Street London, W.C.1.

● **Edinburgh.** On February 17th Sir Mark Dalrymple, Bt., demonstrated his own special equipment. He played a most interesting tape of the Hindenburg Airship Disaster, not the one which is more often heard where the commentator burst into tears.

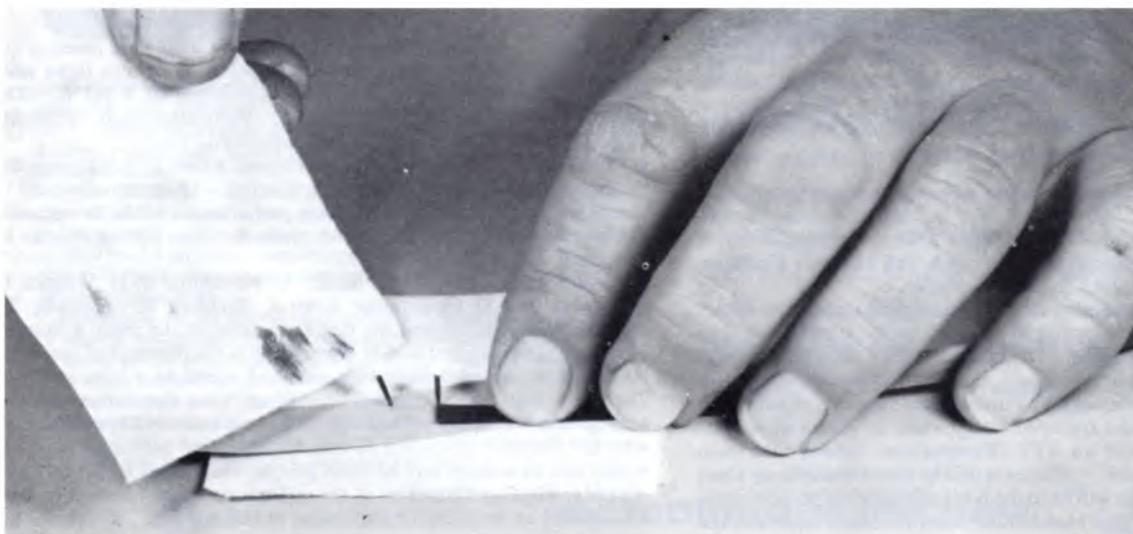
Apologies to their Secretary whose name is, of course, Mr. John F. Penman not Tenman. For details of future meetings, etc., write to Mr. Penman at 22 Lauriston Place, Edinburgh, 3.

● **The Federation of British Tape Recording Clubs** is to sponsor a Club covering the following areas: Chingford, Walthamstow, Leyton, Leytonstone and Woodford. For details please contact Mr. W. J. Tomlinson, 62 Beacontree Avenue, Walthamstow, E.17.



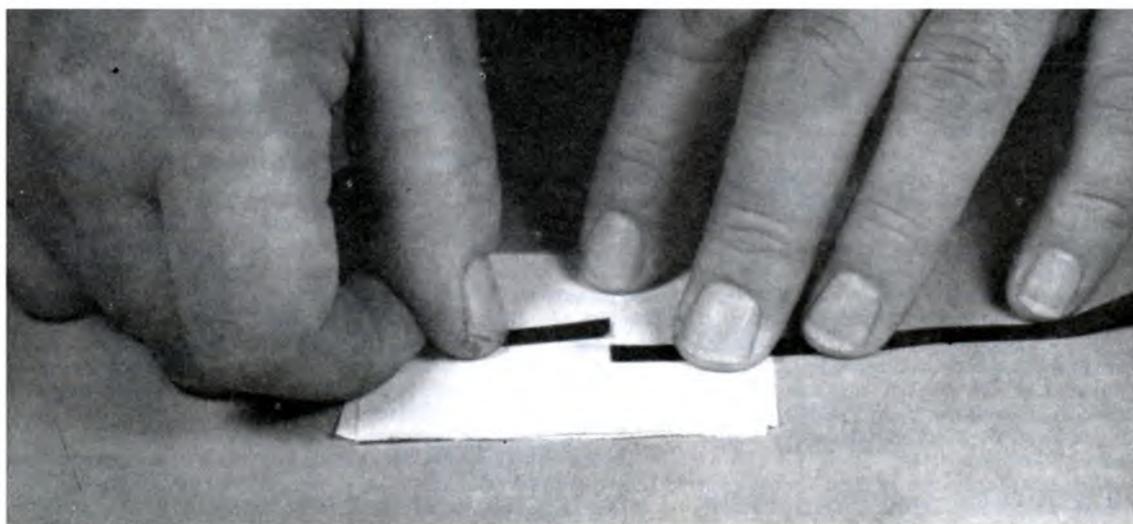
1
Apply
Jointing
Compound

Fig. 1: Apply a small amount of jointing compound to the last $\frac{1}{4}$ inch of the left hand piece of tape.



2
Wipe
off
Coating

Fig. 2: Remove the coating from the compound treated surface using absorbent paper.



3
Overlap
the
Ends

Fig. 3: Apply compound to the portion from which the coating has been removed and place the right hand piece (coated side uppermost) over it. Apply slight pressure and allow a few seconds for the joint to dry.

HOW TO SPLICE TAPE

A PROFESSIONAL APPROACH TO TAPE EDITING . . .

No. 3. PERMANENT JOINTS

IN the two previous articles, I have dealt with joints made by using a pressure adhesive jointing tape. This type of joint is known as "temporary" since it can, if necessary, be taken apart (by peeling off the jointing tape) and remade without causing damage to your recorded material.

There is, however, another type of joint which can be used. This is a permanent joint, since once it is made there is no way of taking it apart. I would use this method of jointing either when editing tapes which are to be kept for a long time, or when servicing tapes for re-use. I shall be dealing with servicing in more detail later.

In making this type of joint, two different methods can be used: (a) that employing a jointing compound which on application to the tape base will slightly soften its surface—this is known as the solvent welding method. (b) that employing a universal jointing compound which is applied to both ends of the tape to be jointed and also to the patch to be laid over the joint.

The first of these two methods I shall describe in detail, since this is the method used in the servicing of the tapes I use. But I would stress that it can only be used on tapes with a cellulose acetate or PVC base. Permanent jointing of polyester base tapes can be done only with one of the universal type jointing compounds.

Jointing by the solvent welding method

The only accessories required over and above those mentioned in the previous articles are jointing compound, a small brush or dip-stick (there is usually one or the other attached to the cap of the bottle) and a supply of absorbent paper.

It is most important that you choose the correct jointing compound for your particular tape. You will find the bottles clearly marked as to whether the compound is for cellulose acetate or PVC base.

The joint can be made at right angles or at 45°. In the photographs shown, I have used a right angle cut for simplicity. For the purposes of demonstrating this joint, I am assuming that the recorded material is no longer required and that you are replacing your temporary joints with those of a more permanent nature. This constitutes a part of servicing.

First cut each side of your temporary joint using your editing block. Remove your tape from the block and place the left hand piece, coated (dull) side uppermost, on a pad of absorbent paper. Apply a small amount of jointing compound to the last $\frac{1}{4}$ in. of the tape as shown in fig. 1. With a piece of absorbent paper remove the coating.

Fig. 2 shows clearly the tape from which the coating has been removed (the pins are included to emphasise the point, because the tape base is transparent!).

Next apply the compound to the portion where the coating has been removed, and place the right hand piece of tape (coated side uppermost) over it so that it overlaps the portion from which the coating has been removed (fig. 3). This can be done in the editing block to ensure accurate lining up of the two pieces. Finally, using a small piece of absorbent paper, apply slight pressure to the joint, allowing a few seconds for it to dry out.

In fig. 4, two joints are shown—one, about half an inch from my left hand, is invisible. The second one has been deliberately made with a slight gap between the pieces, so as to show how perfectly the ends must match. If they had been photographed as they should be (i.e. together) the joint would be invisible.

One very important thing to remember is that if you use this method on a tape which you are editing to improve your material you will, by reason of this overlap, lose a quarter of an inch with each joint made. You will see, therefore, that your editing technique will be different to that for temporary jointing.

With temporary jointing, your cut on the left hand end of the tape will be as close to your required material as possible, but with permanent jointing using the overlap method you should cut $\frac{1}{4}$ in. before the required material.

Great care must be taken not to spill the jointing compound, since these are solvents and can not only damage your tape, but the surface of your tape deck, too.

Jointing with a universal jointing compound

With this method, which is of the contact adhesive type, you can either make an overlap joint as described above (the only difference being that this jointing compound will not remove the coating and that the compound when applied to the tape must be left for a few seconds to become "tacky") or you can make a patch joint.

With the patch joint, the jointing compound is applied to the patch (a special reel of patching tape is supplied with this type of kit) and to the two ends to be jointed (uncoated, glossy side). The compound is allowed to become tacky and the patch is placed over the two ends which have been cut and butted together as in the temporary jointing I described earlier.

4
The
Complete
Join

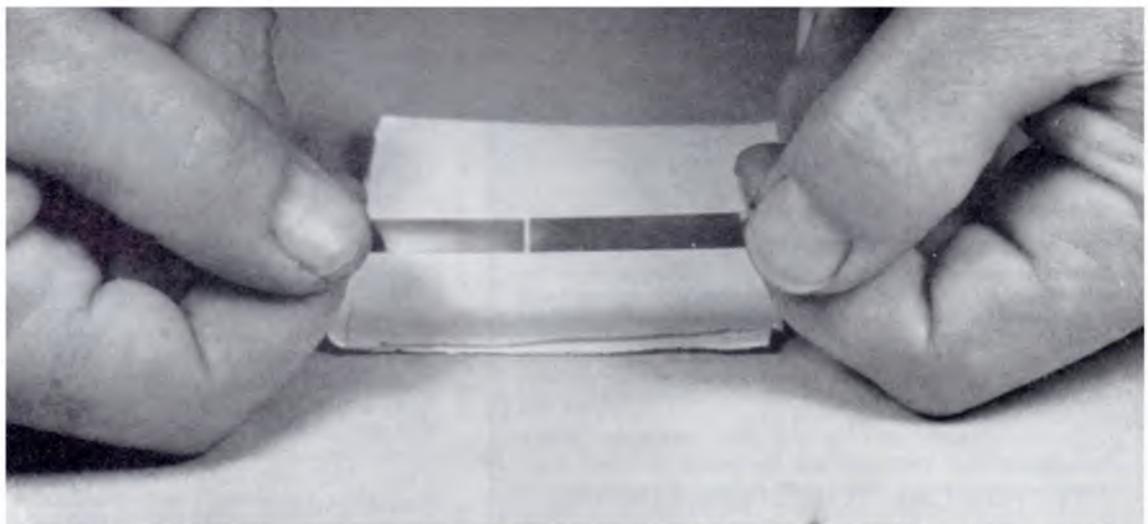


Fig. 4: The joint $\frac{1}{2}$ inch from my left hand is invisible. The second joint has been parted deliberately to illustrate how perfectly the ends must match.

WE ARE PROUD TO INTRODUCE THE WORLD'S FINEST
AND MOST VERSATILE TAPE RECORDER

**THE NEW TANDBERG QUADRUPLE 4-TRACK
MODEL 5 STEREO PLUS**

This machine is unique. The sensation of the recent New York Audio Fair Double the recording and playing time of any other machine available in the world today. Uses standard $\frac{1}{4}$ " tape and carries 4 tracks instead of 2, thus giving two entirely separate stereo recordings or four individual monophonic recordings.

Extra Facilities—Two built-in balanced stereo amplifiers with individual controls capable of playing stereo discs as a normal high fidelity stereo amplifier

Stereo amplifiers for high fidelity live use, either paralleled for monaural with twice the output, or separated for stereophonic use.

SPECIFICATION

Frequency Response—

From 30-18,000 cps. within ± 3 dB at 7 $\frac{1}{2}$ i.p.s.

From 30-12,000 cps. within ± 3 dB at 3 $\frac{3}{4}$ i.p.s.

From 30- 6,500 cps. within ± 3 dB at 1 $\frac{1}{8}$ i.p.s.

