

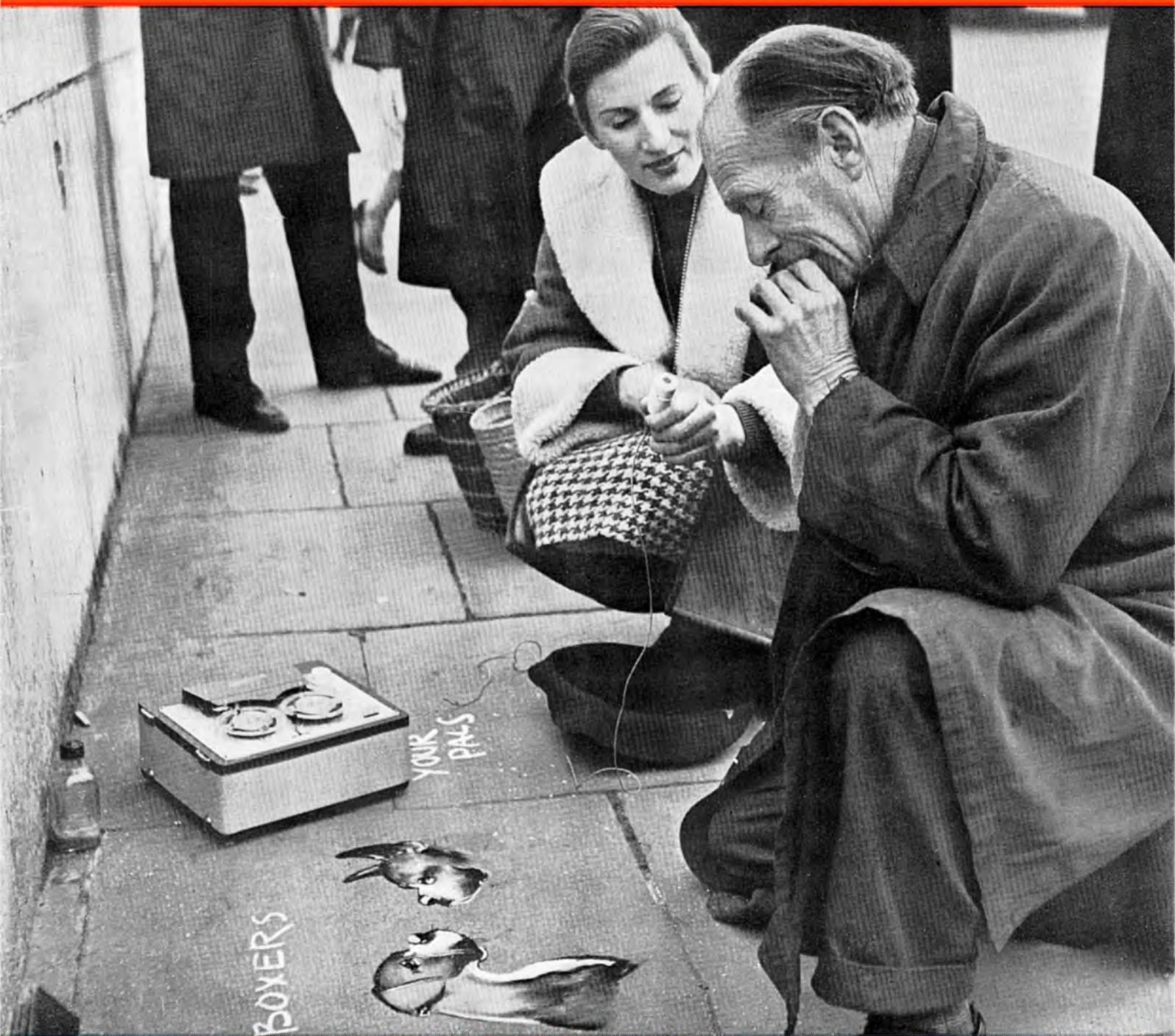
# the TAPE

PRICE 1/6

MARCH 1960  
Vol. 2 No. 2

# RECORDER

INCORPORATING "SOUND AND CINE"



## IN THIS ISSUE

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**I like the look of it—**  
*a really nice piece of furniture for  
 the home—look at that lovely sapele  
 mahogany—so easy to use too—those  
 magazines—simple as putting on a record*



**I like its entertainment**  
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 programmes, music,  
 recordings of the kids—I can  
 keep them—enjoy them when  
 I like.*



**I like the inside—not that**  
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 it and it records.*

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- ★ Automatic erasure when recording
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	1200	$5\frac{1}{2}$	2 x 60	£1 15s. 0d.
	1800	7	2 x 90	£2 10s. 0d.
Double Play tape	300	3	2 x 15	14s. 0d.
Agfa PE 41	1800	$5\frac{1}{2}$	2 x 90	£3 0s. 0d.
	2400	7	2 x 120	£4 0s. 0d.

\* At 4.75 cm/sec ( $1\frac{7}{8}$  ins./sec) recording speed the playing time is doubled. All tapes are supplied on reels with leader and contact strips.

\* Registered Trade Mark of the Manufacturers, Agfa A.G., Leverkusen/Western Germany.

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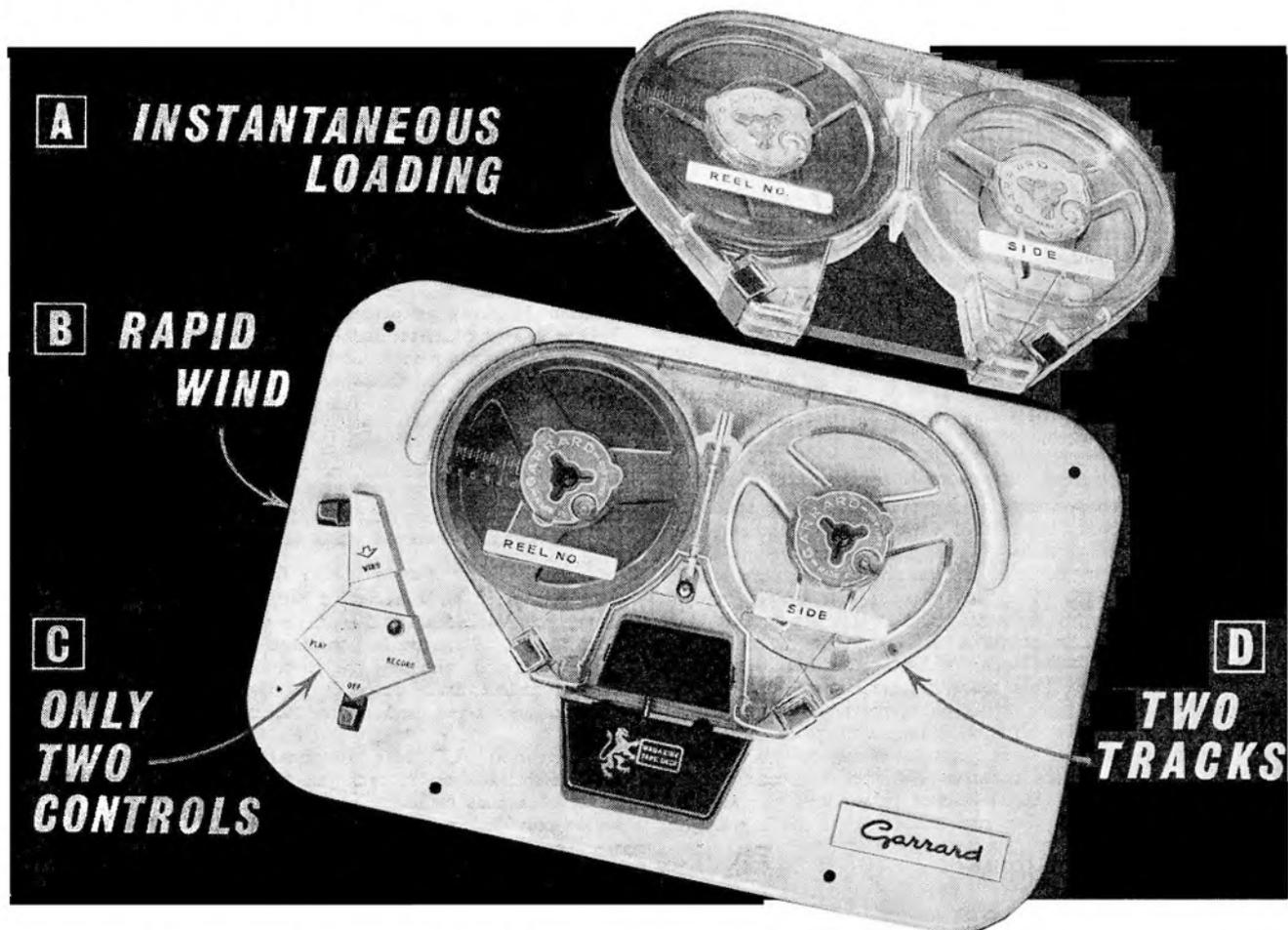
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GS. TR. 194

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. . . about the **NEW**

- A INSTANTANEOUS LOADING**  
Magazine loads on to deck as simply as putting on a record.
- B RAPID WIND**  
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- C ONLY 2 CONTROLS**  
One for record and play.  
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1.  $1\frac{7}{8}$ " ips can be fitted for an extra 3 gns.
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$1\frac{7}{8}$  ips 70—4,500  $\pm$  3dbs.

$3\frac{3}{4}$  ips 60—8,000  $\pm$  3dbs.

$7\frac{1}{2}$  ips 50—15,000  $\pm$  3dbs.

15 ips 40—20,000  $\pm$  3dbs.  
(signal noise ratio at  $7\frac{1}{2}$  ips—47dbs.)

Separate record amplifier.

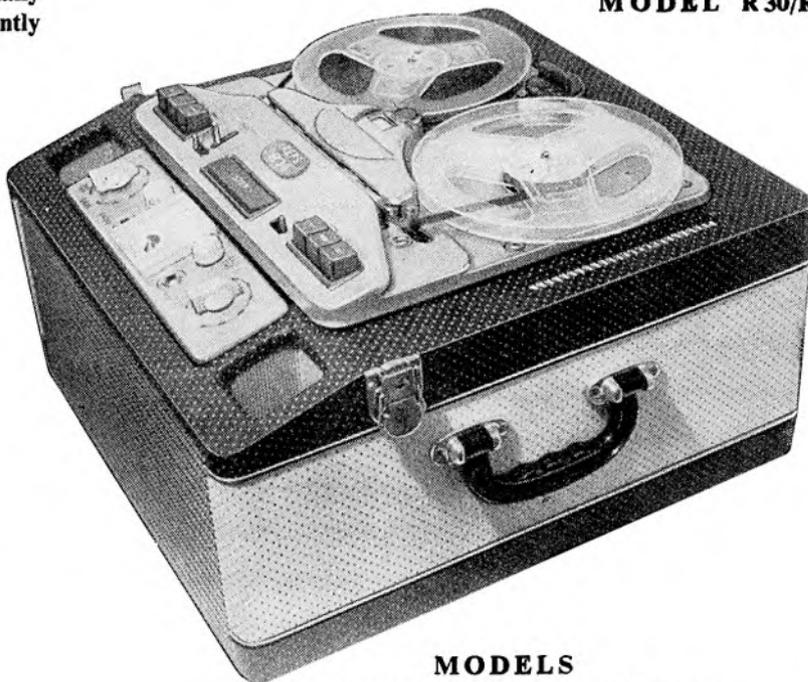
Push-pull bias erase oscillator for low tape hiss.

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Supplied complete with Acos 39/1 microphone, Radio Record lead and 1,200' P.V.C. Tape.

## FURTHER FACTS

It is not generally known that the Tape Deck mechanism is virtually re-built in the REPS machines. It is standard procedure to remove all rubber wheels—i.e., re-wind, idle and pinch—and re-grind them to a closer tolerance. Also the Capstan is skimmed to less than  $\pm$  0.0001". This has resulted in a very low "wow" factor, especially at  $3\frac{3}{4}$  ips which has led to the logical introduction of  $1\frac{7}{8}$  ips in place of the 15 ips. The principal cause of "flutter" is due to



## MODELS

R20 62 GNS. with magic eye record indicator  
R30 66 GNS. with meter record level indicator  
R40 70 GNS. as R30 but with push/pull sound output.

the eccentricity of the three-step pulleys which control the tape speed. This eccentricity occurs when the pulley is locked to the motor shaft and is due to the off-setting action of the fixing screws. This difficulty has been overcome by manufacturing pulleys over-size and machining to the correct diameter when fitted to the motor shaft. By this method a total variation of less than 0.0001" has been achieved at  $1\frac{7}{8}$  ips. Initial measurement indicate total "flutter" content at  $1\frac{7}{8}$  ips to be of a lower order than previously associated with  $3\frac{3}{4}$  ips.

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Please send me without obligation full details of your range of Tape Recorders. I am particularly interested in Model R.....

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# the TAPE RECORDER

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 Technical Editor - - - - - John Borwick  
 Assistant Editor - - - - - Julian Berrisford  
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★  
**EDITORIAL**

OUR "Editorial" last month has apparently created more than a passing interest; and our chosen phrase—the new "magic box for home entertainment"—has brought us a considerable amount of correspondence to support these views. Likewise, we are gratified to note, our belief in the more significant, underlying reason for the amazing popularity of the tape recorder is also approved—i.e. it is a timely medium for re-introducing the element of self-expression into home entertainment, long neglected as a result of an era of canned music.

However, let us not underestimate the factor of "canned music" so far as the tape recorder is concerned. Our view is that this new "magic box" must serve a dual purpose; and only when it is able to do this will it really come into its own. Between now and then it is already possible to see the first harbingers of a veritable shoal of Red Herrings that are likely to cross the trail.

With the gramophone, progress was comparatively straightforward. First came the cylinder; then the disc, because it was a better "all-round" commercial proposition; then came the increased playing time through reduced speeds and micro-grooves; finally came the double trace which brought stereo. With tape, however, there are already a dozen-and-one variations on the agenda. In the U.K., and until quite recently in America, too, it seemed that a playing speed of 7½ i/s was a useful standard for "quality" in recorded music. It seemed also that the 5-inch spool was an ideal size, because the majority of recorders already in use would take such a spool, and play at that speed. A widely held view still supports this speed in America; but the R.C.A. plans favour a speed of 3½ i/s and a cassette packaging for recorded music. A still more recent plan, by Columbia, favours a speed of 1½ i/s, and a narrow tape, also in cassette form.

These different views—any of which could become reality at any time—are all the result of commercial thinking, because tape records (the new canned music) are more difficult to make in quantity, and more costly in terms of basic material, than the discs with which they are beginning to compete. It all boils down to an effort to get as much as possible on to as little as possible. And here, in order to complete the picture, we must consider the question of stereo—or, at least, the number of tracks to be accommodated.

In the first camp, which caters for existing recorders, economy is proposed by a change from two tracks to four on ½-inch tape. From the second camp, which could mean the introduction of an entirely new type of recorder/player, economy would come, two-fold, as four tracks on a ½-inch tape at 3½ i/s. From the third camp, which would also mean a new type of instrument, the economy would come two-fold including a saving of tape in width—two tracks on 0.12-inch tape width, running at 1½ i/s.

About all these possibilities we shall have much to say in the near future; but in the meantime let us remember the ultimate. The tape recorder, whatever its form, should be primarily a recorder. It must not be dispossessed of its heritage by anyone seeking to relegate it to the role of a successor to the gramophone.

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COVER PICTURE

OUR cover picture this month, taken by Tina Tranter of our photographic department, Colour Printers Ltd., shows an incident in one of our monthly "Field Trial" journeys. The pavement artist, a well-known figure in Trafalgar Square is discussing his work with a member of the staff—also an artist! The conversations recorded on the "Minivox" during these trials provided unusual entertainment for the editorial staff (as they always do!) before the customary, dutiful erasure. The conversation between the subject of next month's cover (seen below) and his master was unfortunately not recorded!