Wow and Flutter—Total wow and flutter better than 0-15% at 7 $\frac{1}{2}$ i.p.s.

Amplifiers—Two built-in high fidelity amplifiers constructed within close tolerance limits. An output of 3 $\frac{1}{2}$ watts is available from each amplifier

Signal to Noise Ratio—55 dB below recording level.

Valve Line-up—2x EF804. 2x ECC83. 2x EL84. EM71 magic eye and 3 bridge circuit metal rectifiers.

Speeds—7 $\frac{1}{2}$ i.p.s., 3 $\frac{3}{4}$ i.p.s., 1 $\frac{1}{8}$ i.p.s.

Recording and Replay Characteristics—Corrected to C.C.I.R. or NARTB standards.

Recording Facilities—

Monaural recording on each of 4 tracks or $\frac{1}{2}$ -track system.

Monaural recording on each of 2 tracks or $\frac{1}{4}$ -track system.

Stereo recording on 2 pairs of tracks or $\frac{1}{4}$ -track system.

Stereo recording on 1 pair of tracks or $\frac{1}{2}$ -track system.

Playback Facilities—Four-track or $\frac{1}{2}$ -track stereo.

Four-track or $\frac{1}{2}$ -track monaural.

Two-track or $\frac{1}{4}$ -track stereo.

Two-track or $\frac{1}{4}$ -track monaural.

Full-track monaural.

Reel Size—7 in. reels maximum.

Heads—Record/Replay head: specially made in line stereo quadruple. Head gap: 0.00016 in. Two-track erase head. Cross-talk between the two head halves better than 60 dB.

Inputs—(a) radio (b) microphone (c) disc (d) amplifier

Loudspeaker Facilities—Built-in monitoring loudspeaker

Distortion—A recording level 10 dBs below the saturation point results in less than 1% distortion of a 400 c/s signal on replay.

Speed Tolerance—Better than $\pm 1\%$ for all speeds.

Erase Safety Switch fitted to prevent accidental erasure.

Tape Playing Time with double play tape—

$\frac{1}{2}$ -track monaural. $\frac{1}{4}$ -track monaural.

2 hours at 7 $\frac{1}{2}$ i.p.s. 4 hours at 7 $\frac{1}{2}$ i.p.s.

4 hours at 3 $\frac{3}{4}$ i.p.s. 8 hours at 3 $\frac{3}{4}$ i.p.s.

8 hours at 1 $\frac{1}{8}$ i.p.s. 16 hours at 1 $\frac{1}{8}$ i.p.s.

Note.—On stereo recording or playback above times are halved.

Size—Recorder in portable case: 12 $\frac{1}{2}$ in. \times 16 in. \times 7 $\frac{1}{2}$ in.

Weight—Recorder in portable case: 27 lb. **Price 124 gns.**

TANDBERG STEREO ADD-ON RECORDING UNIT

To record stereo on either two tracks or four tracks from live sources, stereo discs, or from stereo programmes now being transmitted by the B.B.C., TANDBERG presents the STEREO RECORDING ADD-ON UNIT This is a 3-valve recording amplifier to match the TANDBERG Model 5 recorder with built-in magic eye indicator to permit perfect balance with the main recorder

Price £17

Obtainable from all High Class Hi-Fi, Music and Radio Dealers.

Fully illustrated technical catalogue is available on request from:

TECHNICAL SUPPLIERS LIMITED

Hudson House, 63 Goldhawk Road, London W.12

Telephone: SHEpherds Bush 2581/4794

Telegrams—Home : TEKNIKA, LONDON, W.12 Overseas : TEKNIKA, LONDON

HOW TO SPLICE TAPE—(continued)

In each case pressure must be applied to the joint for a few seconds. With this method care must be taken to remove any excess of compound when the joint has been made.

You will find that with all editing kits the manufacturers provide comprehensive instructions as to the use of their particular products.

Servicing and care of tapes

With tape being quite expensive it is in the interest of all users to take as much care as possible to preserve its efficiency. It can be most annoying to find that you have lost part of a favourite piece of music due to a few inches of damaged tape.

You can reduce the possibility of this happening by periodic inspection of your tapes. I would suggest that you do this prior to re-using a tape which has already been recorded and possibly edited. The things to look for are warping, crimping, buckling, "boot-lacing", and patches of coating coming off the tape something which, happily, very rarely happens these days. If you come across any of these things, then the damaged portions should be cut away and the tape jointed using the permanent method.

Temporary joints should be replaced with permanent ones, and I would suggest that when this has been done you run the tape through quickly to get an idea of the amount left on the reel. And it is a good idea to make a note of this on the tape box. It is also a good habit to stick down the free end of a reel of tape, so as to avoid damage to the first few turns which can otherwise come loose.

To Prevent Buckling and Warping

Buckling and warping can be caused by an uneven wind or rewind, which cause odd turns of tape to rise above the general level of the remainder with the result that pressure on the spool will foul them. Although most present-day tapes are designed to be insensitive to working temperatures and humidity, some of your tapes may be affected. Therefore in storing tapes, you should avoid extremes of temperature and humidity and, of course, care should be taken to avoid strong magnetic fields. If your tape has been stored for some time it is advisable to wind and rewind it at a fast speed prior to usage.

This then, concludes the articles on the mechanics of tape editing. I hope to be dealing with the techniques of editing, the identification of your recordings and general recording practices in a future series.

THIS IS YOUR PROGRAMME !

"Sound" on Network Three

Tape recorder enthusiasts have been quick to realise that this new magazine programme on the BBC's Network Three is largely their programme. The producer, Marguerite Cutforth has been busily and happily engaged in answering a great many congratulatory listeners' letters. Also our post bag in "The Tape Recorder" editorial office has contained many favourable references to these broadcasts.

The two demonstrations of accurate tape cutting by I. W. Jarman were very instructive, and provided an excellent complement to his articles in "The Tape Recorder". Having seen the photographs of his fingers wielding razor blade and jointing tape, listeners were able to hear his own running commentary as he performed these same operations. And, even more important, we could hear the programme material—Mr. Jarman bathing the baby, or a zoo attendant's reminiscences—before and after it was tidied up by editing.

Another extremely popular feature of the "Sound" programmes has been the illustrated talks by Tristram Cary on creating rhythmic or melodic sound-tracks by manipulation of tape. He has shown how he makes loops, uses controlled feed back, speed variations and filtering—it is called Musique Concrète in France—to extend the range of sounds he obtains in writing for the conventional orchestra. It is synthetic music and effects of this kind that will form the basis of the Competition we announce on another page.

Our Technical Editor, who introduces the Network Three programme, has been struck at rehearsals by the lively interest of the BBC studio and recording staff. They might be excused for regarding "Sound" as just another routine job, instead of which they weigh in with suggestions and work like Trojans to ensure the technical excellence of the transmissions.

THE 4th LONDON AUDIO FAIR

THIS year the Audio Fair is being held at the Hotel Russell, Russell Square, London, W.C.1, from Thursday, 2nd April to Sunday, 5th April. It will be open each day from 11 a.m. to 9 p.m. with the exception of the Thursday when it is not open until 5.30 p.m.

There will be a great deal to interest the Tape Recorder enthusiast and a number of new recorders will be on show. At the time of going to press definite details of new machines had been received from Fi-Cord, Multimus, Specto, Truvox, and Vortexion. Other Tape Recorder exhibitors include, Ampex, BASF, Brenell, Ferrograph, Collaro, Cosmocord, E.A.P., Grundig, W. Harting-Tandburg, Lustraphone, M.S.S., Minnesota Mining & Manufacturing, Philips, Reslosound, Simon, Specto, Telefunken, Veritone, Vortexion and Walters.

Tickets are available free, on request, for any day from the Fair Organiser, C. Rex. Hassan, 42 Manchester Street, London, W.1. Please send a S.A.E. at least 6 x 4 inches.

A number of Manufacturers have also taken space in adjoining Hotels, these include, at the Imperial Hotel, C.Q. Audio; Repts, who have a new recorder; Film Industries, Wellington and Sound Sales; and at the Royal Hotel (nearly opposite), Daystrom, who will be showing their Heathkits.

How to Get There

By Underground to Russell Square (Piccadilly Line), or the following buses go right past the door:—77, 77A (Euston, Kings Cross, Charing Cross, Trafalgar Square); 68, 188 and 196 (Euston, Waterloo). In the case of the following numbers, you should get off at Southampton Row:—8 (Liverpool Street Station, Oxford Circus), 23 (Marylebone Station, Oxford Circus), 25 (Victoria Station, Oxford Circus). From Southampton Row, or Holborn Underground, it is only five minutes walk to Hotel Russell.



★
THE TRUVOX
MK. VI
TAPE DECK
★

TRUVOX LTD. will be showing their new Mark VI tape deck at the Audio Fair and the R.E.C.M.F. Exhibition. This is a two speed deck, 7½ and 3½ and takes 7 inch spools. It can be supplied with monaural or stereophonic heads for recording and replay. All the features of the Mark IV deck have been retained, push-button operation, pause control, and 3-digit place locator. The deck will only be available for direct sale to manufacturers.

NORTHERN RADIO SERVICES, 11 Kings College Road, London, N.W.3, are operating a tape recorder hire service, Grundig, Stella, and Ferrographs are available for short or long periods, the rates are from 15s. a day or £4 a week for a TK20 and £1 a day or £5 a week for a Stella and for special use, if available, a Ferrograph at the same price. For further details write direct mentioning *The Tape Recorder*.

RANK CINTEL LTD., who have been modifying to British TV standards and distributing the well-known Ampex Videotape equipment are now introducing Ampex Audio Tape Recorders for professional use.

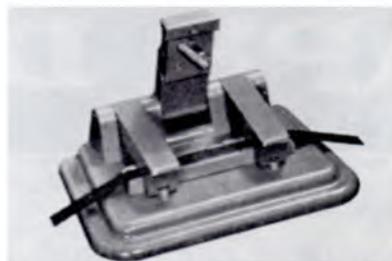
At the Audio Fair in room 259 continuous demonstrations of both monophonic and stereophonic tape recordings especially made for the occasion will be given.

Brief specification details of the equipment to be shown are given below:—

Type 351 Channel Recorder. 7½ and 15 or 3½ and 7½ i/s. ±2 dB 30 to 15,000 c/s at 15 i/s. Signal/noise ratio at 15 i/s. -70 dB full track, -65 dB half track and two channel stereo. Crosstalk rejection 50 dB. Wow and flutter less than 0.15% r.m.s. Separate record and playback heads and amplifiers, 105 μV input for full record level, output +8 dB from 600Ω or 2 V in high impedance.

NEWS PAGE

Type 601-2 Two-Channel Portable Recorder. Weight 42 lb. 7½ i/s ±2 dB 40 to 10,000 c/s, ±4 dB 30 to 15,000 c/s. Separate erase, record and playback heads. Signal/noise ratio and crosstalk rejection better than 50 dB. Wow and flutter less than 0.17%. Separate record, playback, microphone and line amplifiers all 0.1% maximum distortion. Metered input levels.

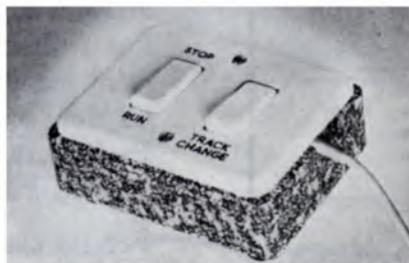


★
SONOCOLOUR
TAPE AND
ACCESSORIES
★

TAPE RECORDERS (Electronics) LTD., who recently became the United Kingdom distributors for Sonocolour recording tape and accessories, have produced a revised price list, copies of which can be obtained from, 784-788 High Road, Tottenham, London, N.17.

A 7 inch spool of standard tape is now 35s., of long play 50s., and of double play 77s. 6d. 5½ inch spools are 28s., 35s. and 52s. 6d. respectively. Also available is a neat and strongly made splicer in grey plastic with its own replaceable cutter blade. This is a most effective splicer and does away with the necessity of using a razor blade. The tape is securely held in the groove. The price is 32s. 6d. A complete jointing and editing accessory kit is priced 72s. 6d. in a fitted case.