NEXT MONTH

THE second instalment of our new series of hints on adding sound to home movies will appear next month, and the approach of the London Audio Fair—perhaps the biggest sound and tape event on the calendar—will be marked by a preview of tape recorders and accessories to be shown by all the well-known manufacturers. The *Field Trial* (held over this month due to pressure of space) deals with the Fi-Cord. More reviews of tape records are scheduled, along with news of the world of tape, *Tape Recorder Workbench*, *Reviewing Tape Recorders*, *Know Your Tape*, and all our regular features. To be sure of getting your copy regularly, place a firm order with your usual supplier, or take out a year's subscription from this office.



THE TAPE RECORDER FOR APRIL—ON SALE MARCH 25

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).



# HERE, THERE AND EVERYWHERE

● In reply to readers who write in, asking to purchase copies of photos, please note that we only control those taken and printed by our own studios. These will in future carry the notice **Photo-Colour Printers**, and whole plate prints of these can be supplied at 3s. 6d. each, post paid.

*Narrow-gauge jointing tape by Agfa was mentioned in these columns last month. The result, despite our request for readers to write direct, was a further crop of letters! This jointing tape is now being made available to the general public through tape dealers. A letter to Agfa Ltd, 27 Regent Street, London S.W.1., will bring you details of your nearest supplier.*

### The Linden Singers

KNOWING that there was a Ferroglyph somewhere in the offing, *The Tape Recorder* called the other day on Mr. W. B. J. Llewellyn, who is well known to the public through his activities with the Linden Singers. Submerged in a large and voluptuous sofa, and with one long pair of legs protruding, he was asked in the best British tradition of understatement if he "ever used the Ferroglyph" these days. The volley that resulted sounded like a copywriter's dream. The occasion was by way of a prelude to his handing over his duties in April as Musical Director to Mr. Ian Humphreys.

Television appearances are always pre-rehearsed, from the introductory niceties to the final "cheerio", and according to all reports, many a catastrophe thus averted. With the Singers, both rehearsals and transmissions are taped, not only for the sake of interest, but to be brought home and studied under the microscope, as it were. With both, this has been found over and over again to be of invaluable assistance; the "clinical" atmosphere at home reveals everything that the ear either half-hears at the time, or indeed prefers not to hear at all! Mistakes are noted and comments added, the tape being returned to base for general consumption at the next rehearsal.

Of the 19-odd singers in all, nearly half have their own machines, with a strong bias in favour of the Ferroglyph. No stereo recorders yet, but the Singers keep in touch with old members all over the world. One particular individual, now resident in Canada, was sent a Christmas tape last November, with

"suitable" messages; history fails to disclose the reply, or was it on 4-track stereo at  $1\frac{1}{2}$  i/s?

In the domestic field, Bill Llewellyn is renowned all over Surrey for his versatility. Officially an Assistant Music master at Charterhouse (a superb tape of "jingles" for each of the 11 houses), he runs local choirs, teaches in local high-class girls schools, conducts everyone and everything in sight and, until recently, never appeared to sit down for more than a couple of seconds. Now that he has handed over most of his work with the Linden Singers, whilst still retaining his seat on the "board", he is turning more to composing and arranging. What are the odds that one of these fine days some highly reputable music publisher, high up over Soho, will find on his desk a 5 in. spool? The days of the manuscript may be numbered in some cases.

### A New Venture

THE CITY OF LONDON RECORDING STUDIOS opened with a flourish at 9-13 Osborn St., E.1, on January 20th last. Many prominent personalities from "Show-Biz" and the advertising world were present when disc jockey Kent Walton metaphorically cut the tape, and *The Tape Recorder* joined in to help the splicing.

The purpose behind this venture is twofold: firstly, to provide a reasonably central meeting point, but away from pink Zones and the like, and secondly to bring together under the one roof all aspects of recording, i.e., recording, editing, dubbing and disc transcription, so that the whole process can be supervised by the



Mr. Bernard Mattimore, recording manager at the new City of London Recording Studios, in action in the control room of Studio A during a "Jingle" session.



Seen together at the opening ceremony at the City of London. L. to R., Miss Margaret Stebbers ("Oh Boy!"), Mr. and Mrs. Bryan Dempster and Mr. Kent Walton.

# HERE, THERE AND EVERYWHERE

one recording engineer. To this end, they have built two sizeable studios, equipped them with some of the best equipment that money can buy, and added the extra touch in décor and modern comforts. The equipment used is principally Rank-Cintel, with Vortexion multi-channel mixers, Garrard 301 turntables and Tannoy monitoring speakers and enclosures. A Chappell Boudoir Grand is used in the larger studio, where the photograph at bottom right was taken. The charges would seem fairly reasonable—5 gns. and 4 gns. per hour for the larger and smaller studios respectively, editing 3 gns., dubbing £2 10s., etc.

The personalities behind the scenes are no less colourful than the décor. Bryan Dempster, ex-crocodile hunter, is the principal, who started here by recording programmes for transmission to Africa on behalf of the Central Office of Information. With scripts by Penny Pearson, these programmes go out several times a week, with subjects ranging from Steam Engines and Electricity via Coffee to The Thousand and One Nights!

The Recording Manager is a familiar figure in this world already, Mr. Bernard Mattimore, and the Studio Manager is Mr. Roger Blaxter. One of the most striking impressions left after this particular visit was the general noise level, and the resulting effect on the ear-drums; few of us can have failed to attend, a cocktail party where movement is not only inadvisable but downright impossible; the noise during these sessions is of the region of 80 phons. But have it in a sound-proofed studio, and despite all the efforts of the multitude, it still remains possible to speak in a normal voice.

## A Fine Gesture

MESSRS. CATHEDRAL SOUND, of 38 Nutfield Gardens, Northolt, Middlesex, have written in with details of their proposed scheme for organising on a wider basis their "Chain Tape Service" for the blind. Briefly, Cathedral Sound are recording programmes with short stories, humorous sketches and so forth with a view to offering them to Tape Clubs. The latter then copy the tape, send the copy round their local Blind Clubs, and send the original tape to the next Tape Club on the list. Tapes already recorded are welcome in the same way, for passing round the chain. Incidentally this is an entirely voluntary effort, and no charges or payment enter into the scheme at all. A splendid effort, in our opinion, and one that we would like to commend to all clubs. Please contact Cathedral Sound direct, and not this office in this case.

MANY thanks again to our readers, this time WO2 R. J. Abbott, of the Regimental Depot, RAOC, Blackdown, Hants, for the following anecdotes:

"On changing duty stations I also changed recorders, and returned home to England with a brand new Ferrograph which was promptly set to work recording military parades. This can prove very entertaining, especially if one appreciates military music. On one occasion I was able to settle a dispute between the Officer Commanding the Parade and the Bandmaster as to who was responsible for the parade falling out of step when changing from slow to quick march.

"Apart from supplying background music at Regimental Dinners I have more recently assisted my Regimental Sergeant Major in the unenviable task of instructing his officers in the correct delivery of words of command to be used in our coming Administrative Parade by recording the commands to be used and replaying them whenever required. The advantage of presenting to the



*Field Trials of the Challen Instrument's "Minivox" recently took our photographer and reviewer through London's West End, and resulted in some fine pictures. Above, a Newsvendor finds time, between "Evening Newses", to say a few words. On the following right-hand page the Minivox finds other admirers.*

*Photo—Colour Printers*

audience the actual commands rather than the written word can be readily appreciated as the correct intonation and pauses can be demonstrated.

"The recording was made in the RSM's office whilst a very puzzled Regimental Policeman stood guard at the door to ensure uninterrupted silence. The only incident worth mentioning during the recording was the unrehearsed language of the RSM when the telephone, which lurked unsuspected in the corner, pealed forth halfway through the final recording. This had to be quickly obliterated but due to the velocity of his voice I swear my peak signal level is slightly bent and will never be the same again.

"My next assignment is to record the actual parade. And the one after that? Post the RSM and buy the unit a tape recorder!"

THE familiar sight of well-known recorders and the many references to them in these columns tend to disguise another but important aspect of tape-recording behind the scenes of some manufacturers' main production lines. A typical example occurred recently when the research company within the Wyndors organisation won the Ministry of Supply contract to design and produce a special tape recorder for the Guided Weapons Trial Wing of the Royal Aircraft Establishment, Farnborough.

This was a remarkable tape-recording instrument in several ways in that its purpose was for recording telemetry signals received from target aircraft. Though quite different from the Wyndors "Viscount" portable tape-recorder, a number of common components were used, which is natural when one considers that both were born in the same laboratory by the same design team. The Ministry of Supply job was for a dual channel recorder/

# TAPE—AS OTHERS ARE USING IT

reproducer covering a very wide frequency response and recording simultaneously on both tracks for 100 minutes continuously. The Wyndor subsidiary, the Magnetic Recording Company, won the contract in open competition and executed the design, the order being completed within five weeks. Other interesting features were that the bias is in excess of 100 K/cs., the operational tape-speed is  $7\frac{1}{2}$  i.p.s. using double play tape and the output feeds a pen-recorder. The machine is rack-mounted for laboratory installation.

**T**APE RECORDS are now promoted to full page feature status, and the first reviews are on page 93. In the meantime the reader might like to know a little more about the various companies in the field.

1. **E.M.I. Records Ltd.**, 8-11 Great Castle Street, London, W.1, who have been in the field the longest, have a catalogue some 40 pages thick, with several hundred different tapes given under various headings. The accent is on the lighter classics, if anything, with fairly frequent excursion into the "heavies", and into pops and jazz. Prices are steep by comparison with others in the field, but common opinion as to quality would seem to excuse this. Recordings are on Emitape, somewhat naturally, and arrive in two-tone boxes with decorative lettering but no photos or sleeve notes. Releases are at irregular intervals, the last being October 1959.

2. **Music on Tape Ltd.**, about whom all enquiries should be addressed to their main distributor, **D.G.C. Ltd.**, 41 High St., Camberley, Surrey (see page 13 last month). The catalogue is smaller but more flexible than E.M.I.'s, in that all tapes are available at 15,  $7\frac{1}{2}$  or  $3\frac{1}{2}$  i/s, but is slanted firmly for the time being in the opposite direction, i.e., towards dance and background music; furthermore it is divided, like Gaul, into three parts—French, Scottish and Stereo. The first two are only available in mono, the last in either stereo or mono form. Recordings are made on either Scotch Brand or Irish tape, and are sold in plain green, purple or red boxes with the firm's name in gold

blocking to the fore. No sleeve notes and no frills, so that prices are reasonable, ranging from 16 minutes mono at  $3\frac{1}{2}$  i/s for 13s. to 30 minutes stereo at  $7\frac{1}{2}$  i/s for £4. Releases are again spasmodic, but watch these pages for any news.

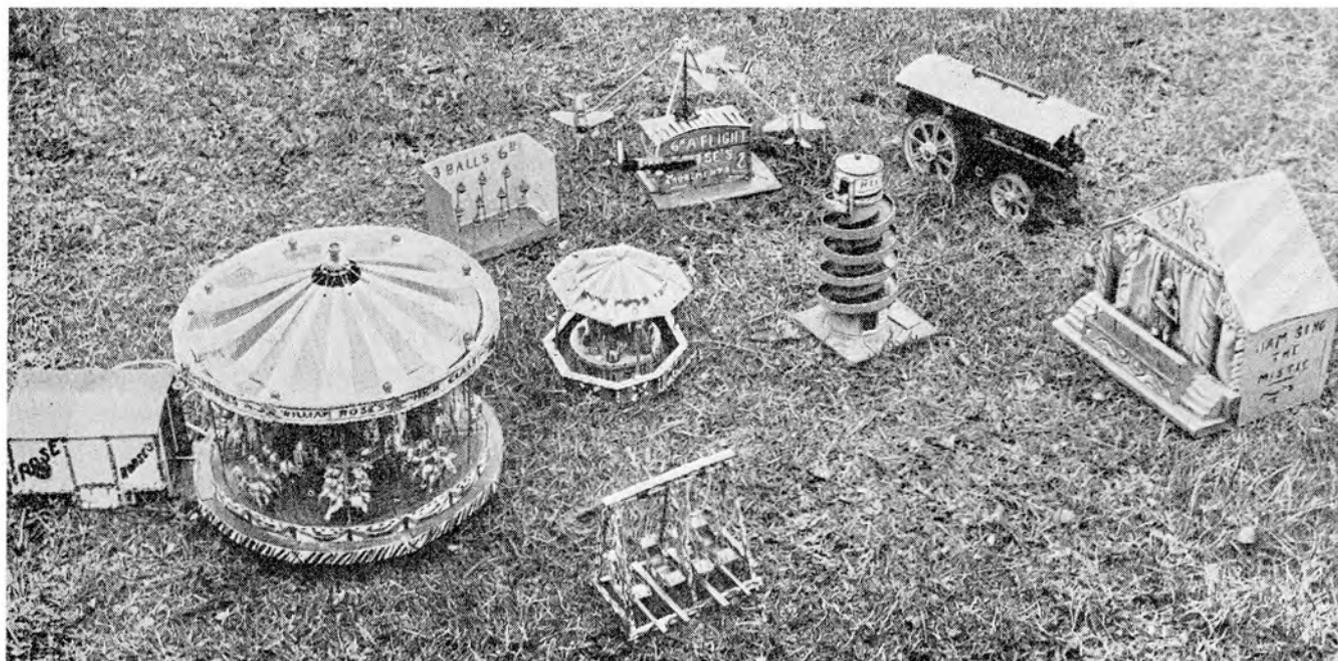
3. **Saga Records Ltd.**, 6-7 Empire Yard, Holloway Road, London, N.7, are relative newcomers but seem to be catching up fast with their high-powered selling techniques. Tapes are issued, on Scotch Brand, side by side usually with their disc counterparts; attractively housed in multicoloured boxes, no effort is spared to catch the eye, and sleeve notes are included into the bargain. Prices are moderate despite all this, and to take a random example, Brahms 4th Symphony costs 35s. at  $3\frac{1}{2}$  i/s mono, 50s. at  $7\frac{1}{2}$  i/s mono, and 84s. at  $7\frac{1}{2}$  i/s stereo. The accent, by and large, is on the classics, with a fair sprinkling of pops and music from shows, films, etc.

## Miniature Fun-Fair

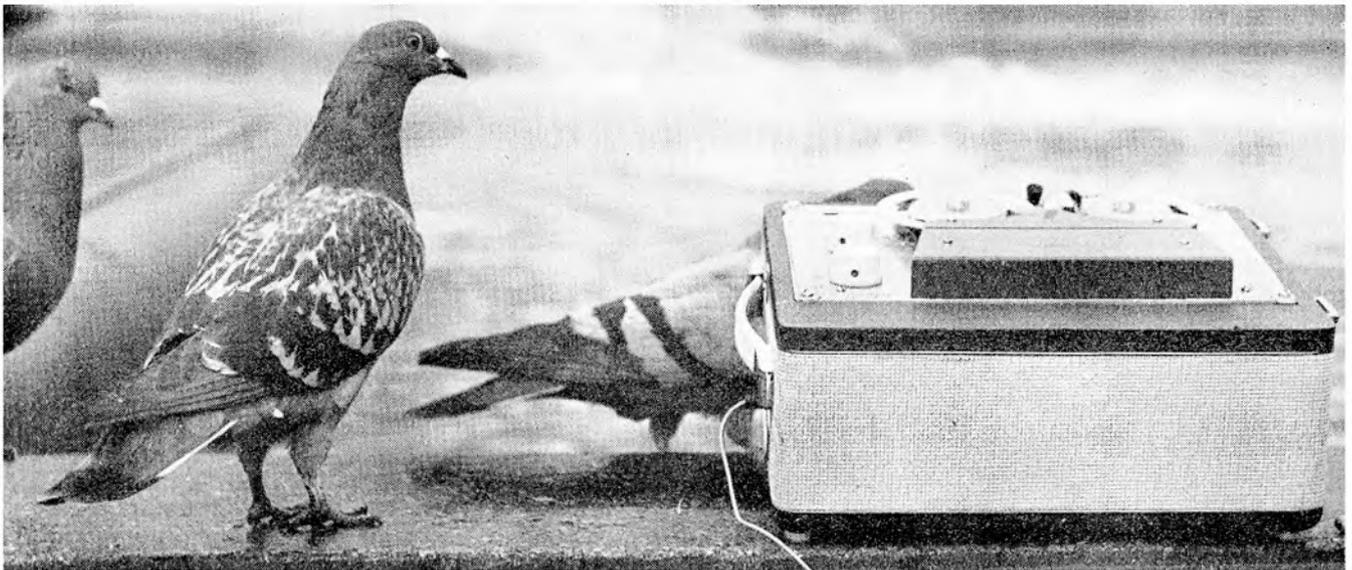
**W**E have received many replies to our invitation to readers to send in news items and pictures about unusual uses for tape recorders—but, to date, we have received none so unexpected and unusual as that described by reader W. Rose, of Plympton, Plymouth, who writes to us as follows:

"I think your readers will be interested in the use I am making of my recorder. I am building a Fair Ground for my garden in the Summer. The music for the roundabout and other Fair Ground noises is played through a loudspeaker fitted inside a side show—the one on the right of the photograph, near the traction engine. The size of the fair may be gauged from the roundabout, which measures two feet across. All the models will be started and stopped by electric drive from my workbench, and I shall be able to start the music with the roundabout".

As may be seen from the photograph, the model work is beautiful; and were it not for Mr. Rose's excellent photograph, which gives the game away by showing up the blades of grass, the layout might well be mistaken for an aerial photo of an English field in Summertime.



All the fun of the fair in miniature—with music from tape—the hobby of reader W. Rose, of Plympton. See story in column two, above.



"Coooh! What do you make of it, Florence? Has it got a hole for breadcrumbs?"—"No; nothing to eat at all. But it's got Minivox written on it, and . . .": "Coooh! Be careful, Florence! We are being recorded".

Photo-Colour Printers

#### News from the Clubs

AS Birmingham can claim to be first in the field as a starting point for marathon walkers, it was only natural that the **Birmingham** Tape Recording and Audio Club should wish to record one of the species. Accordingly, an interview was arranged with the winner of the Edinburgh to London walk. Apart from the obvious entertainment value of the recording (made by Mr. Knee and Mr. Wilkinson), the tape was used as an example during a discussion on the *do's and don'ts* of interviewing.

After a recent demonstration of the *Simon Minstrelle*, the general opinion of club members was that it was "good value for the money" and the plastic cassette a "joy to handle". Enthusiastically received, too, was a *Bradmatic* recorder demonstrated by Mr. Field.

A social visit to the Automatic Telephone Exchange in Bournemouth was made by the **Bournemouth & Poole** Tape Recording Club on the 20th January. On March 8th, one of E.M.I.'s representatives will give a technical talk on the subject of magnetic tape. The club's secretary, Mr. H. R. Jones (442 Poole Road, Branksome, Poole) has extended an open invitation to anyone interested in tape to attend this meeting.

Mr. W. Rawlins, Chairman, was awarded the M.B.E. in the New Year's Honours List; our congratulations are added to the many he must already have received! Not only does Mr. Rawlins take an active part in the club's programmes, but he is also keen on the mechanical construction of recorders, in his spare time. We are told that the "Rawlins" home-constructed recorder is housed in a beautifully-made Formica case, incorporates a Lane deck, and that the sound reproduction is excellent.

A recorded play and various competitions are planned for future meetings.

A special guest night was arranged by the **Crawley and Sussex** Tape Recording Club for members of the Brighton Tape Club who visited them on February 1st. At this meeting, the Tape Message Scheme was inaugurated to cover the Sussex area (a scheme they would like to extend to other clubs). Tony Wales of Horsham, who is said to have one of the finest private collections of tapes in the south, provided a programme for the event.

An auction was held of members' spare or unwanted equipment at a recent meeting of the **Edinburgh** Tape Recording Club. The club received 1d. in the shilling for each article that went "under the hammer". Mr. John Penman, secretary, then played a tape from H.M.S. *Caledonia*, the Royal Navy training establishment

at Rosyth. This group claim to be the only permanent tape recording society in the Royal Navy. The Edinburgh Club welcomed them to any meeting on their taped reply, and it is hoped that exchange of visits will result.

On the 17th January, the club welcomed Mr. Howard Lockhart who gave a talk entitled "Between You and Me and the Mike". This was frequently enlivened by little anecdotes of incidents which had occurred in his past experiences. He told of the time when Mae West arrived at the B.B.C. and the passenger lifts were out of action. A secretary was sent down to meet Miss West to guide her into a lift of sorts, whereupon the American star said, "This sure is some strange elevator you've got here". The secretary, unthinkingly, replied, "Yes, it's normally used for grand pianos"! Occasionally it appears that the deciphering of requests for "Housewives Choice" can cause great amusement, as the two examples given by Mr. Lockhart show, i.e., "Christian and her soldier" (Tristan und Isolde) and "A scone for dearie" (A Song for Desirée).

**TAPE RECORDER VOL. 1 INDEX**  
The Index to Vol. 1 Tape Recorder is now available.



Holding the mike to a Bandbox is Mr. You-Know-Who, getting some admiring looks from Sally Smith into the bargain.



Messrs. Grundig recently announced the appointment of Mr. V. P. Cole as Sales Director. Starting as a wireless operator with Marconi in 1917, Mr. Cole has spent all his life in the radio trade and has held various appointments with prominent manufacturers. He joined Grundig in 1955 as Sales Manager.

Ten months ago, an attempt to organise a group of tape recording enthusiasts at Ilford, Essex, produced very little response. But 31 people were present when the new **Ilford and District Tape Recording Society** was launched at a meeting called on January 22nd at the local Conservative Club. Chairman of the inaugural meeting was Mr. Percy Ager, whom, we hear, is equipped to make tapes which are "beyond the powers of most fans" When he tried to form a group last March, only five responded. Since then, local interest has increased so much that Mr. Jeff Langley, an enthusiast with professional "know-how" has gathered a potential membership of some 70 people.

Miss Marion Way was elected as assistant secretary, and Miss Leslie Edwards as treasurer. It was agreed that Mr. Percy Ager



New plastic containers are now being used for Emitape 3 in. and 3 1/2 in. tapes, empty spools and leader tapes. Types of tape will be indicated by a coloured label on the outside.

# PICTURES FROM NEWS

should continue as Chairman, and the rest of the Committee be elected later when members had become better acquainted. Subscriptions will be one guinea a year; half price for associate members under 18. Meetings will be fortnightly.

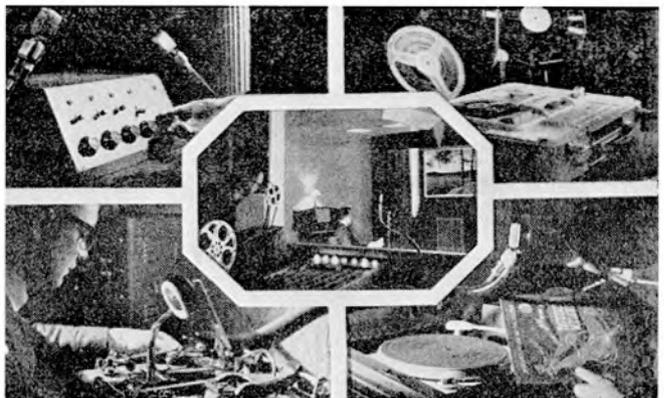
The **Blackpool & Fylde Tape Recording Club** have been engaged in preparing programmes for old peoples' homes in the Blackpool area. As well as amusing the old folk by letting them hear their own voices played back to them, they can hear tapes of famous voices among which are those of King George V, Sir Winston Churchill and, in contrast, Hitler's guttural outbursts.

The "Tall Story Club" tape competition was won by Jim Lister; his tape being the arrival of men from space—complete with rocket. Future programmes include play reading, further shows for old people and, on February 24th, "Open Night for Stereo". Membership of this club is now 26 and those interested in joining should communicate with Mr. Eric Wallis (Secretary), 23, Kipling Drive, Marton, Blackpool.

Mr. Alan Stableford was guest of honour at the annual dinner given by the **Warwick and Leamington Amateur Tape Recording Society**. He told members that societies should take the opportunity of working together to produce tapes for the various competitions being held. Following his suggestion, a number of members volunteered to take part in a recorded extract from the play "She Stoops to Conquer". A five minute "Musique Concrète" competition is now in full swing.

At an Extraordinary General Meeting of the **Leeds and District Tape Recorder Club**, the resignation of the Chairman, Mr. J. W. Williams was announced. A former Committee member, Mr. F. Kelsall was elected as the new Chairman and his place, in turn, was filled by Mr. Crosslex. This club is lucky in having as a member Mr. Pope of Sound Recording & Equipment Hire, for it is due to him that a professional recording studio has been put at the club's disposal. Among the many professional recorders available to them are two E.M.I. TR51's and an M.S.S. recorder.

The **Ipswich Tape Recording Club** are fortunate to possess a well-stocked tape library of interviews with a great many of the leading personalities in show business—thanks to the manager of the local Gaumont Theatre. During the past few weeks they have taped interviews with Edna Savage, Dave Kaye, Jim Dale and, at a "Popular Concert" a short while ago, recorded chats with Craig Douglas, Jimmy Lloyd and Alan Freeman. But their interests do not lie solely with the "pop" artistes, for a most



This picture, sent to us by the **Leeds and District Tape Recorder Club**, shows the Sound Recording and Equipment Hire studio which Mr. Pope puts at the club's disposal.

# NEWS FROM CLUBS

enjoyable afternoon was spent with the renowned pianist, Andor Foldes. The secretary of the club, Mr. Malcom Wilding tells us that his address was noted by a reader of *The Tape Recorder* now living in Capetown—Mr. R. Gladwell. He sent a tape to his mother telling her to contact Mr. Wilding who subsequently arranged a playback. The club was pleased to record a return message from Mrs. Gladwell to her son.

The **Kettering and District Tape Recording Club** have issued the printed list of meetings for 1960; these are to be held every other Wednesday at 8 p.m. Venue is The Rising Sun, Silver Street, Kettering.

We were delighted to receive the following letter from Mr. Alfred H. Williams of The **Stereo Tape Club's African Division**: "It is with pleasure that the present members of the Stereo Tape Club extend to you their sincerest wishes for the future success of your most enjoyable and interesting magazine. We intend extending the scope of our activities and would—through the columns of your magazine—extend an invitation to any fellow-tapers who are interested in the exchange of stereo-tapes, to forward them suitably described the address below.

"An interesting feature of our activities is the availability of an excellent self-help section; and interested tapers are invited to subscribe and include on their tapes details of equipment used, difficulties experienced, and any other relevant matter, so that we may share their difficulties and assist where possible." Stereo Tape Club (Africa Division), 4 Clivedon Court, Main Road, Diep River, South Africa.

The third meeting in the *Star* course of tape recording, as with previous sessions, was well attended. After his opening speech, Mr. Bannister introduced Mr. L. W. Saunders, representative of E.M.I., Ltd. Mr. Saunders, accompanied by his Sales Manager, Mr. P. J. Wetherill, gave an interesting talk on the manufacture of tape, how it originated—their various types, uses and qualities etc.; how tape was made and the kinds of oxide used in the manufacture of tape. The talk was followed by "Any Questions" from the audience. The second half of the meeting was taken over by Mr. G. Dawson (R.A.T.R.S.) who talked on the importance of the right microphone.—what a microphone consisted of, the variety and value of microphones—with a selection of microphones to demonstrate the points made.



During the third week of the *Star* Course of Tape Recording, the Rugby Club were given a talk on tape by Mr. L. W. Saunders of E.M.I. Shown here after the talk are (left to right) P. H. Weatherill, L. W. Saunders (E.M.I.); J. O. Bannister (President of RATR.S.); Miss S. Martin, G. Dawson and Miss P. H. Halliwell (RATR.S.).

At the fourth meeting, held on 28th January, questionnaires were given out to those present, to be completed by February 4th. These were to give the organisers an idea of how much had been gained by the course and act as a guide for planning possible future courses.

Mr. J. Parrington of Walter Instruments Ltd., introduced members to the manufacturing processes of Walter recorders—from raw materials to the finished article. Mr. Parrington explained in detail each step of manufacture, illustrated with slides, and booklets which were passed round his audience. Peter Scott then gave an address on the subject of programme construction which covered dubbing, splicing and editing. At the next meeting, Mr. Leslie Skingley of the Coventry Tape Recording Club will speak on the technique of interviewing.

The newly formed **Ultracorder Club**, a section of the Ultra Sports and Social Club, Ultra Electric Ltd., Western Avenue, Acton, W.3., scheduled its first meeting on the 19th January when a Committee was to be elected. We await news of their activities and meanwhile wish them all success.

We are informed that Mrs. Hilda Wiseman wishes to form a tape recording club in the Acton, W.3. area; her address is 8 Woodhurst Road, Acton, London, W.3. Mrs. Wiseman is prepared to act as "disc jockey" with her recorders, to any hospital in the London area. She has 60,000 ft. of recorded music of all types, some of which is stereo, and simply asks that she be given 48 hours notice to produce a programme.

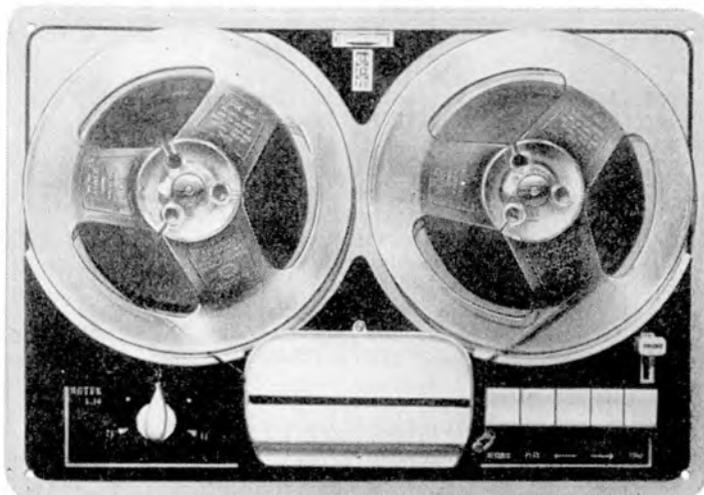


Friends gave Walter Hall of Bexley Heath a ticket for the Michael Miles "Take Your Pick" programme, and jokingly said "See you on Telly". They did, too, for he collected the very prize that he wanted for his work as piano-tuner—a Stuzzi Magnette Portable.

Details on request

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# SOUND and CINE

## ONE—MAKING A CUE TAPE

● This is the first of a series of articles on the subject of sound for films. They are written by an amateur, who started out from scratch, and who has found his own answers to the problems which arose. They will, he hopes, be of interest to others who are finding similar problems when making sound tracks, both for dubbing on film and running side-by-side from a recorder.

SOUND and Cine, from the amateur's point of view must, I think, embrace the following problems, and in approximately this order: (1) The filming of a story; (2) The editing of the filmed sequences; (3) Provision of musical background; (4) Selection of sound effects; (5) Preparation of commentary; (6) The marriage of film and sound.

Since this series is to deal with sound not filming, it will ignore items (1) and (2), I will assume that readers know the answers to them, and pass on to items (3) to (6) in their numerical order. Item (3) can be mentioned briefly and then temporarily shelved, for music will be chosen by the individual worker to please himself and to suit his subject. It has, however, one important bearing upon these notes, because I chose music as my *continuo* medium.

### The Values of the Ingredients

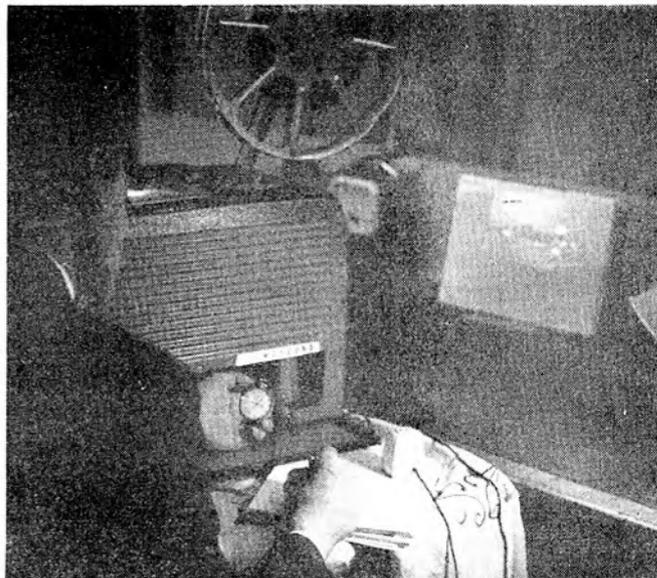
My belief, correct or incorrect, is that a good film should tell its own story quite adequately *without sound*. Following on from this, a good film will be greatly enhanced by a well chosen and well recorded musical background. And from this line of argument it is surely true to say that careful introduction of sound effects must still further enhance the whole. Commentary, if good, is the final ingredient. Needless to say, a well-edited film, plus a well-tailored commentary, can hold its own without sound effects or music; and it is up to the film maker to take his own decisions, depending upon the time at his disposal and the number of complications he is prepared to add.