AT the R.E.C.M.F. Exhibition to be held at Grosvenor House from Monday April 6th-9th inclusive, Collaro will be showing for the first time their new "Studio" tape deck. This is a single track deck, operating in one direction only with two heads; there is space for fitting a third head, either for stereo or monitoring. There are 3 speeds 7½, 3½ and 1½ i/s. It is adaptable to take two sizes of spools either 5½ inch, or 7 inch. The spools of the 7 inch version overhang the base plate while on the 5½ inch version they are housed wholly within the confines of the base. Other features include patented automatic self-compensating mechanical brakes, and three motors. During record and playback operation, the take up motor runs at reduced power. Rewind time is very short. The dynamically balanced flywheel is mounted on a long hardened, ground and lapped spindle which, in turn, runs in low friction bearings. Controls are of the piano key type—one of which is the pause control.

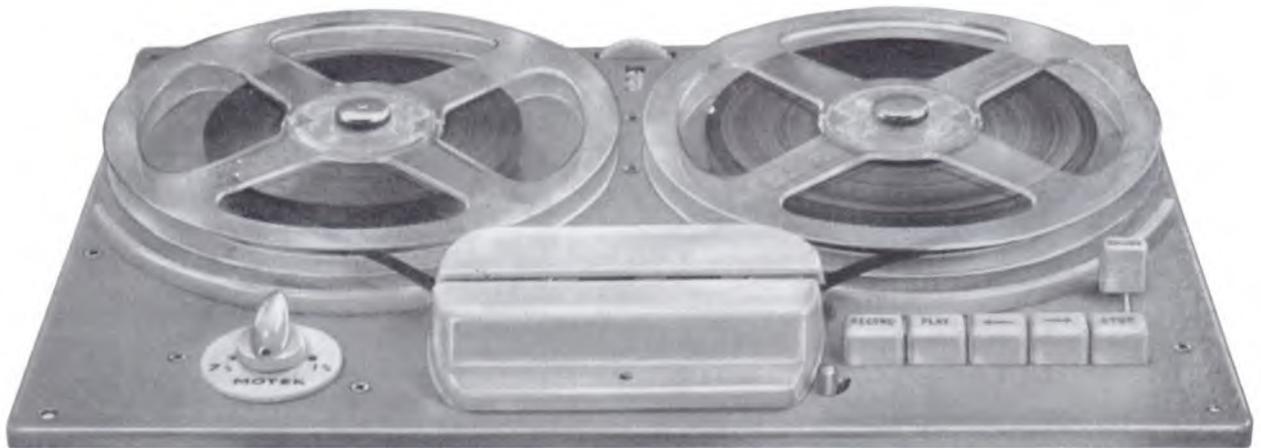


★
The Simon SP/4 Remote Control Unit is now available. This useful Accessory controls the Recorder in Start, Stop and Track-change functions and may be used either during record or replay. Size 1½ x 2½ x 3½ in. Price £3 3s. with cable.
★

YET another new deck is due to be shown for the first time at the R.E.C.M.F. Exhibition, this one is produced by B.S.R. It is a single speed deck running at 3½ i/s, there is only one motor and two control knobs. It will take spools up to 5½ inch. The provisional specification gives a wow and flutter figure of 0.4% and an attainable frequency response of up to 10,000 c/s. The double gap erase head gives attenuation by 70 dB. The record/replay head has a gap of 0.0002 inch. Production is due to start in early April and for the first few months will only be available to manufacturers.

MOTЕК TAPЕ DECK

makes a better Recorder



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21 gns.

Motek is the core of many recording machines. Manufacturers build in Motek — and then out of sight and mind — which is as it should be. For built-in Motek has built up immense confidence from manufacturers and customers alike; and no wonder, with these five star features — Push Button Operation, Counter, Safety Erase Button, Pause Control, Three Speeds.

For its simplicity and low price, the Motek Tape Deck is also a great favourite with the amateur builder.

Details on request.

Patents Pending.

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TAPE TYPES

A SHORT SURVEY OF THE DIFFERENCES BETWEEN SOME OF THE AVAILABLE TYPES

A MAGNETIC tape consists of a base coated on one side with an iron oxide; and both the base and the coating differ, according to the materials used by the manufacturer of the tape.

The nature of the base and the coating have an effect upon the performance of a tape machine, so that it is of some importance to choose the correct tape type. The major factors to be considered are (1) wow and flutter, (2) signal-to-noise ratio, (3) distortion, and (4) frequency range; and all these are inter-related and depend upon the machine being set up to give the best compromise for a particular tape type.

Generally speaking, a thin base is to be preferred; for (apart from the obvious advantage of longer playing time without spool changing) the thin base enables a closer contact to be made with the tape head, improving the frequency response. A thin tape with a polished surface also causes little drag upon the tape transport mechanism, so reducing flutter.

TABLE I

Tape type	Optimum bias voltage
Mastertape PM15	80
Scotch Boy 111	85
Scotch Boy 150	85
Emitape 88	85
Telefunken DS65	90
Philips LP	100
Philips Standard	120
Gevasonor M/A	120

The optimum bias voltages shown are applicable only to the head used for these tests and are of no significance except for the purpose of comparison. There is not necessarily any advantage in high or low bias, the important factor being that the correct bias should be applied to the head used.

Tapes are made in three main thickness groups—*standard*, *long-play* and *double-play*; these at 7½ i/s give the following playing times per track for a 7 in. spool—32 mins., 48 mins., and 64 mins. The double-play tape, such as the Telefunken DS65, requires some care in use as it will not stand excessive strain, and can pull into a thin "wire". In particular, care is needed in stopping a tape machine when this tape is used, as the tape may be stretched between the spools—an effect which can be avoided by slowing the feed spool by pressure upon the spool with the fingers before using the stop switch.

The Importance of Getting the Right Bias

The recording bias applied to the recording head, and the amount of treble boost given to the recording signal, will vary according to the nature of the magnetic coating on the tape. The use of the correct bias enables a good signal-to-noise ratio to be obtained without excessive distortion, and with a good high frequency response. It is important, therefore, to ensure that the type of tape used will suit the bias and frequency response settings of the tape machine, and the tape recommended by the manufacturer of the machine is the safest. "Better" tapes may not give so satisfactory a result. Many tapes, however, do require a similar bias at the recording head and may generally be used without affecting performance.

A test was made with a tape deck set up with variable bias and a means of measuring optimum bias. A number of tapes were run through the machine and the optimum bias was noted. The results are listed in Table I. Tapes which require a bias differing by only a few volts from that required by the tape recommended for a particular machine should give similar results; though the high frequency response obtained with tapes requiring similar bias may differ. Readers should note that the bias figures mentioned in the

table relate only to the head used for the test, and they are therefore for comparison only.

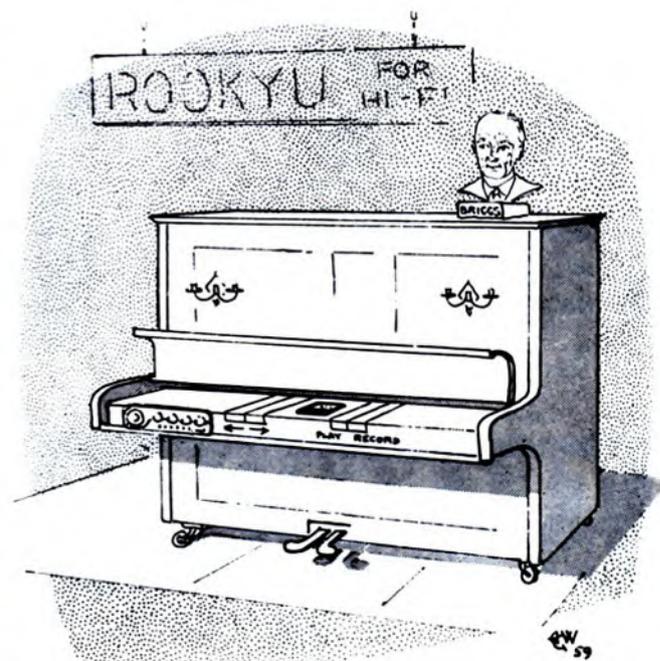
There are other important matters which affect the selection of a tape type which will not be dealt with here. "Print-through", however, deserves a brief word as this effect can be minimised by care of the tape. The effect is for a highly recorded signal to be impressed upon adjacent layers of tape when the tape is spooled. The effect increases with temperature and may be caused by bringing the tape into a magnetic field. It is prudent therefore to store tapes in a cool place, and never to bring them near the magnetic fields of loudspeakers or mains transformers. The occasional rewinding of tapes which are out of use for a period may also assist to reduce the effect of print-through.

The stability of a tape recording may be of importance in recording studios; and tapes of the *high bias* type are frequently used in this connection. It is stressed that the importance of the bias voltage lies in the application of the correct value, the actual value not necessarily implying any virtue of a general nature. Low bias may be an advantage if it is difficult to obtain an undistorted high bias, but where this is available, the stability of the recorded tape may be a desirable feature.

Recorded Tapes

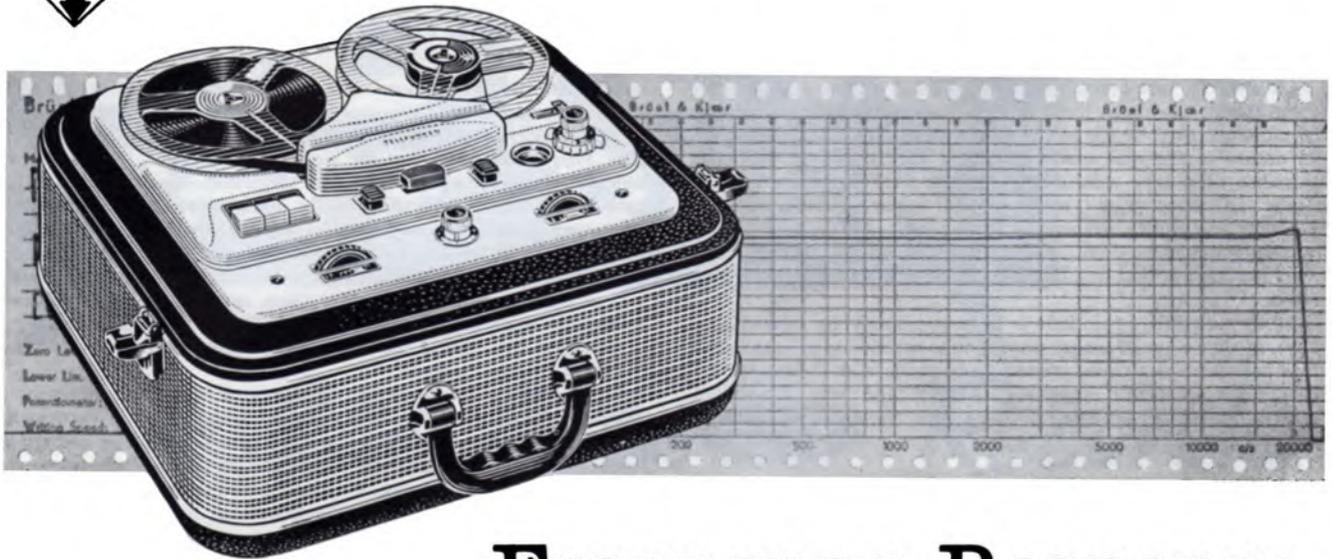
WE regret that, in spite of a paper of increased size this month, there is still so much pressure on the available space that we have been unable to include any reviews of recorded tapes. Instead, and further to our note in the March number, we think it will be of special interest to our readers to have the following details about the large new range of recorded tapes in the catalogue recently made available by Technical Suppliers Ltd.

Some 150 to 200 titles are included in this catalogue, ranging from pops to classics. There are alternative versions in mono and stereo of all titles and these can be had recorded either at 3½ or 7½ i/s. The prices are from 31s. 6d. for a 3-in. reel recorded at 3½ i/s to 75s. for a 7-in. reel.