Starting from the beginning, I took a battery-driven portable recorder with me on holiday, and whenever I filmed a sequence which produced a potentially useful or unusual sound, I recorded it. I avoided all speech, unless it was "atmosphere background conversation". My holiday took me through South Germany and Austria. The sounds I recorded included cow bells, waterfalls, cars on hair-pin bends and mountain roads, bees, bird-song, autobahn traffic, railways, etc. Much of it I knew I would not use, but I did not want to be stumped if I should need it at some later date.

Two or three playbacks taught me my first lesson—which should have been obvious; namely, that one films first and records afterwards. Even with the microphone at some distance from the camera, the noise of the camera mechanism intrudes. Having learned this lesson, I made comparatively long sound shots, planning to cut and use the best bits when I had seen and edited the film. I eventually arrived back in England with some 1,500 feet of film and about 4-dozen 5-inch spools of tape recorded at  $7\frac{1}{2}$  i/s, and here the story really begins.

First, I spliced up all the 100-foot lengths in the sequence in which they were taken. Then, projecting them a couple of times, I tried to make notes of what would have to be cut out and discarded. I soon realised that apart from bad filming and duplicated shots—I might want to use any part of it, so I decided to save time and future hold-ups by having it all prepared for sound, and to do my cutting and editing later. Accordingly, I posted the lot to "Zonal", who added a full-width stripe down the non-perforated edge of the film. I received it back in just on a week, striped and ready for me to go to work.

Here, for the benefit of readers who have still to discover this "striping" process, are the brief details, the address and



the cost. There are three types of stripe available: (1) The "Full stripe", which is applied to all 16 mm films without a photo sound track; (2) The "Half stripe", for 16 mm films with an existing photo sound track; (3) The "Edge stripe", for 16 mm double-perforated film. 8 mm film can be striped with an "Edge stripe". 9.5 mm film takes a stripe slightly narrower than 16 mm half-stripe. On all 16 mm films a "balancing stripe" is added along the opposite edge, beyond the perforations, in order to give even spooling. Though the magnetic oxide stripe is only 0.0007-inch thick, it will be appreciated that the difference in edge thickness (without balancing stripe) would add up to quite a sum! The all-in cost for striping is 1½d per foot; though an additional 1s. 3d. per 100 feet includes an emulsion hardening treatment at the same time. The address is: Zonal Film Facilities Limited, The Tower, Hammersmith Broadway, London, W.6. Readers who care to write, mentioning the *Tape Recorder*, can obtain full details of the process, plus diagram illustrations.

The striped film is now to all intents and purposes a magnetic tape. The quality of the sound that can be recorded and reproduced on it is very high—as good as, if not better than, that which can be obtained from many domestic recorders. Because the stripe is on the back of the film, and since all the film-scraping for editing is done on the emulsion side, subsequent film splicing does not affect the continuity of the stripe; and so no film joints are audibly detectable.

### Striping the Film

For those who want to experiment with sound on film, Zonal will supply transparent film, ready striped, or opalescent leader with stripe. This latter is most useful, since it can be spliced on to the end or the beginning of a film for lead-in or play-out music or commentary.

As most tape enthusiasts will doubtless have discovered, the cutting and editing of a tape involves so many playbacks that one is usually heartily sick of the whole thing by the time it is in a fit state to be enjoyed! As it is with tape, so it would be with film; but whereas no amount of tape replays can normally damage the tape, with film there is always the very real risk of damage through scratching. This was the factor that first set me thinking, and which resulted in the first trick in my home editing technique.

In order to marry up sound and film, the first essential is a set of "cues"—points on the film which should coincide with, or approximate to, points in commentary, music and effects. So, since the tape recorder had to come into use sooner or later, I decided to make full use of it as soon as possible; and I used the recorder as the "cue sheet", as follows:

First, run the film through, with pencil and paper beside the projector, and with one hand near the stop-start switch.

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each reel gives twice or four times what is obtainable from a conventional mono. instrument. Thus 8 hrs. playing from a 7 in. reel at 3½ i.p.s. is possible, and the heads and amplifiers used in each of these models ensures the highest standards of reproduction. Many other advantages are offered by these instruments, particularly for owners of photographic equipment, and are described in the leaflets available.

**HARTING HM8** (illustrated below.)

4-track, 2-speed recorder (7½ and 3½ i.p.s.) with two speakers (one in lid) for direct stereo replay. Overall response 30-20,000 c/s ±3dB. Heavy Engel Motor, Telefunken heads; pause, superimpose and monitor facilities, etc.

**86 GNS**

**ELEKTRON 9S/4K**

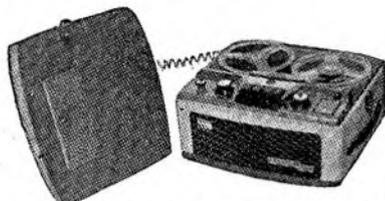
4-track, single-speed recorder (3½ i.p.s.) in small compact "airline" styled case. 2 15-ohm outlets; built-in speaker and dual amplifiers for record and playback. Pause, superimpose, monitor facilities, etc., etc. Response 30-16,000 c/s ±3dB. Squirrel-cage motor by Papst.

**77 GNS**

**KORTING Mk. 128**

4-track, single-speed recorder (3½ i.p.s.). Telefunken heads, built-in speaker for monitoring. Response 30-16,000 c/s ±3dB. 5 watts total output. Superimpose, pause, etc., etc. Heavy-duty A.E.G. motor. 7" reels.

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SUPPLIERS OF FINE RECORDERS TO THE TRADE

Note down event after event, as the film runs, from start to finish. Do not worry about timing or anything else at this stage. The freer the mind the better, for on these run-throughs one can register a good mental sequence of the whole. So concentrate only on film detail. My first note pad ran as this: *Title begins — ends — car ferry — siren begins — ends — passing buoy — disembark begins — ends — Brussels — Customs Aachen — Autobahn traffic — Inside car — ends — rail crossing — Freiburg — Cathedral — city gates — leave Freiburg — hairpin bends — Car up begins — ends — car down begins — ends — and so on, right through.*

Stage two is the preparation of the cue sheet proper from the above data. Set this out in column form, each item under the other, with a short pencil line after it, as follows:

Event	Time	Event	Time
Title Begins		Customs Aachen	
Title Ends		Autobahn Traffic	
Car Ferry		Inside Car	

Stage three. Set up the projector (see photo) so that it throws a small picture, conveniently placed for the eye to take in both it and the dial of your watch. Place the above cue sheets in a comfortable scribbling position—one above the other, so that the top one can be tossed to the floor as it is finished. Set up the tape recorder so that the stop-start control is handy. Place the microphone at a comfortable speaking distance, and adjust the volume level. Load up with sufficient tape to take in the whole film. Allow both projector and recorder to run for 20 to 30 minutes, before starting this operation, so that they have a good chance to settle down to their normal running speeds. This is important. When ready, set the projector so that you have about a foot of run-in leader before the title starts. Start the recorder, let it run for say 30 seconds. Then count down from ten to zero. At zero, start the projector. The instant the picture appears on the screen, call out "Title. Zero".

This whole operation is of course much more satisfactorily done if a stop watch is used—even better if a split-seconds stop watch is available. But perfectly good results can be achieved with a watch having a full dial sweep hand for the seconds.

At "Zero", scribble down the difference in seconds, between the "count-down zero" and the announced "Title Zero". Also begin your time column on the cue sheet with the actual time in seconds, as shown by the watch. The cue sheet example, as given, will thus read. *Title begins — 10. Ends — 15. Car Ferry — 20, etc.* And as the seconds hand completes its first sweep, and its next, write your times down (and call them out) as 1-05: 2-16, etc.

That, briefly, is the essence of the exercise. Record the major items. Announce the times. Write the times against the items.

However, it is obvious that Cue Tape can be far more useful than a mere running record of times. Make it a narrative. On the following lines. *"... Car Ferry 20. The sailors are talking by the capstan in the bows. Seagulls hovering over the boat. Siren 25... still buzzing... ends 30... now they are closing the garage doors and we are almost ready to leave, etc. Siren again 37" and so on.*

The result is a complete cue tape with every major incident precisely noted, plus a memory jogger to assist the mind to carry the complete film along as the Cue Tape is later used. It is good policy to run the film through a second or third time, with the tape, starting as before. This serves several purposes. First, it shows you that you can trust the tape: or, if there is a time variance, it shows it up and allows you to compensate. Second, it enables you to write in between the timed entries, any additional incidents which may be important. Third, if you want to correct the cue sheet, so that the two zeros coincide, it enables you to check that your conversions have been done accurately. Finally, these successive re-plays help to imprint the picture sequence in the mind, so that subsequent replays of the Cue Tape by itself actually bring back the film more realistically.

When this stage has been completed, the film and projector may be put away, and you can get down to serious work with Commentary, Music and Effects, using the tape alone. And the next stage in the series will be described next month.

# ... tape recorder workbench

Practical suggestions for the tape handyman \_\_\_\_\_ by A. Bartlett Still

## No. 10 IMPROVING PLAYBACK QUALITY

MY regular readers will recall that I dealt, in the January issue, with radio recording. The object was to make the best use of the available signal. It now seems natural to adopt the same attitude to the subsequent playback—does the built-in speaker do justice to the signal off the tape?

I doubt whether many designers of domestic tape recorders will disagree with me if I give as the answer an emphatic "no". A case that has to provide an attractive housing for a tape deck and amplifier cannot, surely, be expected to provide at the same time, an efficient loudspeaker enclosure. It should also be borne in mind that the performance figures quoted from time to time normally refer to the signal applied to the output stage. This is not to deny that a portable machine with a good performance can also look attractive, it would not be sold otherwise, but its potential is often greater.

### External loudspeaker

What, then, are the limitations, and how can they be overcome, so that we can listen to as good a signal as the tape and heads can make available? The self-contained loudspeaker, necessarily small, can be replaced. A large number of machines are already arranged so that the plugging in of an external loudspeaker disconnects the one built-in. Such a unit need not be limited by size, and the enclosure possibilities are limited only by your pocket. Even with quite simple means, a very real improvement can be made, particularly in the lower notes. You may even find that you have to turn back to my November article, to deal with the playback hum now made more obvious!

### Fitting a socket

Should your machine not have the appropriate jack socket for an external speaker, one can easily be fitted. A "closed circuit" jack socket is needed, wired as in fig. 1. This has an additional contact on it that maintains the existing connections until the plug is put in. It should be noted that the impedance of any external unit used should match the existing speaker (or the impedance quoted by the makers).

Even if you do not have such a loudspeaker to use, you may well have a radio or radiogram through which to playback your machine. The results may not be an improvement, but they will probably be different. The same output connection can be used, but in this case the external loudspeaker should be replaced by a resistor (whose value matches the required impedance), and connection also made to the P.U. terminals of the radio. Fig. 2 shows how to do this. As the resistor will have to absorb the power output of the recorder it should be of at least 1 Watt rating. This simple form of impedance transfer can be used because we have plenty of power available and need not be concerned at the very poor efficiency.

### Amplifier output

The fact that some recorders have more than one built-in speaker need not worry you. I'll put my money on the larger unit outside. Those larger machines that have a push-pull internal amplifier may well be able to feed such a speaker a very fair signal, but it has to be said that some of the single-ended (one valve) output stages on smaller machines introduce their own distortion that could even sound worse on a wider range speaker.

This poses much the same problem as recording from the radio, and a similar solution is advised. Readers of my January notes will recognise fig. 3 as similar to the "diode" circuit I advocated for recording from radio. The signal obtained will certainly be the best that your machine has to offer, but it will be a "voltage" signal only, requiring power amplification. This can be carried out via the P.U. terminals of your radio or, better still, through

an amplifier designed to something more like "Hi-Fi" standards.

These monthly notes are not intended to go into full detail, but to suggest the right lines for your own experiment. In fact, the detail differences that exist amongst the many models will not allow more. In a recent letter a reader asked my advice about a machine that appeared to be suffering from a severe attack of "wow and flutter". Next month I shall try to help you to understand how good (or how bad) this should be, and give a few tips on looking for the cause of any trouble that may arise.

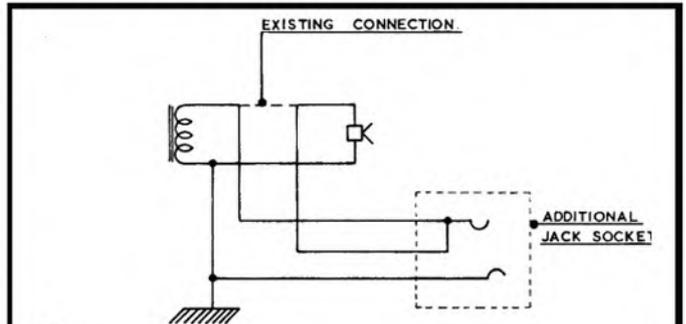


FIG. 1

CIRCUIT OF ADDITIONAL "CLOSE CIRCUIT" JACK TO TRANSFER POWER FROM INTERNAL TO EXTERNAL LOUDSPEAKER.

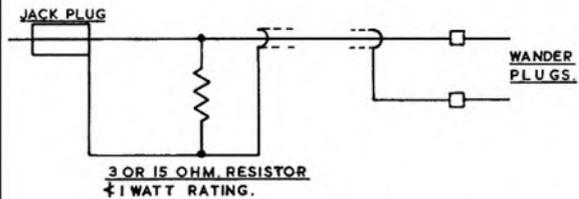


FIG. 2

"DUMMY SPEAKER" CONNECTION TO FEED EXTERNAL AMPLIFIER OR RADIOGRAM

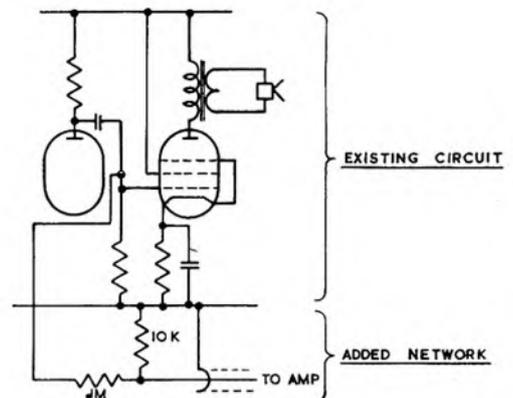


FIG. 3

ADDITIONAL CIRCUIT TO PRODUCE 'HI-FI' SIGNAL FROM T.R. AT LOW LEVEL.

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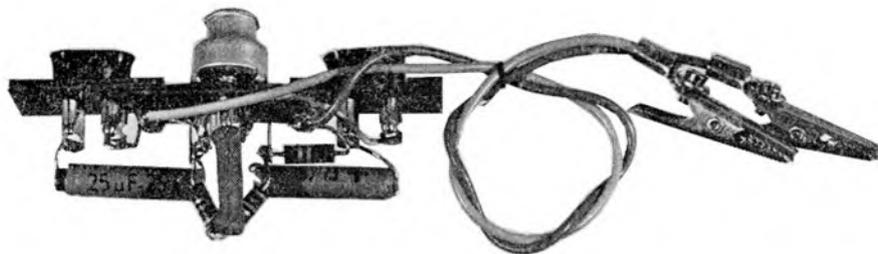
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# beginners' tape recorder

By A. Tutchings

## Part 7 — Conclusion

*Perhaps the most attractive feature of the transistor circuits described in this series is their adaptability to a wide variety of functions. The unit on the left is the pre-amplifier assembled with input and output sockets. (see also fig. 1 on page 77). It produces a gain of about 100 times, and can be used to amplify either on Record or Playback, using the recommended microphone and tape head. One of its additional jobs could be to replace the step up transformer with a ribbon microphone.*



**T**HIS concluding article is really a postscript to the ones that preceded it, and an effort to tie up a number of loose ends, and to answer queries which have arisen in correspondence with readers who have been trying the various experiments and circuits described.

The two basic transistor units, the pre-amplifier, and the bias oscillator recording unit, have so far only been shown in simple breadboard form. The photographs, and point to point wiring diagrams of Figs. 1 and 2, show one way of building the two circuits into self-contained units with input and output sockets. The same layout may be used if the input, output, and transistor sockets are mounted on a small aluminium chassis. Room should be left under the chassis for the battery or batteries, and an "on off" switch fitted to break the battery circuit when required.

I would now like to specify exactly what the two units are meant to do, and also to make clear some of the things they will *not* do.

The pre-amplifier is designed to amplify the output of a low or medium impedance source by about one hundred times, and with the electromagnetic microphone or magnetic playback head specified, will deliver a mean output of about 0.1 volt RMS to the "Pickup" terminals of a radio set, or the input of a power amplifier. The specified microphone and head have mid-frequency impedances of about 500 ohms; at low frequencies the impedance of each unit falls to a few ohms, and at high frequencies the impedance rises to several thousand ohms, but the negative feedback equalisation of the transistor pre-amplifier is designed to use this impedance change to give a more level overall response than either unit would give alone, or if used for example with a valve amplifier. In other words, the design of the magnetic transducers and the pre-amplifier are complimentary, and if input

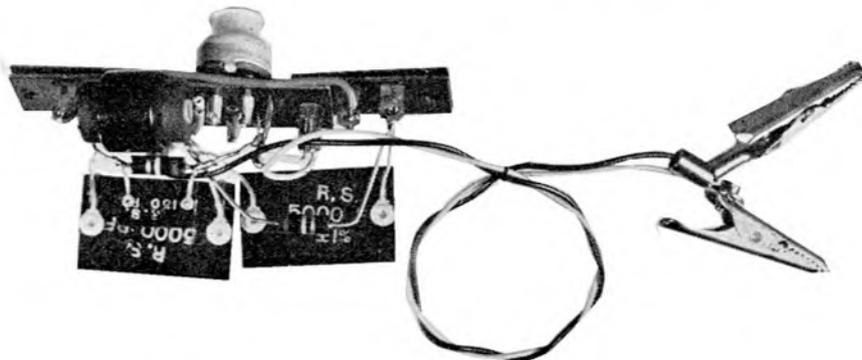
sources of widely differing impedance are used the response and output may not be so satisfactory.

One very common question is whether the pre-amplifier can be used with a crystal microphone. The answer is "no", and the reason is that the impedance of such a microphone is very high, and it is designed to work into an impedance of several megohms. In addition, the impedance is capacitive instead of inductive, and if it is used with our pre-amplifier the gain will be low, and the response will be thin and high pitched. It is possible to design a suitable step down transformer to match the high impedance of the crystal microphone to the relatively low input impedance of the transistor, but the cost of such a component is very high, and may well exceed the combined cost of the crystal microphone and the pre-amplifier together.

The pre-amplifier can be used instead of a step-up transformer for a low impedance moving coil or ribbon microphone, and for this purpose it has many advantages. It is practically immune to hum pickup, and can be placed in situations where an input transformer would pick up a lot of hum. The frequency response is little affected by the impedance of the microphone over a range of less than one ohm up to about 300 ohms. The output impedance of the transistor pre-amplifier is low, and a long length of screened cable may be used to connect it to a remote recorder. As the output of the microphone has been amplified before being fed to the line, the hum picked up on the line is relatively low and the signal hum ratio much improved.

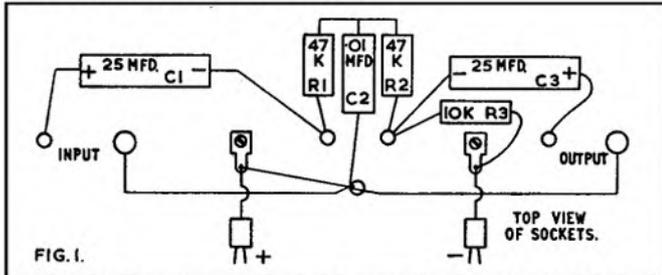
The bias oscillator recording unit is designed to take a signal from the "Extension Loudspeaker" terminals of a radio set, or the voice coil terminals of any audio power amplifier, and to mix it with the proper proportion of HF bias to feed the record head. At the same time, the signal current fed to the

*The bias oscillator unit photographed here, with input and output sockets ready soldered, has two main functions (see also fig. 2 on page 77). Firstly, it produces oscillations at a supersonic frequency, and mixes this with the signal—derived, say from a radio set or gramophone amplifier—in the proportions which give the best distortion-free recording. Secondly, it introduces the necessary high frequency pre-emphasis to allow for losses inherent in the tape head and the tape itself. It is worth repeating here, that the results of all the experiments described in this series depend to a greater or lesser extent on using the microphone/ea piece transducer and the record/playback head recommended.*



**BEGINNERS' TAPE RECORDER—(continued)**

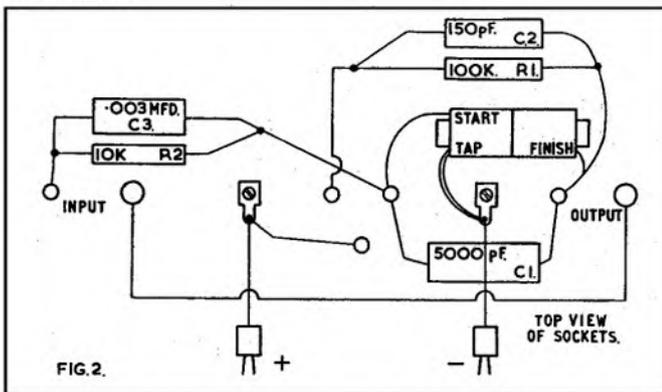
head is modified to give a suitable recording characteristic which overcomes the head and tape losses at high frequencies. It consists of a constant current feed resistor shunted by the pre-emphasis condenser, in series with the oscillating tuned circuit which is powered by the transistor.



Normal listening level on the loudspeaker should feed the correct recording current to the head. It may be asked why no volume or level indicator has been provided, and the answer is that the human ear is a very sensitive level indicator, and with a given loudspeaker and acoustic environment the level of any programme source can be reset to an accuracy of about plus or minus 3dB, which is well within the tolerance of a properly biased tape. A meter or visual indicator to give comparable accuracy would be both bulky and costly. With our system the programme is monitored aurally and then fed directly to the head, virtually through a single resistor. So what we hear is only one step away from what goes on the tape.

It should be emphasised once again that the circuit is designed to match the specified head, both for signal current, and HF bias voltage, and that a head of very much higher impedance, for example, would tend to over record, and at the same time be under biased, with resultant distortion and deterioration of frequency response.

If the two units are to be used with a deck or head already available, the playback should first be tried using a pre-recorded tape which is known to be properly recorded, and C2 in the pre-amplifier altered until the frequency balance is satisfactory. If the response is thin and high pitched, the head is probably a very low impedance one, and is not suitable for use with this amplifier. If, on the other hand, the response is bassy and lacking in high note response, when all the usual precautions regarding azimuth and head tape contact have been taken, it is likely that the head is a high impedance one, and again is not suitable for use with a transistor.

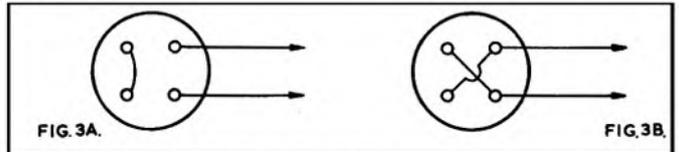


Some heads are wound with two coils which are connected in series, and it is only necessary to connect them in parallel to lower the impedance by four times. The terminals may be covered by the screening can, and be wired as shown in Fig. 3a. If they are rewired as shown in Fig. 3b, the coils are in parallel, and the response may be more satisfactory.

If a high impedance head is used for recording, the bias voltage provided by the transistor oscillator may be inadequate, unless the HT voltage on the oscillator is increased to a dangerous level. With the circuit shown, the HT voltage should not be

increased beyond 18 volts, and, if the recording quality and level is still improving at this voltage, the head should be modified as described above or a lower impedance head substituted. If the bias voltage provided by the oscillator is sufficient, but the loud speaker level for decent recording is abnormally high, or appreciably lower than normal listening level, then the feed resistor R2 may be altered accordingly. It should be lowered when the required LS level is high, and increased when it is low.

It will be seen that no switching for Record/Play has been provided. This is quite deliberate, as most faults in a home-made recorder can be traced to faulty switch wiring, and the formation of earth loops which cause hum or oscillation. Instead, the two units may be left permanently connected to the radio set, the Pre-amplifier to the PU terminals, and the Bias Oscillator Record Unit to the EXT.LS terminals. The head lead is terminated in a two pin plug or jack which is simply plugged into the bias unit for record, and into the pre-amplifier for playback. What could be simpler? After all this was the object of this series, a simple set of units which the beginner could use to learn some of the principles of this fascinating hobby of tape recording.



I hope that they have served their purpose, and that some of you at least have waded through all the experiments, and have had the satisfaction of seeing, or rather hearing, your results improve week by week.

If you have only read the articles so far why not try and "do it yourself"? You will be surprised how much more you can learn by actually trying the experiments, and solving the little problems which arise yourself.

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# PRIZE-WINNERS AND PRIZES "THE TAPE RECORDER" COMPETITION FOR 2-MINUTE TAPES OF NEW STYLE MUSIC BRINGS RECORDERS, "MIKES", DECK AND MIXER FOR SIX



ON Saturday February 6th, the main prize-winners in *The Tape Recorder* competition for "New Music" met by appointment at our editorial office at 99 Mortimer Street, London, and were soon joined in eager and energetic discussion on almost every aspect of tape and recording—their own ideas and entries in particular. The meeting was eventually broken up, temporarily, as the party plus the editor and members of the staff drove down to the photographic department, at 29 George Street, for the prize-giving and picture-taking. Some prize-winners had travelled long distances to attend, but everyone agreed that it was a very worthwhile meeting; and the question most asked was: "When is the next competition?!"

*In this group are all the prize-winners who attended, together with visitors and staff. Standing, left to right, are: F. C. Judd, Ralph C. Broome, Mrs. Judd, John S. Harper, J. W. Williams, Stuart Wynn Jones, Nigel Rees, Jean Clark, the editor, and Anna MacCarthy. Front row (seated) left to right are: Mesdames Portia and Claudia.*



*Jean Clark presents the 1st prize in Class B to Mr. F. C. Judd for his entry "The Butterfly"—A Fi-Cord battery-driven recorder with rechargeable batteries and charger.*



*The editor presents the 2nd prize in Class B to Mr. J. S. Harper for his entry "A Rhythmic Mixture". As apparent, he is delighted with the Brenell Mk 5 deck.*

# PRIZE-WINNERS AND PRIZES "THE TAPE RECORDER" COMPETITION FOR 2-MINUTE TAPES OF NEW STYLE MUSIC

Photos by Colour Printers

The winner of the first prize in Class A was Nigel Rees, a fifteen year-old school boy from Liverpool. His entry was entitled "A Sound Track for a Holiday Camp advertisement for TV or film". For this he won an H.M.V. tape recorder, model DSR 1, with microphone and Emitape. He is seen here receiving his prize from the editor



2nd prize in Class A went to Mr. J. W. Williams—a Grampian DP/4 microphone. His entry—"A Story".



3rd Prize in Class B went to Stuart Wynn Jones. He won a Lustraphone mixer for "Music to be heard for its own sake".



4th prize-winner in Class B was Ralph Broome, who receives a Simon Cadenza ribbon microphone from Jean Clark—for "Science Fiction Background".



A flash-back to the judging. (l. to r.) Desmond Briscoe, Daphne Oram, John Borwick, Eric Tomlinson, Tristram Cary, Miles Henslow.

By E. D. H. Johnson

# DESIGNING AND USING A REFLECTOR

## PART ONE \_\_\_\_\_ CONSTRUCTION

IN view of the wide interest and enjoyment provided by the BBC's bird-song programmes in recent years, it is surprising that so few people outside the realm of professional ornithology have taken up so rewarding a hobby as the recording of bird voices. This is particularly astonishing since the rise in popularity of the tape-recorder has so closely coincided with the tremendous post-war increase in the number of bird-watchers. Perhaps, after all, the reasons are not so far to seek when we consider some of the problems which must be overcome in order to make a faultless recording. An understanding of these problems, however, takes us more than half-way towards overcoming them and I would like to explain how I set about tackling them—from scratch!

### The Stonechat's vocabulary

I had for some years been making an intensive study of the Stonechat, a fascinating little bird which breeds amongst the dunes and marram grass along the shore near my home in Jersey. Quite apart from its song, its vocabulary of calls is complicated and consists of combinations of the sounds "Whit" and "Chack", used differently in varying circumstances. I needed a means of studying these calls closely and at leisure, and decided to try my hand at recording them.

Only the person who has dangled a microphone out of the window with the volume turned fully up, in the hope of recording the song of the garden robin, will understand how frustrating were my first attempts. Dogs, children, cows, cars, wind and waves were far more audible in the playback than the robin's quiet little winter song, and it was obvious that I would have to progress considerably before venturing forth to cope with the Stonechats in the spring. Clearly, I needed to make my microphone as directional as possible to bring in the wanted sounds at the expense of the extraneous ones, so I decided to try my hand at making a parabolic reflector, a piece of equipment with which I had been familiar in the early days of the last war when they had been used for locating enemy aircraft by their sound.

The parabolic reflector can be likened to a car headlamp reflector, only in reverse. Instead of the rays of light from a



The author is seen sighting the parabola to record bird song on a recent expedition with naturalist/photographer Eric Hosking. The parabola's directional properties are particularly useful for picking up distant sounds.

small filament at the focus being reflected into an almost parallel beam, sounds striking the reflector are made to converge at the focus, at which point the microphone is placed. Only those sounds which originate within a very narrow angle in front of the parabola are directed to the microphone. All others fall, or are made to converge, elsewhere, and are not recorded. The larger the reflector the greater is the amount of sound gathered from the required direction.

### Dimensions of parabola

I decided that my reflector would be 20 inches across and 5 inches deep, a convenient size for carrying in the car. Using a sheet of graph paper ruled in inches and 10ths, I plotted a parabolic curve based on these dimensions. The figures so obtained are shown in the accompanying diagram. For the benefit of the more technically-minded readers who might like to construct a reflector to other dimensions, the curve is calculated from the formula:—

$$y^2 = 4ax, \text{ where "a" is the length of the axis, i.e., the "depth" of the reflector.}$$

Having plotted the co-ordinates on the graph paper, they were pricked through to a sheet of hardboard, with a scribe. Joining them neatly into a smooth curve was the work of a moment, and from this a convex template was cut, representing the section of the reflector-to-be. I then passed the job to a panel-beater who, for a surprisingly modest sum, made me a bowl in heavy gauge aluminium which was an exact fit to the template. For increased strength, sufficient metal was left on the edge for turning over a stout wire to form a lip.

The next step was to find a means of both attaching and focusing the microphone and here strength, rigidity and simplicity were essential. The ideal solution was provided by a brass flange

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## PARABOLIC REFLECTOR—(continued)

of the kind used by plumbers in connection with  $\frac{1}{4}$  inch copper tubing. It clamped firmly into a hole in the exact centre of the reflector, and a small set-screw was fitted in the neck of the flange for fixing a short length of copper tubing. A brass bush of the kind used for converting camera tripod threads was sweated

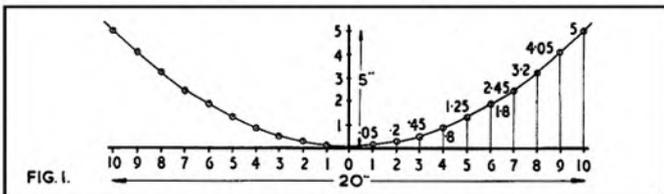


Fig. 1 Plotting the curve of a parabolic reflector 20 in. in diameter and 5 in. deep, using the formula  $Y^2=4ax$ .

to the forward end of the tube, with a female  $\frac{1}{4}$  inch Whitworth thread to which, later, the microphone would be connected.