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TRA

USING A PROFESSIONAL RECORDER AT HOME

WHILST the majority of users of tape recorders are content with a domestic type of instrument, a few enthusiasts want something better and, if their purses allow, prefer to use professional type recorders. It is difficult to draw a line between the better quality domestic recorder and the economically priced professional instrument, but generally the professional machine will give a standard of quality of recording and reproduction which is not obtainable with the domestic recorder. However, to appreciate fully these characteristics it is, of course, necessary to have high quality input and for the recorder to be used in conjunction with one of the better types of loudspeakers.

Our photograph illustrates one popular make of professional recorder, the Reflectograph Model 500. At first glance it will be realised that one disadvantage of a professional machine is that it cannot be as easily portable as a domestic type of recorder. It can really only be called transportable and this is due to the fact that the tape drive mechanism is of more ambitious design, separate record and playback amplifiers are incorporated, all the transformers are larger, and fairly large monitor loudspeakers are usual. A semi-professional tape deck contains a number of features, which are not present on domestic machines.

Three Heads—Much Better than One

Three heads are provided—erase, record and playback. A clock-type tape position indicator is located in the centre between the two reels, which may be up to 8½ in. diameter. The tape drive of this machine is unique in having a continuously variable speed between 8 and 3½ i/s. The usual precise speeds of 7½ and 3½ i/s are determined by viewing a stroboscope. This stroboscope is mounted directly on top of the capstan drive and is illuminated by a miniature neon lamp. When the drive is adjusted to exactly 7½ or 3½ i/s the dots on the stroboscope appear to be stationary.

This variable speed feature has been found to be a great advantage by recording studios, who often have to dub tapes on to discs. Often these tapes will have been recorded on machines which have not been running at the precise standard speeds. Musicians, who wish to accompany recorded tapes can, by means of the variable speed, tune the recorder to the exact key required. Other users who have found the variable speed to be of advantage are enthusiasts, who record commentaries to match the action of a cine-film by adjusting the variable speed drive knob to compensate for variations in projector speed.

Instant Stops and Starts

Another feature is the fitting of three motors, and facilities for controlling the speed or winding forward and winding back. Instant starting and stopping on a cue is also provided. This instant starting and stopping can be a great advantage when undertaking editing of tapes; as the position of the playback head can be marked on the head cover and it is very simple, after a little practice, to edit tapes to a syllable of a word.

It is possible with this machine to wind forward or back at variable speeds; and as sound can be available during wind forward and wind back, this greatly assists the editing of tapes. Editing is further facilitated by the inclusion of a Bib tape splicer on the deck as standard.

An instrument panel is mounted on the deck and separate amplifiers are provided for recording and playback. These amplifiers together with separate record and playback heads enable the incoming signal to be compared with the signal recorded on the tape. The provision of these separate heads and separate amplifiers is, of course, relatively expensive, but when a recording engineer has once used an instrument having these

The Reflectograph 500 professional recorder has continuously variable speed control and neon-lit stroboscope. It takes 8½ in. spools, weighs 50 lb. and costs £98 14s.



features, he is unlikely to wish to return to a machine which has combined heads and amplifiers.

Comparison of the input signal and that on the tape is achieved by throwing a switch on the instrument panel. On one side the input signal is heard, and on the other the signal from the tape. The use of this feature, together with the variable speeds, enables the recording enthusiast to determine whether or not it is worth while making recordings at 3½ or 7½ i/s. The high quality achieved at 7½ i/s, which can readily be verified by the use of the tape-input switch, makes it likely that the higher speed will be used for all inputs of high quality. If, however, it is desired to record foreign radio transmissions, or to dub old non-copyright disc records, then the use of this switch will probably indicate that there is no need to use a higher tape speed than 3½ i/s.

As two amplifiers are included, there are separate gain controls for both record and playback, the record circuits being protected by a safety latch over the record button. A further precaution to ensure that a tape is not erased unwittingly, is the incorporation of a switch in the record gain control.

Level Meters are Most Informative

It is the custom with professional recorders to provide a peak level meter, which operates when the record gain control is adjusted correctly. The pointer of the meter moves across the scale to zero when the record push button on the deck is pressed and the record gain control is turned on. The latter is then adjusted so that the pointer does not move into the red segments on the scale at the peak in the input signal.

Irrespective of the level of the input signal the output signal can be adjusted by the playback gain control. Consequently, it is possible to make recordings whilst nothing is being heard from the loudspeakers or, alternatively, the volume can be adjusted to a convenient level by means of the playback gain control.

Whilst monitor loudspeakers are built into the case, an output socket is provided to feed the output to an external loudspeaker. When the external loudspeaker jack plug is inserted into the instrument panel, the internal loudspeakers are automatically muted. In case the recording engineer should require to take the output at a low level to feed into an external amplifier or the amplifier of a disc recorder, another socket is provided so that the output circuit of the playback amplifier is not used.

The record amplifier can, of course, be employed as a straight through amplifier for any signal, which is fed into the radio or microphone sockets. That is, this signal can be heard, if desired, without the tape deck being in operation.

SUBSCRIPTION RATES

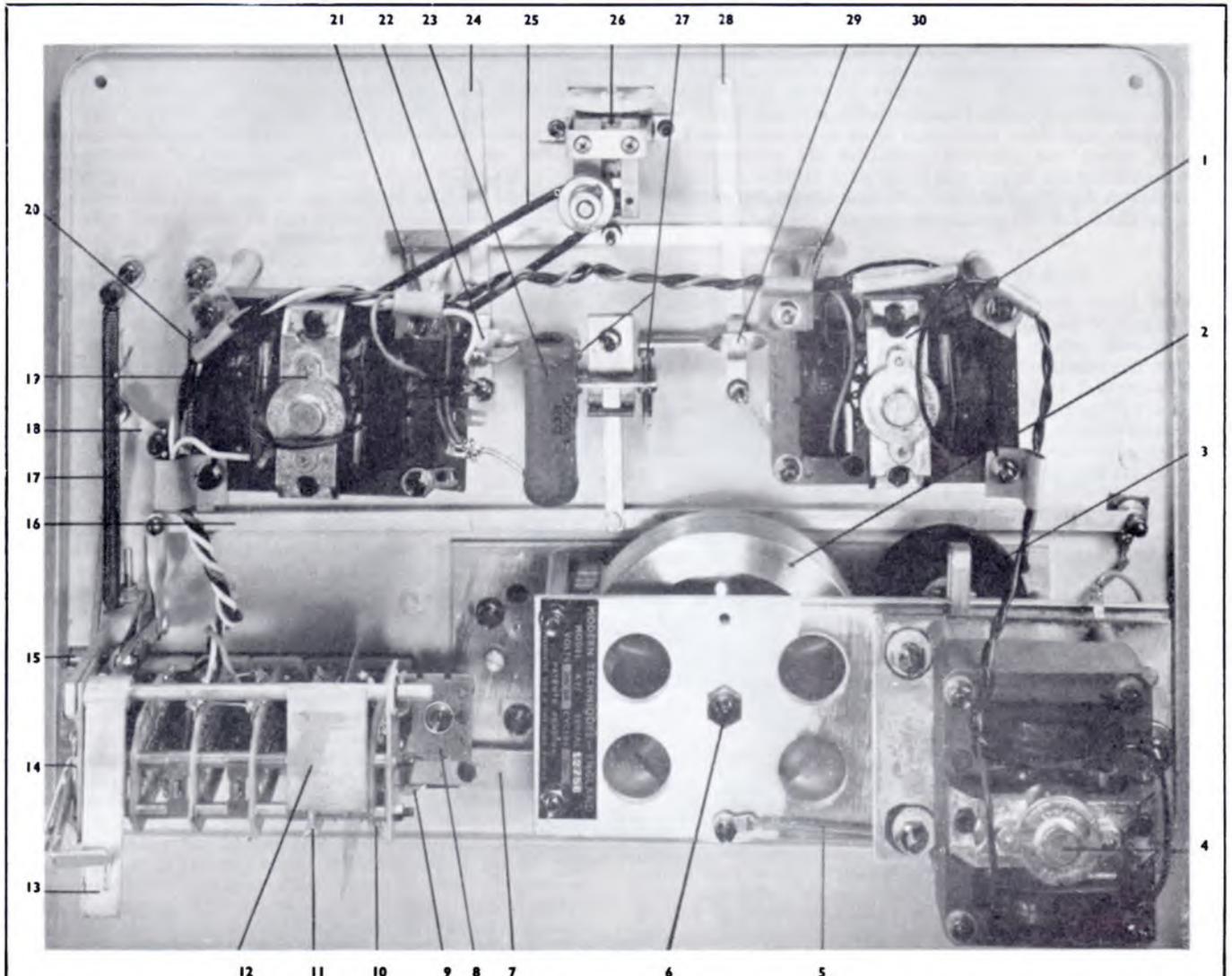
The subscription rate to *The Tape Recorder* is 21/- per annum (U.S.A. \$3.00) from The Tape Recorder, 99 Mortimer Street, London, W.1. Subscription+Index, 24/- (U.S.A. \$3.25).

THE MOTTEK K9

★ The deck is the basic component of every tape recorder. This regular feature may help readers towards a better understanding of the recorder that they own, or are contemplating. In addition, as more and more enthusiasts begin to use their recorders in more experimental ways, they will also be thinking of adding a second channel for editing, dubbing or mixing. This series, therefore, together with the series of surveys which begin this month, should prove of great value to the enthusiast.

THE Mottek tape deck has been in production for over seven years, thereby establishing its position as one of Britain's first decks. Only four of the first Model K1 were made, and it took over six months to produce and sell 72 of the K2; but now the K9 is leaving the factory in North London at the rate of 750 a week and in total over 12,000 have been produced.

They are used not only by manufacturers in Britain but also in many other countries, Belgium and Holland in particular, and until



1 Take up motor. 2 Heavy brass flywheel. 3 Idler wheel. 4 Capstan motor. 5 Idler wheel tensioning spring. 6 Flywheel adjusting screw. 7 Roller and pad assembly actuating arm. 8 Push button assembly. 9 Safety record catch. 10 Record wafer. 11 Replay wafer (four 2-way change overs on each wafer). 12 Paddle assembly controlling record and replay functions. 13 Brake paddle assembly. 14 Interlock mechanism.

15 Interlock stop bush. 16 Brake actuating mechanism. 17 Roller and pad assembly return spring. 18 Pause button linkage. 19 Feed motor. 20 Brake assembly return spring. 21 & 30 Brake band springs. 22 & 29 Left and right brake assembly. 23 Take up motor dropping resistance. 24 & 28 Brake assembly adjusting arms. 25 3-digit counter drive belt. 26 3-digit counter. 27 Brake adjusting screws.

THE MOTEK K9

the distributor's unfortunate untimely death, they were sold in quite large quantities to the "do-it-yourself" enthusiasts in the U.S.A. Since the great growth in interest in tape recording in this country they find they can sell as many as they can produce without having to look very far for a market so this market has not been re-established.

The firm of Modern Techniques was started eight years ago by Mr. S. Korobuk (who was formerly in the Service Department of Ferguson's) in one back room in Palmers Green, on a capital of £75. Some measure of the success of the Motek tape decks can be gauged from the fact that he now has a factory of over 10,000 sq. ft. and looks like soon needing more. He employs 120 people.

Started Making Sound Heads

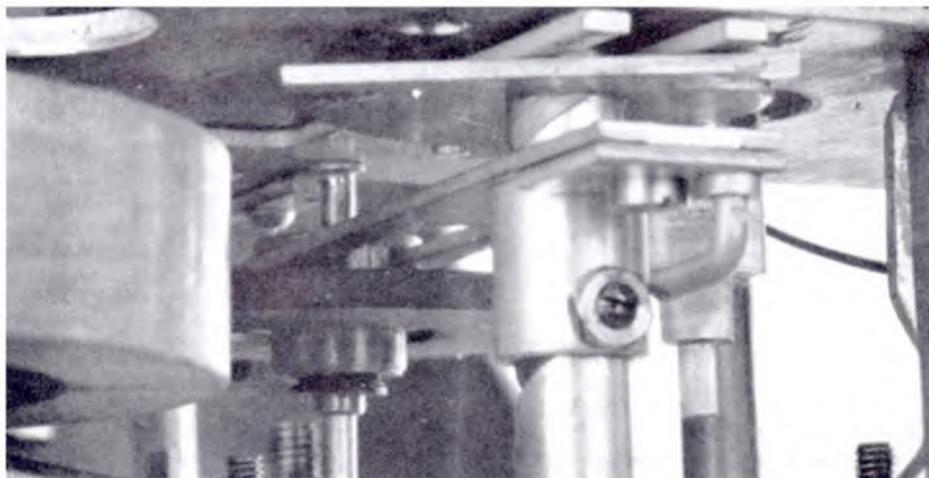
Mr. Korobuk, a keen reader of science fiction books, said that these first gave him the idea of producing a simple and really reliable tape deck selling at a reasonable price, as recorders were mentioned so many times in these books, and under so many varying circumstances, that he realised that here, surely, was a medium that was bound to catch on sooner or later! He started making sound heads only, but soon designed and produced his own deck, the K1. This was very quickly followed by the K2. This was a two-speed machine with belt drive running at $7\frac{1}{2}$ and $4\frac{1}{2}$ i/s, as the speed change was effected by altering the current available to the drive motor. This was controlled by a rotary switch on the left of the deck that, as Mr. Korobuk admits, gave rise to certain difficulties in brake application. There was also no head cover. The rotary switch was replaced on the K3 by a tumbler switch. The K5 was a single speed machine designed to operate at $7\frac{1}{2}$ i/s from 110/120V and was popular in the U.S.A. The two-speed version of this was the K6, minor alterations were made on the K7 and K8, single and two-speed respectively, these were still belt drive.

The Current K9 has Three Speeds

The current model is the K9, this now has three-speed operation actuated by a stepped spindle. The motors are all of their own manufacture, in fact the company is now very nearly self-contained, only a very small number of parts—such as motor castings and counters—coming from outside manufacturers. Other new features on this deck include a safety record button, pause control, and 3 figure digital place locator.

The deck is very simple to use, and is noted for its extreme

This close-up photograph specially taken for "The Tape Recorder" clearly shows the speed change mechanism. The stepped spindle is knurled to give the rubber idler wheel a firm grip, this in turn drives the heavy brass flywheel, the edge of which is seen on the left, this is also knurled. The pillar in the centre is the semi-rotary speed change and the grooves in it can be clearly seen. This mechanism is easy to use and foolproof in operation. Reference to large indexed photograph on the opposite page may assist identification of the layout of this enlarged assembly.



This deck is manufactured by Modern Techniques Ltd., Wedmore Street London, N.19. The price is £22 1s., 12 months' guarantee.

Technical Specification

Track width, 0.090 in; **Track Location**, right to left, recording on the bottom track; **Number of Motors and Type**, 3 Shaded Pole Induction; **Number of Heads**, 2; **Operating Speeds**, $1\frac{1}{2}$, $3\frac{1}{2}$ and $7\frac{1}{2}$ i/s; **Playing Time**, 120, 60 and 30 minutes per track 1,200 ft. reel; **Rewind time**, 55 sec.; **Attainable Frequency Response**, 12 Kc/s at $7\frac{1}{2}$ i/s with equalisation; **Record Head Gap**, .00035 in.; **Wow and Flutter**, better than 0.02% at $7\frac{1}{2}$ i/s.; **Long Term Speed Stability**, better than 0.5%; **Recommended Erase and Bias Frequency**, 45-50 Kc/s; **Erasing Voltage**, 150 V. at 10/15 m/a; **Erase Head Impedance**, 10,000 ohms at 45 Kc/s; **Recording Head Impedance**, 2,000 ohms at 1 Kc/s; **Motor Voltage**, 110/120 or 200/240 (as stated on panel); **Power consumption**, Record/replay—approx. 60 watts, rewind or fast forward—approx. 100 watts; **Dimensions**, $15\frac{1}{2} \times 10\frac{1}{2} \times 4\frac{1}{2}$; **Weight**, 14 lb.; **Price**, £22 1s.

reliability and ease of servicing. For example, it is only necessary to disconnect one spring to replace the Idler wheel. The cork-lined brakes can very easily be adjusted by the average user, to suit any individual requirements, from very fierce to very soft. Oilite motor bearings are used throughout and require no lubrication giving years of trouble free running. The flywheel and capstan assembly are accurately machined to $1/10,000$ in. and run on hardened balls. A simple but effective interlock mechanism is used which prevents damage to the recorder and the tape. It makes it necessary to press the stop button between each operation. The deck is very cool running and has a very fast rewind, about 50 seconds for 1,200 feet of tape. The top of the deck is made of heavy 19 gauge steel finished in a scratch resisting cream enamel. When it leaves the factory each deck carries a twelve months guarantee.

The Motek K9 is now used by a number of leading manufacturers, The E.A.P. (Tape Recorders Ltd.); Escort; The Regentone, RT50; The Magnafon Courier; The Hatfield Radio, Viking; The Sonomag, Gaiety, and in the near future it will be seen in a number of new recorders.

★ This is a report—not a review.

(LANES)
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April 1959

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KL85T TABLE MODEL (Deck and Pre-amp only) 63 gns.

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Microphones at 5 gns., 6 gns., 9 gns., 19 gns.

MODEL 75 takes 5" spools 60-16,000 c.p.s. at 3¾ i.p.s. and 60-10,000 at 1¾ i.p.s. Light weight (approx. 20 lb.). Push-button controls, over 4 hours play at 1¾ i.p.s. on extra long play tape.

KL75T Table Model (Deck and Pre-amp only) 45 gns.

KL75K Complete Recorder, 50 gns.



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MIXER UNITS

a range of useful instruments for tape—

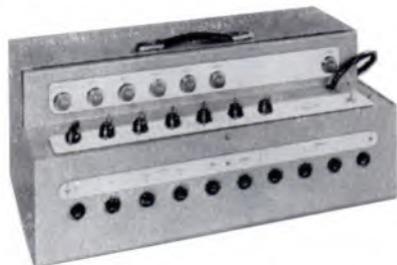
TAPE recording of anything more ambitious than a single voice is made much easier by the use of a mixer unit. The fading down of music, for example, to superimpose a commentary, or the balance of a choir and its accompaniment using two microphones all such operations involve sensitive adjustment of the relative volumes. All professional recording studios depend upon mixing facilities—some of them very elaborate, and the increased interest amongst amateur tape enthusiasts in recording drama productions and music making of all kinds has resulted in a number of small mixer units appearing on the market.

Electronic and "Passive" Mixers

The usual number of channels is 3 or 4, but the circuit complexity and flexibility of operation vary considerably. And so does the price.

The two main categories of mixer unit are "passive" types, which consist of a potentiometer or volume control in each channel with a resistive output network; and "electronic" types which introduce individual amplifiers in one or more of the channels. This permits the mixing of low impedance sources such as moving-coil or ribbon microphones with high level sources such as crystal pickups or radio. The interaction between channels can be kept very low in this latter type of mixer. Transistor models are popular where independence from the mains supply is required.

To assist readers who may be on the point of choosing a mixer, we give here brief descriptions of a number of the small mixer units which are now available, and we acknowledge our gratitude to the manufacturers who have kindly supplied information.



ASTRONIC
A. 1446

Astronic A.1446. 6 channel unit. Designed for 5 low impedance sources each 10/30 ohms, 0.5 mV; 1 high impedance source 250K ohms, 0.2 volts. There are four output sockets supplying 0.7 volts into 600 ohms. A master Gain feeder is incorporated, and each channel has an indicator lamp to show which sources have been faded up. A.C. mains required. Size 9 × 11 × 8½ in. Weight 22lb. Price £58 10s. Associated Electronic Engineers Ltd., 10 Dalston Gardens, Stanmore, Middx.

The Brenell Mixer Unit. 3 channel unit. This consists of 3 volume controls in a metal box. For best results high impedance sources such as crystal microphones and pickups are recommended. There are 4 sockets for jack plugs for the three inputs and the output lead. Price £2 18s. Brenell Engineering Co. Ltd., 1a Doughty Street, London, W.C.1.

Grundig Mixer Unit GMU3. 4 channel unit. This mixer incorporates pre-amplifiers and is designed for 3 low level inputs and one high level input. The sensitivity and impedance of the channels is as follows: 1. 1.2 mV/100 K ohm. 2. 4 mV/100 K ohm. 3. 4 mV/100 K ohm. 4. 300 mV/500 K ohm.

The gain of this mixer is such that the above input levels produce an output of 65 mV. The inter-action between channels is below

GRUNDIG
G.M.U. 3



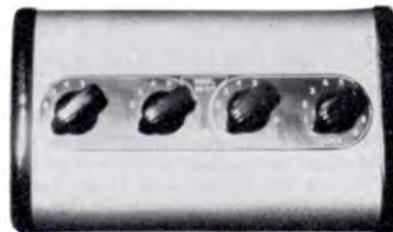
—40 dB. There is a magic-eye level indicator included and a special socket for monitoring by headphones. The input sockets have parallel sockets for jack plugs or 3-pin plugs, and this permits the connection of 6 microphones to the first 3 channels, provided similar microphones in pairs are employed. Channels 2 and 3 incorporate polarisation at 100 volts D.C. for condenser microphones. Mains voltage required 200/250 volts, approximately 15 watts. 3 valves plus rectifier. Price £16 16s. Grundig (Great Britain) Ltd., Kidbrooke Park Road, London, S.E.3.

Kenton Mark I. 4 channel unit. This incorporates thumb control fader knobs, and is designed for 2 low level inputs at 50 K ohms impedance and 2 high level inputs at 100 K ohms impedance. A pilot light is included and A.C. mains is required. The gain of channels 3 and 4 is 20 dB. Size 8 × 3½ × 5 in. Price £10 15s. Kenton Laboratories Ltd., 4 Tottenham Mews, London, W.1.

Lustraphone MU/483. 3 channel unit. Input impedance 20 ohms each channel, or to order. Output impedance 20 ohms or to order. Standard jack plugs supplied. Size 13 × 5 × 5 in. Weight 3 lb. Price £13 13s. Lustraphone Ltd., St. George's Works, Regent's Park Road, London, N.W.1.

Lustraphone MU/577. 4 channel unit. Transistorised, with a set gain of approximately 20 dB in channels 1 and 2, which are designed for low impedance microphones. Channels 3 and 4 are high impedance circuits. The power supply is derived from a single Miniature Mercury Cell with an estimated life of 1,000 hours. Width 9 in. Height 4½ in. Weight 2½ lb. Price £22. Address as above.

**LUSTRA-
PHONE**
MU 577



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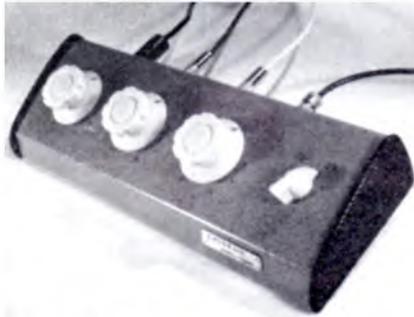
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A SURVEY OF MIXERS FOR TAPE

M.S.S. 2 ML. 4 channel unit. Details as above, but designed for 2 microphones one pickup one line, or 2 microphones and two pickups.

Penco MIX/3. 3 channel unit. Incorporates 3 transistors and is designed for 2 low impedance 15/30 ohms and one high impedance input. Power derived from 4 volt Mercury Cell. Output is high impedance. Price £19 19s. Penco Products, 36 Coniston Road, King's Langley, Herts.



PENCO
MIX/3

Penco MIX/35. Details as above except that 5 transistors are included giving extra gain, e.g., to by-pass input stage of recorder. Price £26 5s.

Note:—Either of the above models can be supplied with extra input channels as required.