In order to mount the reflector to a camera tripod, I next made a right-angled bracket from mild-steel sheet. The top of this was secured under the central flange and the bottom was fixed to the reflector with aluminium rivets. To the base of the bracket I fitted a flange containing another standard female tripod thread, and to the back I riveted a cast-iron carrying handle. After this, the whole of the rear surface of the reflector was coated with  $\frac{1}{2}$  inch foam-rubber sheet in order to kill any tendency to "ring". The fitting of this backing was by no means easy. It is best started by cutting a rough circle about six inches larger in diameter than the bowl. In the centre of this a hole is cut, of sufficient size to accommodate the neck of the flange; and a segment of about  $30^\circ$ , like the first slice from a cake, is removed to allow for shaping.

### Foam rubber damping

A little rubber cement is then spread on the back of the bowl in the area above the mounting bracket, and a corresponding amount on the rough side of the sponge-rubber sheet opposite the cut out segment. When the cement has dried, the prepared surfaces are pressed into contact, and the remainder of the reflector can be treated, a piece at a time, stretching the rubber only as much as is necessary for it to conform to the contours of the

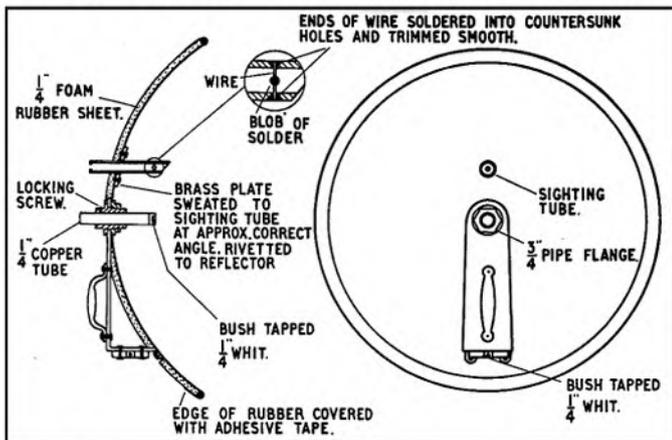


Fig. 2. Two views of the reflector. Except for diameter and curvature, the dimensions are not critical.

bowl. The two edges of the segment can be trimmed and butted together neatly under the mounting bracket, and the rubber at the circumference cut to butt against the turned-back lip of the reflector. In the whole of this operation, care must be taken not to stick the rubber to itself, oneself, or the wrong part of the reflector, as it is very easily torn in the attempt to detach it.

At this stage only one thing remained to be fitted—the sighting-

tube, and this I made from a piece of copper tubing about 6 inches long. The fore-sight was made from a  $\frac{1}{8}$  inch diameter blob of solder on a short length of wire, which passed through two small holes drilled opposite to one another about an inch from one end of the tube. When the "bead" had been centralized in the tube, the ends of the wires were soldered in the holes and the surplus trimmed away. The fore-end of the tube was cut to an angle of  $45^\circ$  to shade the interior from unwanted reflections from the sun at low angles. Matt-black paint was then applied to the inside of the tube, and a circular disc with a  $\frac{1}{8}$  inch hole in it was soldered to the rear end to make a back-sight.

### The sighting tube

I mounted the sighting tube through a hole cut into the reflector about four inches above the microphone mount, by means of a brass flange, which I soldered to it at such an angle as to hold it parallel to the microphone tube. Riveting it in place did not present any great problems, despite the rubber backing, and it was preferable to leave the fitting of the sight to this stage, rather than have one more projection to negotiate when sticking the rubber.

This completed the construction of the reflector and the whole assembly was given two coats of a dark green matt paint to make it less conspicuous in the field. The next stage was to fit the microphone, and carry out a series of tests to discover its performance.

### READERS' PROBLEMS—SOME UNANSWERED

DURING the past few weeks we have been inundated with letters from readers, asking advice, or presenting problems that have arisen. This has resulted in a backlog of correspondence which cannot be cleared quickly. We therefore ask our readers who have written, and whose letters may not have been acknowledged, to be patient. They are being dealt with in strict rotation; but in nearly every case each problem requires its own individual reply, and these replies can only be handled by experienced staff.

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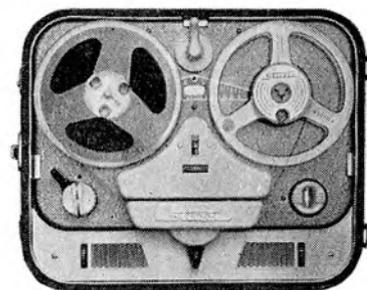
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By James Moir

# REVIEWING TAPE RECORDERS

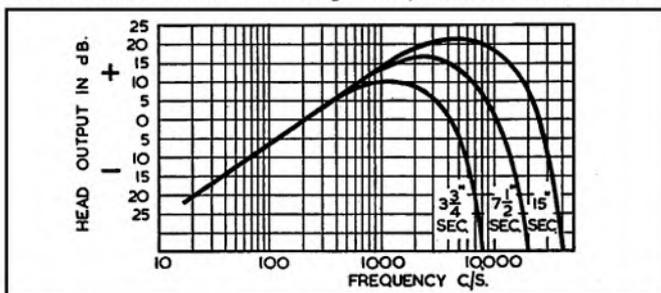


The Stuzzi Mambo Model 368W was reviewed in May, 1959, and Signal/Noise was found to be 38 dB.

## PART THREE ————— SIGNAL/NOISE RATIO

**S**IGNAL/NOISE ratio has not achieved the glamorous position occupied by frequency response as a criterion of the performance of a tape recorder, and yet it is safe to say that many more users are troubled by background noise than by any lack of frequencies above 10 kc/s. This is a comment that applies to both tape and disc users. Let us examine the origin of the noise that always accompanies the signal from a tape recorder.

The fundamental level below which the noise cannot be reduced is set by the micro-structure of the magnetic coating of the tape, though few machines approach this lower limit. In any completely demagnetised magnetic material, the "domains" (the elementary units of any magnet) are arranged in a completely random fashion, the fields of adjacent domains cancel, and there is no resultant external field. In practice, some semblance of order



is always present, and the fields of adjacent domains do not neutralise each other. This is the condition of ordinary demagnetised tape. A noise voltage is induced in the replay head each time any semi-ordered arrangement of domains passes the gap.

### Clumping noise

The same phenomena occurs on a macroscopic scale due to clumping of the particles of the coating material (generally iron oxide). Any lack of uniformity in the coating results in islands of particles having a greater external field than the average, and these induce a small noise voltage in the replay head. Domain noise has a characteristically smooth hiss, while clumping noise has a greater content of the lower frequencies. Noise also results from non-uniformities in coating thickness, from non-uniformities in the thickness of the tape base, and from roughness in the surface of the capstan or pressure roller.

In practice, other noises not so academic in character predominate in all but studio type machines. Stray fields from mains transformers and smoothing chokes induce mains frequency voltages into the replay head, or into the wiring between head and first valve. This trouble is greatly accentuated when the designer attempts to produce a small portable machine, for mains transformers and replay heads are then necessarily in close proximity. In less well designed machines, the mains transformer leakage field may even induce hum voltages into the wiring of later stages of the amplifier, and indeed I have met several amplifiers where the mains transformer induces appreciable hum voltages into the output transformer itself.

The signal voltage produced by the tape is never as large as could be desired, and in consequence the "natural" noise pro-

duced by the first valve can become significant. "Shot" and "thermal agitation" voltages always occur in a valve and may be obvious when the grid signal is small. Both these sources of noise have the same type of smooth high frequency hiss that characterises demagnetised tape. The first valve can (and usually does) introduce mains frequency noises due to leakage from the heater circuit into grid and cathode circuit, or to modulation of the electron stream by the field of the heater, or by the stray field from mains transformers.

### Microphony

Mechanical vibration from the rotating parts may result in noise voltages appearing in the replay head, due to magnetostriction in the core material of the head, or to microphony noise appearing in the first or even the second valve in the amplifier as a result of relative movements of the valve electrodes at their mechanically resonant frequency. This sort of noise can be a very real problem to the designer attempting to produce a small machine.

All the designer's problems are minimised by a large input signal, though this is primarily a problem for the designer of the tape itself. An increase in the number of turns on a given head increases the signal voltage, and thus reduces the trouble from hum induced into the amplifier, but it does little or nothing to reduce the effect of mechanically induced or mains frequency induced voltages in the replay head. Single track full width tape produces the maximum signal voltage, for increase of track width produces a proportionate increase of signal voltage, whereas the tape noise voltage is proportional to the square root of the track width increase. Narrow tracks, though advantageous from the point of playing time, decrease the signal/noise ratio.

The design of high output tapes is a problem that will not be pursued at this point, but during the last ten years there has been a steady increase in the maximum signal that can be recorded on magnetic tape, and there is solid reason for thinking that the improvement will continue. The owner of a machine can make

(continued on page 87)

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## REVIEWING TAPE RECORDERS—(continued)

the best possible use of the tape by ensuring that he records the maximum signal which just avoids overloading the tape. In achieving this, he is greatly helped by the correct choice of volume indicator, a problem that will be covered in a later instalment.

### Frequency dependence

The basic signal obtained from a tape is not the same at all frequencies. If the recording has been made with constant current in the record head at all frequencies, the signal frequency relation will be similar to that shown in fig. 1 for the three tape speeds in common use. The fundamental response is seen to be the same at all three speeds, though the frequency at which the peak output is obtained is roughly proportional to the tape speed. Below this peak frequency, the signal voltage is proportional to frequency (this is a fundamental relation) but above the peak the fall-off is governed by the design of the head and by the magnetic characteristics of the tape used. This basic frequency response must be corrected by equalisation circuits in the tape recorder to produce the flat overall frequency response that is desirable.

Correction is obtained by designing the replay amplifier to have a frequency response that is the inverse of the curves shown in fig. 1, but the overall signal/noise ratio is greatly affected by the frequency range over which a uniform response is maintained. Taking the  $7\frac{1}{2}$  i/s curve of fig. 1 as an example, it will be seen that the correcting amplifier must have a gain 30 dB higher at 50 c/s than at 2,000 c/s, to achieve a flat response down to the lower frequency. If the designer decides to be satisfied with a response that is flat down to only 200 c/s, then the equalising amplifier need only have a gain that is 17 dB higher at this frequency than at the peak frequency. Below this lower limit frequency the gain can be allowed (or encouraged) to fall away, thus minimising the noise voltages at lower frequencies.

Exactly the same condition holds at the upper end of the frequency range. If the response is to be held flat out to 15 kc/s, then 27 dB more gain must be provided at this frequency than at the peaking frequency, but if the designer's aims are more modest, and he is satisfied with a response that is flat out to 10 kc/s, then only 15 dB extra gain is necessary. Above 10 kc/s, the response would be encouraged to fall away as rapidly as possible, both to minimise noise and breakthrough of the bias frequency.

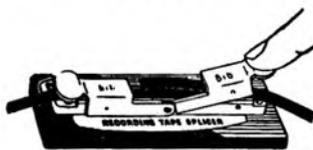
### Chronic distortion

Thus it will be clear that extension of the frequency response to some astronomical frequency to suit the advertising manager can result in an appreciable increase in the background noise (a decrease in the signal/noise ratio). In a way that is not quite so obvious, increase of frequency range (particularly at the lower tape speeds) results in a considerable increase in harmonic and intermodulation distortion. In this respect the equalisation standards now in common use at  $3\frac{1}{2}$  i/s lead to chronic distortion if any attempt is made to record music having appreciable high frequency content.

Next Month: The measurement of signal/noise ratio.

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## LETTER FROM NEW YORK

ALL the signs over here point to a year of big developments in tape. In this first newsletter I should look back over the closing months of 1959, and the outstanding moves concerned U.S.T.—the organisation recently formed to make and market stereo tapes, with Ampex as its parent corporation. U.S.T. definitely means business! In November/December last, it signed a contract with London records, and so added one of the biggest and best musical catalogs to its list. The "London" label over here represents your "Decca" label in England. The contract, which was announced by Herbert L. Brown, vice-president of Ampex and head of U.S.T., and Leon C. Heartstone, vice-president of London, provides exclusive tape rights of the London catalog for a five-year period, and permits U.S.T. to make and market tapes from this catalog on "any and all forms of magnetic tape available now or in the future."

This is undoubtedly big news; but note also that U.S.T. has also already these other catalogs on its list: M.G.M., Vanguard, Westminster, Vox, Omegatape, Decca, Mercury, Warner Bros, Livingstone, Audio Fidelity, Verve, Elektra, Kapp, Hi-Fi Tapes, Concertapes, Stereo Fidelity, Bel Canto, S.M.S., Everest, Roulette, Dot, Liberty, G.N.P., and World Pacific.

United Stereo Tapes (U.S.T.) appear to offer a "United Front" in the commercial battle for the tape market. By offering tapes from the catalogs of more than twenty well-known labels, and by standardising these tapes at  $7\frac{1}{2}$  ips 4-track stereo, which can be played on machines "from among the 19 makes of 4-track recorders available today", they have certainly given the customer something tangible to bite on, as opposed to the many forecasts of what forms tape records will take in the future. And, of course, the quoted extract from the London/U.S.T. agreement suggests that they are prepared for future cassette developments.

It seems clear from English journals available here, and from first-hand news in the U.S., that tape—and particularly recorded tape—is on a bigger scale on our side of the Atlantic; but I think that we have landed ourselves in a far bigger muddle, *pro rata!* Maybe the above news item will provide the first big step to clear it up. I think so. Nevertheless it is true to say that some months back people were already saying that tape records had come and gone. Much of this talk was doubtless inspired, but fact is that tape records began to sell well, and then lost momentum. Responsible people put this down almost entirely to the lack of direction. There were too many rumours of what was on the way—too many speeds, from  $1\frac{1}{2}$  to 15 ips—too much talk of cassettes and non-cassettes. All this meant that stores held off stocking, and customers held off buying; and this worked back until manufacturers held off manufacturing. But now it seems already that interest is reawakening. And I notice that whereas the sales drive over here emphasises *the other uses of recorders*, your sales campaigns do not yet consider the recorder as a playback machine! We have long had a wide variety of recorded tapes to induce sales of machines: it seems that you have no tapes at all outside of the two E.M.I. catalogs of His Master's Voice and Columbia!



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# Readers' Problems

## Single and Twin-track Recorders

Dear Sir:—I wish to send a tape recording to a relation in the U.S.A. The problem is his tape recorder is a single track model, while mine is dual track.

Can you tell me if I recorded on one track only would he be able to play it on his recorder and would I be able to play his recording on my tape recorder? I should be grateful for any information regarding sending tape recordings to the U.S.A.

Yours sincerely, K. V. W. Bournemouth.

The heads on a single track tape recorder have a long gap which "scans" the full width of the tape. When sending a tape recorded on your two-track machine, therefore, it is very important that you record on one track only (i.e., the top track) and make absolutely sure that the lower track is completely erased. If you fail to do this, or for any reason your erase head does not wipe prior recordings all together, your friend will hear the unwanted signal (going backwards) as an accompaniment to the desired material.

If you are proposing to exchange many tapes in this way, it would be worth investing in a bulk eraser or perhaps you could build your own from the suggestions in the "Our Readers' Write" section this month.

Tapes recorded on your friend's full track machine will replay perfectly satisfactorily on your recorder—provided you have agreed on a common recording speed! However, you will have to remember to erase both tracks of his tape before replying on it, or he will get his own recording back backwards!

Finally, since the recording characteristic in the U.S.A. (known as NARTB) is slightly different from ours, you will also find a tendency to topiness on your friend's tapes.

## Army Surplus Microphone

Dear Sir:—I have just purchased an army surplus moving coil mike. On stripping it down I find it has a four core cable, could you please explain how it can be connected for use with co-axial cable? I will be using it with an Elizabethan Essex. What restrictions will this type of mike have, if any? Also, while writing I would like to state what an excellent magazine *The Tape Recorder* is, and I consider it to be the only one of any merit.

Yours faithfully, A. N. R. (Lewisham).