Philips ET 1039. 4 channel unit. Each input is designed for a microphone of 50/600 ohms impedance, and includes a transformer. The output voltage is approximately 90 mV and is Cathode follower. A master gain control is included and mains supply is required. Size 12 × 6½ × 3 in. Price £36. Philips Electrical Ltd., Century House, Shaftesbury Avenue, London, W.C.2.

Philips EL 3989—4 channel unit. Incorporating 4 separate potentiometers. Price £4 4s.



SPECTONE
142

Spectone 142. 3 channel unit. Channel 1 is for high impedance microphone, sensitivity 1.5 mV; channel 2 for low or high sensitivity pickup 6–50 mV, and supplied with selector switch giving equalisation for 78 or l.p. discs plus a "straight-through" position suitable for a second microphone; channel 3 for radio, sensitivity 100 mV. Valve line-up 3xEF86, 2xECC83. Power supply required 200–300 volts, 5 mA, 6.3 volts, 1.2 amps. Size 4½ × 5½ × 12½ in. Price £17 17s. Specto Ltd., Vale Road, Windsor, Berks.

Spectone 142A. Details as above, but including supply unit, for connection to A.C. mains. Price £22 1s.

T.S.L. 3 channel unit. Designed for high impedance inputs. Jack plug sockets fitted. Size 4½ × 3½ × 4½ in. Price £2 2s. Technical Suppliers Ltd., Hudson House, 63 Goldhawk Road London, W.12.

Vortexion 4-channel mixer—Input transformer in each channel, designed for 15–50 ohm microphones. Other inputs to order.

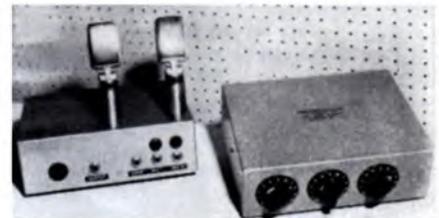
Output voltage ½ volt into 20,000 ohms or higher load impedance. A.C. mains required. Size 18 × 10½ × 6½ in. Weight 22 lb. Price £40 8s. 6d. Vortexion Ltd., 257/263 The Broadway, Wimbledon, London, S.W.19.

Vortexion 3-channel mixer—In. put details and dimensions as above. Output programme meter included, calibrated in dBs. Output 1 milliwatt into 600 ohms. A.C. mains required. Weight 23 lb. Price on application.

★ Details of other mixers will be published in our "New Products" section as they become available, and readers are advised to study the **Hi-Fi Year Book** (1959 edition) for the most comprehensive reference details of these and all other tape products.

Unimixer 1. 3 channel unit. Channels 1 and 2 have duplicate sockets for low or high impedance microphones—30 ohms or 400 K ohms. Recommended load impedance not less than 500 K ohms. Price £9 9s. Sound News Productions, 10 Cliffords Street, New Bond Street, London, W.1.

Unimixer 2. 3 channel unit. Inputs as above, but 6 dB amplification is included in channels 1 and 2. Power supply needed 200/300 volts D.C. at 5 mA, 6.3 volts at 0.3 amps. Special connectors available to obtain power supplies direct from Ferrograph or Vortexion recorders without any alteration. Price £15 15s. Same address as above.



UNIMIXER
No. 1 and No. 2

Note:—Future subjects in this series of useful equipment for tape users will include microphones, amplifiers, accessories, tape, etc.

TWO POST SCRIPT LETTERS from page 107

From:—David J. Evans, 15 Wimborne Avenue, St. Pauls Cray, Orpington, Kent.

Dear Sir:—I do not understand how the lack of sales of tape recorders can be blamed on the intricacies of tape threading. I own a very good "domestic" tape recorder. I find I can place the reels on the recorder, thread the tape, re-set the position indicator and start the machine in under fifteen seconds. My nine year old sister can do this whole operation in under one minute. (She has only threaded it about four times). Surely if a mere child can do it, so can any normal "ignorant adult".

I believe that the lack of sales are due to the ignorance of the general public. In my very short experience with tape recorders I find that very few people have seen a tape recorder working. They believe that a recorder costs a fantastic price and that one has to be a technical expert to run them. Why don't tape recorder firms get together and advertise the simplicity of tape recorders? By advertising on TV the tape recorder would soon be as popular as the record player.

The Tape Recorder is helping a great deal to teach the public these facts. It is an excellent publication and I am sure it will soon be as popular as *Hi-Fi News*.

Yours faithfully

From:—Kenneth L. Davy, Bymead, Redbourn, Hertfordshire.

Dear Sir:—Many congratulations on your first issue of "The Tape Recorder". I shall certainly be a regular reader. The other day I was showing my wife the results of my latest "hook-up" whereby I can silently record radio on to tape. She remarked "That's splendid. Now try and fix it so that it will play back silently!" Can any of your readers help?

Yours.

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7"	35/-	50/-	35/-	50/-	35/-	50/-

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Pilot Twin 10 Stereo	£32
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Jason J2-10 Stereo	£37 10s.
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Ferrograph 4A/N	81 gns.
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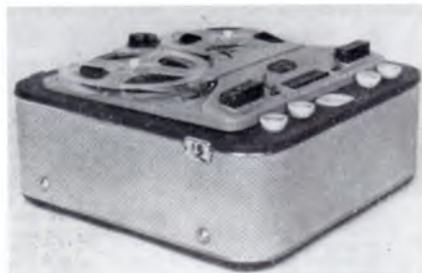
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TAPE, RECORDERS & ACCESSORIES

FIRST DETAILS OF NEW PRODUCTS

● We remind our readers that notices of equipment listed and illustrated in this monthly feature are in no sense reviews. When figures, specifications and diagrams are published, these data are extractions from manufacturers' lists. When samples of this equipment are submitted for test, they are passed to our technical contributors, whose reports are published in a separate section.



★
The Taplin-Hirst Balmoral Tape Recorders

★
AS announced in last month's issue the newly formed company of Taplin-Hirst are producing two new recorders called "The Balmoral", using the Collaro tape deck. The recorders are built to high standards and have a very wide range of facilities normally only found on much higher priced machines.

Both the Standard Plus and the De Luxe have separate record and replay amplifiers, monitoring of the input signal through the built-in loudspeaker, extension speaker sockets, outlet from the pre-amp. stage to feed an external Hi-Fi amplifier and a magic-eye level indicator. While the De Luxe also has provision for superimposing with an indicator light, a manual speed correction switch, straight through amplifier and a mains indicator light. The specification for the two is otherwise the same, frequency response, 40-16,000 c/s \pm 3 dB at 15 i/s and 40-12,000 c/s \pm 3 dB at 7½ i/s, corrected to CCIR spec. on record and playback. The signal to noise ratio at 2 watts output is claimed to be -46 dB.

Both recorders are housed in smart fawn and maroon cases well finished with gilt fittings. The Standard Plus measures 14½ × 15½ × 7½ in. and weighs 34 lb. and the De Luxe measures 14½ × 15½ × 8 in. and weighs also 34 lb. The price of the Standard Plus is £54 12s. and the De Luxe £66 3s. A De Luxe model (shown above) has been submitted for review.

For further details write to Taplin-Hirst & Co., 22/23 Coram Street, London, W.C.1.

A New Dictation Machine by Philips

MANY novel and attractive features are claimed for a new Dictation Machine (Type EL3581) introduced by Philips Electrical Ltd. Chief among these are a snap-in type cassette which



★
A novel tape-loading system is employed

★
eliminates the need for tape threading and handling, and extreme simplicity of controls. The EL3581 sells at £36 15s.,

including cassette loaded with tape, coupon book and dust cover (microphone and other accessories are extra).

The recording time is 20 mins. on each track, and spools are 3 in., each holding 215 feet of tape, the rewind time is 80 secs. The size is 10 × 7½ × 4 in. and the weight 8 lb., the colour is light grey-green. A system of positive locking controls guard against operation al errors

and there is a fast erase facility. A pilot light indicates when the machine is switched on and a red warning light set in the microphone shows when sound is being recorded. The dual-purpose microphone can be used as a monitoring replay speaker if required. The microphone costs £6 6s. Many accessories are available.

For full details write to Philips Electrical, Century House, Shaftesbury Avenue, London, W.C.2.

R.G.D. enter the tape recorder field

R.G.D. have entered the tape recording field with a new two-speed machine selling for £72 9s. The speeds are 7½ and 3½ i/s with a claimed frequency response at these speeds of 30-18,000 and 40-13,000, peak output 4 watts. Features of the recorder include, interlock button to prevent accidental erasing of a recording; erase button so that unwanted modulation can be wiped off without cutting out the sound when it is being reproduced; 3 figure digital counter, 7 in. spools, switched inputs for microphone, telephone and pickup, the amplifier can be used "straight-through"; magic-eye level indicator.

The case measures 16½ × 13 × 8 in., and is covered in green and gold leatherette, the weight is 29 lb. A dynamic microphone with a remote control switch is included in the price.

Manufactured by R.G.D. Co. Ltd., Eastern Avenue West, Romford, Essex.



★
The Stuzzi Tricorder has a slowest speed of 15/16 i/s.

★
THE Stuzzi Tricorder is a new recorder to be seen for the first time at the Audio Fair. This machine is the first to appear using a tape speed of 15/16 i/s. At this speed a frequency response of 40-4,000 c/s is claimed. The other speeds are 3½ and 1½ i/s with a response of 40-16,000 and 40-8,000 c/s respectively. Signal to Noise Ratio, better than -45 dB. D.C. heating of the first three stages. Inputs are provided for Microphone, Telephone adaptor, Radio and Pickup connections with mixing facilities on two inputs. Monitoring is possible through the built-in speaker. Other features include a magic-eye level indicator; continuously variable superimposition control; 3 digit place locator; pause control; remote control from the microphone; connection for remote control foot switch; a slide projector can be controlled from a plug-in connection; automatic stop at end of tape; maximum playing time, 5½ in. spools, using double play tape gives 6 hours on each track at 15/16 i/s. The size is 13 × 10 × 10½ in., and the weight approximately 23 lb. The price has not yet been fixed.

For further details write to Recording Devices Ltd., 95 Villiers Road, London, N.W.2.

Please mention **THE TAPE RECORDER** when writing for further details

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Elizabeth Escort	45 gns.
Elizabethan Sandbox	29 gns.
*Elizabeth Essex	65 gns.
*Ferrograph 4AN	81 gns.
*Ferrograph 4AN/H	86 gns.
*Ferrograph 4AN/S (stereo)	89 gns.
Ferrograph Stereo-Ad	30 gns.
Grundig TK20	52 gns.
*Grundig TK25	62 gns.
*Grundig TK30	72 gns.
*Grundig TK35	82 gns.
Geloso	38 gns.

	Price
*Harting	82 gns.
Magnafon Courier	49 gns.
Magnafon Diplomat	51 gns.
Perth-Saja Standard	45 gns.
Perth-Saja De Luxe	56 gns.
Philips EL357	39 gns.
Philips 8108G	62 gns.
Phonotrix	26 gns.
*Reffecograph	94 gns.
*Saba	89 gns.
*Simon SP4	95 gns.
Sound 444	45 gns.
Sound A20	55 gns.
Sound 555	65 gns.

*Microphones extra

	Price
Sound Belle	26 gns.
Spectone	76 gns.
Stuzzi Maganette	69 gns.
*Telefunken KL85	75 gns.
*Telefunken KL85K	79 gns.
*Telefunken KL75	50 gns.
Truvox R.2	59 gns.
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*Vortexion WVA	£93 13 0
*Vortexion WVB	£110 3 0
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Walser 303 De Luxe	42 gns.
Walser 505	57 gns.
Wyndoor Dauphin	89 gns.
Wyndoor Viscount	49 gns.

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Jason FMT/3 FM	23	19	6
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C.G. FM	26	19	0
Pye FM	23	2	0
Pye FM/AM	30	9	0
Philco FM	19	19	0

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Lustraphone "Lustrette" M/C	3	7	6
Lustraphone VR/64 Ribbon	7	17	6
Lustraphone VR/53 Studio Ribbon	9	19	6
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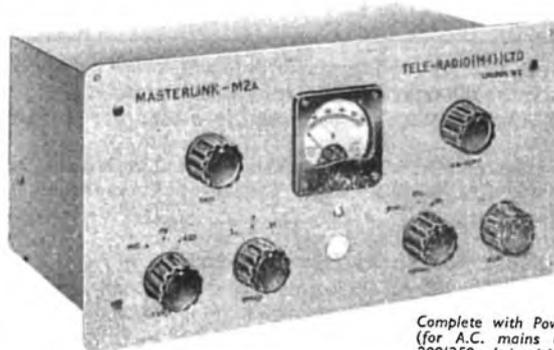
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EQUIPMENT REVIEWED



★
TELEFUNKEN
MAGNETOPHON
SERIES 85
TAPE
RECORDER
★

★ **Manufacturer's Specification:** Tape speeds, $7\frac{1}{2}$ and $3\frac{3}{4}$ i/s. Frequency response, 30-20,000 c/s ± 3 dB at $7\frac{1}{2}$; 30-15,000 c/s ± 6 dB at $3\frac{3}{4}$ i/s. Signal to noise ratio, better than -50 dB. Wow and flutter, better than 0.2% at $7\frac{1}{2}$ and 0.4% at $3\frac{3}{4}$ i/s. 3 recording inputs changeable by an input selector switch, radio, microphone, pickup. Separate tone controls for bass and treble; extension speaker socket. The loudspeaker and volume control can be used for monitoring while recording. Automatic stop by foils at end of tape. Mains voltage 110, 127, 150, 220, 240-50 c/s. Consumption, approx. 40 watts. Size, $7\frac{1}{2}$ in. \times $17\frac{1}{4}$ in. \times $16\frac{1}{2}$ in. Weight, 55 lb. Price, £78 15s. Microphones from £5 5s. extra.

Distributed in the U.K. by Telefunken-Welme Corporation Ltd., 147 Strand, London, W.C.2.

AS the concern responsible for the development of the original *Magnetophon*, the wartime forerunner of all tape recorders, Telefunken have a real reputation to maintain in the tape recorder field. This is worthily upheld by the *Magnetophon 85*, a West German product handled in this country by Welme Corporation, who have established a chain of agents, all technically competent to service the machine. This is a practice that might well be followed by more manufacturers, for there are far too many dealers who carry no spares, and who are incapable of doing anything more difficult than change a valve.

The Magnetophon 85 is rather larger in plan and lower in height than the majority of tape machines, being $18\frac{1}{2}$ in. \times 16 in. \times 8 in. and weighing 33 lb. Though somewhat unusual, these proportions make the 85 easy to handle and convenient to carry. It is well finished in dark green and cream, the appearance and finish of both the exterior and interior getting a "highly commended" report from my family.

The deck is a cream coloured moulding in two sections, with an easily detachable moulded cover over the heads and pressure rollers. This cover is appropriately grooved to form a tape splicing guide, a very simple idea that saves the expense of buying a separate splicing block. Two tape speeds $3\frac{3}{4}$ and $7\frac{1}{2}$ i/s are provided, the desired speed being selected by a rather inconspicuous sliding bar at the back of the deck. All the remaining controls are grouped in two rows along the front of the deck, with the replay controls in the front row, and the recording controls in the second row. This segregation of controls should be more widely adopted by designers of tape recorders, for the present practice of mounting all the controls together, irrespective of function, cannot be anything but confusing to the new owner of a machine. The Telefunken 85 certainly scores on this point.

In the front row are the two tone controls for bass and treble adjustment, with the replay volume control in the centre. On the left hand side of the second row are the three press keys controlling the tape motion, selecting "record", "stop", and "replay", the record button being mechanically interlocked by a slide key against accidental operation. In the centre is a second slide key which controls the high speed wind and rewind, and on the right hand side a "quick stop" button that moves the tape out of contact with the capstan, a valuable feature when using the machine for dictation.

On the right hand side there is a three position input selector switch which connects into circuit the microphone, radio, or pickup, and concentric with this control is the recording volume control. A three digit counter and a magic eye volume indicator of the FM81 type are fitted.

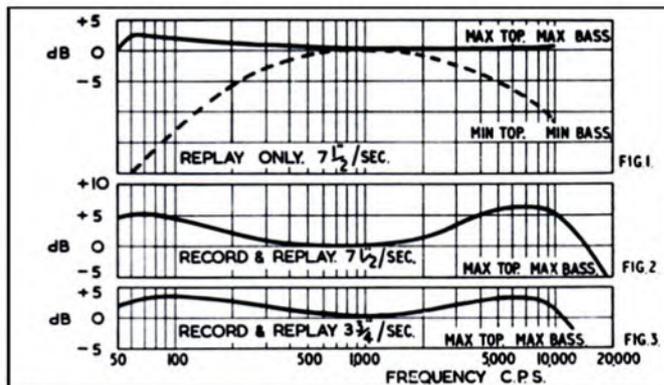
In the rear of the machine, behind two neat sliding covers, are the sockets for the three signal inputs, external loudspeaker, remote control, the mains connection, mains fuses and mains voltage selector. While there is ample space for storage of the mains lead, the standard 13 amp plug could not be got inside the machine, presenting a slight hazard to the neat sliding shutters if the machine was inadvertently put down on top of the plug.

Objective Performance: The instruction book issued with the machine claims a frequency range of 30 to 20,000 c/s at a tape speed of $7\frac{1}{2}$ i/s though, as no limits are placed on what is considered to be a reasonable loss at these two frequencies, the claim might mean almost anything.

Fig. 1 shows the measured performance of the playback system, but as the test tapes available carried tones up to 10 Kc/s only, this placed an upper limit on the measurements. Fig. 2 indicates the performance when recording and replaying, and confirms that the frequency response is less than 5 dB down at frequencies as high as 18 Kc/s, a quite outstanding performance.

A wide frequency range can always be achieved at the expense of signal/noise ratio but, as Table 1 shows, a reasonable value for signal/noise is realised. Such a wide frequency range, and reasonable signal/noise ratio, implies a replay head with a very narrow gap and the utmost care in screening the replay head and its associated wiring. Whether there is anything to be gained by extending the frequency range beyond say 12 Kc/s is doubted, but in today's "frequency-range-conscious market," there is probably a lot to be gained in the commercial sense.

Fig. 3 indicates the frequency range achieved at the lower tape speed, and here again the range obtained is seen to be outstanding by current standards.



● Response curves of the Telefunken 85.

Wow and Flutter: Table 2 lists the total wow and flutter values measured at both tape speeds. Two sets of readings were taken at $7\frac{1}{2}$ i/s, the first figures being obtained using a tape recorded on a laboratory type machine having particularly low values of wow. Thus the results obtained when replaying this test tape on the model 85 are typical of what will be achieved when replaying commercially recorded tapes. The second set of results were obtained by recording and replaying the test tone on the Telefunken 85, and thus indicate the performance obtained when recording and replaying your own programme material. The results are exceptionally good for a portable machine.

General Comment: The machine was impressively quiet and smooth in operation at both tape speeds, and on the high speed wind and rewind—a sure sign of precision in the mechanical workmanship. Rewind time was a little on the long side ($3\frac{1}{2}$ mins. for 1,800 ft.) but the tape spooled evenly and smoothly. The brakes never gave a moment's trouble, even when stopping a full spool after a high speed wind or rewind, a performance that is all too rare in current machines. An automatic end-of-reel stop is provided, actuated by a metal foiled

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● **Hi-Fi Year Book** is scheduled for publication in its fourth annual edition at Mid-April. This year it will be bigger than ever, with several new features, and many informative articles covering the different sections of audio equipment. As its regular readers already know, Tape Recorders, Tape Accessories, Microphones, etc., have always occupied an important place in this invaluable annual; and this year the sections devoted to these products have been very considerably increased in order to take in the many new items of equipment which have appeared on the market. Tape recorders of all types will be illustrated and included in its directory sections—professional and domestic models, stereo and single channel.

The directory sections of **Hi-Fi Year Book** form the most complete published guide to the available audio equipment, and every section is thoroughly covered, with pictures, makers' specifications, prices, addresses and telephone numbers. The various sections are outlined in the opposite column.

● The main sections of the 1959 **Hi-Fi Year Book** will include *Pickups*, stereo and monaural: *Turntable units: Pre-amplifiers*, both stereo and monaural: *Radio tuners: FM and AM*, self-powered and otherwise: *Tape Recorders*, professional, semi-professional and domestic: *Tape Amplifiers: Tape Accessories: Tapes: Tape Decks: Microphones: Loudspeaker Drive Units: Speaker Enclosures and Complete Speakers: Home Construction and Kits*. Following its customary layout, **Hi-Fi Year Book** (1959) will also include its advertisement section, fully indexed, at the end of the book, as well as its directory of Hi-Fi and Tape Dealers.

Hi-Fi Year Book is the accepted annual reference book for the whole Audio Industry, and is read by enthusiasts, engineers and dealers alike, in all parts of the world. The 1958 edition is now out of print, but may be found in most libraries for reference purposes.

To avoid any confusion with other publications note the short title—"HI-FI YEAR BOOK"

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99 Mortimer Street, London, W.1

EQUIPMENT REVIEWED—(continued)

length of tape inserted before the leader, and this worked very well indeed; though adding the foiled section to all your tapes can be a bit of a nuisance. Perhaps, in the fullness of time, all commercially recorded tapes will have a foiled section included as standard.

Table 1 Signal/Noise ratio			Table 2 Wow & Flutter		
7½"/sec	Unweighted	43 dB	7½"/sec	Relaying only	·09%
	Weighted	48 dB		Record & Replay	·11
3¾"/sec	Unweighted	44 dB	3¾"/sec	Record & Replay	·13%
	Weighted	47 dB			

The quality of reproduction is above average for a portable machine, and it fully justifies the use of a separate speaker with a real high fidelity performance. It is quite impossible to do justice to the machine when using the internal speaker system, for the carrying case is necessarily too small to provide adequate baffle area.

Reliability is a factor that it is almost impossible for a reviewer to comment upon, but in the particular machine sent for test the erase circuit failed after about a month's use, the erase only reducing the recorded signal by about 10 dB, though previous to the fault occurring the erase reduced the recorded signal by something nearer 50 dB.

The Magnetophon is a machine with a performance much above average and one that would well repay a close study by British Designers.

J. Moir



★
WALTER
505
2-SPEED
TAPE
RECORDER
★

★ **Manufacturer's specification:** Walter 505. Tape speeds 3¾ and 7½ i/s. Spool sizes, up to 7 in. Frequency response, level 40-14,000 c/s at 7½ i/s. Signal/Noise Ratio, better than -40 dB. Inputs, Microphone 2 mV, Radio/pickup 300 mV, built-in mixing of both channels. Fully screened record/replay head, high impedance, micro gap type. Straight through amplifier response, 40-20,000 c/s. Speakers, one 9 in. × 5 in., one 4 in. tweeter. Output 4 watts. Mechanical braking automatically linked with the control unit and independently adjustable. Mains voltage 200-250 v. A.C. 50 c/s. (100-250 v. 40-50 or 60 c/s to special order) consumption 70 watts approx. Weight 23 lb. Size 16½ in. × 12½ in. × 8 in. Price, with microphone, spool of tape, spare recording leads and plugs; £59 17s.

Manufactured by **Walter Instruments Ltd., Garth Road, Morden, Surrey, England.**

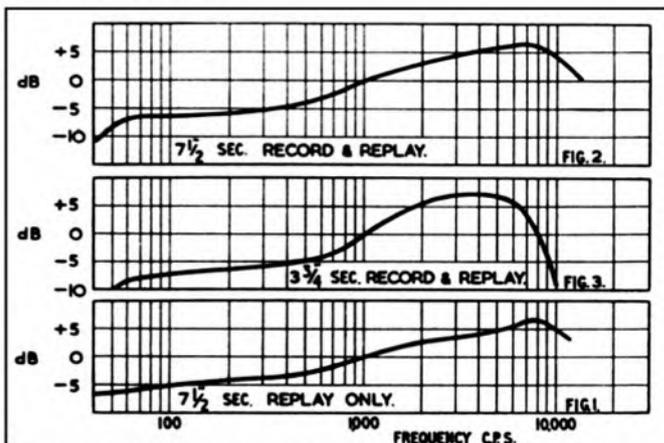
AT 57 guineas, complete with microphone, the Walter 505 is the cheapest tape recorder so far reviewed and the remarks that follow should be read with that point well in mind. It is unreasonable to expect a Rolls-Royce performance from a popular priced product.