The two output wires from a moving coil microphone are usually connected to the two ends of the coil itself, and the impedance is a few ohms only, generally 20 ohms nominal. It is not usual for either wire to be earthed at the microphone end, i.e., attached to the metal parts such as the magnet.

The usual form of lead can, therefore, consist of a balanced twin wire, such as twisted flex. If extra precautions against hum induction are felt to be necessary, special screened cable can be obtained with twin internal conductors.

The Low Impedance input socket of the tape recorder should be used, of course, which consists of a connection to the primary of a step-up transformer. This transforms the impedance up to, say, 20,000 ohms before feeding the recording amplifier. On certain moving coil microphones, there is a built-in matching transformer allowing the high impedance input of a recorder to be employed.

Using ordinary co-axial cable with a moving coil microphone is quite in order, and your only problem would appear to be

in identifying which of the 4 wires are the two carrying the microphone's output signal. Our suggestion is that you resort to trial and error methods until the correct pair are discovered.

The main restriction with a microphone of this kind—apart from the fact that its quality, i.e., frequency response, is an unknown quantity—is in the matter of sensitivity. However, the Elizabethan Essex has sufficient gain for a moving coil type, though there are a number of domestic tape recorders which will only operate satisfactorily with high output crystal microphones.

## The Right Tape for the Job

Dear Sir:—I wonder if you can give me some advice on tape purchasing. There are so many different types of tape on the market now that I feel some help in making the wisest choice might be useful to complete beginners like myself.

It would seem logical to choose the tape best suited to any particular job, with regard to its given length, and in relation to its quality. For instance, on this basis one would select a 200 ft. acetate for simple messages sent through the post, and perhaps a 5 inch polyester for taping plays etc. from the radio, when a speed of  $1\frac{1}{2}$  i/s is used. But, in fact, is it more economical in the long run to buy the more expensive, longer, but albeit better quality extra-play polyester type in the first place? In other words, how does the price difference relate to the improvement in strength, storage quality etc., in cases where slight differences in recording quality are not very important.

Secondly, if one were considering recording pieces of music of set lengths, symphonies, etc., perhaps in sequence, is it better to buy a 7 inch Double Play tape rather than one of exact convenient size, even though this might result in a lot of tape remaining unused on the reel for some time? Obviously, where music is concerned, quality is of first importance, and therefore I should be grateful for your comments on this aspect of the various sorts of tape.

Yours faithfully, Miss H. J. M. F. (Malvern).

We don't think there is any satisfactory answer to this problem. Using long tapes, such as 7-inch LP spools, makes necessary some indexing system to simplify finding the required recording. Yet this is in many ways preferable to the very short tapes which run out before the end of a favourite piece of music. On the question of tape quality, we feel that there is never an occasion for using anything but the best.

## Erasing print-through

Dear Sir:—Regarding your reader's query about print-through, my experience may be of some assistance.

First, the erase field must be very weak. Use a high value variable resistor in series with the HF feed. On the Ferrograph and similar machines this can be conveniently carried out via the erase link. Then experiment with unwanted recordings to find the setting at which little degradation of the higher frequencies occurs (some slight degradation will have to be tolerated). This setting will then remove most of the print-through. An easier method for twin track machines, where only one track carries the wanted recording, is to erase the other track. The slight leakage flux from the erase head will often remove a large proportion of the print-through. The simplest method which will nevertheless produce a wonderful improvement is merely to wind and rewind a few times immediately prior to playback. Of course, a lot of tape troubles could be avoided by careful storage, i.e., tightly wound, cool, dry and away from stray fields.

Yours faithfully, R. G. H., Neath.

The last method mentioned may seem too easy to be true, but we would recommend the practice of spooling forward and back before replay as curing the most common instances of slight printing.

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Brenell 3 star	58	7 10 0	4 9 0
Veritone Portable	58	7 10 0	4 9 0
Fi-Cord	59	7 19 0	4 10 0
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Grundig TK25*	62	8 2 0	4 15 0
Telefunken Deck with Pre-amp*	63	8 3 0	4 16 8
Philips 8108	62	8 2 0	4 15 0
Veritone Venus*	66	8 9 0	5 2 6
Kurting	68	8 8 0	5 5 0
Brenell Mk V with mic.	69	8 11 0	5 5 6
Grundig TK30*	72	9 12 0	5 10 0
Telefunken 85 3w.*	75	9 15 0	5 15 0
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Grundig TK35*	82	10 12 0	6 5 8
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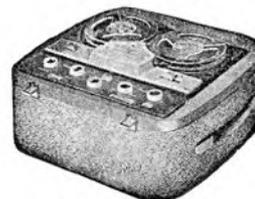
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# FIRST REVIEWS OF TAPE RECORDS

All these tapes are monaural. Stereo tapes will be prefixed by a \* when reviewed, beginning next month.

**GEORGE CHAKIRIS SINGS GERSHWIN**, Vol. 1. George Chakiris with the London Variety Theatre Orchestra, directed by Norman Stanfelt. Saga STA7024. 7½ i/s mono 35s. (3¼ i/s mono STG7024 35s.)

The recording here is of the best tradition "bath-tub" variety, but as such is really very good. The volume is inclined to be ear-splitting at a normal level, but the audible distortion is in no way alarming. There is no "cotton wool", even in the quieter, microphone-hugging numbers, and the tape has been scrupulously edited.

The performance has been generously reviewed on disc, leaving me little to add. Chakiris has a fairly warm, clean voice, and even if variety is not his strong point, the arrangements are slick and the balance is good. Certain tricks seem a little too familiar, but apart from such minor reservations, this is good value.

**DORITA AND PEPE**, singing Spanish and South American Songs to Guitar Accompaniment. 10 numbers. Music on Tape (Stereo) Green and Purple leaders No. CA333. 3¼ mono. 32s. (Stereo 7½ i/s CAS3127. 80s.; mono 7½ i/s CA367. 40s.)

Those who know this pair from their television activities can, and probably will stop reading, whatever anybody says. Those however, like myself, who never seem to get home in time for their programmes may like to know a bit more.

Briefly, this is tape of fairly commercialised Spanish and South American pops, sung by Dorita (range *ad lib*: husky and fairly sexy anyway), to Pepe's guitar accompaniment, the latter straight, as opposed to electrified, thank Heaven. The idea behind this programme, I suspect, is to provide a background to other activities; on that basis, the result is an unqualified success, and there is nothing, save some remarkable breath-control in *La Galopea*, to put anybody off their stroke.

If, however, you want the best from Dorita and Pepe, this is not really the one. The balance between voice and guitar is carefully maintained to give maximum variety, and it is no fault of either the artists or the engineers that the performance comes unstuck as a whole. The fault, if any, lies in the choice of programme material; the highly-charged *Luna Humahuaquena*, which has a genuine "atmosphere" about it, is followed a few minutes later by *Jalisco* and the even more trite *Carnavalito*; I hope that this is only the first of a series, but I also hope that those responsible will avoid falling between two stools.

**IN THE BISTRO**, the first in a series of French Popular Music. Joseph Bazelli and his Quintet, Aimable and his Accordion Band and Emile Carrera (accordion). 11 numbers. Music on Tape No. 8267. 7½ i/s mono. 39s. (3¼ i/s mono No. 8233. 29s.)

This is *Music while you Work*, par excellence. Without wishing to be rude, or even just pedantic, I do think that the title "In the Bistro", is a euphemism, or even slightly inaccurate. The very word implies, to me at any rate, something slightly less corny than the material on this tape. Some hint of the romantic, perhaps? Anyway, with so much off my chest, I can report quite favourably of this little selection. The music is of the type that blares forth day in, day out from café loudspeakers all over France. The programme is well balanced, in that numbers from the different bands are jumbled up but run smoothly together, and the tape has been reasonably well edited.

There are ten numbers in all, ranging from the cheerful nonsense of *Do You Know* (Allier), which never quite makes it but always sounds as if a *Marseillaise* is coming up in ten bars time, to the more subdued and even mechanical *It's a Dream Rumba*. Too attentive an ear under these circumstances is not allowed; in passing, then, and in between sessions on the Encyclopaedia Britannica (no composer mentioned), I might just mention the dexterity of M. Aimable and his crew in *Pleasure Steamers* (Warms).

**BEETHOVEN**. Violin Concerto in D, Op. 61. Alan Loveday with the Royal Danish Orchestra, conducted by George Hurst. Saga STB8019. 7½ i/s mono. 50s. (7½ i/s stereo STE3004. 70s; 3¼ i/s mono STG8019. 35s.)

To be quite honest, the best sections on this tape are the last movement and the first 300 bars or so of the first. The initial drum taps seem to usher in a vital, no-nonsense performance which betrays its early promise; momentum is lost, and only regained at the introduction to the third movement.

In all fairness, however, Loveday's playing is not only of a high standard, but is enjoyable into the bargain. His tone is small by modern standards, due possibly to two things: firstly, the balance between soloist and orchestra is correct, in that the violin never swamps the rest when interest is centred elsewhere, and secondly it would seem that Loveday is no exponent of the "beefy" school of fiddling. Be that as it may, his performance is devoid of ostentation and most musical, and the whole would gain the highest commendation but for a blatant lack of coordination with the orchestra. This in turn is emphasised by the slow tempi adopted in the first two movements. A short glance at comparable playing times will spare the reader either metronome mysteries or my dubious Italian: Aronowsky gives 42½ mins. as "standard", while I. Oistrakh takes 42, Milstein 40, Heifetz 37½ and Loveday 45.

**MOZART**. String Quintet in C, K.515. The Amadeus Quartet with Cecil Aronowitz (viola). H.M.V. HTB408. 7½ i/s. 63s

The only problem involved in reviewing a masterpiece of this nature is to decide how to communicate, without falling back on a dreary list of superlatives, the effect that it has upon the listener. The mere facts of the case are not exactly helpful, in that the music is not as widely known as it might be, and also that the price is fairly steep.

The most alarming action one can take here is to play the disc immediately after the tape, under the same conditions. The former is very fine, in its way, and has certainly given the present writer enormous satisfaction for a number of years. But the very sound is quite different to that on the tape; the latter is far more rounded, far more naturally resonant—in short, far closer to that of the Quintet.

In many ways, the performance is typical of the Amadeus at the period; always graceful, they are almost unique in the way they not only extract but maintain the maximum musical interest, combining precision in attack with the most scrupulous attention to every phrase, however short.

Sean O'Toole



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# EQUIPMENT REVIEWED



★  
The  
Telefunken  
M23 Recorder  
★

**Manufacturer's Specification:** Tape Speeds:  $7\frac{1}{2}$  and  $3\frac{3}{4}$  i/s. 3 motors. 9-in. spools. **Frequency Response:** 20-16,000 c/s  $\pm 3$  dB at  $7\frac{1}{2}$  i/s, 20-13,000 c/s  $\pm 3$  dB at  $3\frac{3}{4}$  i/s. **Wow and Flutter:**  $< \pm 1.5$  per cent. at  $7\frac{1}{2}$  i/s;  $< \pm 3$  dB at  $3\frac{3}{4}$  i/s. **Level indicator:** moving coil meter. **Mixing** 4 inputs. Separate amplifiers. Full monitoring. 3 heads fitted. **Price:** M23 £147 chassis only, £157 10s. in cabinet. New and improved model M24, £166 19s. chassis only, £177 9s. in cabinet.

Sole U.K. distributors: **Welmecc Corporation Ltd., 147 Strand, London, W.C.2.**

THE Telefunken M 23 is a studio type tape recorder with those indefinable qualities that distinguish a quality product and at the same time make a reviewer's job so troublesome. There is very little in the published performance data to indicate that this machine is well above average, in fact the devotees of ultra-wide frequency range would conclude that the M 23 was inferior to some of the machines in the £50 group. The price is high, £167, particularly when it is noted that there is no internal power amplifier or speaker. What does one get for the money?

As the photograph shows, this machine is an impressive engineering job without any concession to the "juke box look" which is the hallmark of current fashion. The case, in solid wood, measures  $20\frac{1}{2} \times 16\frac{1}{2} \times 10\frac{1}{2}$  in., the whole machine weighing 57 lb., rather more than comfortably portable, and about twice the weight of some of the machines in the £50 group.

On the left of centre along the front of the deck is a group of five push-keys "fast wind", "fast rewind", "record" and "stop", all with a delightfully easy action that makes them a pleasure to use. In the centre is a small volume indicator meter scaled between  $-20$  and  $+3$  dB, and it was noted that the meter was in excellent agreement with the levels recorded on the EMI professional test tape SRT 13. Meters are universally used in professional equipment to indicate recording levels, and are invaluable for this purpose when used for recordings at 15 and  $7\frac{1}{2}$  i/s, but they fail to indicate overloads of short duration when used to monitor the highly pre-equalised recordings made to the present "standards" on tape running at  $3\frac{3}{4}$  i/s. The meter in the M 23 is very good indeed, the time constant being low and the calibration accurate, but I suspect that if the present practice in pre-equalising  $3\frac{3}{4}$  i/s tapes is standardised, any meter will require to be backed up by an inertia-less indicator of the electron beam type. To date, a recording characteristic for a tape speed of  $3\frac{3}{4}$  i/s has not been standardised by any international body, and the M 23 uses the same characteristics for both  $7\frac{1}{2}$  and  $3\frac{3}{4}$  i/s. Thus there is no trouble due to high frequency overloading, though there may be a penalty in the form of loss of "top" response and a decrease in signal/noise ratio.

On the right hand side of the volume indicator is a group of four gain controls, and a switch styled to look like one of the adjacent controls. The four controls are mixers taking in a second tape recorder, a gram pickup, a second microphone (or radio input) and a microphone, while the two-position switch allows the signal coming off the tape to be compared directly with the signal going on to the tape.

Nine inch spools can be accommodated, the tape path between

spools being completely exposed to view when the cover over the head assembly is hinged down. Opening the cover automatically lifts the tape clear of the heads, and leaves the head assembly fully exposed for cleaning. This is a standard facility on professional machines that is long overdue in the domestic market. It is a unique feature of the Telefunken machines that the whole head assembly can be lifted out and replaced by another unit, enabling a user to make full track, half track, two track, or stereo recordings in rapid succession.

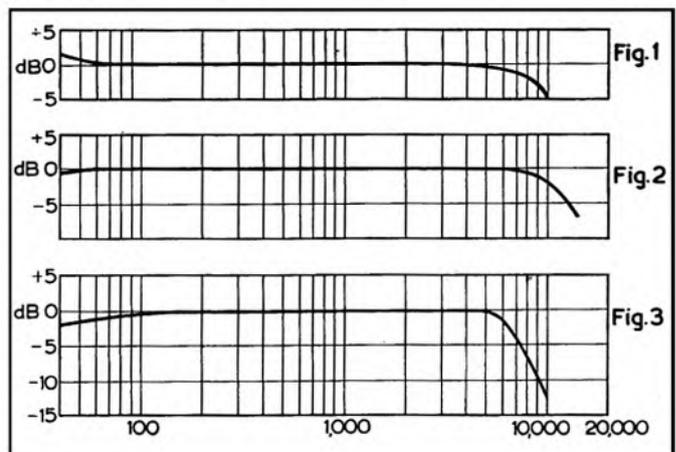
From the head cluster, the tape passes between the capstan and pressure roller and then round a spring loaded lever that operates a motor cut-out switch to cut off the drive motor at the end of a tape. The pressure roller is moved into contact with the tape and capstan by a solenoid, operated via the start button push-key. At the back of the deck there is a conventional type of three digit counter, mounted in an inclined position to bring the figures into view. A long recessed panel in the rear of the machine carries a group of sockets for the four inputs, a head-phone connection, a remote control socket and two output sockets; quite a formidable collection. Plugs and sockets are the standard continental type having three small pins in a circular shell and are of professional calibre.

## Excellent Accessibility

The complete deck can be lifted out of the case by removing four screws, four small holes being provided in the sides of the deck to allow lifting hoops to be inserted. The interior is impressive. Three large drive motors are used, two driving the spools, while the third drives the capstan through a rubber faced wheel in contact with a large flywheel on the capstan shaft. All the mechanical drives are mounted on a deeply webbed die cast chassis to ensure rigidity, an absolute necessity if low values of flutter are to be achieved. The introduction of a speed reduction between the capstan drive motor and the capstan, allows a large diameter capstan to be used, another essential feature if performance is to be maintained over a long working life. Both spool spindles are fitted with very efficient brakes, held off by electro-magnets.