The machine is relatively small, 16½ in. × 12½ in. × 8 in. deep and weighs only 23 lb., so that it is really portable, without straining the word. It is reasonably well finished in a two colour imitation leather-cloth that will undoubtedly withstand a lot of wear without showing undue signs of stress. The cream coloured plastic top plate is unusual in that the spools drop on to spindles recessed into the top plate to leave the top face of the spool about level with the deck. This is a neat arrangement, but one that makes threading of the tape a little more difficult than the conventional arrangement where the spools stand proud of the deck. The recess limits the size of the spool that can be accommodated to 7 in., but this is generally not of great moment for a 7 in. spool of thin tape will allow nearly 55 minutes of

recording time per track at a tape speed of 3¾ i/s. Both spools can be locked in position for transit by decorative brass nuts that can be screwed down on to the spindles, but their small size makes them easy to lose.

The top deck controls are disarmingly simple. The use of double purpose controls, a multi-function "joystick" and the placing of some of the knobs on a recessed side panel decreases the number of knobs appearing on the top deck, improves the appearance, and probably decreases the confusion engendered in the minds of the non-technical user by a multiplicity of controls. Confusion as between recording and replay controls is still further reduced by the use of red scales on the recording controls and green scales on the replay knobs, a simple device that should be in more widespread use. A top deck with fifteen or twenty knobs may be a simple control panel to the technically knowledgeable, but it must look alarmingly complex to the man-in-the-street.

Controls on the top deck are minimal, a joystick type of lever that selects "Record", "Replay", "Fast wind" and "Fast rewind". This is a trifle heavy in action but it gave no trouble during a couple of weeks use. Precautions against the accidental erasure of a valuable tape is given by a small push-button that must be depressed before the stick can be put into the "Record" position. A centrally placed coin operated knob selects either of the two speeds, 3¾ i/s or 7½ i/s and rather unusually it must only be operated when the motor is running. An "instantaneous stop" button is provided—a most useful feature when the machine is being used for dictation. A standard type of three digit footage counter is mounted towards the back of the deck rather out of eye range.



● Tone controls in "max. top" position for all curves.

On the left side of the deck there is a magic eye volume level indicator and one of the double function controls. When replaying a tape the knob gives control of "top cut", i.e., it is a tone control, but when recording it provides control of monitor volume. Functionally, it might have been more useful to have this knob give control of replay volume.

A small recessed panel on the left hand side of the machine carries two knobs, giving control of playback volume and the high level signal when recording, but the replay volume control doubles as the low level signal control when recording, and in addition carries the ganged on/off mains switch. The sockets for the input signal plugs and the extension speaker are also mounted on this panel.

The light weight, relatively small size, the quality of the sound from the internal speaker, and the generally workmanlike appearance, created a good first impression with the family when the 505 was put into domestic service. A couple of minor faults soon showed up: the joystick control could be moved into the record position without pressing the safety button, and the switch (normally operated by the joystick) failed to change over the left hand panel control from being a tone control on replay, to a monitor volume control on record. This left the control acting as a monitor volume control on both record and replay. The same fault was present in a second machine that became available for a short time, rather suggesting that the switch operating mechanism needs the designer's attention.

With these general remarks, the results of the objective tests can now be reviewed.

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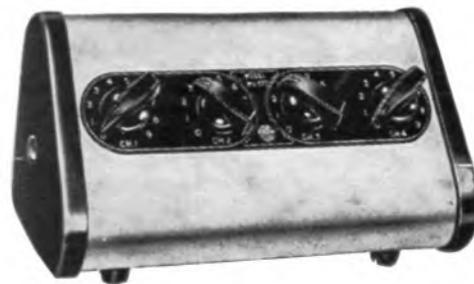
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EQUIPMENT REVIEWED—(continued)

Frequency Response: At a tape speed of 7½ i/s, the replay response from a calibrated test tape was as shown in fig. 1 though, because of the failure of the joystick operated change over switch, only the response in the "max top" position could be taken. If it had been operative it would no doubt have taken the "top lift" out of the response, so something flat to ± 3 dB between about 70 and 11,000 c/s could have been obtained. The top end response is more than adequate for almost any application, but the bass end performance as measured at the external speaker terminals could be improved with advantage, though the extra bass would have to be kept off the internal speaker if it were to have a reasonable life and such niceties cost money.

Table 1—Signal/Noise Ratios			Table 2—Wow and Flutter		
7½ i/s	Unweighted	43 dB	7½ i/s	Replay only	·22%
	Weighted	44 dB		Record & replay	·25%
3¾ i/s	Unweighted	42 dB	3¾ i/s	Record & replay	·33%
	Weighted	47 dB			

The combined record and replay response at 7½ i/s fig. 2 is very similar to the replay response, indicating that the recording performance is very close to C.C.I.R. standards. Though the combined record/replay response at a tape speed of 3¾ i/s fig. 3 is obviously inferior to that obtained at the higher tape speed, it is still quite adequate to do justice to any AM programme broadcast by the BBC.

Signal/Noise Ratio: The signal/noise ratio, the ratio in dB of a 1 Kc/s note recorded at full modulation level as indicated by the magic eye indicator, to the residual noise remaining when the signal is erased on the machine, is shown for both tape speeds in Table 1, the figures being unusual in that they show a slightly better performance at the lower tape speed (this was checked several times with two separate noise meters, somewhat of a mystery). The S/N figures can be considered good indeed for a portable machine.

Wow and Flutter: The cyclic variations in instantaneous speed known as wow and flutter, are shown for both tape speeds in Table 2 and they indicate a good standard of performance for a portable machine of such low weight. A good point not indicated by the use of single values, is that the high frequency flutter components in the totals quoted, were all unusually low even for machines at more than twice the price.

Microphone: The microphone included with the 505 gave a surprisingly good performance when used for speech recording. It was free from excessive bass response or pronounced sibilance and produced some very smooth speech recordings. The 505 has adequate gain to allow the microphone to be used at several feet from the speaker if the room acoustics permit.

General Impressions: The low price at which the *Walter* sells, has clearly necessitated economies in the design and construction that have had the usual effect on performance but some tightening-up of test and inspection appears advisable. The machine was well liked by members of the family and by a couple of friends to whom it was loaned, in case my more experienced eye was being over critical. Its small size and low weight are well balanced by the performance obtained.

J. Moir



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WHAT DO YOU KNOW?

In this column are one or two more mental exercises, a catch or two, and some straightforward quiz questions. The answers are printed at the foot of the column upside down.

1. One of the most important points to observe, with tape recorders and all other domestic electronic apparatus, is to *switch off at the mains* when going out. The reason for this is that failure of quite a small component in the power supply part of the equipment can cause a heavy overload on the mains transformer, and this in turn can burn out; and the result could, *in extremis*, mean the clanging of fire-bells. Now all this makes sense, but where have we gone wrong?

2. As a sidelight on the much over-stressed subject of frequency response, it has been proved that a person of limited hearing response can tell immediately if there is a serious deficiency of the higher frequencies, even though his ears cannot hear those frequencies. Why?

3. A centipede, 8 inches in length, has its 100 legs spaced equally along its chassis, beginning and ending at $\frac{1}{4}$ -inch distances from each end. It walks across the business part of a microphone while the recorder is working at the $7\frac{1}{2}$ i/s speed. How many footfalls will be heard in 5 seconds of tape time?

4. We know that the recorded sound track on magnetic tape consists of a long strip of differently magnetised iron oxide particles. These variations are invisible. Is it possible to make them visible?

5. Dirt on the face of a tape head can cause a lot of trouble. It can keep the tape at an imperceptible, but vital, distance from the gap; and that is only one of the several things that may result. There are many substances that can be used for cleaning metal surfaces. (a) Which should not be used, and why? (b) What is safe?

6. Which of the following microphones: Ribbon, Condenser, Crystal, Moving Coil, would you use for recording: (a) A car rally. (b) A string quartet. (c) Animals in the tropics?

THE ANSWERS

1. Our danger relates to the bad effect of switching off at the mains without switching off on the recorder itself, which leaves the pressure roller in contact with the drive capstan. This is bad practice since "a flat" is formed and can give rise to unfortunate speed fluctuations, i.e., wow and flutter. Moral: Switch off at the mains by all means, but switch the recorder off too.
2. The explanation is believed to be twofold. Firstly, there are the beat frequencies to be considered, and, secondly, the attack of sounds is a function of the complete spectrum.
3. Your guess is as good as ours! Maybe it depends on how fast your centipede goes.
4. Yes. The Ampex system of recording television programmes on tape includes facilities for editing. So that this may be done accurately enough to maintain the correct synchronising, a very fine magnetic powder is employed which indicates the recorded peaks.
5. (a) Do not use pure alcohol or carbon tetrachloride, except when expressly mentioned in the maker's instructions, as these may have a harmful effect upon the casing or the coil insulation. (b) It is safe to use methylated spirits on a soft brush or cloth.
6. (a) Moving Coil or Crystal since the others are unsuitable for outdoor use. (b) Any, but Ribbon or Condenser types are usually preferred. (c) Moving Coil since Crystal microphones are affected by temperature and humidity.



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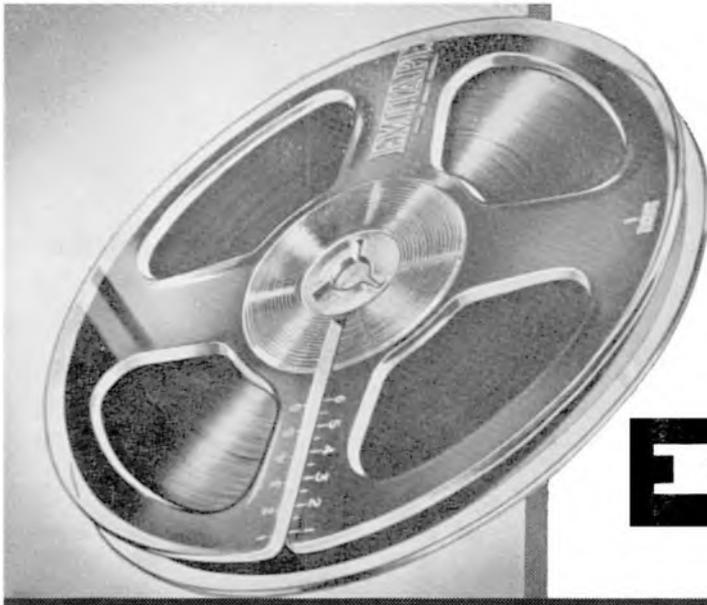
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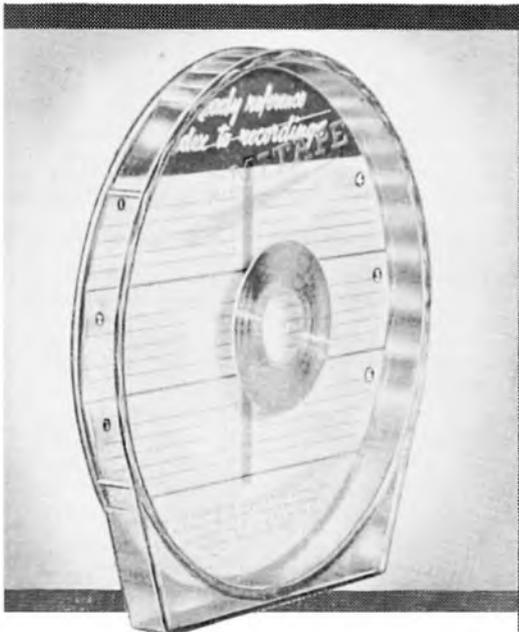
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