All the amplifier circuitry is collected together on one chassis, no less than seven valves being employed. Four are the usual number in a domestic machine. Separate record and replay amplifiers are used so that the signal after recording on the tape can be compared with the incoming signal with a delay of only a few milliseconds, an invaluable facility common on professional machines but available on very few domestic models.

Four input sockets are provided, the first being suitable for any of the good low impedance moving coil microphones, the input



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signal for full modulation of the tape being 0.25 mV. The rated input impedance is 200 ohms, the primary impedance of a 1:20 screened input transformer that allows a balanced input circuit to be employed, both sides of the circuit being free from ground. The second socket also has its own pre-amplifier, negative feedback being used to give three different input sensitivities, 5, 15, 100 mV selected by a three-position switch accessible (or perhaps I should say, inaccessible) through a small hole in the rear panel. The remaining pair of input sockets provide direct access in the first stage of the recording amplifier, each of the input circuits having its own input gain control allowing any combination of the four signals to be mixed and applied to the tape.

Judged by the standards of domestic tape recorder advertising, the objective results obtained from the standard series of tests are not particularly impressive. Fig. 1 illustrates the replay response at the 1 volt/600 ohm output socket, the EMI professional test tape type SRT 13 being used. It will be seen that the output is down by 6 dB at 10 kc/s, though the overall curve is remarkably smooth over the frequency range. The

Table 1 Signal/Noise Ratios

Tape Speed 7½ in./sec.	Tape Speed 3½ in./sec.
Weighted S/N 53 dB	Weighted S/N 51 dB
Unweighted S/N 51 dB	Unweighted S/N 50 dB
● The S/N ratio increased by only one dB using virgin tape	

overall record and replay response is slightly better than the replay response, being only 3 dB down at 10 kc/s, indicating that there is a little over-correction provided on record and some under-correction on replay. As the same correction circuits are employed at both tape speeds, it is not surprising to note that the 10 kc/s output is down by as much as 12 dB at 10 kc/s at the lower tape speed.

The signal/noise ratio is particularly good at both tape speeds, Table 1 indicating the measured figures. The weighted values are only about 1 dB higher than the unweighted values, a sure sign that mains frequency components are low. This good result is the consequence of using DC heating to all valves, careful layout, no real attempt at miniaturisation and the use of a mumetal shield totally enclosing the replay head and tape.

The erase circuit and head are well designed, the tape noise remaining after erasing a fully modulated tape being only one dB higher than the noise on virgin tape, easily the best result yet found in any machine tested to date. This performance can only be obtained by using a bias and erase oscillator of exceptionally good waveform.

**Wow and Flutter**

The wow and flutter values at both tape speeds are given in Table 2 and are good without being exceptional. What was exceptional, was the uniformity in the values of total flutter measured at the start, middle and end of a reel. Two to one differences between start and finish are common in domestic machines, and even higher values have been found. The second to second variations in flutter were also very low, a vital point in obtaining a clean sound. In spite of the relatively high loss at 10 kc/s (see Fig. 1), sound quality was excellent, the uniformity of response within the frequency band, the low value of amplitude distortion and the mechanical steadiness of the tape drive, combining to produce very smooth sound. The sound quality raised favourable comment from my wife after a few seconds running, even though twenty-four hours had elapsed since hearing another machine and that was one costing nearly £100.

Mechanically the machine is quiet, the brakes exceptionally good, and the uniformity of spooling exceptionally high. The rewind time is short, 2.8 mins. for a 9 in. spool of double play tape, and the rearound tape was as tight as a new reel.

Bearing in mind the high price, some criticisms of the machine are relevant. Accessibility could be improved by providing a removable bottom panel, a small knob on the pre-set sensitivity

Table 2 Wow and Flutter

Tape Speed 7½ in./sec.		
Start of Reel		End of Reel
Flutter	.12%	.16%
Wow	.04	.05
Total	.13	.17
Tape Speed 3½ in./sec.		
Total	.22%	.31%

switch would be an advantage, and the frequency response could be brought well inside the CCIR tolerances instead of allowing it to creep near them. When the machine is shut down by the end of reel switch, the last function remains operative, unless manually cancelled. If this is not done, the machine may commence a high-speed wind, (if that was the function last used), on next threading in a tape.

The results quoted were all obtained with the BASF tape recommended by Telefunken, but the machine was unusually sensitive to the make of tape, some British tapes being almost unusable. The torque characteristics of the tape drive motors are such that spools with hub diameters below about 4 in. are unsatisfactory.

This is a formidable list but it is understood that all these criticisms have been taken care of in the M24 models now current. I look forward with real pleasure to testing one of these machines. The casual reader may feel surprised that I think so highly of the machine after such criticism, but it is very true that many aspects of the performance of high-quality products, be it cars or tape recorders, cannot be adequately conveyed in a group of test figures. From personal experience I can vouch that this is true of Rover cars and the M 23 recorder.

James Molr

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### . . . tape in the Army

From:—Sgt. A. W. H. Pryce, 3 Hogarth Avenue, Ashford, Middlesex.

Dear Sir:—Perhaps you will be interested in our use of a tape recorder.

I am a Senior N.C.O. in a Royal Corps of Signals Territorial Army Squadron and one of my tasks is to train wireless operators. On a voice "net" i.e. a number of wireless stations, in order to maintain brevity, accuracy, security and speed, all the foreseeable phrases an operator has to say are standardised in a manual of voice procedure. The normal lecture room techniques of blackboard etc. are a long way from practice, so my colleague Staff-sergeant Stuckey and I decided to make a training tape embodying examples of all these phrases. We made the tape sitting around a microphone, adjusting the distance from the mike to give the impression of weaker stations.

Background atmospherics were provided by a domestic radio and were attenuated on pressing a switch connecting a shunt resistor in the loudspeaker circuit, thus giving the impression, as in practice, of the signal cutting through the QRM. The tape was made in one piece, and then cut, and leader tape introduced, to separate the various items. At camp this year we had four stations working a net, and we monitored and recorded the traffic. This has been and will be very useful in illustrating mistakes, a very powerful weapon in correcting operators who are always right!

Operators must not learn the morse code as dot-dash etc., it is far better for them to learn the letters as a sound sensation on the ear, therefore we are making a tape for morse training consisting of the letters repeated time and time again, having got the operators to recognise a letter from a sound we will go on from there.

The other trades in the squadron do not lend themselves to the use of a tape recorder but we continue to search for ways and means.

Staff-sergeant Stuckey has an Elizabethan Countess, and my recorder is home built using a Collaro MK IV deck and the Sterns' amplifier kit. I hope the above letter proves of interest to you and may do the same for your readers.

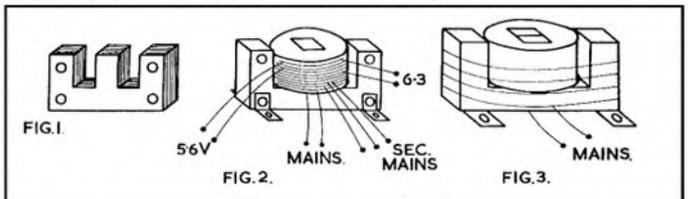
Yours faithfully

\* \* \*

### . . . the bulk eraser again

From:—R. W. Panting, 33 Rupert Street, Reading, Berks.

Dear Sir:—In the November '59 issue of your magazine I was fortunate enough to have my details of a Bulk Tape Eraser published. I have had a couple of queries regarding this unit and requiring more details so I wondered if you would be interested

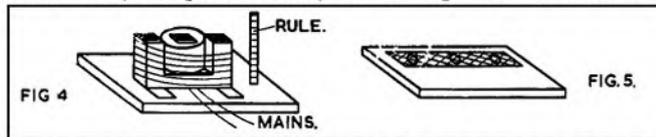


in a more detailed and diagrammatic description of it. I enclose details in case this is so.

I used a 200-250v Transformer, with 6.3v and 5.6vappings. The transformer must have laminations of E's and I's. This I took to pieces, and rebuilt only the E's; the I's being thrown away except four.

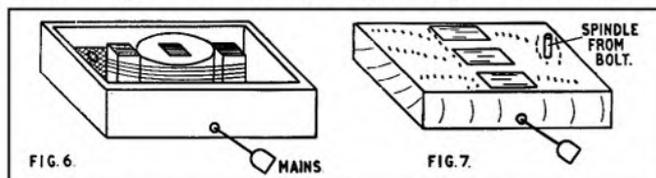
Next I drilled four holes as shown in fig. 1, taking care that the laminations do not move out of line of each other. The bottom two holes are for affixing mounting brackets which can be made out of four of the I laminations. Next I replaced the coil, winding on the centre limb, and wedged this with packing. Cardboard will do nicely.

Now I covered any unused wires such as the Sec. mains, 6.3v and 5.6v windings, with Adhesive Tape. This tape covered the whole Unit, except, of course, for the top. The 6.3v winding



can be used for supplying a voltage to a small Bulb for an Indicator Light, if one is thought to be needed. Now I mounted the Unit on a base, which should be about 1½ inches larger all round than the unit itself.

The height of the sides, back and front can now be taken, which will be the measurement from the base to top of unit. Cut two sides, front and back from ½ inch thick timber. In the back I drilled three ¼ inch holes and covered them with gauze. This is for ventilation purposes. Next I formed the box on the base, and brought the mains supply out through the front, as shown in fig. 6. Now the most important part of the unit, the



top. In the prototype I used, as I said, a thin plastic. I found that, since I wrote to you last, it has buckled and I have replaced it with Formica, which has shown no signs of buckling in the two months it has been in use. This was screwed in place, and the unit was complete at a saving of somewhere between £7—£8.

I hope that if you publish this it will enable your readers to make as efficient an Eraser as my own. *Yours faithfully*

P.S. One of my enquirers was in South Africa, so it shows how far your magazine reaches abroad.

\* \* \*

**... a correspondent wanted**

**From:—P. B. van Rhyn, 4 Sunnyside Flats, 260 Upper-Buitengracht St. Cape Town.**

*Dear Sir:—*I was lucky to obtain a copy of your magazine. Believe me the only one I could get with something on Tape Recorders in it.

I have a 3-speed recorder which takes reels up to 7 inch. I wondered whether it would be possible to help me to obtain tape spondents via your magazine. I would like to correspond with people of my own age group i.e. 22.

Although I do not belong to one, we have got a few tape recorder clubs here in South Africa. I promise a speedy reply in case I obtain any tapespondents.

Hoping to win a lot of pen-pals through you.

*Yours Sincerely*

\* \* \*

**... a handy Gramdeck drive unit**

**From:—R. L. Walker, 42 Windsor Road, Wanstead, E.11.**

*Dear Sir:—*As a reader of your very excellent journal *The Tape Recorder*, from the first issue, I have noted with interest your comments, etc., concerning this most useful piece of equipment—the "Gramdeck". I am wondering if the enclosed photos may be of interest to any of your readers who may possess one of these. I have found a certain amount of inconvenience existed having to utilise the main gramophone turntable for driving the unit. In some instances I have wished to use the Gramdeck at a distance from the radiogram or, alternatively, through a radio not having record playing facilities. I have accordingly evolved



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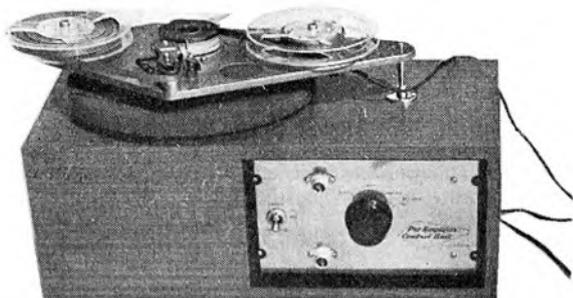
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Grams: Bradmatic, Birmingham

**READERS' LETTERS—(continued)**

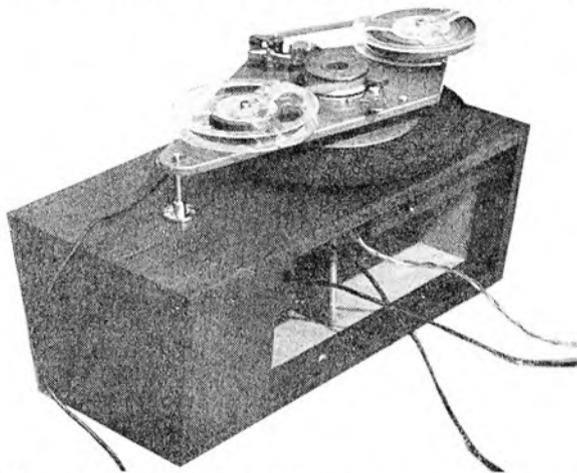
the following housing having the facilities of: (a) a 78 rpm turntable; (b) housing for the pre-amp; (c) storage space for the mic; (d) storage space for four 5½ in. tapes; (e) storage space for leads etc.

This housing I have made up at low cost, and includes a cheap single speed turntable and driving motor costing 22s. 6d. The



box itself was made from ½ in. plywood (off-cuts) obtained at low cost, and finally covered with wood grain (brown), "Fablon" plastic material. Looking at the rearview photograph, a vertical web in ¼ in. plywood divides the interior of the box and forms one side of the tape storage compartment. I have found that 5½ in. spools of LP Scotchboy tape are very suitable and have accordingly made the storage to suit the width of these boxes plus ¼ in. clearance.

The "Lustraphone" mic. is stored behind the left side of the unit in a strap made from 2 in. x 16 swg aluminium. The whole of this section is lined with brown felt to prevent damage. An



on/off switch may be seen below the turntable to control the current supply to the turntable unit. To locate the Gramdeck a 3/16 brass rod is mounted on the top of the box by means of a suitable disc. I later found it necessary to lower the position of the motor slightly, as hum was caused in the recording head. This was easily carried out with an extension shaft, and re-positioning of the motor.

In conclusion, the total cost of the housing has been kept very low, and the finished article has proved very satisfactory in mounting the Gramdeck and also to provide storage for accessories, etc.

*Yours faithfully*

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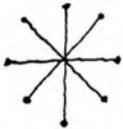
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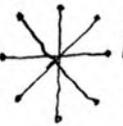
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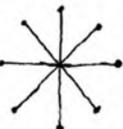
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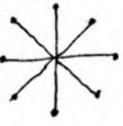
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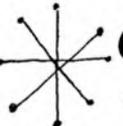
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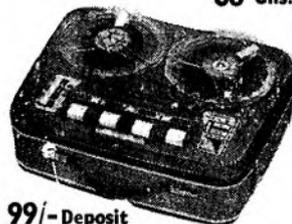
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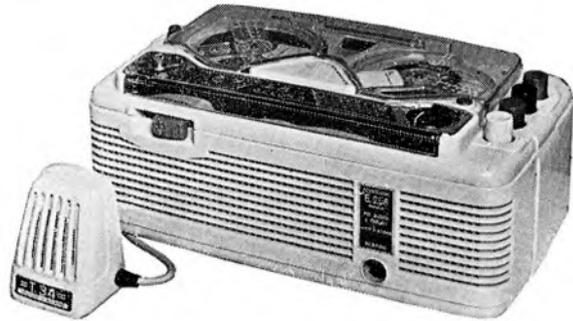
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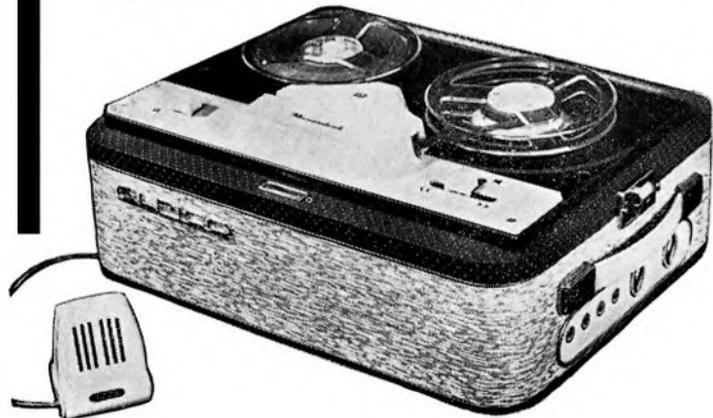
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